

Valuing companies in financial trouble – Eurotunnel

The Eurotunnel was a hugely complex construction project. It was also a difficult financial engineering project that to this day continues to need support from banks and shareholders. **DR ANDREAS SCHUELER** looks at the tunnel's financial performance and the various DCF methods being used to achieve present value.

Professor Dr. Andreas Schueler
Universitaet der
Bundeswehr Munich
Fakultaet WOW
Department of Finance
85577 Neubiberg, Germany

The Eurotunnel was built during 1987 to 1994 for over £10 billion, of which roughly 80% was debt and 20% equity.

For both shareholders and lenders the project has been depressing so far. Shareholder rates of return are negative, the contractual interest payments and debt repayments have not been met and had to be postponed and restructured several times.

The Eurotunnel links the UK and continental Europe by two single-track rail tunnels for train and shuttle services and one service tunnel. The Treaty of Canterbury between the British and the French governments stressed the point that the project was to be financed by private funds only.

The initial public offering of Eurotunnel in November 1987 was followed by several capital increases. The initial debt financing had to be increased in 1990, completely restructured in 1997, when the project faced insolvency the first time, and revised again in 2002. Since 2005, Eurotunnel's management had to negotiate with its lenders again. Operating cash flows are not even covering interest payable. The share price hovered around 25 pence before trading was suspended in May 2006.

The shares were priced at £3.5 at the IPO and were quoted at about £11 in

1989. Dividends haven't been paid yet. From August 2006 until January 2007 the company was operating under a safeguard procedure (Procédure de Sauvegarde) provided for by French bankruptcy law.

The procedure ended when the majority of the lenders and the court of commercial law in Paris approved the proposed safeguard plan. The legal structure of Eurotunnel was altered when a new structure, Groupe Eurotunnel SA, became the holding company.

Previous shareholders can now exchange their shares (the so called units) against the same number of shares of the new company and warrants which can be exchanged against further shares in the future. The senior debt was refinanced by a term loan provided for under the lead of Goldman Sachs and Deutsche Bank. Junior claimholders benefited only to a minor extent from the term loan, but received notes redeemable in shares (NRS) and warrants in exchange for their claims.

Thus the debt which amounted to €9.073 billion at the end of September 2006 was reduced to a term loan of €4.164 billion and interest bearing notes with a nominal value of €1.87 billion, of which €244 million is treated as debt for accounting purposes. Two

TABLE 1 DEBT RESTRUCTURING (€ MILLION)

	Principal amount remaining due	Repayment by Term Loan	NRS I	NRS II	Difference
Senior debt	347	347			
Fourth tranche debt	186	186			
Tier 1A	1,085	1,085			
Tier 1	792	792			
Tier 2	1,306	1,306			
Tier 3	2,599	220	305	1,110	964
Resettable bonds	678	44	84		550
Participating loan notes	1,260	36	91		1,133
Stabilisation notes	820	53	118	44	605
Total	9,073	4,069	598	1,154	3,252

series of notes have been issued. Contrary to the NRS I, NRS II can be bought back by Eurotunnel. Table 1 summarises the debt restructuring (see also Exhibit 3 on page 39 for details on the debt employed before restructuring).

The issue of notes and warrants to the lenders will result in a heavy dilution for the shares held by previous shareholders depending upon the acceptance of the exchange offer and the number of new shares granted against notes and warrants.

Previous shareholders will hold at least 13% of the new company. The design of the restructuring package and the willingness of investors to approve the plan relies heavily upon the ability of the company to generate future cash flows. The liquidation value of Eurotunnel assets was reported to be only £890 million. Therefore future cash flows have to be estimated and valued. This requires a discounted cash flow (DCF) valuation. Secondly, one has to think about how to distribute this cash flows among the claimholders.

A DCF valuation is necessary to answer that question. We will apply the APV (adjusted present value) approach, since it enables us to differentiate between the present value of operating cash flows after capital expenditures and taxes, the value of tax shields caused by debt financing and the expected loss of creditors' claims. It also helps to quantify the debt capacity of the project.

CASE BACKGROUND¹

The construction of the tunnel began in December 1987. On 6 May 1994 most of the construction was completed and the tunnel was officially inaugurated by Queen Elizabeth II and François Mitterrand.

The tunnel links the terminals in Folkstone, Britain and Coquelles, France. Its approximate length is 31 miles. On both sides of the channel, the terminals have direct access to motorways. The operations of Eurotunnel include shuttle

business, railway business and ancillary business. The latter does not contribute much to total revenues (see Exhibit 2).

