Business Valuation

UNIVERSIDAD NACIONAL DEL LITORAL – HOCHSCHULE KAISERSLAUTERN

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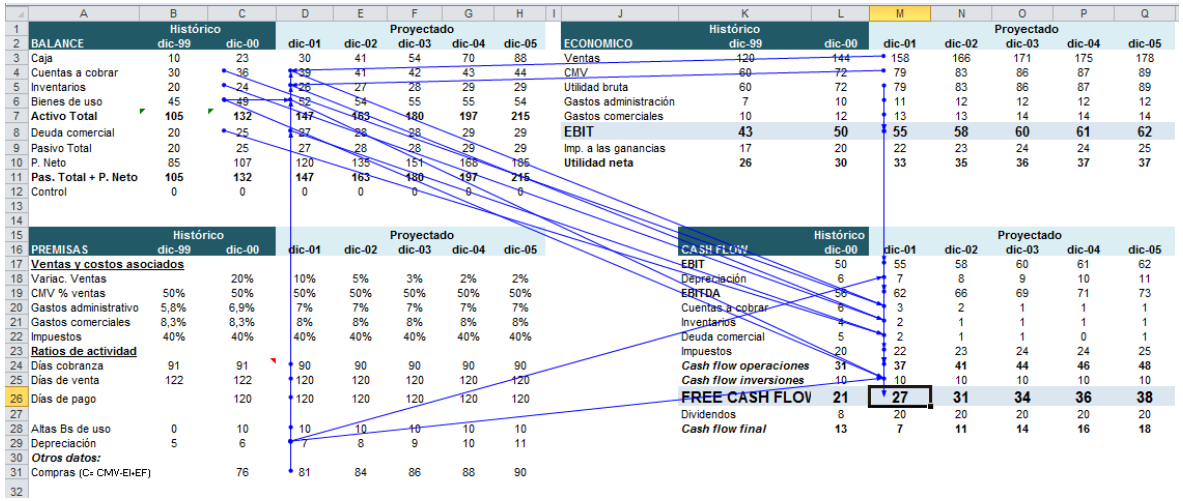
FORECASTED FREE CASH FLOW: HOW TO MEASURE ITS VALUE?

Our last session finished with the forecasted company´s free cash flow, establishing the connections between balance sheet, income statement and cash flow, using a set of assumptions:



BALANCE	Histórico dic-99	dic-00	Proyectado dic-01	dic-02	dic-03	dic-04	dic-05
Caja	10	23	30	41	54	70	88
Cuentas a cobrar	30	36	39	41	42	43	44
Inventarios	20	24	26	27	28	29	29
Bienes de uso	45	49	52	54	55	55	54
Activo Total	**105**	**132**	**147**	**163**	**180**	**197**	**215**
Deuda comercial	20	25	27	28	28	29	29
Pasivo Total	20	25	27	28	28	29	29
P. Neto	85	107	120	135	151	168	186
Pas. Total + P. Neto	**105**	**132**	**147**	**163**	**180**	**197**	**215**
Control	0	0	0	0	0	0	0

ECONOMICO	Histórico dic-99	dic-00	Proyectado dic-01	dic-02	dic-03	dic-04	dic-05
Ventas	120	144	158	166	171	175	178
CMV	60	72	79	83	86	87	89
Utilidad bruta	60	72	79	83	86	87	89
Gastos administración	7	10	11	12	12	12	12
Gastos comerciales	10	12	13	13	14	14	14
EBIT	**43**	**50**	**55**	**58**	**60**	**61**	**62**
Imp. a las ganancias	17	20	22	23	24	24	25
Utilidad neta	**26**	**30**	**33**	**35**	**36**	**37**	**37**

PREMISAS	Histórico dic-99	dic-00	Proyectado dic-01	dic-02	dic-03	dic-04	dic-05
Ventas y costos asociados							
Variac. Ventas		20%	10%	5%	3%	2%	2%
CMV % ventas	50%	50%	50%	50%	50%	50%	50%
Gastos administrativo	5,8%	6,9%	7%	7%	7%	7%	7%
Gastos comerciales	8,3%	8,3%	8%	8%	8%	8%	8%
Impuestos	40%	40%	40%	40%	40%	40%	40%
Ratios de actividad							
Días cobranza	91	91	90	90	90	90	90
Días de venta	122	122	120	120	120	120	120
Días de pago		120	120	120	120	120	120
Altas Bs de uso	0	10	10	10	10	10	10
Depreciación	5	6	7	8	9	10	11
Otros datos:							
Compras (C= CMV-EI+EF)		76	81	84	86	88	90

CASH FLOW	Histórico dic-00	dic-01	Proyectado dic-02	dic-03	dic-04	dic-05
EBIT	50	55	58	60	61	62
Depreciación	6	7	8	9	10	11
EBITDA	56	62	66	69	71	73
Cuentas a cobrar	6	3	2	1	1	1
Inventarios	4	2	1	1	1	1
Deuda comercial	5	2	1	1	0	1
Impuestos	20	22	23	24	24	25
Cash flow operaciones	**31**	**37**	**41**	**44**	**46**	**48**
Cash flow inversiones	**10**	**10**	**10**	**10**	**10**	**10**
FREE CASH FLOV	**21**	**27**	**31**	**34**	**36**	**38**
Dividendos	8	20	20	20	20	20
Cash flow final	**13**	**7**	**11**	**14**	**16**	**18**

Now that we have the forecasted free cash flow, it is time to consider the time value of money …

And because the free cash flow of San Telmo is not a promise but an expected cash flow, we have to consider how to introduce the risk…

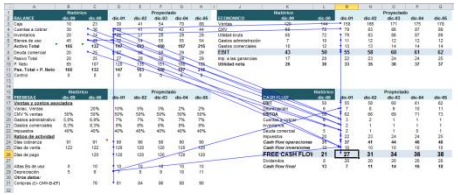
LEARNING TARGETS

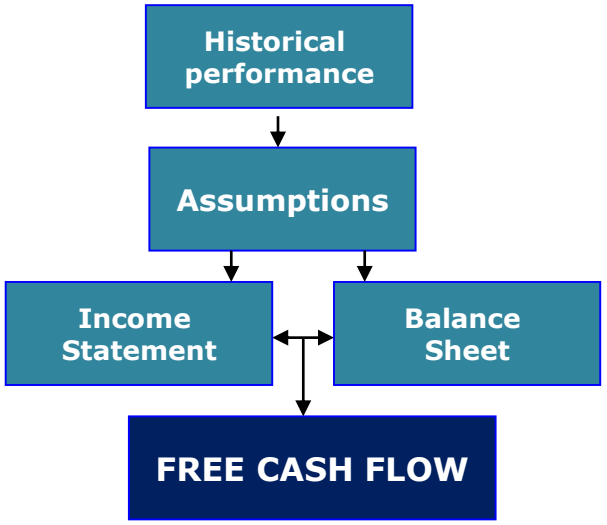
- Understand the time value of money
- How to estimate the cost of capital
- Estimating San Telmo´s fair value
- Comparable approach (multiples)

FREE CASH FLOW-WACC METHODOLOGY

- **Forecasted Free Cash Flow**

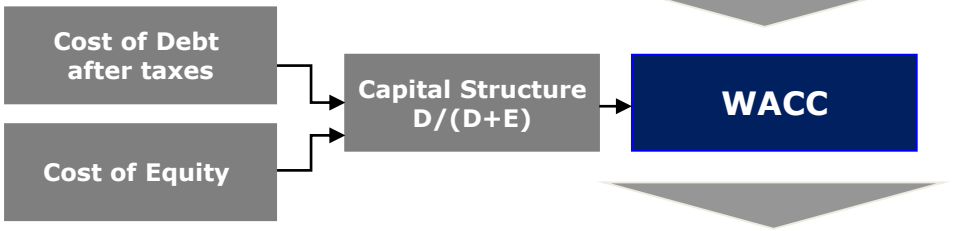
- Based in historical performance and trends.





- **Cost of capital**

- Cost of equity capital → CAPM model
- Country risk premium
- Cost of debt after taxes
- Capital structure



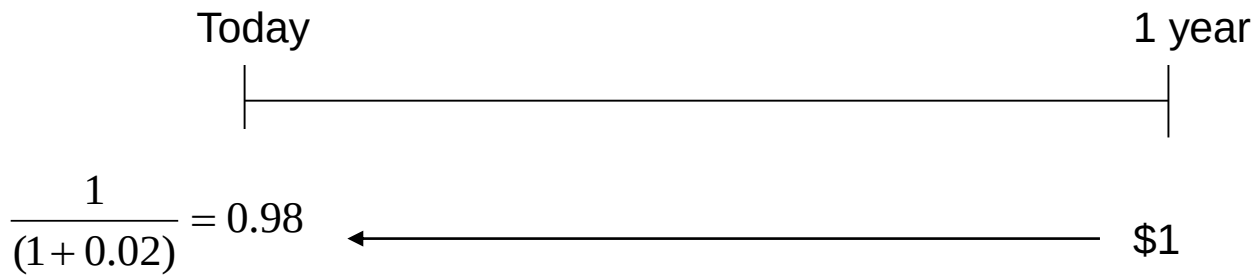
FAIR VALUE OF OPERATIONS
- FINANCIAL DEBT
FAIR VALUE OF EQUITY

Time Value of Money

A dollar today is worth more than a dollar tomorrow. Let´s consider two cases:

1. We have $1 today. Suppose we can get an annual interest rate of 2% on a bank deposit.

2. We will receive $1 a year from now. As one dollar today is worth more than one dollar in a year, the present value of one dollar to be received in a year is less than one dollar.



$$\frac{1}{(1+0.02)} = 0.98$$

Time Value of Money

Understanding the mechanic of present value is simple if you think about the value of 0,98 multiplied by (1+0.02) equals $1 in a year:

$$0.98(1+0.02)=1$$

So, to get the present value we have to divide the future value by (1+0.02):

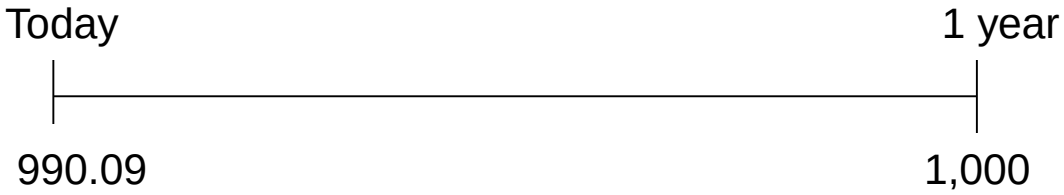
$$PV=\frac{1}{(1+0.02)}=0.98$$

The expression 1/(1+0.02) is known as the discount factor.

RISK FREE RATE

The risk free rate is the return on a security that has no default risk.

