CHAPTER 8

An Introduction to Mineral Finance

Pietro Guj and Allan Trench

Financial objectives and financial management
- The role of financial managers

Sources and application of funds
- General considerations
- Main sources of funds

Sources of equity
- General considerations
- Off-market sources of initial equity
- On-market sources of equity
- Resource sector initial public offerings are generally small
- Criteria for inclusion in a stock market index
- Innovative investment vehicles for the resources industry
- Fiscal and policy incentives
- Joint venture farm-outs
- Specialty finance (royalty) companies

The cost of equity – balancing risk and return

Sources of debt
- Some general considerations
- Long-term debt
- Short-term debt

Hybrids between equity and debt

Project finance
- Some introductory considerations
- Risk underpinning

The financial structure of mining companies
- Cost of debt, financial leverage and financial risk
- Financial structure of mining companies

Conclusions

FINANCIAL OBJECTIVES AND FINANCIAL MANAGEMENT

Most analysts suppose that the financial objective of an exploration or mining enterprise is to maximise the value in the hands of its current ordinary shareholders. Whether decision makers in the enterprise achieve this objective depends, in the first order, on the quality of the orebody in terms of its size, grade, metallurgical and geotechnical characteristics. A sound mine plan to achieve such an outcome, however, can only become reality if mine managers and professionals are competent, labour is skilled, plant, equipment and materials are appropriate, and, above all, there is adequate investment and working capital. Second order effects beyond orebody management that influence shareholder returns include:

- the distinctive capabilities of the enterprise (Kay, 1993; Collins, 2001)
- the industry forces-at-work that shape (commodity) prices and competitiveness (Porter, 1980, 1985)
- the attractiveness (or otherwise) of the regulatory and external economic environment (Porter, 1990).

Because of its capital-intensity and the requirement for large initial investments in mine developments, the mining industry has a voracious appetite for capital. Yet, some common sources of borrowing are not easily accessible to it because of its inherent risk and the variability of its cash flows. Compared to other sectors of the economy, mining companies generally must rely more on either equity, specialised financial arrangements such as project finance, or both together. The unique characteristics of the mining industry are also reflected in the specific style of financial management that characterises successful mining enterprises.

The focus of this chapter is on four main areas:

1. the main principles of financial management and their relevance to the mining industry
2. the various sources of equity and debt funds used by the mining industry, their cost and availability
3. the more specific area of project finance
4. the financial structure of mining companies and the trade-off between financial leverage and financial risk.

Discussion will consider the general financial context within which mines are successfully developed and operated, setting the scene for the following two chapters, which deal with specific aspects of mine finance in more detail.

Financial managers of mining companies are particularly concerned with two distinct types of decisions. These are:

1. the **investment decision**
2. the **funding decision.**

Another important decision concerns the proportion of profits that are to be devoted to **dividend payments** to shareholders**.** Traditionally, the capital-hungry mining industry has tended to be parsimonious in terms of dividends. Many exploration and small mining companies never pay dividends. Their shareholders must derive their return entirely from capital gains when selling their shares.

The **investment decision** is concerned with determining which asset base is most appropriate to achieve the financial return based objectives of an enterprise. A company's Board of Directors sets these objectives at a level that is sufficiently high to attract and retain adequate investment capital from the owners, or shareholders, given the degree of risk that they face. To build, diversify and maintain an optimal portfolio of exploration, development and mining projects, and other assets entails occasional asset acquisitions and disposals. The effect of having a **diversified portfolio,** as will be discussed in a later section, means that the combination of assets:

- adds greater value for the shareholders than the sum of the returns on the individual projects
- results in lower combined risk exposure or
- both of the above.

The process of selecting capital investments is sometimes referred to as **capital budgeting**. Investment (and disinvestment) decisions are the main determinant of the assets, which appear in the statement of financial position (balance sheet), of a mining company and indeed of any enterprise. The time focus of investments is also a major consideration in financial management. While the mining industry is capital-intensive and its assets long-lived (ie fixed or non-current), it is also critical to manage cash, other short-term (current) assets and liabilities to maintain adequate **liquidity**. The inability to satisfy any debt as it becomes payable is often a reason for enterprises to be placed under administration/liquidation. Liquidity problems, rather than a lack of net asset worth (**solvency**), push companies into liquidation. This is because most of their non-current assets are illiquid, ie not capable of being sold on a short-time scale. Liquidity is crucial in the case of mining because of the high variability of cash flows, which is due to the general volatility of commodity prices and revenue.

The funding or **financing decision**, by contrast, is concerned with how to fund the above assets, whether through:

- equity (ie owners' or shareholders') funds or
- debt (bank loans or other financiers' and creditors' funds) in its various forms.

