Introduction to Financial Management in SMEs

Financial statements analysis

Cash Flow and Working Capital Management

Investment Projects Appraisal

Financing policies in SMEs

Investment Projects Appraisal

- A project from a financial perspective
- Techniques for valuing and selecting investment projects
- Risk analysis
- Introducing investment projects techniques in SMEs

Investment Projects Appraisal

A project from a financial perspective

Investments from the financial perspective



- **1.** Rate of return \geq Costs of financial resources
- 2. Net Cash flows ≥ Reimbursements and remunerations

Investment projects as a stream of cash flows



Project assessment





Two basic principles

Problem: We cannot compare today's cash flow to tomorrow's cash flow!





The yield-to-maturity curve (Euro Area; AAA Bond)



Source: https://www.ecb.europa.eu/stats/financial_markets_and_interest_rates/euro_area_yield_curves/html/index.en.html - 9 November 2017

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Different methodologies

- However the incomparability of today's to tomorrow's cash flow is not always taken into consideration
- We have in fact two groups of methodology for investment project valuation, depending on the way they deal with that point

Graham – Harvey (2002), How Do CFOs Make Capital Budgeting and Capital Structure Decisions?, Journal of Applied Corporate Finance



FIGURE 1 ■ SURVEY EVIDENCE ON THE POPULARITY OF DIFFERENT CAPITAL BUDGETING METHODS*

*We report the percentage of CFOs who always or almost always use a particular technique. IRR represents Internal Rate of Return, NPV is Net Present Value, P/E is the Price to Earnings ratio, VAR is Value At Risk, and APV is Adjusted Present Value. The survey is based on the responses of 392 CFOs, as are the rest of the figures in this paper.

Investment Projects Appraisal

Techniques for valuing and selecting investment projects

Techniques for investment project valuation

Methodologies that DO NOT TAKE into account time value and risk

- Accounting Rate of Return
- Pay-back period

Methodologies that TAKE into account time value and risk

- Discounted Pay-back period
- Profitability index
- Net Present Value
- Internal Rate of Return

Accounting Rate of Return

P&L	0	1	2	3
Sales		700	820	600
(Monetary Costs)		(300)	(450)	(200)
(Amortisation & Depreciation)		(300)	(300)	(300)
= Operating Income		100	70	100
Balance Sheet	0	1	2	3
Balance Sheet Investment Cost	0 900	1 900	2 900	3 900
Balance SheetInvestment Cost(Amortisation)	0 900	1 900 (300)	2 900 (600)	3 900 (900)
Balance SheetInvestment Cost(Amortisation)= Investment Carrying Amount	0 900	1 900 (300) 600	2 900 (600) 300	3 900 (900) 0

ROI	0	1	2	3	average
ROI (beginning of year)		11.1%	11.6%	33.3%	18.6%
ROI (average)		13.3%	15.5%	46.6%	25.1%
ROI (end of year)		16.7%	23.3%	n.a.	?

Pay-back Period (simple and discounted)





Pay-back Period < 3 years

Discounted Pay-back Period (10%) ≈ 3 years

Net Present Value: introduction



Internal Rate of Return







Possibility of multiple IRR according to Descartes' rule of signs: if the terms of a single-variable polynomial with real coefficients are ordered by descending variable exponent, then the number of positive roots of the polynomial is either equal to the number of sign differences between consecutive nonzero coefficients, or is less than it by an even number

	TO	T1	IRR	NPV (10%)
PROJECT A	- 1,300	+1,690	30%	+169.6
PROJECT B	+1,300	-1,690	30%	- 169.6

Funding and investment projects could have the same IRR, but when we borrow money we we want a low rate of return, when we lend (or invest) money we want a high rate of return.

	TO	T1	IRR	NPV (10%)
PROJECT A	- 10,000	+16,500	65%	+5,000
PROJECT B	-20,000	+30,000	50%	+7,273

IRR is insensitive to the size of the project. In the case of mutually exclusive projects, the risk is to chose very small projects with very high IRR, so gaining only some cents!