Suppose you buy a one-year Treasury bill for $990.09, with a face value of $1,000, which is considered as a risk free security (similar to the German bonds). If you pay $990.09 you would get an annual return of about 1%. The present value (the price) of this security is equal to:



$$990.09 = \frac{1{,}000}{(1+i)}$$

$$i = \frac{1{,}000}{990.09} - 1 = 1\%$$

EXERCISES

Calculate the present value of $100 to be received one year from now, if the interest rate is:

a) 0.5% (The expected return of a German T-Bill)

b) 1% (The expected return of a US T-bill)

c) 1.5% (The expected return of a Brazilian T-bill)

SOLUTIONS

a) $$PV = \frac{100}{(1+0.005)} = 99.50$$

b) $$PV = \frac{100}{(1+0.01)} = 99.01$$

c) $$PV = \frac{100}{(1+0.015)} = 98.52$$

EXERCISES

1. **Which is the largest present value if interest rates is of 10%?**

   a) $600 to be received five years from now
   b) A future value of $1,000 after ten years
   c) $380 received right now
   d) $100 annuity for five years

SOLUTION

1. **Which is the largest present value if interest rates are 10%?**

   a. $\$600/(1+0.10)^5=372{,}55$
   b. $1{,}000/(1+0.10)^{10}=385.55$
   c. 380
   d. $100\ \dfrac{(1+0.10)^5-1}{(1+0.10)^5 \times 0.10} = 379.07$

Risk free rate

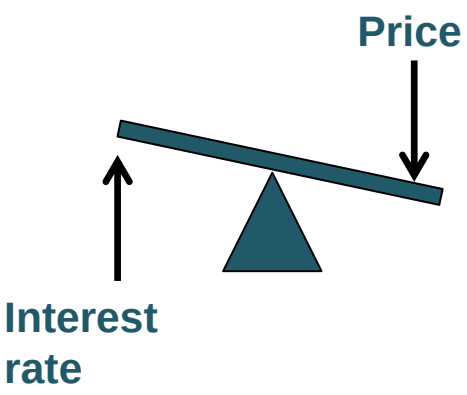
The risk-free rate varies with maturity:

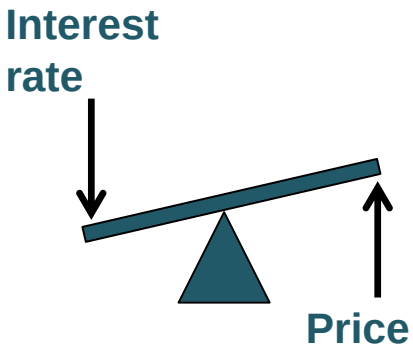
T-bills are zero-coupon bonds, they don´t pay interest, so are sold at discount. Their maturities range from three months to one year, they have a low interest rate risk and so, they have a lower return.

T-Bonds are bullet bonds, which pay interest semiannually and the principal at maturity. Their maturities range from 5 to 30 years. They are also risk-free securities, but they have a higher interest rate risk than T-bills. Today a T-bond maturing in 30 years yields about 3% per year.

Interest rate Risk

Interest rate risk: refers to the change in bond price as a consequence of a change in the interest rate. If interest rates rise, bond prices fall; when interest rates fall, the yield offered on a bond decreases and the price rises.





This situation is known as the "interest rate risk of a bond". Buy-and-hold investor's don't worry about the interest rate risk, since they think of holding the bond until its maturity. So, they will either enjoy a steady stream of income until the face value of the bond is returned to them.

BONDS

A bond is a debt instrument issued by a borrower (Government, State or local Government, Municipality or a Corporation).

When an investor purchases a bond she obtains the right to receive an interest payment for many years and the principal (PR)at maturity date.

The price of a bond is equal to the present value of the promised cash flow, which are discounted with the required yield *y*:

$$P = \frac{CF}{(1+y)} + \frac{CF}{(1+y)^2} + ... + \frac{CF+PR}{(1+y)^n}$$

The required yield is estimated investigating the yields offered on comparable bonds in the market; comparable bonds are bonds with similar credit risk, liquidity and maturity.

INTEREST RATE RISK

Suppose the required return on a one-year T-Bill is 1% and the required return for a Bond with a coupon rate of 4% and interest paid annualy, is 4%. So, the prices are:

$$P = \frac{100}{(1+0.01)} = 99.00 \qquad P = \frac{4}{(1+0.04)} + \frac{4}{(1+0.04)} + \frac{4}{(1+0.04)} + \frac{4}{(1+0.04)} + \frac{104}{(1+0.04)^5} = 100$$

Suddenly, the interest rate increases a half percentual point for all maturities, so the new required returns are 1.5% and 4.5%. Both prices decrease, but while the price of the T-Bill goes down by **0.48%**, the T-Bond decreases approximately by **2.2%**:

$$P = \frac{100}{(1+0.015)} = 98.52$$ **-0.48%** (98.52/99.00)-1

$$P = \frac{4}{(1+0.045)} + \frac{4}{(1+0.045)} + \frac{4}{(1+0.045)} + \frac{4}{(1+0.045)} + \frac{104}{(1+0.045)^5} = 97.8$$ **-2.2%** (97.8/100)-1

Time Value of Money

A risk free rate must compensate two things:
- the inflation rate
- a pure interest rate

A pure interest rate represents the excess of return over the inflation rate (when it is positive).

The interest rate, in a world without risk, represents the price of patience, and it could be consider as a compensation for a sacrifice.

we make a sacrifice of consumption today with the expectation to consume more tomorrow.

Bonds – Face Value

- Face value is the amount paid to a bondholder at the maturity date, assuming the issuer doesn't default.

- Although investors can purchase bonds paying a lower or greater price than the face value, the issuer must pay the face value to the bondholder at maturity.

- For example, we can purchase a bond with a face value of $100 for $95 or $105, but the borrower will be always responsible for the face value.

Bonds - Exercises

1. Calculate the price of a bond that pays an annual interest rate of 10% for five years, interest are paid annually and the principal at maturity. Its face value is of 100. The investor requires a yield of 10% since she can get other investments with a similar risk-return relation.

2. Now calculate the price of the bond if the required yield goes up to 11%.

3. Finally, calculate the price of the bond if the required yield falls to 9%.

BONDS – EXERCISES (SOLUTION)

1. $$P = \frac{10}{(1+0.10)} + \frac{10}{(1+0.10)^2} + \frac{10}{(1+0.10)^3} + \frac{110}{(1+0.10)^4} + \frac{110}{(1+0.10)^5} = 100$$

2. $$P = \frac{10}{(1+0.11)} + \frac{10}{(1+0.11)^2} + \frac{10}{(1+0.11)^3} + \frac{110}{(1+0.11)^4} + \frac{110}{(1+0.11)^5} = 96.3$$

3. $$P = \frac{10}{(1+0{,}09)} + \frac{10}{(1+0{,}09)^2} + \frac{10}{(1+0{,}09)^3} + \frac{110}{(1+0{,}09)^4} + \frac{110}{(1+0{,}09)^5} = 103.9$$

RISK ADJUSTED RATE

Time Value of Money with risk

Stocks involve a very high risk since you can obtain an extremely high reward or an extremely high loss. The return is not guaranteed.

High-risk investments should be compensated with a higher premium to entice investors to take on riskier investment.

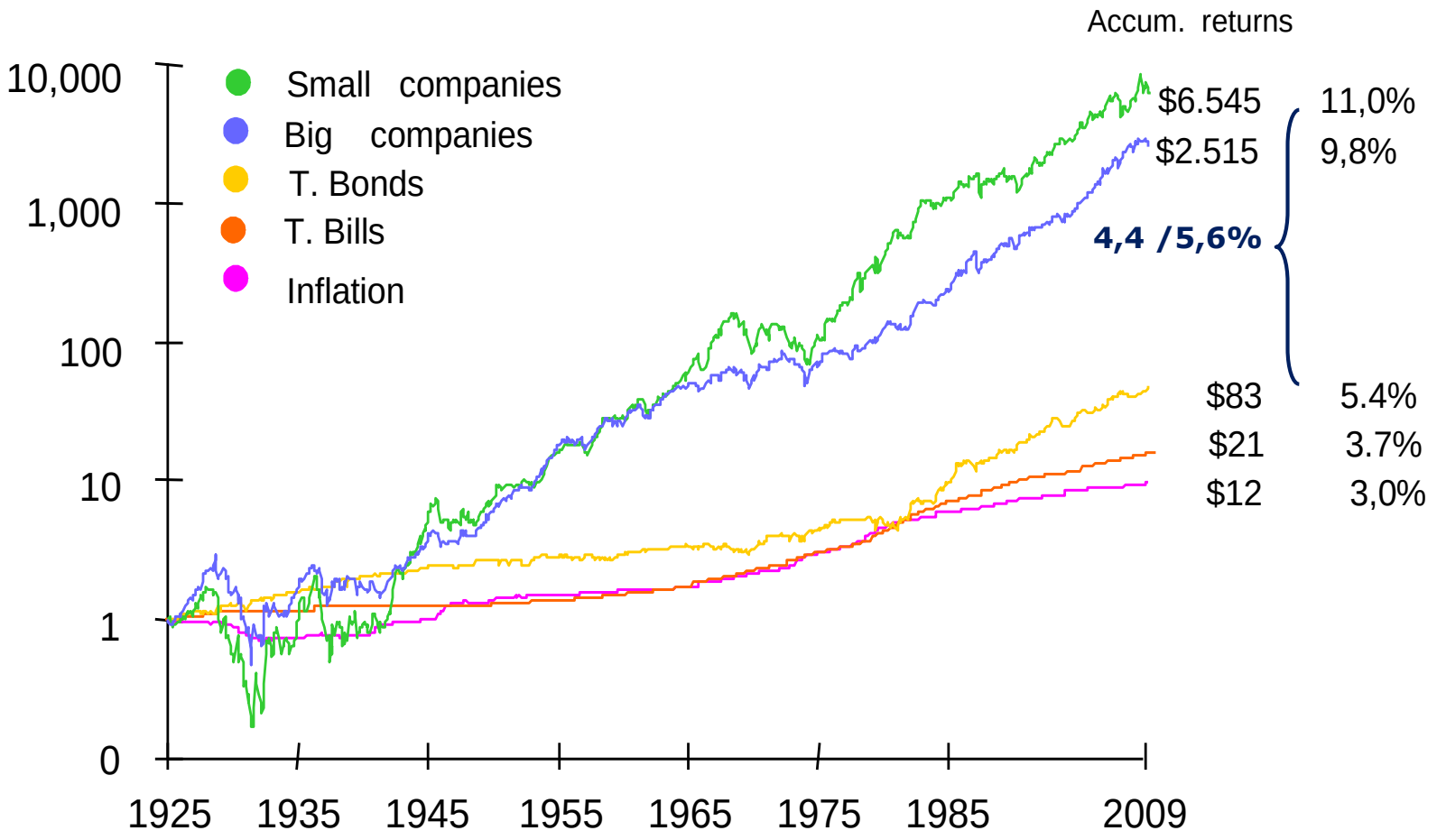
How should the additional risk be compensated?

Later we will examine a famous model called CAPM, whose author, William Sharpe, won the Nobel Prize in Economics in 1990. It give us a formula to calculate the required return on equity.

For now, we will say that stocks have historically performed well over the long term, 5% more than T-Bonds´ return, as we will see in the next slide.

INFLATION, BILLS,BONDS AND STOCKS IN THE USA

USD 1 invested from december 1925 to december 2009)



EXERCISES

Year	Stocks	T.Bills	T.Bonds
1927	100	100	100
2013	255,553.31	1,972.72	6,295.79

The table shows the values of three index markets at the end of years 1927 and 2013.

