

Valuation using multiples. How do analysts reach their conclusions?¹

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This chapter focuses on equity valuation using multiples. Our basic conclusion is that multiples nearly always have broad dispersion, which is why valuations performed using multiples may be highly debatable. We revise the 14 most popular multiples and deal with the problem of using multiples for valuation: their dispersion. 1,200 multiples from 175 companies illustrate the dispersion of multiples of European utilities, English utilities, European constructors, hotel companies, telecommunications, banks and Internet companies.

However, multiples are useful in a second stage of the valuation: after performing the valuation using another method, a comparison with the multiples of comparable firms enables us to gauge the valuation performed and identify differences between the firm valued and the firms it is compared with.

We show that PER, EBITDA and Profit after Tax (the most commonly used parameters for multiples) were more volatile than equity value.

We also provide additional evidence of the analysts' recommendations for Spanish companies: less than 15% of the recommendations are to sell.

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Tables and figures are available in excel format with all calculations in:
http://web.iese.edu/PabloFernandez/Book_VaCS/valuation%20CaCS.html

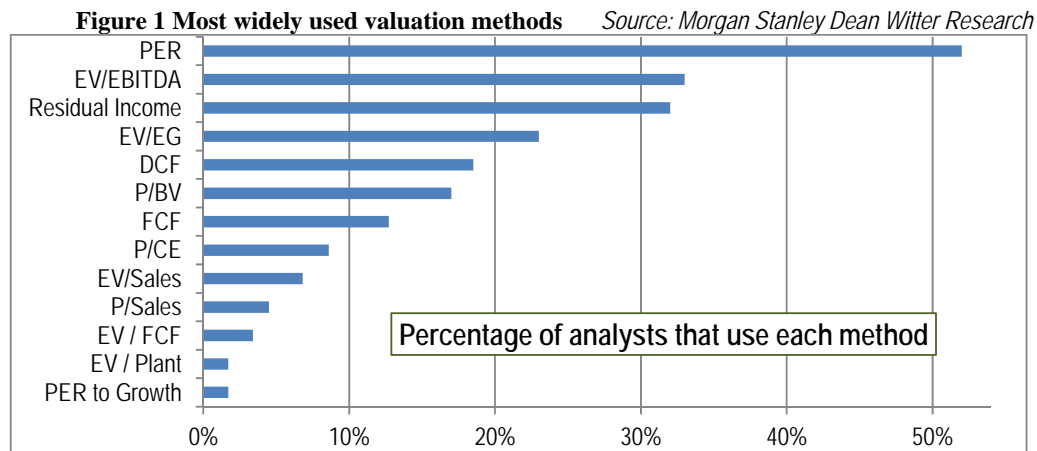
¹ I would like to thank Laura Reinoso and Laura Parga for their impressive work with data collection and Charlie Porter for his wonderful help revising previous manuscripts of this chapter.

This chapter focuses on equity valuation using multiples. The basic conclusion is that multiples almost always have broad dispersion, which is why valuations performed using multiples are highly debatable.

However, multiples are useful in a second stage of the valuation: after performing the valuation using another method, a comparison with the multiples of comparable firms enables us to gage the valuation performed and identify differences between the firm valued and the firms it is compared with.

1. Valuation methods used by the analysts

Figure 1 shows the valuation methods² most widely used by Morgan Stanley Dean Witter's analysts for valuing European companies. Surprisingly, the discounted cash flow (DCF) is in fifth place, behind multiples such as the PER, the EV/EBITDA and the EV/EG.



2. Most commonly used multiples

Although as **Figure 1** shows, the PER and the EV/EBITDA seem to be the most popular multiples for valuing firms, it is also true that, depending on the industry being analyzed, certain multiples are more appropriate than others.

Table 1. Most commonly used multiples

P/E, PER	Price earnings ratio	P/output	Price to output
P/CE	Price to cash earnings	EV/EBITDA	Enterprise value to EBITDA
P/S	Price to sales	EV/S	Enterprise value to sales
P/LFCF	Price to levered free cash flow	EV/FCF	Enterprise value to unlevered free cash flow
P/BV	Price to book value	EV/BV	Enterprise value to book value
P/AV	Price to asset value	PEG	Price earnings (PER) to growth
P/Customer	Price to customer	EV/EG	Enterprise value to EBITDA growth
P/units	Price to units		

The multiples can be divided into three groups³:

1. Multiples based on the company's capitalization (equity value: E).
2. Multiples based on the company's value (equity value and debt value: E+D)⁴.
3. Growth-referenced multiples.

² Weighted by the market capitalization of the industry in which it is applied.

³ Morgan Stanley Dean Witters Report *How We Value Stocks*, 15 September 1999.

⁴ The value of the firm (E+D) is often called *Enterprise Value* (EV). However, the initials are also used sometimes to indicate the value of the shares (*Equity Value*)

2.1. Multiples based on capitalization

The price- or capitalization-based multiples have the advantage of being very easy to understand and calculate.

1. Price Earnings Ratio (PER).

$$\text{PER} = \text{market capitalization} / \text{total net income} = \text{share price} / \text{earnings per share}$$

Sometimes, the mean of last or next few years' earnings is used.

2. Price to Cash Earnings (P/CE).

$$\text{P/CE} = \text{market capitalization} / (\text{net income before depreciation and amortization})$$

3. Price to sales (P/S).

$$\text{P/S} = \text{market capitalization} / \text{sales} = \text{Share price} / \text{sales per share}$$

This multiple compares sales with capitalization (the shares' value) only. However, sales are attributable to all the company's stakeholders: shareholders, creditors, pensioners, Inland Revenue... As we will see in chapter 24, this multiple is often used to value Internet companies... and also telecommunications infrastructure companies, bus companies and pharmacies.