Compounded interests: gains from investments that result from earning returns on previously earned returns are calculated at the IRR. If the project under valuation is very profitable, this appears as far from reality!

$$NPV = \frac{F_0}{(1+k_0)^0} + \frac{F_1}{(1+k_1)^1} + \frac{F_2}{(1+k_2)^2} + \frac{F_3}{(1+k_3)^3} + \dots$$
$$IRR: \frac{F_0}{(1+IRR)^0} + \frac{F_1}{(1+IRR)^1} + \frac{F_2}{(1+IRR)^2} + \frac{F_3}{(1+IRR)^3} + \dots$$

One rate fits all! With NPV different discount rates can be used for discounting cash flows expected in different periods. When using IRR all cash flows are discounted at the same rate (the IRR).

Profitability Index







Investment Projects Appraisal

Techniques for valuing and selecting investment projects - The NPV: The expected cash flow -

How to calculate cash flow for NPV

- Only incremental cash flows are important
- Consider operating cash flow (net of taxes on operating income) and capital expenses
- Be careful about the role of taxes
- Do not confuse average vs incremental profits
- Consider the effect of Net Working Capital on cash flow
- Forget sunk costs
- Remember opportunity costs
- Neglect allocated overhead costs
- Remember salvage value
- Consider incidental effects
- Be careful when considering inflation

Net operating cash flow: Calculation

INCOME STATEMENT

(Capital Expenses)

Unlevered Free Cash Flow to the firm

Divestments

Sales	800
(Operating Costs)	(300)
EBITDA	500
(Amortisation and provisions)	(200)
Operating Profit or EBIT	300
(Taxes on Operating Income)	(100)
Net Operating Profit After Taxes (NOPAT)	200
CASH FLOW	
NOPAT	200
+ Amortisation and provisions	200
$\pm \Delta$ Net Working Capital	(150)
Unlevered Cash Flow from Operations	250

CAPITAL EMPLOYED

Divestments 50	Divestments 50
Divestments 50	Divestments 50

We already know that! We can calculate Taxes on Operating Income by simply multiplying EBIT by the Tax rate.

00

50

(300)

Please, remember that Net Working Capital is an

50) investment and as such a reduction in cash flow. (600)

Do not confuse average vs incremental profits

Division A is losing money, but the opportunity for a new project with a positive NPV arises. What to do?

- Accept the project
- Refuse the project

Sunk costs

Firm A has already invested € 200 in an R&D project for launching a new product.

Manufacturing and marketing the product require a further investment of €100.

Expected net cash flows from this new investment have a present value of € 130.

What to do?

- Accept the project
- Refuse the project

Opportunity costs

Firm B owns a machinery that has a market price of € 30 on the secondary market.

The firm is analysing a project requiring an investment of €100 together with the machinery.

Expected cash flows from this new investment have a present value of € 120.

What to do?

- Accept the project
- Refuse the project

The opportunity cost of being a mom

Job	Average hours per week	Payroll
Child care	7	€ 230.40
Washing and ironing	4	€ 155.40
Chauffeur	4	€ 208.00
Personal shopper	1	€ 150.00
Colf	14	€ 560.00
Chef	10.5	€ 1,260.00
Tutor	6	€ 480.00
Total	46.5	€ 3,045.00

Source: La Repubblica, Il "lavoro di mamma" varrebbe oltre 3mila euro netti al mese, se fosse pagato, http://www.repubblica.it/economia/miojob/2017/05/11/news/mamma_lavoro-165156145/

Overhead costs

Firm C is valuing a new project, which has a cost of €100. Expected net cash flows from this new investment have a present value of € 125.

Once run, the new project will be charged for € 30 as its share of overhead costs. The accounting system of the firm, in fact, allocates a share of overhead costs to all projects of the firm.

What to do?

- Accept the project
- Refuse the project

The role of taxes

- Tax rules can strongly modify the NPV of a project. For instance:
 - Italian rules are now giving the possibility to deduct a cost larger than actual, in some specific cases (super-ammortamento)
 - The deferral of taxes increases the NPV of a project
- The impact of tax rules must be carefully taken into account when calculating NPV.
- My suggestion is to first calculate the NPV of the project without tax benefits, and then the same NPV but considering tax benefits.
- The risk is in fact that a firm could decide to undertake a project due to the fiscal benefits relating to it.

Salvage value

Firm D is valuing a project requiring an investment of €100 and promising expected cash flow having a present value of € 120.