Which were the geometric returns of the three assets?

EXERCISES

Year	Stocks	T.Bills	T.Bonds
1927	100	100	100
2013	255,553.31	1,972.72	6,295.79
Geometric return	**9.55%**	**3.53%**	**4.93%**

Geometric return is calculated taking the last value of the index divided by the initial value and raised to the power of 1/numbers of years minus 1. For example, to calculate the geometric return on stocks we have

$$\left(\frac{255{,}553.31}{100}\right)^{\frac{1}{86}} - 1 = 9.55\%$$

PERPETUITIES: NOBEL PRIZE AND CONSOLS BONDS

Some cash flows go on forever, generating an infinite series of equal payments. Such streams are referred to as perpetuities. We have some cases in the real world.

Nobel Prize. Nobel Prize in Economics is awarded yearly to individuals making exceptional contributions to economics. An endowment from Sweden's central bank provides in perpetuity funding to pay the Nobel prize, which is approximately US1.5 million as of 2010.

Consols bonds. During the Napoleonic Wars, the Bank of England issued bonds with no maturity date. Because the bonds were used to consolidate past debts, they were called “consols”. These bonds are still traded today.

Ferrobonos. Argentina issued the “Ferrobonos” in 1991, a bond with no maturity date which defaulted in 2001.

PERPETUITIES: NOBEL PRIZE AND CONSOLS BONDS

The value of a perpetuity is calculated as:

$$V = \frac{C}{i}$$

Where C represents the cash flow at perpetuity and i represents the cost of capital. For example, if the cash flow is $1 and the interest rate is 10% per year, the present values is

$$V = \frac{1}{0.10} = 10$$

PRESENT VALUE OF THE FREE CASH FLOW

Sometimes we have to calculate the value of a stream of equal cash flow payments received at regular intervals (for example, we find equal cash flow payments in loans or in pensions).

However, in valuation it is common to calculate the value of a stream of uneven cash flows at regular intervals (like the forecasted free cash flow of San Telmo).

The value of the business operations is equal to the present value of each individual free cash flow:

$$V = \frac{FCF_1}{(1+WACC)} + \frac{FCF_2}{(1+WACC)^2} + \frac{FCF_3}{(1+WACC)^3} + \ldots\ldots + \frac{FCF_T}{(1+WACC)^T} + \frac{FCF_{T+1}}{(WACC-g)} \times \frac{1}{(1+WACC)^T}$$

Present Value of the Free Cash Flow

$$V = \underbrace{\frac{FCF_1}{(1+WACC)} + \frac{FCF_2}{(1+WACC)^2} + \frac{FCF_3}{(1+WACC)^3} + \ldots\ldots + \frac{FCF_T}{(1+WACC)^T}}_{\text{Present value of explicit forecasted free cash flow}} + \underbrace{\frac{FCF_{T+1}}{(WACC-g)}}_{\textbf{Terminal Value}} \times \underbrace{\frac{1}{(1+WACC)^T}}_{\text{PV of the Terminal Value}}$$

The value after the explicit forecast period is referred to as the "Terminal Value". Terminal value is the present value of the free cash flow from period T+1 and beyond, expressed at the end of T period.

Terminal Value is calculated with the growing *perpetuity* formula…

Terminal Value

- Since the company works in an economy that grows over time, the expectation is the cash flow will grow at a rate similar to the GDP growth rate.
- The growing perpetuity formula assumes that the company's free cash flow is expected to grow over time. The formula is as follows:

$$V = \frac{FCF_1}{(1+WACC)} + \frac{FCF_2}{(1+WACC)^2} + \frac{FCF_3}{(1+WACC)^3} + \ldots\ldots + \frac{FCF_T}{(1+WACC)^T} + \frac{FCF_{T+1}}{(WACC-g)} \times \frac{1}{(1+WACC)^T}$$

$$TV = \frac{FCF_T(1+g)}{(WACC-g)}$$

Where FCF_T is equal to the free cash flow projected in the last year of the explicit period and "g" is the nominal (constant) growth rate at which the free cash flow is expected to grow over time.

EXERCISES

Calculate the terminal value of a company´s free cash flow if the last forecasted free cash flow FCF_T=100 and the cost of capital is of 10% when:

a) The long term growth rate is of 2%
b) The long term growth rate is of 3%
c) The long term growth rate is of 4%

SOLUTION

a) 100 (1+0.02)/(0.10-0.02)=1,275

b) 100 (1+0.03)/(0.10-0.03)=1,471.42

c) 100 (1+0.04)/(0.10-0.04)=1,733.33

Risk and Return

- Basic principle of risk in finance: risk that can be eliminated through diversification does not command a risk premium.

- Diversification works because there is no perfect positive correlation between stock prices (they don´t move perfectly in phase with one another) so, some of the fluctuations cancel out. Some stocks move up, others move down and others don´t move at all. This relationship conduces to a very important fact:

The variability of portfolio return is <u>always less</u> than the weighted average variability of returns on its component assets.

Risk and Return

Suppose you have two stocks A and B. While A has an expected return of 10%, B has an expected return of 20%. If you invest half of your money in A and the other half in B, the expected portfolio return is equal to the average of its component stocks:

Expected portfolio return= 0.50 x 10% + 0.50 x 20%=15%

Now suppose the variability of A´s return is 10% and the variability of B´s return is 20%. Which is the variability of portfolio return?

It will be always less than 15%, since there is no perfect positive correlation between two assets, since some movements in A cancel out some movements in B (for example, one day A goes up 1% while B goes down -0.5%, etc.)

UNSYSTEMATIC AND SYSTEMATIC RISK

There are two well defined types of risk. Unsystematic and systematic risk.

While the former is related to a company or an industry, the later is related to a market as a whole.

While the unsystematic risk can be eliminated through diversification, the systematic risk can never be eliminated.

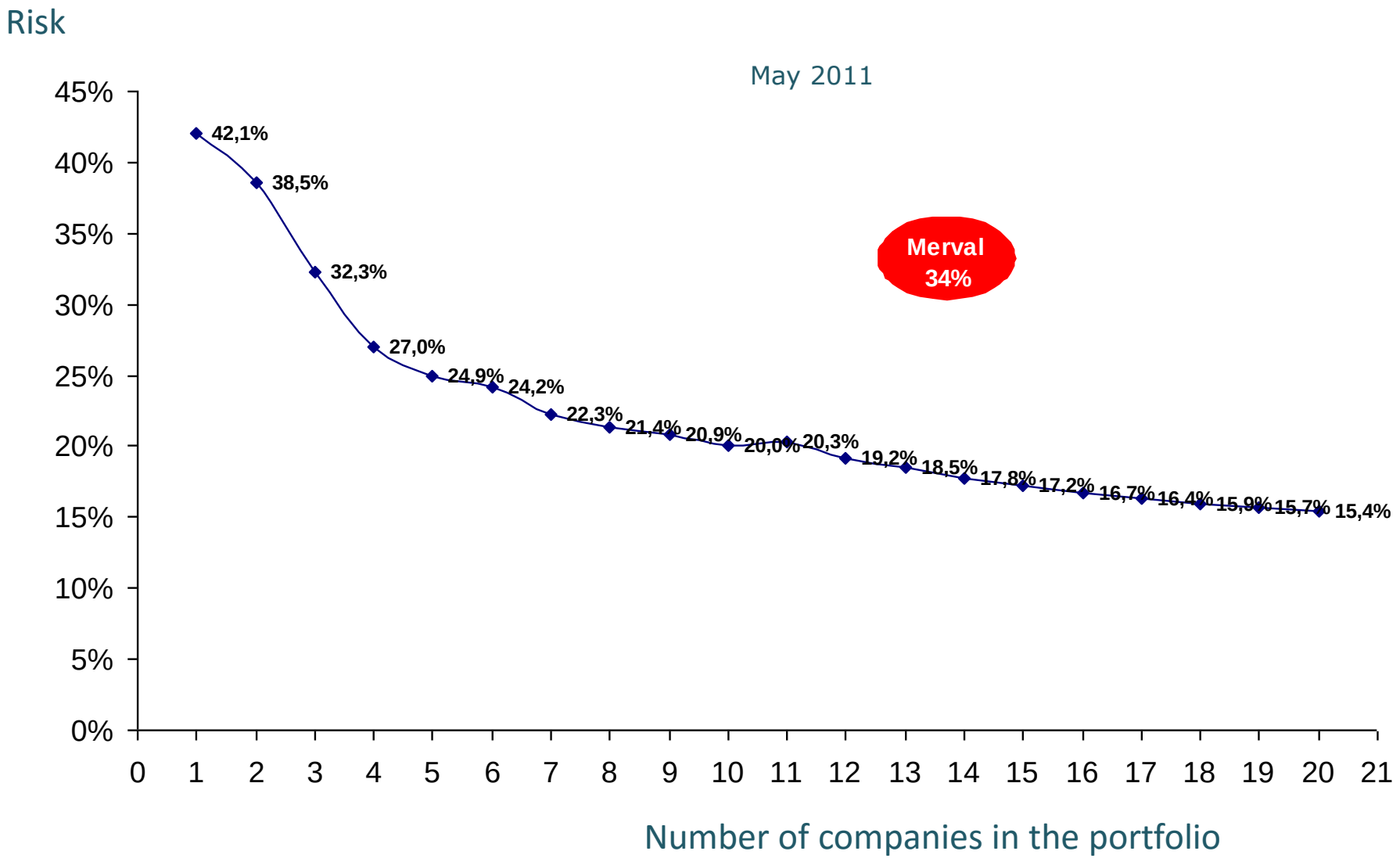
UNSYSTEMATIC RISK

Unsystematic risk is the risk that is specific to a company or industry. Examples of unsystematic risk are:

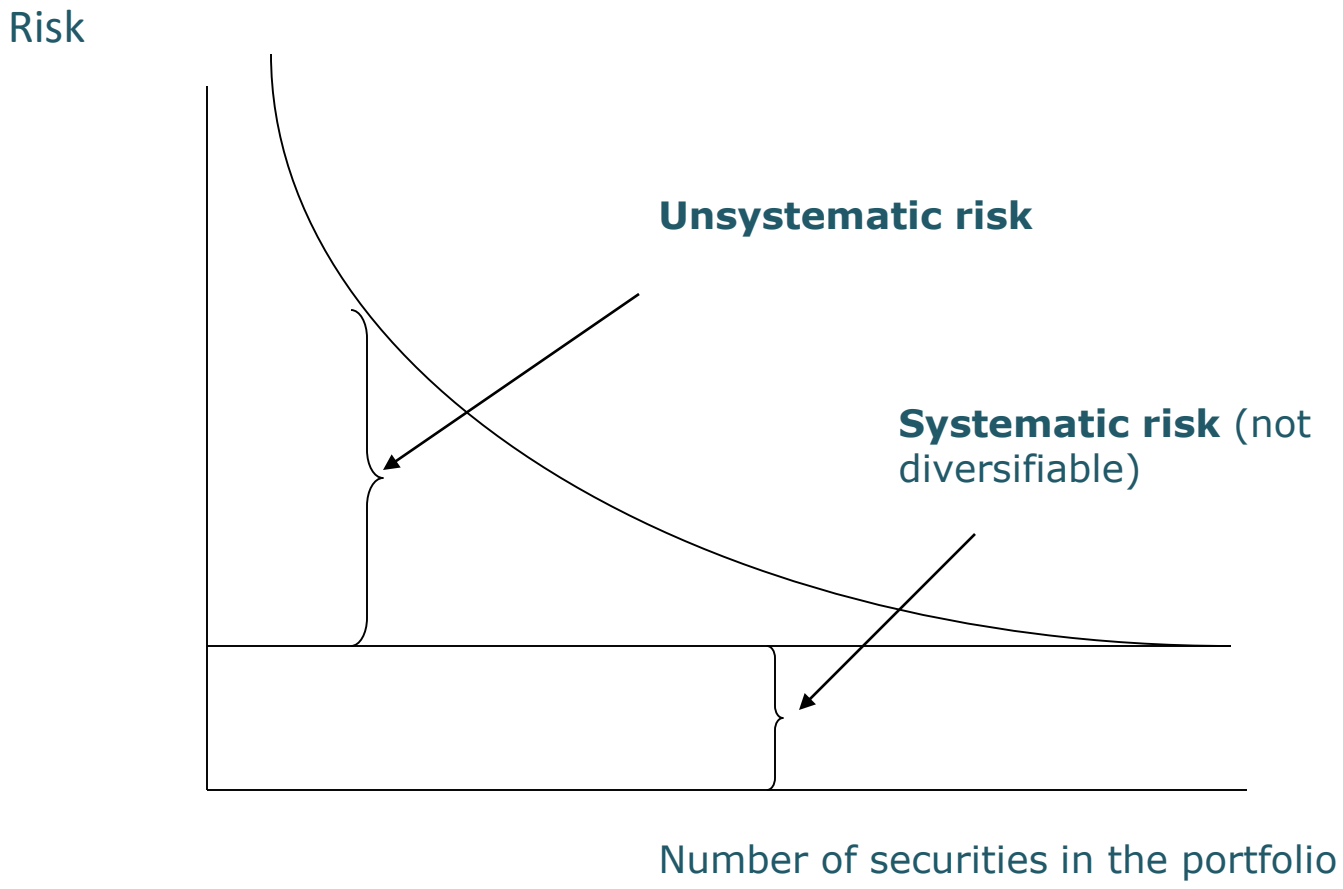
- A sudden labor strike
- A natural disaster such as a fire
- A regulatory change
- A new competitor
- An unfavorable litigation

We can diversify our portfolio by buying stocks of different companies, from different industries.

REDUCING THE UNSYSTEMATIC RISK: REAL WORLD EXAMPLE



A LIMIT TO THE BENEFIT OF DIVERSIFICATION: SYSTEMATIC RISK



SYSTEMATIC RISK

On the other hand, systematic risk or “market risk” is represented by the uncertainty inherent to the entire market. You can diversify your portfolio, but you cannot isolate it from the day-to-day fluctuation in the market as a whole.

Systematic risk is associated with macroeconomic events such as:

- Changes in interest rate
- Recession
- Wars
- Devaluation

QUESTIONS

Classify these events between unsystematic (U) and systematic risk (S)

1	An increase of the interest rate	
2	A devaluation	
3	A prohibition to imports	
4	New competitor	
5	A regulatory change that has an impact in the telecommunication companies´ revenue	
6	A decrease of the oil price	
7	A lawsuit lost by an utility company	
8	A recession	

SOLUTION

Classify these events between unsystematic (U) and systematic risk (S)

1	An increase of the interest rate	S
2	A devaluation	S
3	A prohibition to imports	S
4	New competitor	U
5	A regulatory change that has an impact in the telecommunication companies´ revenue	U
6	A decrease of the oil price	U/S
7	A lawsuit lost by an utility company	U
8	A recession	S

How can we measure the systematic risk?

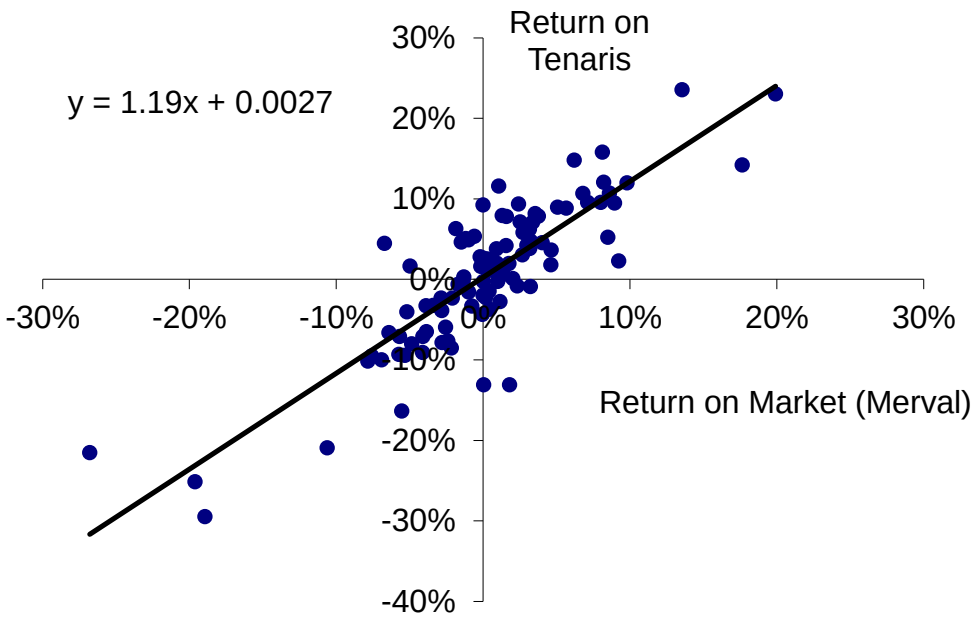
Although the systematic risk cannot be eliminated, it can be measured. However, stocks don´t have the same systematic risk.

The market demands a premium according to the asset´s contribution to the risk of a fully diversified portfolio, which represent the market risk of the asset.

The market risk of a stock is measured by beta, which is a measure of stock´s volatility in relation to the market.

BETA COEFFICIENT

Beta is calculated using regression analysis, and you can think of beta as the tendency of a security's returns to respond to swings in the market.



Beta can also be calculated as the covariance between the expected return on an asset Rj, and the expected market return Rm, divided by the variance of the market return:

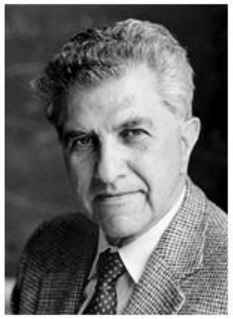
$$\beta = \frac{Cov(R_j, R_M)}{\sigma_M^2}$$

THE NOBEL PRIZE IN ECONOMICS

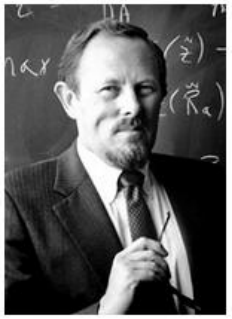
Harry Markowitz, Merton Miller and William Sharpe shared the Nobel Prize in economics *"for their pioneering work on the theory of financial economics".*

The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 1990

Harry M. Markowitz
Prize share: 1/3



Merton H. Miller
Prize share: 1/3



William F. Sharpe
Prize share: 1/3

UNSYSTEMATIC AND SYSTEMATIC RISK

By definition, the market portfolio has a beta of 1.

A beta below 1 indicates a stock with lower volatility than the market, or a volatile stock whose price movements are poor correlated with the market.

A beta above one indicates a stock with a higher volatility than the market.

Many utilities stocks have a beta of less than 1. Conversely, most high-tech, Nasdaq-based stocks have a beta of greater than 1, offering the possibility of a higher rate of return, but also posing more risk.

Beta is a key component for the capital asset pricing model, which is used to calculate the cost of equity capital.

EXERCISES

Mark the correct answer

1. A well diversified portfolio

a. Increases systematic risk
b. Reduces systematic risk
c. Increases unsystematic risk
d. Reduces unsystematic risk

2. Beta

a. A beta similar to 1 means that the asset returns is highly correlated with the market.
b. A beta above one generally means that the asset is less volatile than the market.
c. Depends on the unsystematic risk.

EXERCISES

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c. Depends on the unsystematic risk.

EXERCISES

Mark the correct answer:

3. A beta coefficient of 1.2 implies

a. The stock's return is 1.2 times – in average - the return on the market
b. The stock is less risky than the market
c. The market's return is 1.2 times the return on the stock

4. An investor may reduce risk by selecting

a. High beta stocks
b. Stocks with poorly correlated returns
c. Stock with high correlated returns

EXERCISES

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The Capital Asset Pricing Model

In the 60´s William Sharpe, Jack Treynor, John Lintner and Jan Mossin developed the CAPM.

The CAPM is a central piece of finance and it is used for analysts and consultants to estimate the cost of equity and the fair price of an asset.

Capital Asset Pricing Model

To estimate the opportunity cost of equity, we apply the Capital Asset Pricing Model (CAPM).

$$ke = rf + \left[E(rm) - rf\right]\beta$$

Suppose we have a company with a beta of 1.2, the 10 years T-Bond current yield is of 4% and the market risk premium is estimated in 6%. The market risk is the difference between the expected rate of return on a market portfolio and the risk-free rate. It is usually estimated using the market return series measured by Standard & Poors .

$$ke = 4\% + \left[6.0\%\right]1{,}2 = 11{,}2\%$$

QUESTIONS

Mark TRUE or FALSE:

a. A risk free security has a return equal to the US T-Bond return.

b. The market portfolio has a beta of 1.

c. A portfolio composed 50% of market portfolio and 50% of US T-Bonds, has a beta higher than 1.

d. Investors can control the level of unsystematic risk, but they cannot control the level of systematic risk.

QUESTIONS

Mark TRUE or FALSE:

a. A risk free security has a return equal to the US T-Bond return. **TRUE**

b. The market portfolio has a beta of 1. **TRUE**

c. A portfolio composed 50% of market portfolio and 50% of US T-Bonds, has a beta higher than 1. **FALSE**

d. Investors can control the level of unsystematic risk, but they cannot control the level of systematic risk. **TRUE**

QUESTIONS

Mark TRUE or FALSE:

a. The CAPM assumes the perspective of a fully diversified investor, and the only risk that must be compensated is the systematic risk

b. If a stock has a negative beta, then its correlation coefficient is positive

c. A stock with a volatility of 40% will have a higher beta than a stock with a volatility of 30%.

QUESTIONS

Mark TRUE or FALSE:

a. The CAPM assumes the perspective of a fully diversified investor, and the only risk that must be compensated is the systematic risk. **TRUE**

b. If a stock has a negative beta, then its correlation coefficient is positive **FALSE**

c. A stock with a volatility of 40% will have a higher beta than a stock with a volatility of 30%. **FALSE, NOT NECESSARILY**

FILL IN THE BLANKS…

Complete each sentence with a suitable word or words. The first one has already been done for you.

The *expected* portfolio´s return is equal to the ……average of the assets´return included in the portfolio.

The risk of a portfolio is lower than the ……of the individual assets´ standard deviations, due to the fact that changes in the assets´return are always imperfectly……..

The risk of a well diversified portfolio is always……than the risk of investing in an individual stock.