Currently 9 passenger shuttles carry cars, caravans, trailers and coaches from one side of the Channel to the other. They can carry either 180 cars or 120 cars and 12 coaches. In peak times the system can ensure 4 departures per hour in each direction. 16 freight shuttles carry on average 20 trucks (heavy goods vehicles, HGV). The drivers travel separately from their vehicles in 'club cars' in order to enhance their safety.

In peak times the system can handle 7 departures per hour in each direction.

Furthermore, the Eurotunnel group provides capacity for the Eurostar train and the Through Railfreight Services. The resulting fees consist of a fixed annual charge and a variable charge. The latter depends on the number of passengers or tons of freight respectively passing through the tunnel. A toll formula is used which is linked to inflation and volume thresholds. In addition, until November 2006 the railways were obliged to make payments to Eurotunnel if usage was below a minimum level.

In addition, Eurotunnel leases space to retailers in the terminals on either side of the channel. The tenants pay a fixed amount and/or a variable fee as a percentage of revenues.

CONSTRUCTION PHASE

Due to the delays and technical difficulties during construction and also due to the unexpectedly high costs for the so-called procurement items such as the specially designed shuttles, the initial financial capacity was already stretched beyond budget in 1989. Before granting more loans, the banks required Eurotunnel to raise additional equity. This was achieved by the successful equity offering in November 1990, which increased equity by £568 million.

Total loan facilities were increased from about £5,000

million to £7,300 million. The next capital increase took place in 1994 as well as an additional senior debt financing of £647 million. The construction costs more than doubled compared to the initial budget (see Exhibit 1). The cost overruns led to intense discussions between Eurotunnel and the construction consortium Trans Manche Link (TML) and also between Eurotunnel and the governments represented by the Intergovernmental Commission (IGC).

It became clear that not all of the system's design had been specified clearly in advance. Safety prescriptions imposed by the IGC led to changes in the design of the tunnel and the shuttles leading to compensatory claims on behalf of Eurotunnel for the increased costs. Eurotunnel and the IGC settled their disputes on those issues in December 1993 as Eurotunnel waived its claims in exchange for an extended concession period from July 2042 to July 2052.

The total cost until opening increased also because of the delayed opening. Instead of an opening in May 1993, the system was fully operational only by the end of 1994. The cash inflows were therefore postponed by one and a half years.

As well, cash flow forecast became less optimistic. Based upon the cash flow forecasts and the price per unit, the implied internal rate of returns before income taxes and without tax credits can be estimated. As Table 2 shows, the estimated rate of return decreased significantly due to the revised cash flow forecasts.

	Unit price in £	IRR in %
IPO 1987	3.5	15.2
Capital increase 1990	Average unit price during subscription period (12 November – 3 December): 3.62	11.8
Capital increase 1994	Average unit price during subscription period (2 June – 22 June): 3.17	9.8

OPERATIONS FROM OPENING TO PRESENT

After Eurotunnel became fully operational at the end of 1994, it did not meet the forecast price level due to price wars with the ferry companies. Unfortunately, not only prices but volumes also failed to meet expectations.

At the end of 1996 a fire had a negative effect on tunnel traffic in 1997 due to repair works necessary. The system was shut down for almost 6 months. Table 3 compares the forecasts made at different points of time for 2003 with the actual figures of 2003. The number of passengers per car and coaches and the tons per HGV are taken from the Annual Review 2005. Looking back, it becomes evident that, for example, the number of passengers transported was far below the forecasted number.

However, not only the expectations concerning prices and traffic volumes but also concerning operational efficiency were not met. Operating costs in percent of revenues were expected to be 19% (IPO 1987), 25% (capital increase 1990) and 27% (capital increase 1994) respectively. In fact, they were 46% from 1995 to 2006 on average. Eurotunnel currently is trying to increase its cash flow by the project DARE (Deliver Actions to Revitalise Eurotunnel). Steps to be taken within that project are reshaping the agreements with HGV hauliers, adjusting the capacity for freight shuttles accordingly, reducing the capacity for car shuttles and reviewing sub-contractor and supplier contracts.

FINANCING FROM OPENING UNTIL 2006

Failure to achieve forecasts imposed financial constraints on Eurotunnel in terms of meeting interest and repayment schedules. Eurotunnel's board decided to suspend interest payments on junior (subordinated) debt in September 1995 in order to renegotiate the capital structure under a standstill provision. The standstill was extended by the lenders until December 1997. A restructuring plan was executed leading to a major debt equity swap and postponements of interest payments and repayments.