4. Price to Levered Free Cash Flow (P/LFCF).

$$\text{P/LFCF} = \text{Market capitalization} / (\text{Operating income after interest and tax} + \text{depreciation} + \text{amortization} - \text{increased working capital requirements} - \text{investments in existing businesses}^5).$$

One variant of this multiple is the P/FAD (*funds available for distribution*).

5. Price to Book Value (P/BV).

$$\text{VM/VC} = \text{P/BV} = \text{market capitalization} / \text{book value of shareholder's equity}$$

In a firm with constant growth g , the relationship between market value and book value is:
 $\text{P/BV} = (\text{ROE} - g) / (K_e - g)$

This multiple is often used to value banks. Other industries that use P/BV or its derivatives are the paper and pulp industry, real estate and insurance. One variant of this multiple for the insurance industry is the capitalization / *embedded value* (shareholder's equity + present value of the future cash flows on signed insurance contracts).

6. Price to Customer

$$\text{P / Customer} = \text{market capitalization} / \text{number of customers}$$

This multiple is very commonly used to value cellular phone and Internet companies.

7. Price to units

This multiple is often used to value soft drinks and consumer product companies.

8. Price to output.

This multiple is used to value cement and commodities companies.

9. Price to potential customer

As we will see in chapter 24, some analysts use this multiple to value Internet companies.

2.2. Multiples based on the company's value ($\text{EV} = \text{D} + \text{E}$)

These multiples are similar to those in the previous section, but instead of dividing the market capitalization by another parameter, they use the sum of the firm's market capitalization and financial debt. This sum is usually called the *Enterprise Value* (EV)⁶.

⁵ "Investments in existing businesses" are those in businesses that the company already has. They do not include growth-oriented investments, either for new businesses or to increase capacity.

1. Enterprise Value to EBITDA (EV/EBITDA).

$EV/EBITDA = \text{Enterprise value} / \text{Earnings before interest, tax, depreciation and amortization.}$

This is one of the most widely used multiples by analysts. However, the EBITDA (earnings before interest, tax, depreciation and amortization) has a number of limitations⁷, including:

1. It does not include the changes in the working capital requirements (WCR)
2. It does not consider capital investments.

2. Enterprise Value to Sales (EV/Sales).

$EV/Sales = \text{Enterprise value} / \text{Sales.}$

3. Enterprise Value to Unlevered Free Cash Flow (EV/FCF).

$EV/FCF = \text{Enterprise value} / (\text{Earnings before interest and after tax} + \text{depreciation} + \text{amortization} - \text{increased working capital requirements} - \text{capital investments}^8).$

2.3. Growth-referenced multiples

1. P/EG or PEG. PER to EPS growth

$PER/g = P/EG = PEG = PER / \text{growth of earnings per share in the next few years}$

This multiple is mainly used in growth industries, such as luxury goods, health and technology.

2. EV/EG. Enterprise value to EBITDA growth

$EV/EG = EV/EBITDA (\text{historic}) / \text{growth of EBITDA in the next few years}$

As with the previous multiple, it is mainly used in growth industries, particularly health, technology and telecommunications.

3. Relative multiples

All of these multiples by themselves can tell us very little. They need to be placed in a context. There are basically three relative valuations:

1. With respect to the firm's own history
2. With respect to the market
3. With respect to the industry

1. With respect to the firm's history

$\text{History-referenced multiple} = \text{multiple} / \text{mean of recent years' multiple}$

One problem with historic multiples is that they depend on exogenous factors, such as interest rates and stock market situation. In addition, the composition and nature of many firms' business changes substantially over time, so it does not make much sense to compare them with previous years.

2. With respect to the market

$\text{Market-referenced multiple} = \text{firm multiple} / \text{market multiple}$

3. With respect to the industry

$\text{Industry-referenced multiple} = \text{firm multiple} / \text{industry multiple}$

This comparison with the industry is more appropriate than the two previous comparisons. However, one problem is that when the industry is overvalued, all of the companies in it are overvalued: a clear example of this situation was the Internet companies up to 2000. We shall also see

⁶ If there are preferred shares and minority interests, the enterprise value is: market capitalization + preferred shares + minority interests + net debt.

⁷ For a good report on the limitations of the EBITDA, see *Putting EBITDA In Perspective*, Moody's Investors Service, June 2000.

⁸ Sometimes recurrent *free cash flow* is used as well. In this case, investments in existing businesses are considered.

in section 4 that the multiples of companies operating in the same industry normally have very wide dispersion.

Table 2 is a summary of the most commonly used multiples for valuing different industries.

Table 2. Most commonly used multiples in different industries

Industry	Sub-Sector	Most commonly used multiples
Automobiles	Manufactures	P/S
	Components	P/CE relative and P/S
Banks		P/BV
Base Materials	Paper	P/BV
	Chemicals	EV/EBITDA, EV/S, P/CE
	Metals & Mining	P/LFCF and EV/EBITDA
Building & Construction		P/LFCF, EV/FCF, PER and EV/EBITDA
Business Services		EV/EBITDA, ROCE, P/LFCF, PER and PER to growth
Capital Goods	Engineering	PER, EV/EBITDA and EV/S
	Defence	PER, EV/EBITDA and EV/S
Food, Drink & Tobacco	Food Producers	EV/EBITDA and EV/CE
	Brewers & Pubs	ROCE, PER to growth and PER relative
	Alcoholic Beverages	EV/EBITDA
	Tobacco	ROCE
Healthcare		PER, PER relative to S&P and EV/EBITDA
Insurance		P/AV
Leisure		EV/EBITDA
Media		PER relative and EV/EBITDA
Oil & Gas	Integrated	PER and EV/CE
Real Estate		P/FAD, EV/EBITDA and P/NAV
Retail & Consumer Goods	Clothing	PER relative to market and sector, EV/EBITDA
	Food	PER relative
	Luxury Goods	PER, PER to growth, EV/S and EV/E to EBITDA growth
Technology	Software, equipment & semiconductors	PER y PER relative
Telecoms		EV/E to EBITDA growth, EV/S and P/customer
Transport	Air	EV/EBITDA
	Travellers through road	P/S
Utilities		PER and P/CE

Table 3 shows the average multiple of different industries⁹ in the US stock market in September 2000. The total number of companies analyzed was 5,903.