However at the end of the project the land where the plant will be built should be remediated, with additional costs whose present value is €25.

What to do?

- Accept the project
- Refuse the project

Incidental effects of a project

- A new product or service can cut sales of existing products or services
- Sometimes the are important network effects: the new project can increase the value of older projects
- The new project could increase the risk of the firm since it needs a large amount of funds

Inflation

It appears that it is only necessary to be consistent: working with both cash flows and discount rate expressed in real or inflated terms

2

In practice it is better to incorporate inflation in cost and revenues values. Cash flows are in fact delayed with respect to revenues and costs and therefore the cash flow of a specific year is influenced by inflation rates of many previous years

Wrap-up: How to calculate cash flow for NPV

- Only incremental cash flows are important
- Consider operating cash flow (net of taxes on operating income) and capital expenses
- Be careful about the role of taxes
- Do not confuse average vs incremental profits
- Consider the effect of Net Working Capital on cash flow
- Forget sunk costs
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Investment Projects Appraisal

Techniques for valuing and selecting investment projects - The NPV: Weighted Average Cost of Capital -

A fundamental question

Which discount rate should be applied to cash flows expected over a project's life?

- We know that the discount rate must take into account the time value and the value of risk
- We know that a firm (and a project) are financed by financial debts and equity
- We can use the average cost of the two sources of funds to discount expected cash flows

Il Weighted Average Cost of Capital

$$W\!ACC = r_e \times \frac{E}{E+D} + r_d \times (1-\tau) \times \frac{D}{E+D}$$

 $\bullet r_{\rm e}$ is the expected return on equity, usually calculated according to CAPM or to a similar model;

- *r*_d is the expected return on financial debts;
- τ is the tax rate on income;
- *E* is the market value of equity;
- D is the market value of financial debts

A problem..

 How to determine the minimum acceptable return (MAR) a shareholder would ask for investing in a firm?

Can the firm set the MAR equal to the return of a Government bond (such as a BTP)?

 NO, It can't. Any firm is riskier than a Government bond, and the risk in excess calls for a higher return.



Can the firm set the MAR equal to the cost of its financial position?

 NO, It can't. Shareholders bear a higher risk than banks, since banks have priority over shareholders as for remuneration and the reimbursement of capital. MAR is therefore expected to be higher than the cost of financial debt.

If the firm finances an investment project by using new and additional bank loans, can it set the MAR equal to the cost of this new debt?

- NO, It can't. Fund providers finance the whole firm, not specific projects, and the return they ask depends on the risk of the whole firm
- The additional debt also increases the risk of the firm, other remaining the same

As for the return of a Government bond, which bond should the firm select?

It depends on the investment horizon.



Source: http://www.rendimentibtp.it - 10 November 2017

Which are the main determinants of the risk premium of a firm?

- They are the industry the firm operates in (and the way it do it) and the financing decision of the firm
- In other words: Business Risk and Financial Risk

How can the firm calculate its MAR?

- For listed firms, there are models that can be implemented on market data (e.g. CAPM)
- For non-listed firms, we can use multiple sources of data (market-based risk premia referring to industry, competitors, book values, etc.)

The CAPM at a glance



The Beta: A graphical representation



Beta is the risk that remains after a fully diversification

Variance of the portfolio



- Diversifiable risk, also known as company-specific or unsystematic risk, can be cancelled away through diversification
- Market risk, also known as nondiversifiable or systematic risk is the risk that remains after diversification.

Biotech (NYSE)



Utilities (NYSE)



The Energy industry (NYSE)

Company	Beta	Price/Book	Leverage
Exxon Mobil Corporation (XOM)	0.33	3.22	0.15
BP plc (BP)	0.59	2.22	0.33
TOTAL Fina Elf S.A. (TOT)	0.60	2.79	0.44
Royal Dutch Petroleum Com (RD)	0.76	2.50	0.31
ChevronTexaco Corporation (CVX)	n.d.	2.30	0.51
Shell Transport & Trading (SC)	0.77	2.54	0.31
Eni S.p.A. (E)	0.37	2.40	0.47
PetroChina Company Limite (PTR)	0.21	0.97	0.28
ConocoPhillips (COP)	0.66	1.13	0.68
Schlumberger Ltd. (SLB)	0.99	2.79	0.86