While not part of the restructuring agreement but linked to the critical financial condition of the project, the French and

		Passengers (millions)	Freight (million tons)
Actual	Cars · 2.52 passengers per car	5.74	
	Coaches · 38.75		
	Passengers per coach		
	Eurostar		
	Sum		
Actual	HGV · 13 tons per HGV	16.71	
	Rail freight		
	Sum		
Forecast	ET 1987	39.5	21.1
	ET 1990	44.6	26.8
	ET 1994	35.8	25.3

British governments approved an extension of the concession period to 2086 in July 1997. That extension will be paid for by a total annual sum, including corporate taxes, equal to 59% of the group's pre-tax profits from 2052 on.²

The company experienced a 'shareholder revolt', which led to a change in management during spring 2004. The mainly French shareholders urged the governments to provide financial support but this was declined. It became obvious, however, that the repayments scheduled to begin in 2006/2007 would become a major problem for Eurotunnel as its operating cash flow was hardly covering the interest payable. At the end of 2006 total loans outstanding amounted to €9.073 billion. Interest expenses of roughly €490 million exceeded the net operating cash flow of €473 million.

RESTRUCTURING 2006/2007

On 5 April 2005, Eurotunnel requested an exemption of the covenants in the credit agreement from its creditors. Two weeks later, senior debt holders and co-financiers gave Eurotunnel the waiver to the credit agreement enabling it to start negotiations.

During the presentation of the preliminary results for 2004 Eurotunnel estimated that the maximum amount the group could bear was somewhere between £2.3 billion to £2.7 billion or – applying the exchange rate used for the safeguard plan – around €3.4 to €4 billion respectively.

A representative of the ad hoc credit committee (see below), responded that 'Eurotunnel's suggestion will not be acceptable to the banks whose support is necessary for any capital restructuring. We look forward to starting negotiations within the framework of Eurotunnel's existing obligations and in the spirit of economic realism'.

In February 2006 Eurotunnel announced the validation of a memorandum of agreement with the committee concerning the outline of the restructuring of its debt. The ad hoc credit committee consisted of MBIA (an US credit insurer), the European Investment Bank, Franklin Mutual Advisers LLC. and Oaktree Capital Management. It represented 21% of senior debt and 73% of subordinated debt, the fourth tranche debt and the tier 1A debt.

The restructuring plan was finalised by a binding agreement on 23 May 2006 and complemented by a financing agreement with a consortium of financial institutions including, among others, Goldman Sachs. However, this proposal was opposed by some subordinated creditors resulting in the company's request at the Paris Commercial Court to operate under a safeguard procedure according to French insolvency law. Eurotunnel obtained that protection in August 2006. At the end of 2006 major lenders voted in favour of Eurotunnel's safeguard restructuring proposals as described above.

We will use the proposed debt restructuring as shown in Table 1 for valuing the company as a going concern.

APV APPROACH

We will apply the adjusted present value (APV) method for valuing Eurotunnel. Its main characteristic is the stepwise

approach to company valuation. That is particularly useful for companies with several business units, with a heavy debt burden or in financial distress. We start with describing its standard procedure. Firstly, the unleveraged value of the company (V_U) is derived by discounting unleveraged cash flows (C_U ; expected operating cash flows after capital expenditures and taxes) with the unleveraged cost of equity (r_U):³

$$V_{U,0} = \sum_{t=1}^n C_{U,t}(1+r_U)^{-t} \quad (1)$$

If there is information available for estimating cash flows for different lines of business – as it is for Eurotunnel – unleveraged company value can be derived as the sum of the unleveraged values of the business units. Secondly, debt financing is taken into account by discounting the tax shields caused by interest expenses (C_{TS}) in order to get their present value (V_{TS}). We are using a corporate tax rate τ . The interest expenses are the contractual cost of debt ($r_{D,FV}$) multiplied with the face value of debt (D_{FV}). The discount rate has to be equivalent to the risk of the periodic tax shields (r_{TS}). Thus, for a constant r_{TS} , we get:

$$V_{TS,0} = \sum_{t=1}^n C_{TS,t}(1+r_{TS})^{-t} \quad (2)$$

If tax shields can be used without restrictions, it follows:

$$C_{TS,t} = \tau r_{D,FV} D_{FV,t-1} \quad (3)$$

The leveraged company value (V_L) is the sum of the unleveraged firm value and the value of the tax shields:

$$V_{L,0} = V_{U,0} + V_{TS,0} \quad (4)$$

Finally, after subtracting the value of debt (D), i.e. the present value of expected interest payments and repayments (C_D),

$$D_0 = \sum_{t=1}^n C_{D,t} \prod_{j=1}^t (1+r_{D,j})^{-1} \quad (5)$$

we obtain the value of equity (E):

$$E_0 = V_{L,0} - D_0 \quad (6)$$

The leveraged value of the company under the going concern assumption (V_L) has to be compared with its liquidation value (V_{Liq}) and any capital contribution necessary to finance the restructuring effort (I_{Restr}). The going concern is assumed to be,

$$V_L > V_{Liq} + I_{Restr} \quad (7)$$

if the cost of financial distress (direct and indirect cost of insolvency) is left aside.

