



Saïd Business School teaching notes

APRIL 2009

Note on Valuation and Mechanics of LBOs

Tim Jenkinson – Ruediger Stucke

This Note was prepared by Tim Jenkinson and Ruediger Stucke. Tim Jenkinson is Professor of Finance at the Saïd Business School, Oxford University. Ruediger Stucke is Research Fellow in Finance and Economics at the Saïd Business School, Oxford University.

© University of Oxford 2009

The University of Oxford makes no warranties or representations of any kind concerning the accuracy or suitability of the information contained herein for any purpose. All such information is provided "as is" and with specific disclaimer of any warranties of merchantability, fitness for purpose, title and/or non-infringement. The views expressed are those of the contributors and are not necessarily endorsed by the University of Oxford.

Introduction

This note gives an introduction to the concept of relative valuation using market comparables. Relative valuation is the predominate method used when assessing the enterprise and equity values of companies in the context of Leveraged Buyouts (LBOs). Other valuation approaches such as net or adjusted present values are used as well, but also rely on market comparables, e.g. in assessing systematic risk or calculating terminal values. This note further introduces the mechanics and levers of value creation in LBOs and their impact on the final return on investment.¹

Enterprise and equity values

The value of a company's economic assets must equal the value of the claims against those assets. Hence, the enterprise value (EV) of a company refers to the present value of all future free cash flows from operations that are generated by a company's economic assets. This value equals the sum of investors' claims on the assets, as represented by the company's equity and net debt positions.

As the enterprise value is determined by future cash flows, its value changes when expectations about the amount, riskiness, or opportunity costs, of future cash flows change. This is the case when the situation for a company, the industry within which it operates, or the whole economy improves or worsens (or is expected to do so). As the claims of a company's debt holders are fixed, a change in the enterprise value of a company directly results in a change in the equity value (EqV) of a company. For a publicly listed company, the equity value equals the market capitalization of a company, which is determined by the number of issued shares and the share price. For a private company, the share price can clearly not be observed, so needs to be estimated – which is where market comparables are used.

When calculating the enterprise or equity value of a company, one always accounts for a company's "net" debt position, which equals the amount of a company's long and short-term interest-bearing liabilities minus any cash and short-term investments.²

Cash and short-term investments are deducted as they could immediately be used to repay an equal fraction of a company's debt, or could be taken out after a takeover and used to recoup a part of an acquirer's purchase price.

The following formula reiterates this equation.

$$\begin{aligned} \text{Enterprise Value} &= \text{Equity Value} + \text{net Debt} \\ \Leftrightarrow \text{Enterprise Value} &= \text{Equity Value} + \text{short / long - term interest bearing Liabilities} \\ &\quad - (\text{Cash} + \text{short - term Investments}) \end{aligned}$$

¹ A number of aspects and statements in this Note are simplified to improve the understanding of general concepts. Certain valuation, structuring and debt issues are more complex in practice.

² Interest-bearing liabilities can be all kinds of long and short-term debt positions as well as preferred stock.

Earnings multiples and relative valuation

In an LBO context, the acquisition price of a company is usually expressed as an earnings multiple. This earnings multiple is the ratio of a company's enterprise value and an earnings or performance measure.

The most commonly used performance measure is a company's earnings before interest, taxes, depreciation and amortization (EBITDA) over the last twelve-months, as this represents a company's ability to generate cash from its current operations. Other measures – such as EBITDA–Capex or EBIT – are also frequently used, at least for comparison purposes. EBITDA–Capex measures a company's remaining cash after its investment activities. This provides an estimate of the amount of money that can be used to pay interest expenses and taxes, with the remainder being at the disposal of the company's owner. In the case of LBOs any remaining free-cash flow is used to repay debt principal. Capex includes both reinvestments in a company's maturing long-term assets and expenditures for future growth. As a result, Capex can be volatile, due to changes in investment activity, and should be compared to previous years' levels. In contrast, a company's EBIT allows for previous Capex by deducting depreciation from cash flow, and hence the impact of investment activity is smoothed according to the assets' depreciation schedules. Nevertheless, when using EBIT multiples, one should compare the amount of amortization with previous year's numbers as, for example, goodwill impairments might bias the EBIT in a particular year.

The multiple that is applied to earnings measures – to arrive at the valuation of the firm – depends on many related factors, including:

- The expectations about the growth of an economy in general and a certain industry within the economy in particular;
- The position, the strength and future potential of a company within its industry;
- The current level of the risk-free rate;
- The capital intensity of a certain industry, especially when using a company's EBITDA as the performance measure.