4. The problem with multiples: their dispersion.

4.1. Dispersion of the utilities' multiples. **Table 4** shows multiples used to value European utilities.

Table 5 concentrates solely on English utilities. Note the multiples' wide dispersion in all cases.

4.2. Dispersion of the multiples of construction companies. **Table 6** shows different multiples for construction and building materials companies in Europe, America, Asia and Spain. **Table 7** contains multiples for hotel companies

⁹ You can find these multiples in http://www.stern.nyu.edu/~adamodar/New_Home_Page/datafile/pedata.html

Table 3. Mean multiples of different American industries. September 2000.

Industry	PER	P/S	EV/S	P/BV	EV/BV	EV/EBITDA	PEG	ROE	ROC	Payout	Beta	Dividend Yield	Volatility	Capitalization (mm)
Air Transport	12.0	0.4	0.7	1.8	1.6	3.8	1.0	13.9%	15.3%	10.7%	1.1	0.98%	53.1%	64
Auto & Truck	14.7	0.7	1.4	2.1	1.5	4.9	1.0	12.6%	12.5%	28.7%	0.9	1.15%	45.8%	378
Bank	12.2	NA	NA	2.2	2.1	4.0	1.1	18.9%	28.1%	38.1%	0.8	3.28%	32.5%	524
Beverage (Soft Drink)	39.8	3.5	3.9	9.4	5.4	13.4	2.6	22.1%	19.6%	46.5%	0.8	0.68%	38.3%	236
Chemical (Diversified)	24.0	2.0	2.4	4.0	2.7	7.4	1.6	15.7%	16.7%	44.2%	0.8	1.51%	39.7%	183
Computer & Peripherals	75.8	3.9	3.9	12.5	12.9	25.2	2.7	18.3%	24.5%	9.2%	1.1	0.06%	88.8%	1,418
Computer Software & Svcs	73.1	7.3	7.1	12.6	17.5	25.3	2.3	19.2%	33.4%	4.3%	1.0	0.09%	91.1%	1,223
Drug	59.0	9.2	9.3	14.3	13.6	27.2	2.1	23.9%	28.3%	48.2%	0.9	0.08%	95.6%	1,490
Electric Utility (East)	13.2	1.0	1.9	1.7	1.3	5.3	1.6	13.5%	11.7%	70.6%	0.5	4.83%	30.1%	137
Electrical Equipment	43.8	4.3	4.4	9.5	8.2	23.9	2.2	22.9%	17.9%	40.9%	0.9	0.68%	76.5%	650
Electronics	110.8	2.8	2.9	8.2	7.3	27.8	4.5	10.9%	12.4%	9.2%	0.9	0.19%	75.4%	260
Entertainment	125.8	2.8	3.3	2.8	2.2	11.1	5.7	2.5%	7.9%	17.9%	0.9	0.16%	70.0%	306
Financial Services	21.3	5.7	7.6	3.6	2.4	8.0	1.3	17.7%	17.4%	18.9%	0.9	1.36%	48.8%	784
Food Processing	14.0	0.8	0.9	2.3	2.4	5.3	1.1	15.0%	19.9%	42.0%	0.7	1.61%	41.8%	247
Foreign Electron/Entertain	342.6	2.6	2.7	3.2	3.3	8.9	20.2	2.8%	11.8%	122.6%	0.9	1.50%	42.6%	437
Foreign Telecom.	82.3	9.9	10.6	10.8	6.8	17.3	5.2	10.3%	19.1%	49.8%	1.1	1.23%	45.7%	1,765
Household Products	20.8	1.8	2.0	7.1	4.0	8.2	1.4	35.0%	24.4%	39.2%	0.8	1.23%	43.4%	172
Insurance (Life)	14.9	NA	NA	2.2	2.1	4.2	1.4	15.0%	31.6%	23.6%	0.9	1.43%	42.4%	125
Internet	NA	26.7	26.1	16.2	26.4	NA	NA	-18.3%	-13.0%	0.0%	2.0	0.00%	134.0%	672
Medical Services	21.8	0.7	0.8	2.3	2.1	6.5	1.0	10.0%	14.1%	8.2%	0.9	0.18%	76.1%	136
Medical Supplies	34.9	2.2	2.3	7.3	5.8	14.8	1.6	21.7%	20.9%	27.8%	0.8	0.16%	73.2%	442
Natural Gas (Diversified)	36.4	1.2	1.6	3.6	2.1	9.1	2.0	12.1%	10.4%	46.0%	0.7	2.73%	44.8%	142
Newspaper	37.9	2.8	3.3	4.4	3.2	11.1	3.2	12.6%	13.6%	33.6%	0.8	1.40%	38.8%	142
Petroleum (Integrated)	23.6	1.2	1.3	3.0	2.6	6.4	1.6	12.3%	17.4%	68.6%	0.8	2.43%	40.3%	973
Retail Building Supply	41.6	2.0	2.0	7.1	6.3	18.8	2.8	18.0%	17.9%	9.6%	0.9	0.43%	42.9%	136
Retail Store	26.9	0.8	1.0	4.5	2.9	10.2	1.8	16.8%	13.8%	18.7%	1.1	1.06%	45.0%	373
Securities Brokerage	18.9	1.7	3.0	4.4	2.0	5.4	1.1	27.4%	19.8%	11.6%	1.2	1.20%	62.5%	271
Semiconductor	80.9	8.6	8.5	11.3	13.6	25.7	2.7	18.8%	26.5%	6.8%	1.3	0.01%	90.7%	978
Semiconductor Cap Equip	86.8	9.2	8.9	13.6	25.4	40.6	3.2	26.2%	33.6%	0.0%	1.8	0.00%	72.0%	108
Telecom. Equipment	122.0	6.1	6.2	11.0	9.5	30.3	3.8	9.9%	15.1%	7.5%	1.1	0.02%	98.7%	489
Telecom. Services	111.3	4.2	4.8	4.6	3.2	11.2	3.7	2.8%	11.4%	87.2%	1.2	0.24%	83.9%	1,120
Tobacco	8.6	0.7	0.8	3.8	2.8	4.5	1.1	43.6%	31.1%	55.2%	0.6	5.61%	48.8%	89
Total market	34.6	2.2	2.6	4.6	3.1	9.6	1.7	14.4%	15.9%	35.0%	0.9	1.14%	60.5%	20,057