The present value of the tax shields according to (2) is influenced by financial distress in several ways:

- Taxable income might not suffice for generating a tax shield on interest expenses in the period they occur. Tax losses carried forward have to be considered.
- The interest rate might be affected by financial troubles, if it depends upon specific thresholds of profitability or liquidity ratios for example.
- The rate for discounting uncertain tax shields is not equal to the risk-free rate. The question arises as to which discount rate has to be applied instead of the risk-free rate. Ruback (2002) suggests using the unleveraged cost of equity. We use this for our valuation.

OTHER APPROACHES

For the WACC approach the unleveraged cash flows are to be discounted with the weighted average cost of capital. If the ratio between value of equity (or debt) to leveraged company value is not constant over time WACC will vary periodically.

If the FTE (flow to equity) approach is applied, the expected leveraged cash flows are discounted with the leveraged cost of equity. However, the leveraged cost of equity cannot be calculated independently, because they are based upon the valuation results.

Furthermore, WACC and FTE approaches are not persuasive here because the argument in favour of those methods, i.e. constant discount rates if a constant leverage ratio is followed, does not fit into the context of valuing firms in need of financial restructuring. Therefore, we will use the APV approach.

UNLEVERAGED VALUE OF EUROTUNNEL

A valuation of Eurotunnel is necessary in order to estimate how much of its debt can be repaid. The estimated debt capacity is crucial for developing a sound financial restructuring plan. With the APV approach we start with estimating future operating cash flows after taxes and capital expenditures as their present value (V_U) which is necessary for valuing the position of owners and lenders.

We value Eurotunnel as of the end of 2006. The published safeguard plan included a cash flow forecast for the years 2007, 2008 and 2009. We will use those forecasts and estimate the key cash flow drivers for all later years until the end of the concession period (2086).

The main drivers for Eurotunnel’s unleveraged cash flows are the growth rates for its shuttle, rail and ancillary revenues and operational efficiency. In doing an external estimation one might use historical growth rates and historical ratios like the ratio of operating costs to revenues and the ratio of capital expenditures to revenues.

Other assumptions based upon the growth of the European GDP, inflation rates, growth rates for the infrastructure industry or explicit traffic projections can also be used.

Revenue projections are based upon the compound average growth rate (CAGR) of Eurotunnel’s shuttle business (0.023) and rail business (0.0154) for the years 1999 to 2006 (see Exhibit 2). Since 1995 was the first year of full operations and revenues in 1996 and 1997 were adversely affected by the

fire, the growth rate from 1998 to 1999 is used as the first data point.

Since the ancillary business is only of minor importance, we assume a growth rate of zero for simplification purposes.

A restriction to be considered is capacity. Since growth rates are going to be applied for a time span of about 80 years (2007 to 2086), volumes increase considerably and it is questionable whether existing capacity can cope with them. The current maximum capacity is as follows:

- Passenger shuttles: 4 departures per hour, in both directions, 24 hours a day, 365 days a year equals 70,080 departures a year. Comparing that to the actual number of departures of around 40,000 a year, it becomes evident that passenger capacity is used only up to 57%.
- Freight shuttles: 7 departures per hour, in both directions, 24 hours a day, 365 days a year equals a maximum capacity of 122,640 departures a year. Since the number of actual departures is 60,000, 49% of freight capacity is used currently.

Thus, there is unused capacity. This is also true for the rail business. By investing in shuttles, which can carry more vehicles or by increasing the speed of the shuttles, capacity might be increased as well. As it is hard to predict at what point of time major capital expenditures will be necessary, we assume that capital expenditures occur permanently as a percentage of revenues.

Exhibit 2 reveals that capital expenditures averaged 7.3% of revenues between 1998 and 2006. This number is used for the DCF valuation. Capital expenditures lead to tax deductible depreciations. Total tangible fixed assets are €7,147 million at the end of 2006.

This amount and the capital expenditures occurring during the concession period are to be depreciated. We apply a straight-line depreciation which leads to fixed assets at the end of the concession period equal to zero. Changes in net working capital are not considered for the sake of simplification.