Determining a company's enterprise value and, with respect to a certain performance measure, its earnings multiple is as easy for publicly listed companies as it is difficult for privately held companies. For a publicly listed company the enterprise value is determined by the equity market value of a company plus the company's net debt.

Exhibit 1: Estimating the Enterprise Value using relative valuation

	Public Co A	Public Co B	Recent M&A	Recent LBO	Avg Mult.	Private Co
Market Capitalization	200	800				
Net Debt	250	100				
Enterprise Value	450	900				
Deal Value			900	1,250		
EBITDA	60	150	110	130		90
EBITDA-Capex	40	100	90	100		70
EBIT	45	95	80	110		65
EV / EBITDA	7.5	6.0	8.2	9.6	7.8	
EV / EBITDA-Capex	11.3	9.0	10.0	12.5	10.7	
EV / EBIT	10.0	9.5	11.3	11.4	10.5	
Private Co's estimated Enterprise Value according to its						
EBITDA						704
EBITDA-Capex						748
EBIT						684

Source: Own calculations.

In the case of a private company, whose equity claims are not subject to a regular market valuation, the enterprise value has to be estimated by using comparable companies or transactions. Comparable companies are publicly listed companies that operate in the same, or a related, industry. Comparable transactions are recent mergers, acquisitions or buyouts that involved companies operating in a similar industry. From the value of those companies and transactions, earnings multiples can easily be derived. By applying these observed multiples to the private company's earnings measures, the enterprise value can be estimated. Exhibit 1 shows a simple example of using earnings multiples of a peer group to estimate the enterprise value of a private company.

As no two companies are directly comparable, one has to consider carefully whether adjustments to the valuation multiples, or the earnings measures, are required. Factors to consider include:

- A control premium for a publicly traded company or an illiquidity discount for a privately held company;
- Differences in capital structure, as tax shields resulting from increased debt impact on enterprise values;
- Differences in operational risk, which may result in more volatile earnings;
- Trends in the overall market since the occurrence of recent M&A or LBO transactions;
- Whether the earnings measures are "normal", or include exceptional revenues or costs that are unlikely to recur in the future;
- Whether there are any advantages or disadvantages that justify a premium or a discount to peers.

There is no question that relative valuation of companies is more an art than a science. Nevertheless, one should be aware of these issues and try to adjust the appropriate multiples accordingly.

The leveraged buyout

After having determined an enterprise value for a potential target company, a private equity firm has to determine the maximum purchase price it would be prepared to pay, such that the anticipated final return on investment at exit is still compliant with the firm's return expectations. Of course, the private equity firm will try to bid lower than this maximum price, depending on the competitive environment it faces in the deal.

This maximum purchase price is influenced by three factors.

- The estimated enterprise value of the target company at exit, which depends on the anticipated EBITDA growth potential and the earnings multiple at exit;
- The fraction of the purchase price that can be financed with debt, the terms and conditions of the debt, and hence the size of the initial equity contribution, as well as the willingness to take on risk by high leverage;
- The demanded return on investment – private equity investors often focus on the Internal Rate of Returns (IRR) and the Money Multiple; an IRR of 25 percent is a common target, although it is not clear that IRRs of this magnitude closely reflect the cost of capital.

Mechanics of Increasing the Equity Value

Immediately after an LBO a company's equity value equals the amount of equity a private equity fund has invested in the company. Since the equity value of a company at exit will equal the capital that is returned to the fund, and hence determines the return on the fund's initial equity contribution, private equity firms are keen to increase a company's enterprise value as much, and as fast, as possible following the LBO.

As the equity value is a residual there are obviously two options to increase it.

- Reducing the amount of net debt of a company.
- Increasing the enterprise value of a company;

As noted in the previous section, the enterprise value of a company can be expressed by an individual recent performance measure and an earnings multiple. Hence, the enterprise value can be increased by either of the following two options.

- Increasing the performance (measure) of a company;
- Increasing the earnings multiple that the market will apply to a company at exit, i.e. exiting the company at a time when there are higher growth expectations for an economy or an industry, or improving the "quality", and hence the future outlook, of a company.

Therefore, there are three main ways to create equity value: paying off debt, increasing earnings, and multiple expansion. The three levers of increasing the equity value are obviously not mutually exclusive. The most important lever is the growth of a company's EBITDA as this

results in a higher enterprise value at exit (in case of a steady multiple), as well as the ability to repay the initial LBO debt more quickly. Both effects positively influence the final equity value.