Investors can eliminate the unsystematic risk through ……but they cannot eliminate the ……risk.

MULTIPLE CHOICE – SOLUTION

Complete each sentence with a suitable word or words. The first one has already been done for you.

The *expected* portfolio´s return is equal to the *weighted* average of the assets´return included in the porfolio.

But its risk is lower than the *weighted average* of the individual assets´ standard deviations, due to the fact that changes in the assets´return are always imperfectly *correlated*

The risk of a well diversified portfolio is always *lower* than the risk of investing in an individual stock.

Investors can eliminate the unsystematic risk through *diversification* but they cannot eliminate the *systematic* risk.

The Beta and the security market line

Suppose that US T-Bonds yield an annual rate of 4% and the expected market return is of 10%.

Calculate the expected returns of the stocks X and Y, taking into account that their betas are:

$$\beta_x = 1.25$$

$$\beta_y = 0.6$$

THE BETA AND THE SECURITY MARKET LINE

$$\text{Marke Risk Premium } (\text{rm} - \text{rf}) = 6\%$$

$$\beta_x = 1.25$$

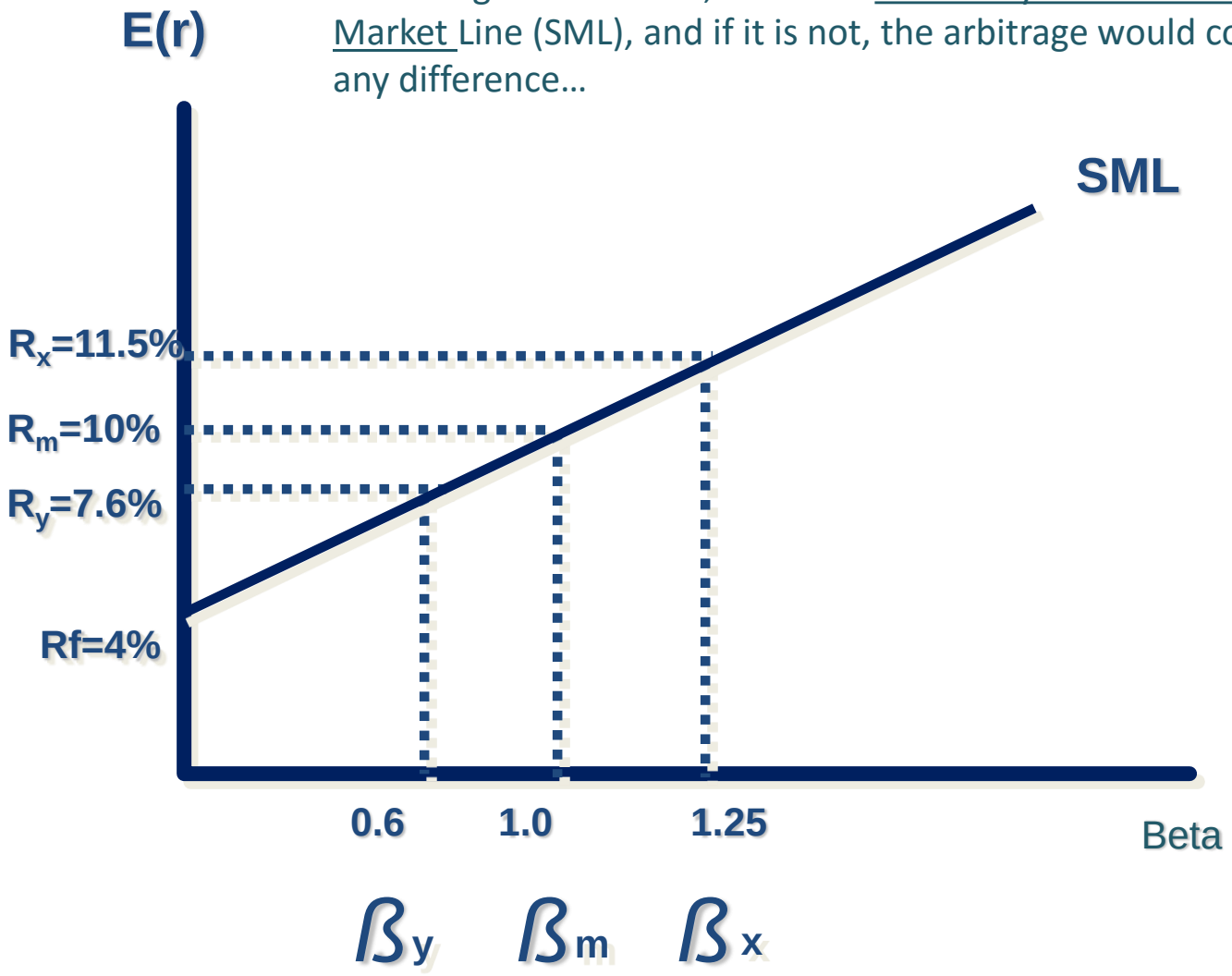
$$E(r_x) = 4\% + 1.25\,(6\%) = 11.5\%$$

$$\beta_y = 0.6$$

$$E(r_y) = 4\% + 0.06\,(6\%) = 7.6\%$$

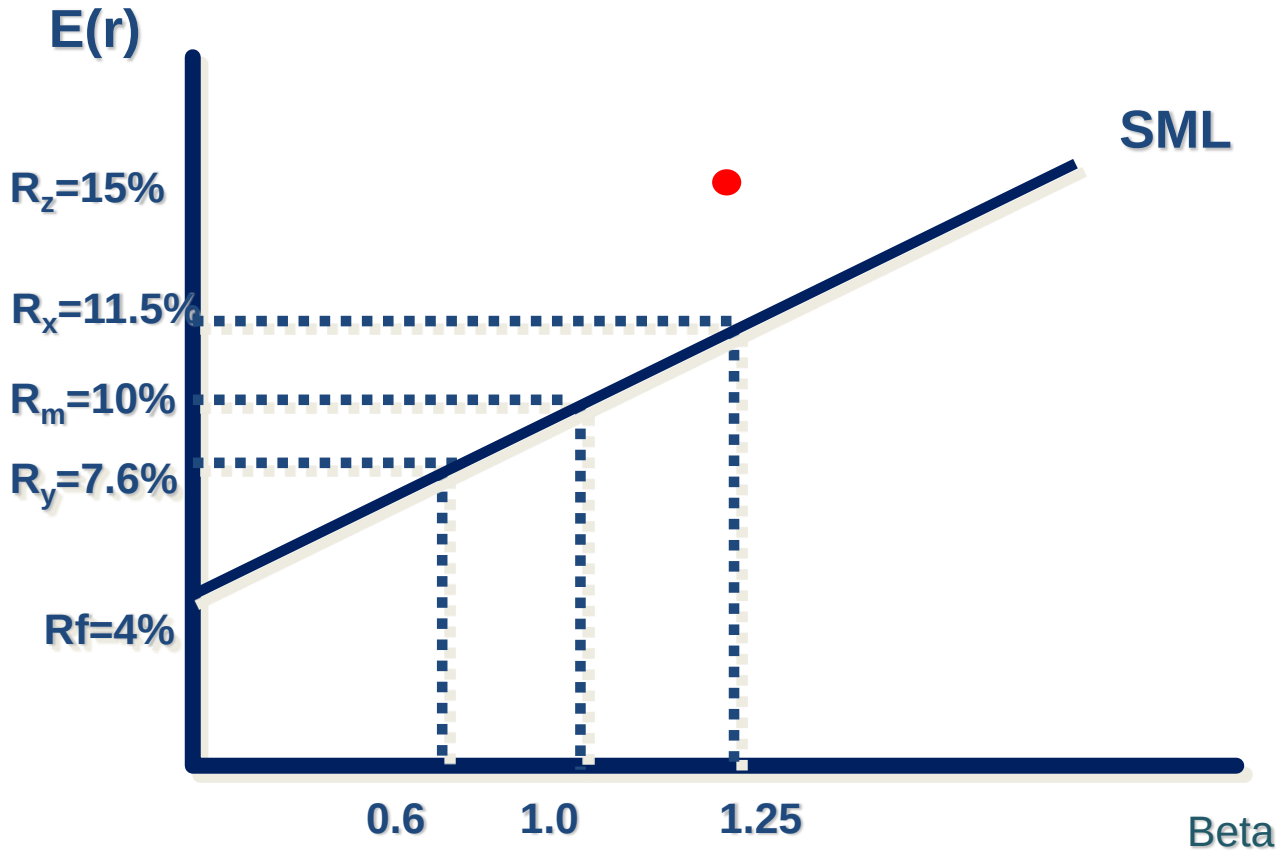
The Beta and the security market line

According to the CAPM, all assets should lay on the Security Market Line (SML), and if it is not, the arbitrage would correct any difference…



The Beta and the security market line

Suppose a stock Z has a beta of 1.25 and an expected return of 15%. According to the SML, the expected return should be equal to 11.5%, so its price does not reflect the fair price. What should happen?



FILL IN THE BLANKS

Complete each sentence with a suitable word or words. The first one has already been done for you.

The market risk of a stock is measured by its *beta* coefficient. In the CAPM world only the……..is compensated, because the……risk can be eliminated by…….

The beta coefficient is the ……of the ……line and is also equal to the……between …… ……return and ……market return over the ……of the market return.

Fill in the blanks

Complete each sentence with a suitable word or words. The first one has already been done for you.

The market risk of a stock is measured by its *beta* coefficient. In the CAPM world only the *systematic* is compensated, because the *unsystematic* risk can be eliminated by *diversification*

The beta coefficient is the *slope* of the *regression* line and is also equal to the *covariance* between *asset* return and *market* return over the *variance* of the market return.

EXERCISES

If the risk free rate is of 5% and the expected market return rm is of 12%, and assuming that the CAPM´s hypothesis holds:

a) How much is the market risk premium?

b) How is the expected return of a stock with a beta of 1.5?

c) If a stock has a beta of 1, and its expected return is of 10%, is it overvalued or undervalued?

d) If a stock has a beta of 0.5, which is its expected return?

e) Draw the security market line that shows how the expected return changes as beta changes.

Solution

a) 7% (12%-5%)

b) 5% + 7% x 1.5=15.5%

c) The fair expected return would be 5% + 7% x 1.0=12%, so, is overvalued

d) The fair expected return would be 5% + 7% x 0.5=8.5%

e)

SUMMARY

- The unsystematic risk can be eliminated by diversification
- The CAPM model assumes the perspective of a well diversified investor. So, the only risk that has to be compensated is the systematic risk
- The systematic risk is associated with events that affect the market as a hole, and cannot be eliminated by diversification.
- The systematic (market) risk of an asset is expressed by its beta.
- CAPM: $E(R_i) = R_f + [E(R_M) - R_f]\beta$

COMPARABLE BETA APPROACH

The method to estimate the company´s beta depends on whether their stocks are traded or not. Because San Telmo is a private company, we cannot observed its beta. In this case, we can apply the “comparable beta approach”.