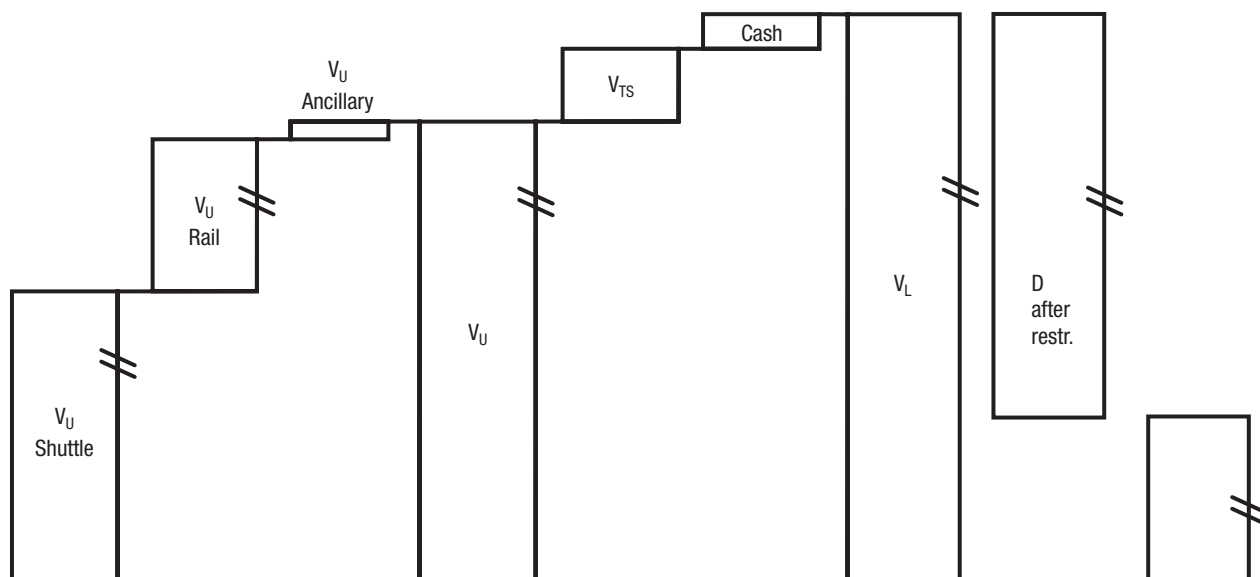
As mentioned earlier, on average 46% of revenues are spent on operating costs. The corporate tax rate was set at 31.5%, which is the average of the French and British corporate tax rate.

At the end of 2006 tax losses carried forwards are €4,931 million, which is used for deriving unleveraged company value.⁴ As well, 59% of profits before taxes will have to be paid to the governments after 2052 which includes corporate taxes.

According to the offer document, the company has used an unleveraged cost of equity of 7.1% for impairment tests. It applied the CAPM by using an unleveraged beta of 0.55, a risk-free rate of 4.5% and a market risk premium of 4.75%.

It can be argued, that using a r_U at 7.1% is low for a company in need of major financial restructuring. However, the project produces operating cash flows which are covering future capital expenditures. The risk of default is not considered at this point, since it is assumed first that the company is financed solely by equity, and the volatility of operating cash flows has not been high during the last years (see Exhibit 2). Insolvency risk becomes relevant enters when debt is considered (see below). After making all assumptions

FIGURE 1 APV VALUATION EUROTUNNEL (€ MILLION)



$$3,705 + 2,117 + 45 = 5,867 + 341 + 102 = 6,310 - 4,396 = 1,914$$

the unleveraged free cash flows can be derived. This is shown in Exhibit 4. Discounting them to the end of 2006 gives an unleveraged firm value (V_U) of €5,867 million.

PRESENT VALUE OF THE TAX SHIELDS

The next step during an APV valuation is valuing tax shields caused by tax deductible interest expenses. Exhibit 5 contains a projection of interest expenses depending upon an estimated repayment schedule which is based upon data provided by the registration document.

For the term loan we used a weighted average interest rate of 6.14%. The interest rate on the NRS I (NRS II) is 3% (6%). Unlike the usual treatment of the APV approach in textbooks on corporate finance, it is not enough to simply multiply the corporate tax rate with interest expenses, since Eurotunnel will not have any positive taxable income for years.

Working with losses carried forward within an APV valuation requires differentiation between tax losses for the unleveraged and the leveraged case. The easiest way to cope with those problems is to compare taxes paid in the unleveraged and the leveraged case. The difference is caused by debt financing, i.e. it equals the tax shields (see Exhibit 6).