Exhibit 2: Numerical example of an LBO

EV Multiple at Entry	8.0	EBITDA	125.0
EV Multiple at Exit after 6Y	10.0	EBITDA CAGR	3.1%
Sources of Funds		D&A / Capex Margin	10.0%
Senior Debt	400.0	Senior Debt Interest	4.7%
Junior Debt	300.0	Junior Debt Interest	8.0%
Equity	300.0	Tax Rate	35.0%

		1	2	3	4	5	6
Senior Debt at End of Year	400.0	354.5	304.3	249.1	188.6	122.3	50.0
Junior Debt at End of Year	300.0	300.0	300.0	300.0	300.0	300.0	300.0
EBITDA	125.0	128.9	132.8	136.9	141.2	145.5	150.0
D&A / Capex		12.9	13.3	13.7	14.1	14.6	15.0
EBIT		116.0	119.6	123.3	127.1	131.0	135.0
Interest on Senior Debt		32.0	28.4	24.3	19.9	15.1	9.8
Interest on Junior Debt		14.0	14.0	14.0	14.0	14.0	14.0
EBT		70.0	77.2	84.9	93.2	101.9	111.3
Taxes		24.5	27.0	29.7	32.6	35.7	38.9
Net Earnings		45.5	50.2	55.2	60.6	66.3	72.3
Enterprise Value	1,000						1,500
Equity Value	300						1,150

Source: Own calculations.

Exhibit 2 provides a numerical example of the mechanics of an LBO. At the point of acquisition by the private equity firm the EBITDA of the target company equals \$125. It is expected to achieve a compounded annual growth rate over the following 6 years of 3.1 percent, which brings the EBITDA to \$150 after the intended holding period. Due to planned changes in the strategic direction of the company and longer-term improvements in operational efficiency it is anticipated that the market will value the target at 10 times EBITDA at exit. To keep things simple, assume that depreciation and amortization equal the company's annual Capex, hence the Net Earnings of the company are assumed to be equal to the company's free cash flow at year's end. All of this free cash flow is then used to repay a fraction of the outstanding senior debt principal at the end of each year. Interest expenses on the senior debt are assumed to equal 4.7 percent with a maximum debt amount of 3.2 times EBITDA that lenders are willing to provide. Junior debt is priced at 8 percent and available up to 2.4 times the most recent EBITDA.³ As a result the enterprise value of the company will be \$1,500 by the end of year 6. With outstanding net debt of \$350 the equity value of the private equity fund's investment then equals \$1,150.

The impact of the three levers on the equity value can be seen separately in Exhibit 3, and the combined effect is presented in Exhibit 4.

³ In reality, the terms and conditions on senior debt vary with the amount of junior debt that a private equity firm intends to use for further leveraging up an LBO capital structure.