β_{levered} (Weighted average) = 0.48

Source: Yahoo!Finance end of 2002

Beta and the Capital structure



Usually, beta and leverage (Debt-to-Equity ratio) are positively associated

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Where can Beta be found?

http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/Betas.html

Betas by Sector (US)

Data Used: Multiple data services

Date of Analysis: Data used is as of January 2017

Download as an excel file instead: http://www.stern.nyu.edu/~adamodar/pc/datasets/betas.xls

For global datasets: http://www.stern.nyu.edu/~adamodar/New_Home_Page/data.html

can be obtained by clicking here

Download Detail

on which companies are included in each industry

Industry Name	Number of firms	Beta	D/E Ratio	Tax rate	Unlevered beta	Cash/Firm value	Unlevered beta corrected for cash	HiLo Risk	Standard deviation of equity	Standard deviation in operating income (last 10 years)
Advertising	41	1.36	62.98%	5.10%	0.85	6.27%	0.91	0.6671	72.80%	17.05%
Aerospace/Defense	96	1.07	23.53%	10.86%	0.89	5.21%	0.94	0.5241	40.75%	14.67%
Air Transport	18	1.12	70.12%	22.99%	0.73	4.23%	0.76	0.4760	38.61%	99.37%
Apparel	58	0.88	34.21%	10.95%	0.67	4.30%	0.71	0.4968	47.15%	24.77%
Auto & Truck	15	0.85	150.42%	8.14%	0.35	6.46%	0.38	0.6222	29.21%	366.54%
Auto Parts	63	1.12	35.22%	10.40%	0.85	8.90%	0.94	0.5478	50.64%	54.10%
Bank (Money Center)	10	0.86	188.03%	27.90%	0.37	9.89%	0.41	0.2658	25.85%	#DIV/0!
Banks (Regional)	645	0.47	60.51%	25.43%	0.33	10.76%	0.36	0.2325	22.84%	#DIV/0!
Beverage (Alcoholic)	25	0.79	29.02%	10.86%	0.63	11.30%	0.71	0.5805	44.18%	27.49%
Beverage (Soft)	36	0.91	24.51%	5.87%	0.74	4.84%	0.78	0.5856	52.80%	16.55%
Broadcasting	30	1.22	95.92%	18.54%	0.68	2.17%	0.70	0.4266	41.01%	18.50%
Brokerage & Investment Bank	45	1.08	232.21%	13.59%	0.36	14.97%	0.42	0.4577	44.96%	40.20%
Building Materials	41	1.01	26.98%	23.39%	0.83	4.05%	0.87	0.3818	33.77%	48.36%
Business & Consumer Services	165	1.07	35.10%	12.61%	0.82	3.52%	0.85	0.5200	44.71%	20.37%
Cable TV	14	1.12	49.24%	20.28%	0.80	2.32%	0.82	0.3395	30.78%	40.08%
Chemical (Basic)	45	1.00	58.62%	7.71%	0.65	4.00%	0.68	0.5526	59.91%	54.64%
Chemical (Diversified)	8	1.52	35.52%	6.59%	1.14	6.50%	1.22	0.5298	45.48%	26.46%

Calculating the WACC for Eni Group



*** Equal to the risk-free rate

Equity opportunity cost for a SME





The build-up approach to beta



Source: Hawawini G.and– Viallet C., Finance for Executives, South-Western College, Cincinnati, Ohio, 1999

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From levered to unlevered beta and vice-versa

If you are analysing a non-listed firm (or a listed firm that is modifying its capital structure), you can calculate its (new) beta by following these 4 steps:

1. Identify companies similar to the one under analysis (operating in the same industry), get market capitalisation and calculate the levered beta, the D/E ratio and the tax rates of the companies in the sample above identified





3. Calculate the weighted average unlevered beta using firms' market capitalization as a weight

 $\beta_U = 0.65$

4. Calculate the (new) levered beta corresponding to the (new) capital structure of the company under analysis according to the formula: $\beta_L =$ $0.65[1 + (1 - 0.35) \times 1.3] =$

$$\beta_L = \beta_U \left[1 + (1 - \tau) \times \frac{D}{E} \right]$$

Investment Projects Appraisal

Risk analysis

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Risk analysis in investment projects