The first tax shield is expected to occur in 2025, the last one in 2056 as all debt is repaid by then. All tax shields are discounted back to the end of 2006. Due to the risky

nature of the project and its debt financing, the risk-free rate might not be the best choice.

We will apply the cost of unleveraged equity (r_U) following Ruback (2002). In order to be more specific about tax shield risks, it would be necessary to model future scenarios and their intertemporal development explicitly. As that overstretches the information available for our external analysis, we use r_U . This leads to a present value of €341 million (V_{TS}). With the first tax shields being delivered in about two decades, it is not surprising that the present value of tax shields is below 10% of debt employed.

LEVERAGED VALUE OF EUROTUNNEL AND DEBT CAPACITY

Adding the value of the tax shields (€341 million) to the unleveraged value of Eurotunnel plus cash (€5,867 million + €102 million in cash) leads to its leveraged value ($V_L = €6,310$ million). Subtracting debt employed before restructuring ($D = €9,073$ million) – implicitly using the value of the tax shields based upon debt employed after restructuring for the sake of simplicity – leads to a negative ‘value’ of equity ($E = -€2,763$ million). Obviously, this is a case of too much debt and estimated cash flows will not cover repayments and interest expenses. The need for a financial restructuring becomes evident.

However, the comparison of the leveraged company value with the amount of debt after restructuring yields a positive

value of equity: €6,310 million – €4,396 = €1,914. Total debt employed is the sum of the term loan (€4,164 million) and the estimated present value of the interest payments on the notes redeemable in shares (€232 million) using a discount rate of 4% which was also applied by Eurotunnel.

An estimated value of equity of around €2 billion might look surprisingly high at first sight, which could possibly lead to the impression of the debt reduction being oversized. However, this is a myopic perspective since up to 87% of that equity will be owned by former junior claimants.

In Chapter 4 of the offer document it is reported that Eurotunnel came up with an equity value of €3.3 billion during impairment tests. Since a long-term cash flow projection is not publicly available we have been forced to use several assumptions. It is not possible – and also not necessary for the purpose of this paper – to explain the differing results. One possible explanation might be the assumed growth rates: if we use a rate of growth in shuttle revenues of 4.2% instead of 2.3% for example, the value of equity would increase to €3.3 billion in our model also (with all other assumptions remaining unchanged).

Figure 1 summarises the APV valuation of Eurotunnel.

CONCLUSIONS

The APV approach is recommended for valuing companies in financial troubles, as it illustrates the implications of a given capital structure step by step. First, the company is valued as if it were financed by equity only. The unleveraged company value measures debt capacity. In addition, tax shields caused by debt financing have to be taken into account. This is the second step in an APV valuation which requires an explicit modelling of the contractual repayment and interest payment schedule according to the restructuring plan.

We have also shown how tax losses carried forward have to be treated, as the valuation of a company in need of financial restructuring has to deal with negative taxable income quite regularly. Adding the value of the tax shields to unleveraged company value yields leveraged company value. The difference between leveraged company value and debt employed after restructuring delivers the value of equity after restructuring.

The APV approach also facilitates the comparison of competing restructuring proposals as it differentiates between operating (unleveraged) firm value and the impact of debt financing. On the contrary, we do not recommend the WACC and FTE approach for valuing companies in need of financial restructuring. Eurotunnel serves as an example throughout the paper, as it is a current and prominent restructuring case.

The restructuring plan consists of a refinancing schedule for senior claims and a combination of a debt equity swap and waived claims for junior lenders. Previous owners will hold at least 13% of the restructured company. As each stakeholder has to compare their position after restructuring with their position if the company is liquidated, it seems plausible that facing a liquidation value, considerably below the going concern value the majority of the stakeholders supported a restructuring effort.