Exhibit 3: The three levers of increasing the Equity Value

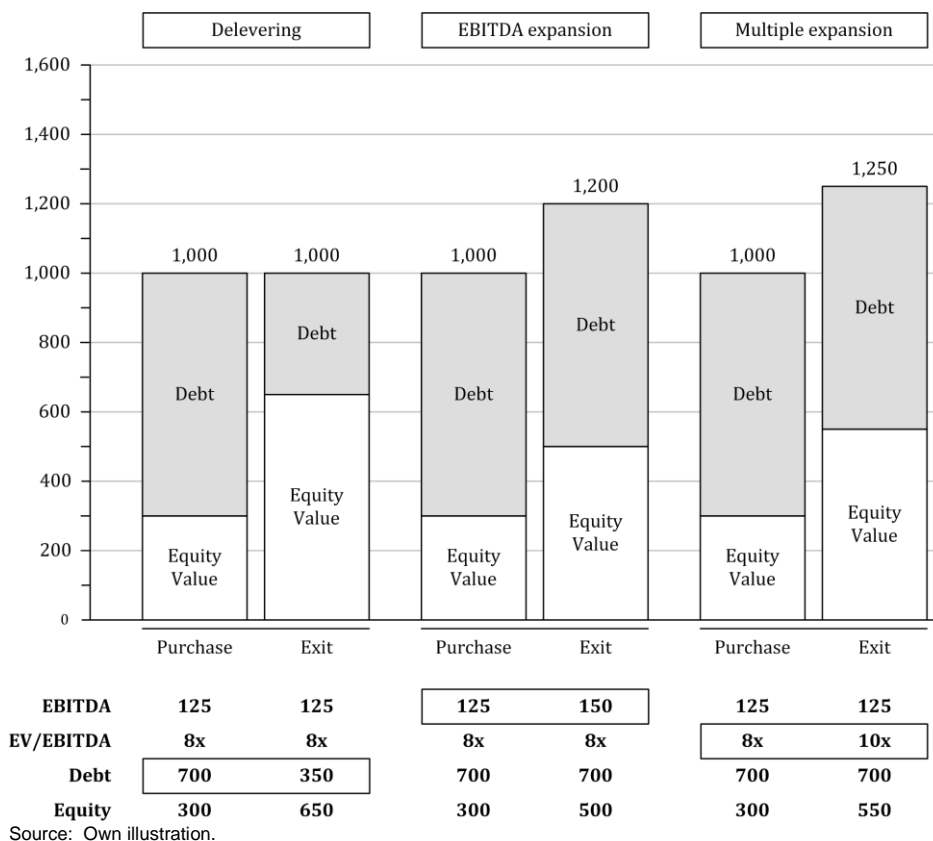
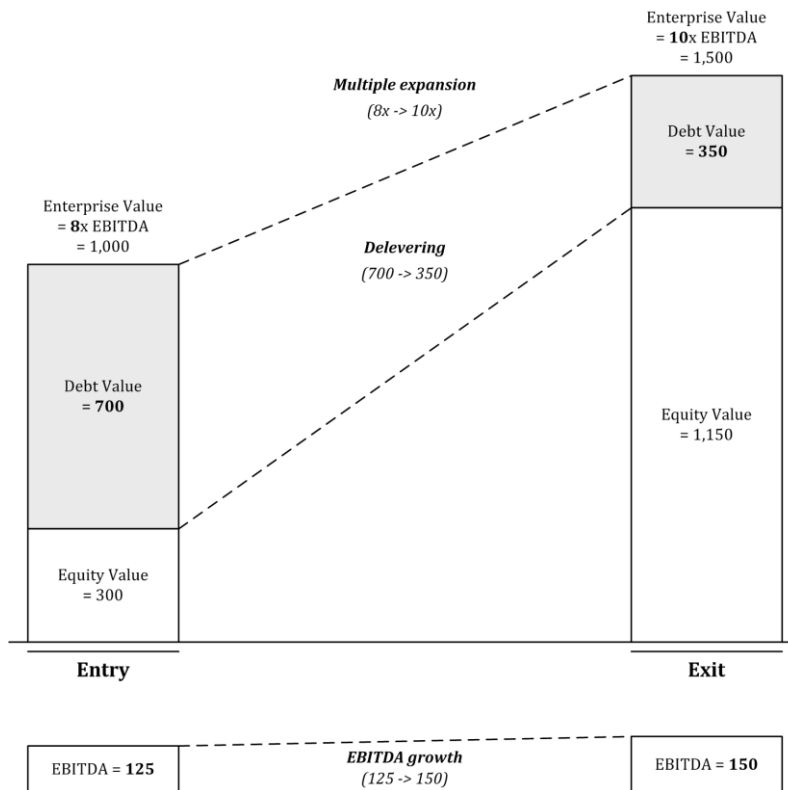


Exhibit 4: Combined effects on the Equity Value



Source: Own illustration.

Given the expected equity value of \$1,150 after 6 years, and based on the availability of up to \$700 of debt at entry as well as certain other assumptions, there is obviously a maximum acquisition price and hence a maximum amount of equity that can be provided by a private equity fund in order to achieve an IRR of e.g. at least 25 percent on this investment. With respect to a single equity investment at entry and a single equity divestment at exit, this amount can be determined by solving the following equation.⁴

$$\sqrt[6]{\frac{\$1,150}{x}} = 1.25 \Leftrightarrow x = \frac{\$1,150}{1.25^6} = \$301.5 \approx \$300$$

As a result, the maximum equity contribution from the private equity fund would be \$300, which leads to a maximum acquisition price of \$1,000 or 8 times the company's recent EBITDA when using all of the provided debt. Putting more than \$300 of equity into this investment results in an IRR below 25 percent. Being able to purchase the company below 8 times EBITDA, while still using the available \$700 of debt, will result in an IRR beyond 25 percent. Of course, this is only the case if the assumptions about the target's enterprise value at exit are correct. In practice, a number of different scenarios and cases are created and analyzed.