**Table 4. Multiples of European utilities (excluding the English utilities).
September 2000. Source: Morgan Stanley Dean Witter Research.**

	PER		P/CE		Dividend yield (%)		EV/EBITDA		P/BV
	1999	2000E	1999	2000E	1999	2000E	1999	2000E	
EVN	-5.9	14.4	3.8	5.3	2.2	2.4	6.4	7.7	1.4
Verbund	32.6		8.9		1.2		11.8		3.7
Electrabel	15.0	15.1	7.4	7.7	5.6	5.8	8.5	8.2	2.8
Fortum	4.3	10.0	6.1	3.7	4.7	4.5	6.1	6.3	0.6
Vivendi	32.2		9.7		1.9		13.7		4.7
Suez LdE	27.2	24.5	6.8	7.0	2.7	2.9	9.7	8.3	2.4
RWE	19.4	18.4	4.9	4.7	3.6	3.9	4.7	4.5	3.4
E.ON	14.0	10.6	5.8	8.0	3.1	3.4	7.7	7.9	1.8
Edison	32.5	31.6	13.4	13.3	1.3	1.4	11.8	10.4	3.6
ENEL	22.8	25.6	7.7	8.9	2.7	3.0	7.3	8.6	7.9
EDP	21.0	19.2	8.4	8.2	3.9	4.2	9.3	9.3	1.8
Agbar	18.6	16.2	9.5	8.2	1.8	2.0	10.9	8.9	2.1
Endesa	18.1		5.7		2.7		10.6		2.5
Iberdrola	17.6		7.1		3.6		8.6		1.6
Unión Fenosa	10.6	23.4	11.0	10.5	1.7	2.1	7.5	6.9	2.3
Hidrocarbónico	21.2	18.6	9.3	8.5	2.6	2.8	9.6	8.5	2.2
REE	19.6	18.4	8.8	8.4	3.4	3.7	6.7	6.5	2.1
Sydskraft A (SKr)	14.8	13.3	7.6	7.0	3.3	3.4	6.2	5.9	1.4
Average	18.6	18.5	7.9	7.8	2.9	3.3	8.7	7.7	2.7
Maximum	32.6	31.6	13.4	13.3	5.6	5.8	13.7	10.4	7.9
Minimum	-5.9	10.0	3.8	3.7	1.2	1.4	4.7	4.5	0.6

Table 5. Multiples of English utilities. September 2000. *Source: Morgan Stanley Dean Witter Research.*

	PER		P/CE		Dividend yield (%)		EV/EBITDA		P/BV 2000
	2000	2001E	2000	2001E	2000	2001E	2000	2001E	
British Energy	7.4	-26.1	1.8	2.4	4.6	4.6	4.4	5.7	0.8
National Grid	25.0	29.8	17.2	14.7	2.3	2.5	11.6	11.4	4.5
National Power	12.8	14.7	7.6	8.9	3.2	3.4	8.1	10.0	3.3
PowerGen	8.9	7.4	5.7	5.1	6.2	6.8	6.9	6.3	1.9
Scottish Power	7.3	18.2	7.8	8.7	4.7	5.0	9.1	7.6	1.5
Scottish & Southern	12.3	12.4	9.0	8.9	4.9	5.1	7.5	7.6	2.9
Anglian Water	9.6	12.0	5.5	5.8	7.4	7.6	6.9	7.1	1.0
Hyder	5.2	5.0	2.1	2.2	5.6	5.9	5.9	5.2	0.6
Kelda	6.8	10.6	4.0	4.8	6.5	6.9	6.7	7.1	0.8
Pennon	7.7	11.9	5.3	6.3	7.2	5.4	6.9	7.9	1.0
Severn Trent	9.9	10.9	4.4	4.9	6.2	6.5	6.9	6.3	1.0
Thames	12.5	27.7	7.8	11.7	3.9	4.1	7.8	8.6	1.9
United Utilities	8.4	12.1	5.0	6.0	6.5	6.7	6.8	7.3	1.5
Average	10.3	11.3	6.4	7.0	5.3	5.4	7.3	7.5	1.7
Maximum	25.0	29.8	17.2	14.7	7.4	7.6	11.6	11.4	4.5
Minimum	5.2	-26.1	1.8	2.2	2.3	2.5	4.4	5.2	0.6

Table 6. Multiples of construction companies. August 2000. *Source: Morgan Stanley Dean Witter Research.*