References

- Esty, B.C., (2004), 'Why Study Large Projects? An Introduction to Research on Project Finance', *European Financial Management*, Vol. 10, pp. 213–224.
- Eurotunnel (2006), Proposed Safeguard Plan for the Eurotunnel Group Companies.
- Eurotunnel (2007), Offer Document of Groupe Eurotunnel SA, Eurotunnel SA and Eurotunnel PLC.
- Eurotunnel (2007), Registration Document relating to Groupe Eurotunnel SA and Eurotunnel Group UK PLC.
- Fitch Ratings (2005), 'Eurotunnel and Related FLF1 & FLF2 Debt Vehicles – How Far Underwater Are They?', May 2005.
- Modigliani, F. and Miller, M.H. (1958), 'The Cost of Capital, Corporation Finance, and the Theory of Investment', *American Economic Review*, Vol. 48, S. 261–297.
- Modigliani, F. and Miller, M.H. (1963), 'Corporate Income Taxes and the Cost of Capital: A Correction', *American Economic Review*, Vol. 53, pp. 433–443.
- Myers, St. C., (1974), 'Interactions of Corporate Financing and Investment Decisions: Implications for Capital Budgeting', *Journal of Finance*, Vol. 32, pp. 1–25.
- Ruback, R.S., (2002), 'Capital Cash Flows: A Simple Approach to Valuing Risky Cash Flows', *Financial Management*, Vol. 32, pp. 85–03.
- Stiglitz, J.E., (1969), 'A Re-Examination of the Modigliani-Miller Theorem', *Review of Economics and Statistics*, Vol. 59, pp. 784–793.
- Stiglitz, J.E., (1974), 'On the Irrelevance of Corporate Financial Policy', *American Economic Review*, Vol. 64, pp. 851–866.
- The Secretary of State for Transport/Le Ministre de l'Urbanisme, du Logement et des Transports/The Channel Tunnel Group Limited/France-Manche SA, (1986), Concession Agreement.
- Treaty between the United Kingdom of Great Britain and Northern Ireland and the French Republic concerning the Construction and Operation by Private Concessionaires of a Channel Fixed Link with Exchange of Notes, Canterbury, 12 February 1986.

Notes

¹ Data sources: prospectus published for the IPO 1987 and the capital increases in 1990 and 1994; prospectus for the financial restructuring 1997; registration document and offer document published 2007; summary of the safeguard plan published in 2006; annual reports of the company from 1987 to 2006 and press releases until June 2007.

² See Eurotunnel, Annual Report 1997, p. 60.

³ See e.g. Modigliani and Miller (1958, 1963); Myers (1974); Stiglitz (1969, 1974). r_U is assumed to be constant.

⁴ The information about tax rates and losses carried forward was taken from Eurotunnel's Annual Accounts 2006, p. 46. **J**

EXHIBIT 1 COST UNTIL OPENING

£ million	Nov. 1987	Nov. 1990	Oct. 1991	May 1994
Target works (e.g. tunnels)	1,367	2,009	2,009	2,110
Lump sum works (e.g. buildings)	1,169	1,305	1,305	1,753
Procurement items (e.g. shuttles)	252	583	692	705
Bonus TML		72	72	46
Direct works				36
Project contingency		239	239	
Total construction costs	2,788	4,208	4,317	4,650
Corporate costs	642	787	829	1,128
Provision for inflation	469	1,031	1,031	1,146
Net financing costs	975	1,386	1,534	4,757
Capital expenditure				222
Transfer to interest reserve				72
Net cash outflow at the beginning of operations		196	343	-1,859
Total	4,874	7,608	8,054	10,116

EXHIBIT 2 KEY FIGURES

£ million	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Revenue projections											
Shuttle	145	113	210	270	314	309	333	309	285	296	318
Rail	198	212	213	215	208	211	217	232	234	235	240
Ancillary	105	132	196	141	57	27	20	25	19	11	10
Total revenues	448	456	618	627	579	548	570	566	538	541	568
Costs											
Staff expenses	88	86	92	95	95	95	102	105	104	104	83
Other operating expenses	265	235	240	207	159	146	144	162	146	144	149
Total operating cost	353	321	332	302	254	241	246	267	249	248	233
Capex	44	37	57	59	71	82	41	25	19	16	9
NOCF	115	201	356	315	328	320	348	314	283	232	318

EXHIBIT 3 DEBT STRUCTURE

Type of debt	Principal amount outstanding at 30 September 2006	Contractual payment date for repayment of principal	Contractual interest (credit agreements)
Senior debt	€346,637,823	In eight half-yearly equal payments from June 2009 to December 2012	€93 million at £140 million floating rate (EURIBOR/LIBOR) increased by 1%; € 48 million fixed rate (8.27% to 8.78% p.a., depending on the tranche)
Fourth tranche debt	€186,175,999	One single payment on 18 July 2019 (for EFL), in half-yearly payments from 15 June 2006 to 15 December 2018 (for FM)	€117 million floating rate (EURIBOR/LIBOR) - increased by 1%; £47 million fixed rate (8.9475% p.a.) increased by 1%
Tier 1 A	€1,085,099,000	£120 million in January 2026 and £620 million in two equal payments in January 2027 and January 2028	Tranche 1 (£335 million) and 2 (£285 million) 6.645% p.a.; Tranche 3 (£120 million) 8.16% p.a.
Tier 1	€791,578,835	In half-yearly payments from 15 January 2007 to 15 July 2025	Floating rate (EURIBOR/LIBOR) increased by 1.25%
Tier 2	€1,306,207,482	In half-yearly payments from 15 January 2007 to 15 July 2025	Floating rate (EURIBOR/LIBOR) increased by 1.25%
Tier 3	€2,598,808,606	In half-yearly payments from 15 January 2007 to 15 July 2025	Floating rate (EURIBOR/LIBOR) increased by 1.25%
Resettable bonds	€678,402,885	In one single payment on 31 December 2050	Rate determined by reference to French and UK government bonds, increased by 1.5%
Participating loan notes	€1,259,921,672	In one single payment on 30 April 2040	Fixed coupon at 1% at variable coupon equal to 23.3% of net free cash flow after debt service
Stabilisation notes	€819,800,056	In annual payments from 15 March 2018 to 15 March 2026	Floating rate (EURIBOR/LIBOR) increased by 1.25%
TOTAL	€9,072,632,359		