Company	Country	Beta 09	D/E	Effective tax rate
Sound	US	1,1	30%	34%
Pacman	US	1,1	35%	32%
Bemis	US	1,0	25%	36%
Greif	US	1,5	40%	34%
Sansuy	BR	0,9	30%	35%
Sealed Air	US	1,4	32%	34%
Mean		**1,15**	**32%**	**34%**

UNLEVERING AND RELEVERING THE BETA

Because the industry beta is an average beta that reflects the effect of the financial debt we unlever it using the Hamada's formula that takes into account the levered beta (1.10), the industry capital structure (32%) and the industry marginal tax rate (34%):

$$\beta u = \frac{\beta e}{\left[1 + \frac{D}{E}(1-t)\right]}$$

$$\beta u = \frac{1.10}{[1 + 0.32\,(1 - 0.34)]} = 0.95$$

The unlevered beta for the industry is about 0.95 and reflects only it business risk. To obtain the levered beta for San Telmo, the unleveraged beta of 0.95 is relevered for the expected capital structure, using the formula to relever the unlevered betas, taking into account the marginal tax rate in the emerging country:

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

$$\beta_L = 0.95\left[1 + \frac{30}{70}(1 - 0.40)\right] = 1.19$$

COST OF EQUITY CAPITAL

The risk-free rate has been considered as the 10 years T-Bond current yield of 4% and the market risk premium is estimated in 5.5%.

Since obtaining the free cash flow in developing countries is riskier than in USA and other developed countries, we include a country risk premium in the cost of capital. In order to compute the country risk, we add a premium of 200 basis points to the cost of equity capital. Therefore, the cost of equity capital, adjusted to reflect the country risk premium is as follows:

$$ke = rf + \left[E(rm) - rf\right]\beta + CRP$$

$$ke = 4\% + \left[5.5\%\right]1.19 + 2\% = 12.56\%$$

Country risk premium (CRP)

Cost of debt after taxes

We assume that San Telmo can issue a bond with a coupon rate of 8% and it will be sold at par value, so the effective cost of debt before tax will be 8%. Because interest charges are tax deductible, the cost of debt must be expressed on an after tax basis. So, the cost of debt after tax is:

$$kd(1-t) = 8\%(1-0.40) = 4.8\%$$

Country risk premium

The additional risk associated with investing in an international company rather than the domestic market. Macroeconomic factors such as:

- Political instability
- Volatile exchange rates
- Economic turmoil
- Expropriation
- Default risk
- Devaluation risk
- Regulations

These factors cause investors to be wary of overseas investment opportunities and thus require a premium for investing. The country risk premium (CRP) is higher for developing markets than for developed nations.

There exist consensus that these kind of risk are not captured in the beta coefficient, so, we have to consider a country risk premium in the cost of capital.

Country risk premium

In practice, the country risk premium is estimated as the spread of the local government bond rate denominated in US dollars and a US government bond with similar maturity:

Country risk premium= Yield Local Bond in US dollars – Yield UST-bond

Contry risk premiums for emerging markets are measured and published by JP Morgan.

For example, if the yield of an emerging bond is of 5% and the yield of a US treasury bond is of 3%, then the country risk premium is of 2%.

WACC OF SAN TELMO

In order to estimate the weighted average cost of capital (WACC) we must consider the cost of debt after taxes, the cost of equity capital and establishing fair values weights for the capital structure. The equation for the WACC is as follows:

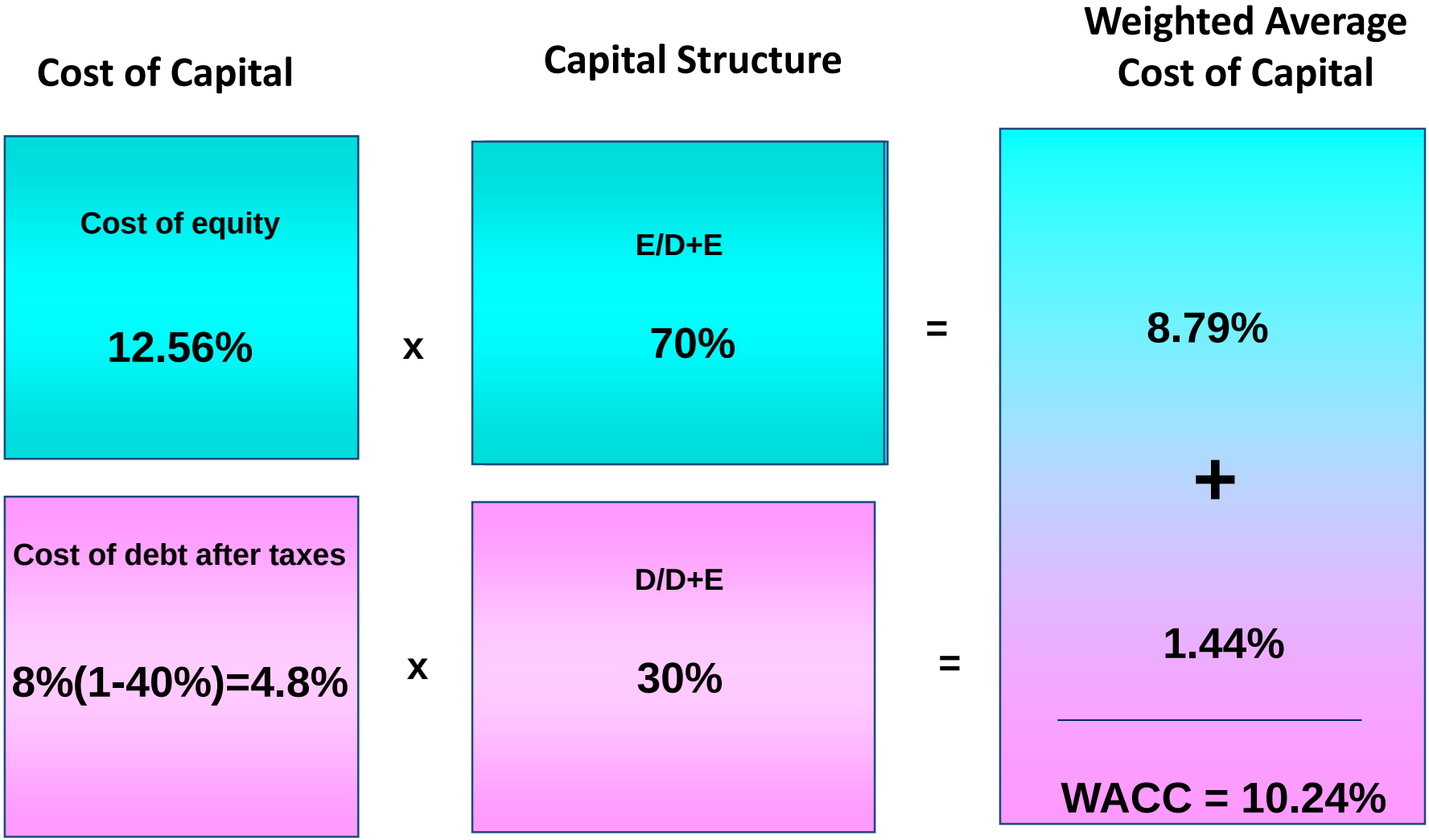
$$WACC = kd(1-t)\frac{D}{E+D} + ke\frac{E}{E+D}$$

$$WACC = \underbrace{8\%(1-0.40)}_{kd(1-t)=4.8\%} \times 0.3 + 12.56\% \times 0.7 = 10.24\%$$

$$ke = 4\% + [5.5\%]1.19 + 2\% = 12.56\%$$

kd: pretax cost of debt
t: marginal tax rate
D: fair value of financial debt
ke: cost of equity
E: fair value of equity

SAN TELMO´S WACC



FAIR VALUE OF SAN TELMO

	d 2011	d 2012	d 2013	d 2014	d 2015	d 2016
FREE CASH FLOW		27	30	33	35	38
Terminal Value						821
FCF + Terminal Value		27	30	33	35	859
V (PV FCF)	$ 465.7					

$$V = \sum_{t}^{\infty} \frac{FCF_1}{(1+WACC)^t} = 465.7$$

Finally, to obtain the Equity Fair Value, we subtract the financial debt to the fair value of current operations. So, the equity fair value (*E*) is the value of its operations minus the value of its financial debt:

$$E = V - D$$

Since the expected capital structure is D/V=30%, financial debt must be equal to

D=465.7 x 30%=139.7

$$E = 465.7 - 139.7 = 326$$

Fair Value of San Telmo

So, the Equity Fair Value, obtained with the Discounted Cash Flow method, is $ 326 million.

Usually, DCF is used in conjunction with the multiples approach to check if the value estimated by the former is similar to the value that investors are willing to pay for the share of a similar company in the stock market.

Multiple is a ratio which relates a market value with a measure of a company's earnings.

FILL IN THE BLANKS

Complete each sentence with a suitable word or words. The first one has already been done for you.

The WACC of the company is equal to the *weighted* average cost of capital.

The cost of debt always must be expressed in an…….taxes basis. The cost of equity is obtained with the ……..model.

If the company is not traded, the beta can be obtained using the ……approach, which consists in identified similar companies, and then calculate the……beta of the peer group. Since the capital structure of the target may be different to the capital structure of the peer group, we have to ……..the beta of the peer group, and then…… it using the capital structure of the target and the legal …….rate.

FILL IN THE BLANKS

Complete each sentence with a suitable word or words. The first one has already been done for you.

The WACC of the company is equal to the *weighted* average cost of capital.

The cost of debt always must be expressed in an *after* taxes basis. The cost of equity is obtained with the *CAPM* model.

If the company is not traded, the beta can be obtained using the *comparable* approach, which consists in identified similar companies, then calculate the *average* beta of the peer group. Since the capital structure of the target may be different to the capital structure of the peer group, we have to *unlevered* the beta of the peer group, and then *relevered* it using the capital structure of the target and the legal *tax* rate.

MULTIPLES

Valuation using multiples or relative valuation is another method of estimating the value of a company by comparing it to the multiples observed for similar companies.

The process consists of identifying comparable companies (known as the peer group) and obtaining their EBITDA multiples.

Once the multiples were obtained, the mean (or the median) is calculated and applied to the company´s EBITDA to obtain an estimation of the equity fair value.

Price/EBITDA is calculated as follows:

$$P / EBITDA = \frac{Market\ \ capitalization}{EBITDA}$$

MULTIPLES – PRICE EBITDA (P/EBITDA)

What does a multiple such as Price/EBIDTDA mean?

The Price/EBITDA (P/EBITDA) is equal to a stock´s market capitalization (which is equal to all stocks multiplied by its price) divided by EBITDA.

It shows how much investors are willing to pay per dollar of EBITDA. If a company were currently trading at a multiple P/EBITDA of 7, it means that an investor is willing to pay $7 per dollar of current EBITDA.

MULTIPLES

In mergers, acquisitions and transactions on private companies another EBITDA multiple is often used known as Enterprise Value/EBITDA (EV/EBITDA). It is based on enterprise value (the market value of equity + the value of financial debt). EV/EBITDA is calculated as follows

$$EV/EBITDA = \frac{Market\ \ capitalization + D}{EBITDA}$$

MULTIPLES

Suppose the average P/EBITDA multiple for the peer group was 6. Once the multiple was obtained, we can apply to San Telmo by multiplying it to the current EBITDA of $56 (remember that the EBITDA of 2012 was 56 million). So, the estimated equity fair value is

$$E = 6\,EBITDA$$

$$E = 6 \times 56 = 336$$

MULTIPLES

The DCF value is compared with the multiple of EBITDA to assess whether the fair value obtained by DCF isconsistent with market prices. In our example, the EBITDA multiple is near to the DCF value (326 vs 336).