	PER				EV/EBITDA				P/CE			
	1999	2000E	2001E	2002E	1999	2000E	2001E	2002E	1999	2000E	2001E	2002E
CRH	17.5	14.4	13.0	12.4	10.1	7.6	7.3	7.0	10.7	8.8	8.4	8.0
Holderbank	19.5	17.1	13.7	12.2	8.7	7.6	7.0	6.5	8.9	8.2	7.1	6.6
Lafarge	15.2	12.2	11.8	10.2	7.2	5.9	5.8	5.5	6.8	6.1	6.0	5.7
Saint Gobain	18.0	11.5	9.8	8.4	5.4	4.6	4.1	3.7	8.0	5.9	5.2	4.7
Cemex	5.5	6.6	6.1	5.7	5.1	5.7	5.1	4.9	4.1	5.0	4.7	4.5
Lafarge Corporation	6.5	6.0	5.8		5.3	4.8	4.7					
Martin Marietta Materials	15.8	15.0	13.0		6.7	6.2	5.6		7.9	7.2	6.6	
Vulcan Materials	19.2	17.0	13.5		9.8	8.9	7.5		2.4	2.7	3.5	
Siam Cement	9.6	6.6	5.6		8.5	5.7	5.1	4.9	4.1	3.2	2.6	2.3
Acciona	26.5	22.3	18.5	16.1	12.5	9.1	7.8	7.0	15.4	11.5	9.9	9.0
ACS	18.8	15.3	13.7	12.1	10.6	7.8	7.1	6.4	12.4	10.6	9.7	8.8
Dragados	14.1	13.6	10.4	9.1	7.2	6.5	5.9	5.0	9.6	9.6	8.0	7.6
FCC	11.4	11.3	11.1	10.6	5.8	5.6	5.3	5.0	6.1	5.7	5.3	5.1
Ferrovial	16.9	13.0	10.5	9.2	21.2	16.2	14.2	12.3	10.1	8.3	7.2	6.3
Average	15.3	13.0	11.2	10.6	8.9	7.3	6.6	6.2	8.2	7.1	6.5	6.2
Maximum	26.5	22.3	18.5	16.1	21.2	16.2	14.2	12.3	15.4	11.5	9.9	9.0
Minimum	5.5	6.0	5.6	5.7	5.1	4.6	4.1	3.7	2.4	2.7	2.6	2.3

Table 7. Multiples of hotel companies. November 2000.

	EV/EBITDA		PER	
	2000E	2001E	2000E	2001E
Accor	10.0	9.0	23.1	20.0
Bass	5.8	6.3	11.8	10.7
Club Med	10.5	8.2	26.2	18.4
Hilton Group	10.0	8.8	13.2	11.4
Hilton Hotels Corp.	7.6	7.3	13.5	12.8
Marriot Int'l	10.6	9.4	20.5	18.4
Millennium & Copthorne	8.7	8.0	11.2	9.8
NH Hoteles	12.8	9.9	21.4	18.1
Scandic Hotels	7.7	6.5	15.2	14.5
Sol Meliá	10.0	8.7	17.6	14.4
Starwood	7.4	7.1	16.0	14.2
Thistle Hotels	8.1	7.8	9.2	9.2
Average	9.1	8.1	16.6	14.3
Maximum	12.8	9.9	26.2	20.0
Minimum	5.8	6.3	9.2	9.2

4.3. Dispersion of the multiples of telecommunications

Table 8 shows the leading telecommunications operators divided by geographical area. In the case of North America, Europe, and Latin America, it can be seen that the PER is the multiple with the highest dispersion, particularly for the year 2000E, ranging between 13.5 - 73, 12.2 - 63 and 14.9 - 45.1, respectively. In the case of Asia, the differences are substantial in all multiples, particularly the EV/EBITDA, which ranges between 3.4 and 136.7 (for 2000E) and 3.1 and 117.1 (for 2001E), and the P/CE, with data between 3.2 - 196.9 and 2.9 - 171.4 for 2000E and 2001E, respectively.

Table 9 shows multiples for cellular phone companies. Note, again, the multiples' wide dispersion.

Table 8. Valuation by multiples of telecommunications companies

Source: Morgan Stanley Dean Witter Research. 15 September 2000.

		P/E		EV/EBITDA		P/CE		EV/Sales	
		2000E	2001E	2000E	2001E	2000E	2001E	2000E	2001E
North America	AT&T	18.6	18.9	7.6	6.7	13.6	13.1	2.7	2.5
	Verizon	13.5	11.9	5.9	5.3			2.6	2.4
	BellSouth	16.7	14.7	6.8	6.1	15.7	13.9	3.1	2.9
	Broadwing			15.5	11.5			3.8	3.0
	CenturyTel	17.3	13.8	6.3	5.0	14.1	11.7	3.1	2.5
	Commonwealth Telephone Ent.	73.0	53.9	11.5	9.5			3.8	3.4
	WorldCom	15.7	12.3	8.2	6.6	12.7	10.3	2.8	2.4
	SBC Communications	19.6	17.0	8.1	7.2	18.6	16.1	3.3	3.0
	Sprint FON Group	14.3	12.0	5.7	5.1	13.9	11.8	1.7	1.5
	TELUS Corp.	15.4	17.2	4.7	4.8	5.5	5.5	1.9	1.9
	Qwest	62.2	71.9	13.7	11.6	16.8	14.1	5.2	4.6
Europe	British Telecom	53.6		11.6	12.4	13.8	16.0	3.4	2.9
	Cable & Wireless	63.6	44.2	17.7	15.5	24.0	18.1	4.4	4.3
	Deutsche Telekom	17.5	18.5	9.6	9.7	9.7	13.3	5.4	5.0
	KPN	20.4		13.2	11.4	7.3	11.5	4.2	3.6
	OTE	16.4	15.2	7.8	7.3	10.0	8.9	3.4	3.3
	Portugal Telecom	25.9	26.8	9.0	8.5	11.3	11.4	4.3	4.0
	Swisscom	12.2	34.3	10.1	9.8	6.9	10.9	3.0	2.8
	Telefónica	47.6	39.5	12.9	12.2	18.6	17.9	5.2	4.8
	Telia		57.0	17.2	13.5	18.6	15.4	3.8	3.4
Latin America	CANTV		38.1	3.2	3.3	3.4	3.4	1.4	1.4
	CTC	45.1	24.2	8.3	7.7	7.6	6.5	3.7	3.5
	Embratel	21.5	15.1	7.3	5.5	8.2	6.6	2.1	1.7
	Brasil Telecom	24.6	18.4	3.7	3.0	4.9	4.2	1.8	1.5
	Telemar	42.8	19.5	3.8	3.0	4.0	3.3	1.8	1.4
	Telecom Argentina	14.9	14.1	4.8	4.4	3.9	3.6	2.2	2.1
	TelMex	16.6	15.7	7.2	6.4	9.1	8.5	3.8	3.3
Asia	Korea Telecom	19.7	13.3	6.6	5.3	5.3	4.6	2.5	2.3
	MTNL	4.4	4.2	3.4	3.1	3.2	2.9	1.7	1.6
	PLDT			7.2	5.6	7.4	7.3	3.5	3.1
	Indosat	5.5	5.4	3.8	3.7	5.0	4.8	2.2	2.1
	PT TELKOM	10.1	7.7	5.4	4.7	5.2	4.5	3.7	3.3
	Singapore Telecom	20.1	19.6	13.2	13.1	15.8	15.1	7.0	6.9
	Telecom New Zealand	14.3	13.2	7.7	6.8	7.9	7.3	3.5	3.0
	VSNL (GDR)			136.7	117.1	196.9	171.4	45.3	43.2
	Japan Telecom	59.8	59.4	6.6	5.3	9.6	7.4	1.6	1.4
	NTT		59.3	6.2	5.8	6.4	5.9	2.2	2.0
	<i>Average</i>	19.1	22.8	19.7	17.1	26.3	23.1	7.3	6.9