- Risk is usually ignored in investment project valuation
- Why
 - People is more focussed on return
 - They are not used to assess risk
 - They don't know how to take risk into account

Project risk analysis



Pay-back period and risk analysis



Pay-back Period < 3 years

- Firms can employ payback as a heuristics in order to deal with:
 - uncertainty, since shorter-payback projects are less exposed to future uncertainty;
 - and capital constraints, since payback ranks projects in terms of their speed in refunding the investor.
- The payback rule is consistent with preserving cash for the continuity of the firm.
- Again, the payback period approach can be a successful heuristics in the case of wait-and-see real options

Sensitivity analysis

Impact on NPV

Which is the impact on a dependent variable caused by the variation of an independent variable?

			∆ Price (%)										
		-10%	-5%	0%	+5%	+10%							
(+10%	-10.0%	2.5%	15.0%	27.5%	40.0%							
sts (%	+5%	-17.5%	-5.0%	7.5%	20.0%	32.5%							
able co	0%	-25.0%	-12.5%	0.0%	12.5%	25.0%							
∆ Vari	-5%	-32.5%	-20.0%	-7.5%	5.0%	17.5%							
	-10%	-40.0%	-27.5%	-15.0%	-2.5%	10.0%							

MonteCarlo simulation







A real case



A software for Montecarlo simulation



http://www.oracle.com/us/products/applications/crystalball/overview/index.html

Investment Projects Appraisal

Introducing investment projects techniques in SMEs

Capital Budgeting techniques

	Owne		Sales			
Capital Budgeting techniques	Family	Other	<€10 mln	€10-20 mln	€20-43 mln	тот
Costs-Benefits analysis	22.2%	8.1%	21.7%	11.2%	16.8%	15.6%
Accounting ratios	20.5%	7.5%	13.3%	10.4%	18.0%	14.5%
NPV	6.5%	21.1%	18.3%	19.2%	<mark>6.8%</mark>	13.3%
Hurdle rates	13.0%	13.0%	11.7%	11.2%	14.9%	13.0%
Payback period	8.1%	15.5%	10.0%	15.2%	9.3%	11.6%
Sensitivity analysis	13.5%	5.0%	1.7%	5.6%	15.5%	9.5%
Discounted Payback period	4.3%	13.7%	6.7%	14.4%	5.0%	8.7%
Profitability index	6.5%	2.5%	11.7%	4.8%	1.9%	4.6%
Scenario analysis	2.7%	6.2%	0.0%	2.4%	7.5%	4.3%
Adjusted NPV	1.6%	4.3%	3.3%	2.4%	3.1%	2.9%
Real options	0.5%	3.1%	1.7%	3.2%	0.6%	1.7%
IRR	0.5%	0.0%	0.0%	0.0%	0.6%	0.3%

Source: Marzo. Scarpino e Cappello, Le PMI italiane e la valutazione economica dei progetti di investimento, Amministrazione & Finanza n. 4/2016

The cost of capital

	Family business (Sales)					Others (Sales)			
The cost of capital	<€10 mln	€10-20 mln	€20-43 mln	тот	<€10 mln	€10-20 mln	€20-43 mln	тот	
Not estimated	33.3%	26.9%	29.3%	<mark>32.4%</mark>	30.0%	28.0%	52.0%	<mark>38.3%</mark>	
Average of past returns (e.g. Return On Equity) Regulatory decisions	19.0% 0.0%	26.9% 7.7%	20.0% 5.3%	21.4% 6.6%	50.0% 0.0%	12.0% 16.0%	20.0% 8.0%	21.7% 10.0%	
Return expected by funds providers	0.0%	0.0%	1.3%	0.5%	0.0%	0.0%	0.0%	0.0%	
Capital Asset Pricing Model Other TOT	42.9% 4.8% 100.0%	30.8% 7.7% 100.0%	34.7% 9.3% 100.0%	30.2% 8.8% 100.0%	10.0% 10.0% 100.0%	28.0% 16.0% 100.0%	16.0% 4.0% 100.0%	20.0% 10.0% 100.0%	

Source: Marzo. Scarpino e Cappello, Le PMI italiane e la valutazione economica dei progetti di investimento, Amministrazione & Finanza n. 4/2016