	DCF Method	Multiples approach
Estimated Equity Fair Value	326	336

Although the EBITDA multiples are commonly used in professional valuation, sometimes a book value, cash flow or other categories such as the company´s sales are used. In stock trading, the most widely used multiple is the price-earning ratio(P/E ratio or PER) which is popular in part due to its wide availability and in part due to the fast comparisons it allows. However, the usefulness of P/E ratios is lessened by the fact that earnings per share is subject to distortions from differences in accounting rules and capital structures between companies.

Telecom´s Fair Value

Telecom is one of the two largest telecommunications companies in Argentina.

Its shares are traded in the Bolsa de Comercio of Buenos Aires and in the New York Stock Exchange.

Now we will see a brief summary of the task of valuation to obtain the fair value of Telecom, performed in 2008, when we were hired by one of the shareholders, in their litigation with Telecom Italia.

HISTORICAL PERFORMANCE 1996-2007

	dic-96	dic-97	dic-98	dic-99	dic-00	dic-01	dic-02	dic-03	dic-04	dic-05	dic-06	dic-07
Sales increases		30%	23%	0%	1%	-5%	31%	-6%	20%	27,2%	30,1%	22,0%
COGS	59%	54%	50%	48%	54%	49%	72%	70%	65,6%	64,8%	60,6%	54,7%
Adm. expenses	6%	7%	7%	7%	7%	8%	7%	6%	5,4%	4,4%	3,7%	3,8%
Commercial expenses	10%	13%	18%	21%	20%	30%	26%	21%	20,0%	22,1%	23,4%	23,5%
EBIT	**25%**	**26%**	**26%**	**23%**	**20%**	**14%**	**-5%**	**3%**	**9%**	**9%**	**12%**	**18%**
Interest rate on debt	11%	7%	9%	8%	8%	8%	12%	6%	7%	9%	11%	9,7%
Income taxes	31%	34%	36%	29%	24%	52%	23%	-2%	-4%	8%	-7%	24,4%
Depreciation	13%	14%	17%	15%	16%	17%	22%	23%	24%	25%	24%	25%
Fixed assets/sales	2,1	1,8	1,5	1,6	1,6	1,6	2,4	2,1	1,53	1,04	0,77	0,63
Capes	0	1.033	860	1.062	1.019	472	6.892	260	540	562	1.174	1.413
Other assets	3%	2%	3%	2%	4%	10%	2%	4%	2%	1%	2%	4%
Fiscal liabilities	5,2%	5,6%	5,3%	2,3%	2,0%	2,8%	2,9%	4,0%	2,5%	3,9%	3,1%	2,9%
Social liabilities	3,5%	3,5%	2,6%	2,9%	2,1%	2,0%	1,5%	2,1%	1,8%	1,8%	1,8%	1,8%
DSO	67	62	73	70	79	67	45	47	50	45	38	36
DSI	4	4	8	6	12	5	2	2	10	10	14	12
DAP		116	110	158	177	123	50	62	66	81	119	121
Cash Cycle		**-50**	**-29**	**-82**	**-85**	**-51**	**-3**	**-14**	**-7**	**-25**	**-66**	**-73**

Assumptions

1. Sales: were forecasted using the lineal tendency for the period 2008-2014, decreasing until reach a growth rate of 5% in the 10th year.

2. **COGS, Administrative expenses and Commercial expenses:** were considered as 50%, 3.5% and 23% of the sales, respectively.

These assumptions leads to an EBIT/sales ratio of 21/22%

3. Interest rate on financial debt: was considere an interest rate of 10% per year, based on the yield of Telecom´s bonds.

4. Effective Tax Rate: was considered been the legal tax rate of 35%.

Assumptions

7. **Fixed assets, capex and depreciation**: the global rate of depepreciation was estimated been 25% and capex were estimated been 15% of the forecasted sales (according to the standard rate in the industry).

These assumptions leads to a fixed assets/sales ratio of 0.4

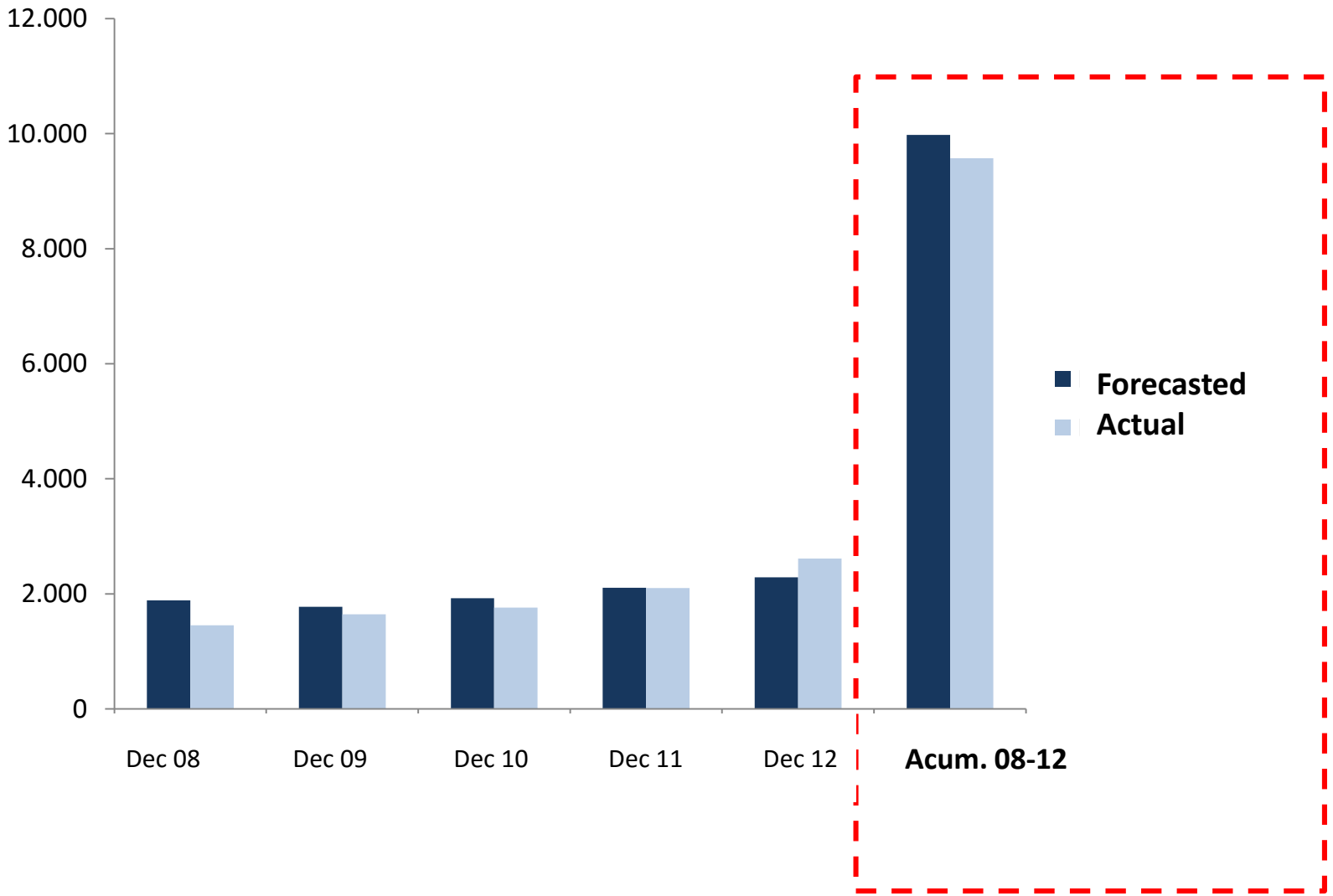
8. **DSO, DSI and DAP**: 36, 10 and 120 days respectively, based on the historical performance.

These assumptions leads to a cash cycle of -76 days

Forecasted Free Cash Flow 2008-2017

	dec 08	dec 09	dec 10	dec 11	dec 12	dec 13	dec 14	dec 15	dec 16	dec 17
EBIT	**2.036**	**2.588**	**3.069**	**3.569**	**3.933**	**4.297**	**4.660**	**4.986**	**5.285**	**5.550**
Depreciation & Amortization	1.830	1.826	1.881	1.980	2.113	2.270	2.446	2.630	2.816	2.998
EBITDA	**3.866**	**4.415**	**4.951**	**5.549**	**6.046**	**6.567**	**7.106**	**7.617**	**8.101**	**8.547**
Accounts receivables	143	152	152	152	153	152	152	137	126	111
Inventories	-1	16	18	17	21	21	21	19	17	15
Accounts payables	233	201	220	209	256	254	254	227	209	184
Fiscal liabilities	50	46	46	46	47	46	46	42	38	34
Other assets	-121	31	31	31	31	31	31	28	25	22
Social liabilities	47	31	31	31	31	31	31	28	25	22
Income taxes	713	906	1.074	1.249	1.377	1.504	1.631	1.745	1.850	1.942
Cash flow from operations	**3.463**	**3.587**	**3.972**	**4.386**	**4.798**	**5.190**	**5.602**	**5.985**	**6.356**	**6.697**
Capex	1.582	1.814	2.046	2.278	2.511	2.743	2.974	3.183	3.374	3.542
Cash flow from investments	**1.577**	**1.814**	**2.046**	**2.278**	**2.511**	**2.743**	**2.974**	**3.183**	**3.374**	**3.542**
FREE CASH FLOW	**1.886**	**1.773**	**1.926**	**2.108**	**2.287**	**2.447**	**2.628**	**2.802**	**2.982**	**3.154**

Free Cash Flow: actual vs forecasted 2008-2012



TELECOM´S WACC

Telecom´s WACC was estimated considering the current capital structure. At may 2008, the D/V relation was about 15%. The CAPM was used to estimate the cost of equity and was included a country risk premium. The cost of debt was estimated been 10%, based on the yield of Telecom´s bonds.