Table 9. Multiples of cellular phone companies. September 2000

	PER		EV/EBITDA		P/CE		EV/Sales	
	2000E	2001E	2000E	2001E	2000E	2001E	2000E	2001E
Europolitan	42.0	39.4	22.1	20.0	28.0	25.0	8.4	7.9
Libertel	55.3	38.2	17.9	12.3	22.0	15.2	4.6	3.9
Mobistar			30.0	17.8	63.7	28.8	5.0	3.9
Panafon	34.0	31.6	16.3	14.2	23.9	21.7	6.8	5.8
Sonera		65.3	46.0	37.1	45.2	35.8	13.4	11.3
STET Hellas	52.7	35.6	11.0	8.8	15.2	11.1	3.0	2.6
Telecel	34.8	28.8	13.2	11.2	16.8	14.2	4.5	4.3
Turkcell	36.7	22.3	16.5	10.8	18.6	11.9	6.1	4.2
Vodafone Group	72.7	52.7	25.7	21.1	37.8	29.6	8.8	7.6
<i>Average. Europe</i>	<i>46.9</i>	<i>39.2</i>	<i>22.1</i>	<i>17.6</i>	<i>30.1</i>	<i>21.5</i>	<i>6.7</i>	<i>5.7</i>
Iusacell			13.1	10.9	14.1	10.2	4.5	3.9
Tele Celular Sul	46.9	30.4	9.2	7.0	11.2	8.8	2.9	2.5
Tele Centro Oeste	30.9	26.2	8.1	7.2	11.1	9.0	3.2	2.5
Tele Leste Celular		23.1	10.6	5.5	13.1	6.2	2.3	1.9
Tele Nordeste Celular	34.7	23.3	6.9	5.4	9.8	7.6	2.2	1.9
Tele Norte Celular	60.4	27.8	6.4	4.6	6.4	5.0	1.5	1.3
Telemig Celular Part.	72.7	54.1	8.2	6.5	8.5	7.1	2.8	2.3
Telesp Celular Part.	61.6	46.5	12.8	11.3	13.3	11.6	5.4	4.5
<i>Average. Latin America</i>	<i>51.2</i>	<i>33.1</i>	<i>9.4</i>	<i>7.3</i>	<i>10.9</i>	<i>8.2</i>	<i>3.1</i>	<i>2.6</i>
Adv. Info. Service (AIS)	24.1	23.8	9.1	8.5	11.8	10.8	3.2	2.9
China Mobile (HK)	42.3	38.6	18.8	15.5	24.7	20.4	10.6	8.7
SK Telecom	23.0	23.0	8.0	7.8	11.4	11.8	3.6	3.6
SmarTone	44.8	37.3	13.9	10.4	58.8	12.0	2.0	1.9
Total Access Com.	21.0	19.9	12.6	12.0	15.0	12.9	4.6	4.2
DDI		50.9	8.2	6.2	6.7	4.9	1.8	1.4
NTT DoCoMo			24.5	20.0	32.4	26.5	7.4	6.3
<i>Average Asia</i>	<i>31.0</i>	<i>32.3</i>	<i>13.6</i>	<i>11.5</i>	<i>23.0</i>	<i>14.2</i>	<i>4.7</i>	<i>4.1</i>

4.4. Dispersion of the multiples of banks

Table 10 shows multiples for Spanish and Portuguese banks in November 2000. The PER in 2000 ranges between 10.4 and 30.9; the price to book value multiple ranges between 1.5 and 4.7; the ROE ranges between 12.9% and 28.2%. The multiples are much more homogenous in the case of the Portuguese banks.