EXHIBIT 4 ESTIMATED UNLEVERAGED CASH FLOWS 2007–2086														
€ million	2006	2007	2008	2009	2010	2015	2020	2030	2040	2050	2060	2070	2080	2086
Shuttle		477	486	495	507	569	639	805	1015	1279	1612	2031	2560	2941
Rail		253	260	276	280	302	326	380	443	516	601	701	816	895
Ancillary		6	6	6	6	6	6	6	6	6	6	6	6	6
Revenues		736	752	777	793	877	971	1191	1464	1801	2219	2738	3382	3841
Operating costs		366	377	382	365	404	447	548	673	828	1021	1259	1556	1767
Depreciation		129	129	130	230	230	230	230	230	230	230	230	230	230
Operating profit		241	246	266	198	244	295	413	560	743	968	1248	1596	1844
Taxes		0	0	0	0	0	0	-130	-177	-234	-571	-737	-942	-1088
Tax loss carry forward	4931	4690	4444	4179	3980	2854	1485	0	0	0	0	0	0	0
NOPAT		241	246	266	198	244	295	283	384	509	397	512	654	756
Depreciation		129	129	130	230	230	230	230	230	230	230	230	230	230
Change NWC		0	0	0	0	0	0	0	0	0	0	0	0	0
Net operating cash flow		370	375	395	428	474	524	513	614	739	627	742	884	986
Capital expenditures		38	49	39	58	64	71	87	107	131	162	200	247	280
Unleveraged cash flows (C _U)		332	326	357	370	410	454	426	507	607	465	542	638	706

EXHIBIT 5 ESTIMATED REPAYMENT SCHEDULE 2007–2086														
€ million	2006	2007	2008	2009	2010	2011	2012	2016	2017	2040	2041	2055	2056	
Term loan	4164	4164	4164	4164	4164	4164	4120	3946	3814	787	655	44	0	
Tranche A+B	2199	2199	2199	2199	2199	2199	2199	2199	2111	88	0	0	0	
Repayment	0	0	0	0	0	0	0	0	88	88	88			
Interest	6,14%	135	135	135	135	135	135	135	135	11	5	0	0	
Tranche C	1965	1965	1965	1965	1965	1965	1921	1747	1703	699	655	44	0	
Repayment	0	0	0	0	0	0	44	44	44	44	44	44	44	
Interest	6,14%	121	121	121	121	121	121	110	107	46	43	5	3	
NRS I	716	477	239											
Interest	3%	21	14	7	0	0	0							
NRS II	1154	1154	1154	0										
Interest	6%	69	69	69										
Total interest on NRS		91	84	76	0	0	0							
Total repayment		0	0	0	0	0	44	44	132	132	132	44	44	
Total interest payments		346	339	332	256	256	256	245	242	56	48	5	3	

EXHIBIT 6 ESTIMATED TAX SHIELDS 2007–2086														
€ million	2006	2007	2008	2009	2010	2020	2025	2035	2039	2040	2050	2056	2057	
Operating profit after interest		-105	-93	-67	-57	77	173	386	480	504	724	869	895	
Taxes (leveraged case)		0	0	0	0	0	0	0	-45	-159	-228	-513	-528	
Tax loss carry forward (leveraged case)	4931	5036	5130	5196	5253	5185	4515	1634	0	0	0	0	0	
Taxes (leveraged case)		0	0	0	0	0	0	0	-45	-159	-228	-513	-528	
Taxes (unleveraged case)		0	0	0	0	0	-49	-152	-171	-177	-234	-515	-528	
Periodic tax shield		0	0	0	0	0	49	152	126	18	6	2	0	