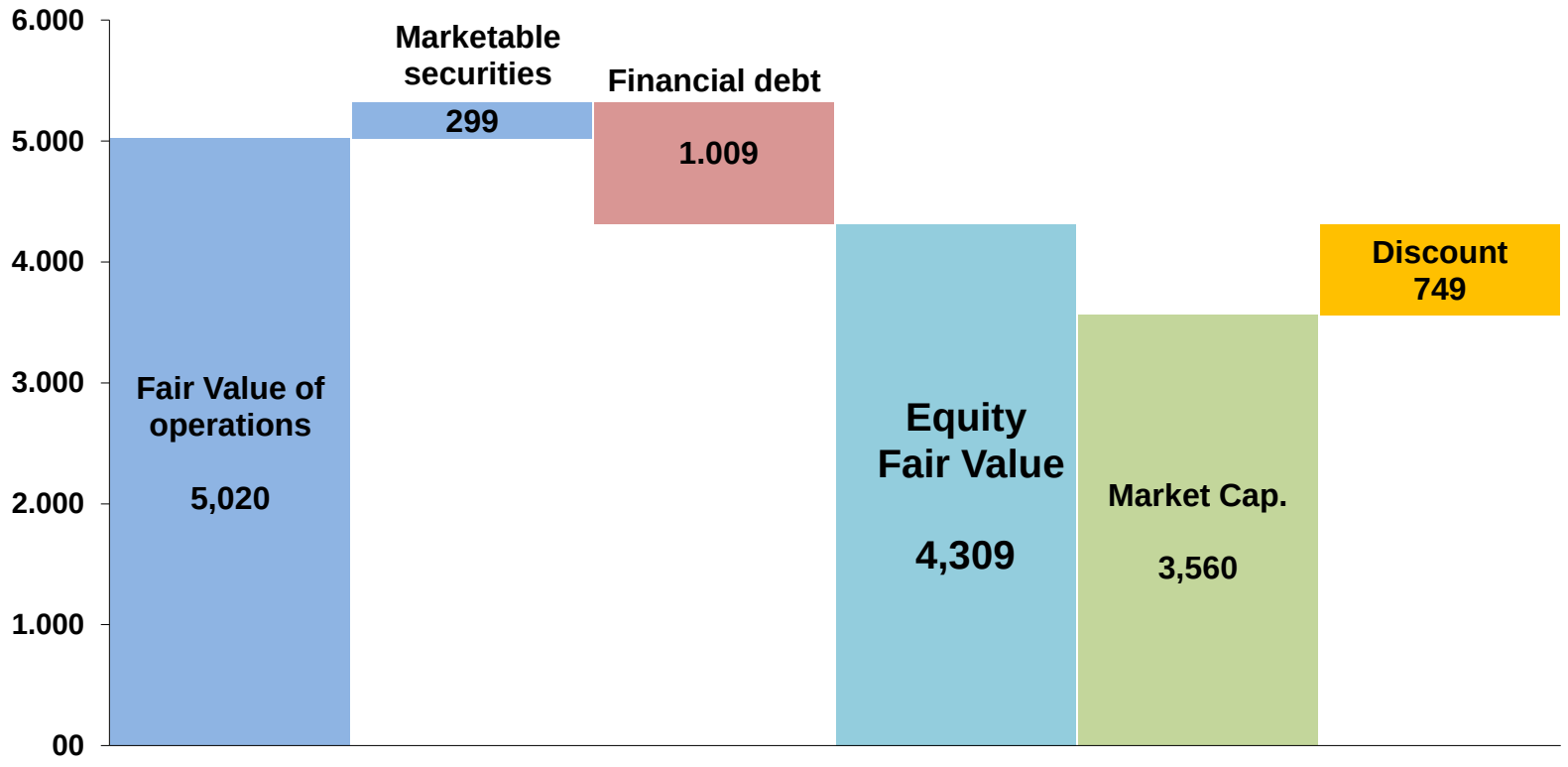
$$ke = rf + [E(rm) - rf]\beta + CRP$$

$$WACC = kd(1-t)\frac{D}{D+E} + ke\frac{E}{D+E}$$

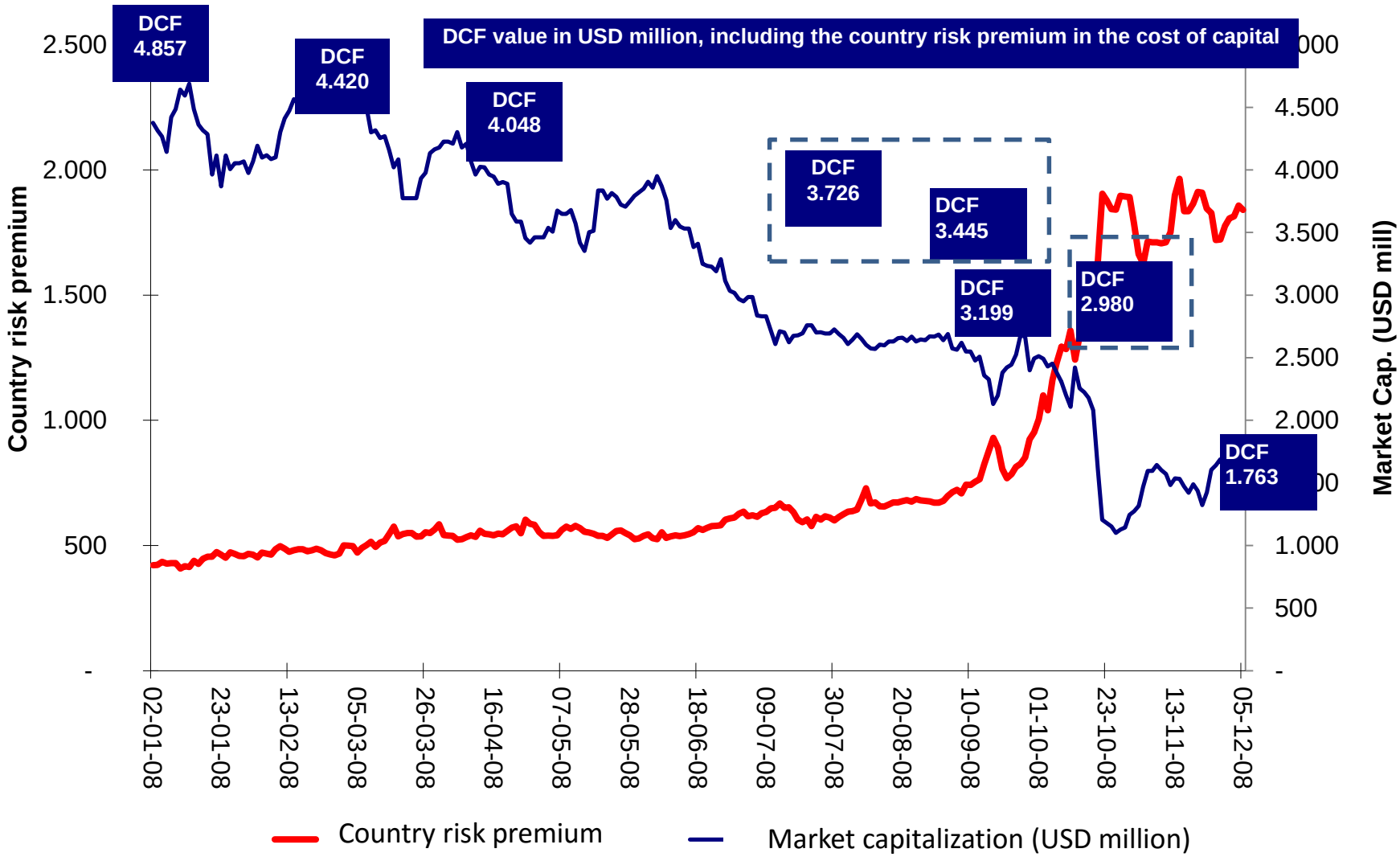
$$WACC = 10\%(1-0{,}35) \times 0{,}15 + 13{,}49\% \times 0{,}85 = 12{,}4\%$$

$$ke = 3{,}8\% + [10{,}5\% - 3{,}8\%]0{,}73 + 4{,}8\% = 13{,}49\%$$

TELECOM´s Fair Value (million of USD)



COUNTRY RISK PREMIUM AND TELECOM MARKET CAP.



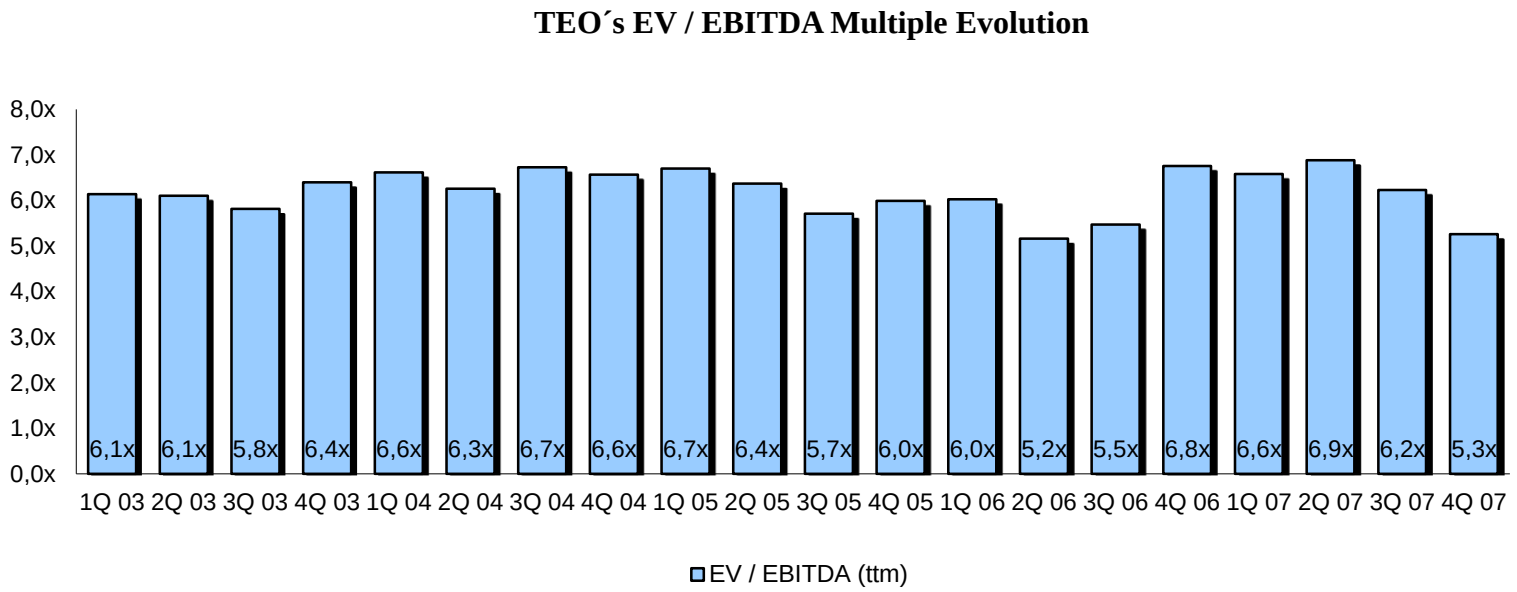
ENTERPRISE VALUE/EBITDA

Company	EV / EBITDA		
	FY 07	FY 08 E	FY 09 E
Wireline/Integrated			
Telecom Argentina	4,8x	4,0x	3,5x
Telmex	5,9x	5,9x	5,8x
Axtel	8,5x	7,0x	6,3x
CTC	4,7x	4,4x	4,5x
Brasil Telecom Part.	3,8x	3,6x	3,4x
Tele Norte Leste Part.	3,4x	3,3x	3,3x
Telesp Fixed	4,0x	4,5x	4,5x
Mean	**5,0x**	**5,0x**	**4,9x**

ENTERPRISE VALUE/EBITDA

Fair Value of operations

$$\frac{\text{Enterprise Value USD MM}}{\text{EBITDA 2007/exchange rate}} = \frac{5{,}020}{3{,}052 / 3.17} = 5.2x$$



Business Valuation

UNIVERSIDAD NACIONAL DEL LITORAL – HOCHSCHULE KAISERLAUTERN

DR. GUILLERMO L. DUMRAUF

SANTA FE, JUNE 2016