Table 10. Multiples of Spanish and Portuguese banks. November 2000

	PER			P/BV		P/NAV	Dividend yield		ROE		ROE/P/BV	
	2000	2001	2002	2000	2001	2000	2000	2001	2000	2001	2000	2001
BBVA	21.5	17.3	13.9	3.9	3.5	3.4	2.2%	2.6%	20.2%	21.4%	5.2	6.1
BSCH	19.6	15.8	12.9	3.2	2.9	4.2	2.6%	3.4%	19.6%	19.2%	6.2	6.6
Banco Popular	16.5	14.2	12.5	4.7	4.1	4.1	3.3%	3.9%	28.2%	30.7%	6.0	7.5
Bankinter	30.9	29.9	27.0	4.0	3.8	3.2	2.2%	2.3%	12.9%	12.8%	3.2	3.3
Banco Pastor	10.4	9.5	9.2	1.5	1.4	1.5	2.8%	3.1%	14.7%	14.2%	9.5	10.3
Banco Zaragozano	17.8	16.6	16.6	1.7	1.6	n.a.	2.4%	2.9%	15.0%	16.0%	8.8	10.0
Banco Valencia	13.7	12.4	11.5	2.2	2.0	2.2	3.5%	5.7%	16.4%	17.0%	7.4	8.5
<i>Spain</i>	<i>18.6</i>	<i>16.5</i>	<i>14.6</i>	<i>3.0</i>	<i>2.9</i>	<i>3.1</i>	<i>2.7%</i>	<i>3.4%</i>	<i>18.1%</i>	<i>18.8%</i>	<i>6.3</i>	<i>6.8</i>
BCP	17.7	16.2	14.4	3.0	2.8	3	2.4%	2.6%	18.6%	19.8%	6.3	7.0
BES	13.7	12.2	11.6	2.6	2.4	2.6	3.5%	4.0%	18.6%	14.4%	7.3	6.0
BPI	14.0	12.8	11.4	2.6	2.4	2.6	2.9%	3.1%	18.6%	21.4%	7.0	8.9
<i>Portugal</i>	<i>15.1</i>	<i>13.7</i>	<i>12.5</i>	<i>2.7</i>	<i>2.5</i>	<i>2.7</i>	<i>2.9%</i>	<i>3.3%</i>	<i>18.6%</i>	<i>18.5%</i>	<i>6.9</i>	<i>7.3</i>

4.5. Dispersion of the multiples of Internet companies

Table 11 contains the price/sales multiple of Internet companies¹⁰. Note the wide dispersion and the multiple's decrease in 2000.

¹⁰ More about Internet multiples can be found in chapter 23: "Internet Valuations: The Case of Terra-Lycos", <http://ssrn.com/abstract=265608>

Table 11. Multiples of Internet companies in 1999 and 2000

e.service companies	price / sales				
Company	dec-99	mar-00	jun-00	sept-00	dec-00
Agency. Com	20.7	8.1	4.3	3.0	0.7
Answerthink	5.8	3.8	2.4	2.3	0.5
Braun Consulting	30.4	11.7	6.7	5.4	0.9
Cambridge Technology	2.6	1.4	0.9	0.5	0.3
C-bridge Internet Solutions	44.8	36.8	7.8	6.0	0.9
CMGI	312.0	88.9	24.2	9.4	1.3
Diamond Tech. Partners	18.2	11.8	13.3	9.5	3.4
Digitas Inc.		6.7	4.0	3.9	1.0
Inforte Corp.		16.2	9.5	7.8	2.6
iXL Enterprises, Inc.	19.2	7.4	3.0	0.9	0.2
iGate Capital Corporation	3.6	6.1	1.7	0.7	0.4
Internet Capital Group	2880.6	1658.8	733.0	208.6	9.2
Lante Corporation		26.5	13.1	2.7	0.8
Luminant Worldwide	23.7	5.5	2.1	0.6	0.2
MarchFIRST	16.8	8.9	3.2	2.1	0.2
Modem Media, Inc	23.3	8.8	2.9	0.9	0.6
Organic, Inc		19.6	7.3	3.0	0.5
Proxicom	84.8	23.2	19.0	6.2	1.1
Razorfish	53.1	13.0	6.4	3.3	0.5
Sapient	60.4	31.2	33.3	10.8	2.8
Scient Corporation	63.7	42.6	14.0	5.1	0.6
Viant Corporation	77.5	19.1	12.7	2.2	1.5
Xpedior	10.8	7.2	3.7	0.8	0.1
Average	197.5	89.7	40.4	12.8	1.3

DOT COMS	price / sales				
Company	dec-99	mar-00	jun-00	sept-00	dec-00
About.com	60.3	39.5	10.0	7.7	5.0
Amazon.com	16.5	12.4	5.9	5.6	2.2
El sitio	221.2	72.4	15.3	6.2	0.9
Excite@Home	51.2	29.5	15.8	9.9	3.6
Gemstar	140.1	145.8	96.8	128.6	66.8
Homestore.com	97.3	41.8	17.8	21.5	7.2
iGo	9.0	6.0	2.7	1.8	1.0
InfoSpace.com	1351.4	669.8	189.0	75.9	10.9
iTurf	10.6	6.6	1.6	0.7	
Liberate	1260.1	268.6	107.6	92.6	39.2
Promotion.com	27.0	8.0	3.2	0.9	0.2
Quepasa.com	426.7	89.4	11.7	4.9	
Salon.com	11.1	7.6	2.0	2.4	0.8
Sportsline	22.0	10.8	5.4	3.9	1.4
StarMedia	131.2	69.3	32.3	9.9	2.0
Student Adverage	29.0	10.7	6.5	6.0	3.1
Switchboard		77.2	17.8	9.3	3.5
Terra	559.0	462.6	149.1	113.9	34.3
TheKnot Inc.	24.0	12.2	3.7	2.4	0.6
TicketMaster CitySearch	32.3	16.3	8.2	7.4	3.4
Tickets.com	18.4	10.5	3.6	1.1	0.3
Travelocity.com		18.0	7.1	4.7	3.2
Women.com Networks	22.2	9.4	2.0	2.6	0.2
Yahoo	403.8	132.0	79.6	50.2	14.8
Average	223.8	92.8	33.1	23.7	9.3

5. Volatility of the most widely used parameters for multiples

Table 12 shows the average volatility of several of the most commonly used parameters for multiples and of some of the multiples for the 26 largest Spanish companies during the period 1991-99. PER, EBITDA and profit after tax were more volatile than equity value.

Table 12. Average volatility of several parameters used for multiples. 26 Spanish companies. 1991-1999.

	equity value	profit after tax	EBITDA	dividends	Book value	ROE	ROA	PER
Average volatility	41%	49%	59%	20%	18%	4%	2%	76%

6. Analysts' recommendations: hardly ever sell

Table 13 shows the recommendations of 226 brokers during the period 1989-1994. Note that the recommendations range mostly between hold and buy. Less than 10% of the recommendations are to sell.