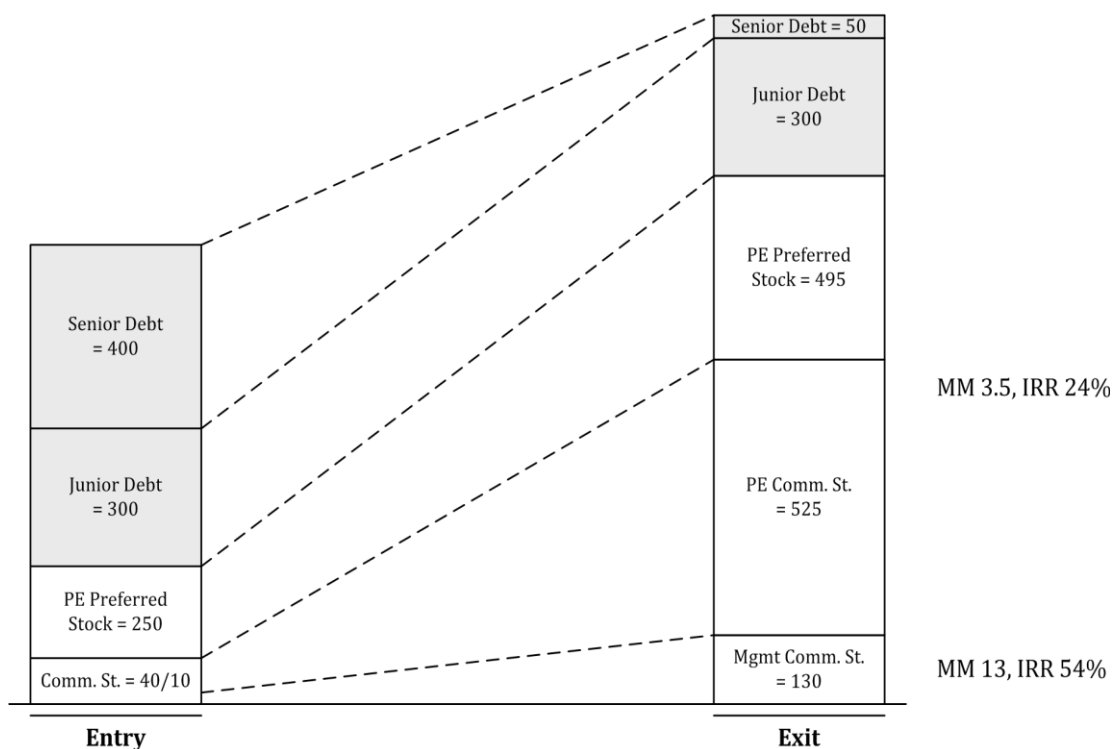
Structuring the Equity

⁴ Calculating the IRR of an investment this way is only possible in the case of two cash streams, one cash investment and one cash divestment. We assume no Recapitalization of the company during the holding period that would increase the IRR. A Recapitalization is a change in a company's capital structure during the holding period by bringing in additional debt, e.g. after year 2 or 3, and receiving a special dividend, hence "cashing out" a part of the interim equity value before the final exit.

To align interests between the private equity fund and the management of a portfolio company, the management is expected to invest alongside the private equity fund into the equity of an LBO. At this point it becomes relevant how much of its own wealth the management puts into an LBO and how their equity investment is structured to incentivize appropriate behavior. If the management puts too much of its own wealth into the company, it might become excessively risk-averse. If the management's contribution is too small, it might not focus enough on necessary changes and implementation. As a rule of thumb, management is often expected to contribute around 50 percent of its own wealth into a deal. In the case of public-to-private LBOs, management usually rolls-over a part or all of its shares and stock options into the equity of the post-LBO company.

To sweeten the upside potential for the management beyond the IRR earned by the private equity fund, a combination of common stock and preferred stock is often used to give management the chance to multiply their investment many times over if there is a successful final exit. Exhibit 5 shows an example of a typical structure. In this case the overall equity contribution from the Private Equity fund and the management is split into a larger fraction of preferred stock and a smaller fraction of common stock. The private equity fund holds the \$250m tranche of preferred stock and \$40m, i.e. 80 percent, of the common stock. Preferred stock is rewarded with rolled-up dividends of 12 percent in this case. Its final value after five years equals \$3,172m.

Exhibit 5: Structure of the equity contributions



Source: Own illustration.

The value of the common stock at exit, which is the true residual for equity holders, equals the enterprise value at exit minus all other claims. In this case the final value of the company's common stock has increased to \$3,328m from its initial value of \$200m. As a result, the \$20m, or 10 percent of common stock, contributed by the company's management increases to an equal fraction of the common stock's value at exit, which is \$333m or 16.7 times the management's initial investment. Hence, by improving the company's value and bringing the whole LBO to a successful exit, management has the chance to earn handsome profits.

The equity contribution by the private equity fund of \$1,980m has a final value of \$6,167m, which is a multiple of 3.1 times. Over the 5 years period of this example, this results in an IRR of 25.5 percent.