Table 13. North American analysts' recommendations. 1989-1994. Source: Welch (2000).

From ↓	to →	Strong buy	Buy	Hold	Sell	Strong Sell	Sum	%
Strong buy		8,190	2,234	4,012	92	154	14,682	27.5%
Buy		2,323	4,539	3,918	262	60	11,102	20.8%
Hold		3,622	3,510	13,043	1,816	749	22,740	42.5%
Sell		115	279	1,826	772	375	3,367	6.3%
Strong Sell		115	39	678	345	407	1,584	3.0%
Sum		14,365	10,601	23,477	3,287	1,745	53,475	
%		26.9%	19.8%	43.9%	6.1%	3.3%		

Table 14 shows the analysts' recommendations for Spanish companies in the IBEX 35 index. Note that the recommendations mostly range between holding and buying. Less than 15% of the recommendations are to sell. On 14 February 2000, the IBEX stood at 12,458 points; by 23 October it had fallen to 10,329 points.

Table 14. Analysts' recommendations on Spanish stocks. *Source: Actualidad Económica*

	14 february 2000			23 october 2000				14 february 2000			23 october 2000		
	Buy	Hold	Sell	Buy	Hold	Sell		Buy	Hold	Sell	Buy	Hold	Sell
ACS	90.0%	0.0%	10.0%	81.8%	18.2%	0.0%	Ferrovial	50.0%	30.0%	20.0%	70.0%	30.0%	0.0%
Acciona	37.5%	25.0%	37.5%	88.9%	0.0%	11.1%	Gas natural	18.8%	43.8%	37.5%	22.2%	50.0%	27.8%
Aceralia	82.4%	5.9%	11.8%	79.0%	21.1%	0.0%	Iberdrola	57.9%	36.8%	5.3%	50.0%	38.0%	12.0%
Acerinox	68.8%	18.8%	12.5%	70.6%	17.7%	11.8%	Indra	55.6%	33.3%	11.1%	76.9%	23.1%	0.0%
Acesa	54.6%	36.4%	9.1%	72.7%	27.3%	0.0%	NH Hoteles	85.0%	15.0%	0.0%	81.3%	18.8%	0.0%
Aguas Bna	69.2%	15.4%	15.4%	50.0%	36.7%	13.1%	Popular	54.6%	36.4%	9.1%	70.0%	30.0%	0.0%
Alba	80.0%	0.0%	20.0%	62.5%	25.0%	12.5%	Repsol	75.8%	18.2%	6.1%	48.6%	45.9%	5.6%
Altadis	72.7%	18.2%	9.1%	76.9%	15.4%	7.7%	Soqecable	87.5%	0.0%	12.5%	62.4%	25.9%	11.8%
Amadeus	75.0%	0.0%	25.0%	58.6%	34.3%	7.1%	Sol Melia	60.0%	26.7%	13.3%	76.5%	17.7%	5.9%
Bankinter	31.6%	47.4%	21.1%	33.3%	38.9%	27.8%	Terra	87.5%	0.0%	12.5%	59.1%	31.8%	9.1%
BBVA	57.7%	34.6%	7.7%	54.7%	33.5%	11.8%	Tele pizza	50.0%	37.5%	14.3%	41.5%	35.4%	23.1%
BSCH	63.0%	37.0%	0.0%	51.8%	48.2%	0.0%	Telefónica	94.7%	5.3%	0.0%	86.3%	11.8%	2.0%
Cantabrico	42.9%	42.9%	14.3%	27.8%	44.4%	27.8%	TPI	50.0%	37.5%	18.5%	38.5%	30.8%	30.8%
Continente	71.4%	14.3%	14.3%	53.3%	40.0%	6.7%	Unión Fenosa	88.2%	11.8%	0.0%	85.7%	14.3%	0.0%
Dragados	50.0%	41.7%	8.3%	66.7%	33.3%	0.0%	Vallehermoso	50.0%	10.0%	40.0%	76.9%	23.1%	0.0%
Endesa	67.9%	28.6%	3.6%	52.9%	44.4%	2.8%							
FCC	70.0%	30.0%	0.0%	51.3%	48.7%	0.0%	average	64.1%	23.1%	13.1%	61.8%	29.8%	8.4%

Table 15. Most relevant valuation multiples by industry. *Source: Harbula, Péter (2009)*

Industry	Valuation multiples	Valuation error (mean / median)
Real estate	P / BV, P / E Current	14% / 11%
Building materials	EV / EBITDA, P / GCF Prospective / current	15% / 14%
Banking and insurance	P / BV, P / E Current	17% / 14%
Food and beverages	EV / EBITDA, P / E Prospective / current	17% / 18%
Services	EV / EBIT, P / E Prospective / current	19% / 20%
Energy	EV / EBITDA, EV / IC Current	21% / 17%
Technology	EV / EBITDA, EV / EBIT Prospective / current	21% / 18%
Telecommunications	EV / EBITDA, P / E Prospective	23% / 22%
Distribution	EV / EBITDA, EV / EBIT Prospective / current	25% / 28%
Manufacturing	EV / EBITDA, P / FCF Prospective	31% / 27%
Construction	EV / EBITDA, P / E Current	32% / 29%
Life sciences / healthcare	EV / Sales, EV / EBITDA Prospective	34% / 29%
Capital goods	EV / EBITDA, EV / EBIT Prospective / current	35% / 28%
Media	EV / EBITDA, EV / EBIT Prospective / current	20% / 21%

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Questions

- Is it true that some multiples have little dispersion?
- What is the most reliable multiple?
- Which multiple provides better valuations?

Please **define**:

Multiple PER EBITDA Price to Book Value (P/BV)

Please **define and differentiate**:

PER. Price to sales (P/S). Price to Book Value (P/BV)