These funding sources appear as liabilities, both short and long term, and as shareholders' equity in the balance sheet. As the name implies, the balance sheet must balance. As a consequence, total liabilities

plus shareholders' equity must equate to the value of the corresponding assets. In effect shareholders' equity represents the balancing item. Thus the shareholders have control of but bear the ultimate risk of the enterprise, although their risk is limited to their investment in it and does not flow through to their other assets, personal or otherwise. Of course, the value of the assets must equal or exceed that of the liabilities. When this is not the case the enterprise is insolvent. Directors who continue trading in the knowledge that their company is insolvent commit a punishable crime.

Shareholders' equity = assets - liabilities

is the fundamental financial accounting equation. Every financial transaction is either an asset, a liability or an equity account entry in the chart of accounts (financial system) of the firm.

The funding decision also encompasses determining which **financial structure**, ie which proportion of equity and debt, is most appropriate for any specific company or project. To the extent that interest is a tax-deductible expense, using debt reduces the amount of tax payable and as a consequence improves a project or company's cash flows. This is the **financial leverage** effect. As discussed later in more detail, the use of excessive debt introduces an additional element of risk, which is known as **financial risk.** It differs from the technical and marketing risk inherent in any mining project. Project finance is sometimes provided on a limited recourse basis in which case, as discussed below, some of the shareholders' risk is transferred to the lenders.

As we will see below, the search for an optimal financial structure is a complex and somewhat ambiguous field of academic research on which opinions are divided.

The role of financial managers

Financial managers play a significant corporate role in securing the necessary funds and ensuring that they are used effectively and efficiently in achieving the financial objectives set by their Board of Directors. Peirson *et al* (2004, p 7) provide an exhaustive list of their duties and services. They include:

- **Group accounting,** including developing and implementing financial policy, and maintaining accounting systems supporting both consolidated, **financial accounting** reports on an **accrual** basis, and operational **management accounting** reports compiled on a **cash** basis.
- **Treasury operations,** including both management of current assets and liabilities (ie cash management) to ensure an appropriate level of continued liquidity, and obtaining and servicing long-term finance through borrowing (including project finance), leasing, retention of earnings after payment of dividends, and issuing of shares and other securities. This function also includes managing relationships with corporate bankers.
- **Tax services,** including tax advice, compliance and optimisation.
- **Corporate finance services,** including the financial analysis and evaluation of exploration, development, mining projects and other investment opportunities, contribution to the financial components of prefeasibility and feasibility studies, implementation of selected projects, advice on related strategic financing issues, and advice on possible mergers and acquisitions.
- **Risk assessment and management,** relating to both project and market risk. This involves identifying and assessing sources of risk through internal audits to determine their potential impact and likelihood of occurrence, and helps in formulating the company's risk-management policy to secure an appropriate level of insurance, commodity prices and exchange rates hedging to shelter them from those risks that the company is less capable to, or does not wish to bear.
- **Investor relations** with shareholders, investment analysts and the public as well as satisfying all disclosure and other requirements of the Australian Stock Exchange (ASX).
- **Financial planning,** including forecast and construction of corporate and project specific financial models capable of generating short, medium and long-term forecasts of the company's finance under different development scenarios and various economic and other assumptions.

To the extent that this monograph focuses on economic and financial analysis rather than financial accounting, we make further reference to this discipline only when it is relevant to the first two topics.

Most exploration and mining professionals probably require a relatively superficial knowledge of the principles and practice of financial accounting, as well as the intricacies of reporting on an accrual basis. A reasonable understanding of management accounting on a cash basis generally satisfies their immediate financial management needs. By contrast, to be effective strategic managers, a relatively deep understanding of corporate finance, financial planning and project modelling and evaluation is required. Our focus is therefore on these latter topics in the rest of this and in the following chapters.

SOURCES AND APPLICATION OF FUNDS

The reporting of the sources and application of funds by companies is communicated to stakeholders through the company's financial reporting process and embedded financial statements. Specifically, movements in funds are outlined within the company's financial statement of the same name, being the **sources and application of funds (or cash flow) statement.**

General considerations

The **sources and application of funds (or cash flow) statement is structured into three types of activity that** generate or consume funds (cash). They are:

1. **operations** – hopefully generating more cash through reported revenue than the operations consume in the corresponding recurrent expenses and tax payments
2. **investment** activities – increasing tangible and intangible assets consumes cash; while asset sales and risk-spreading activities like joint venture farm-outs may increase cash
3. **financing** activities – either issuing new shares or drawing down loans (ie increasing liabilities), or both activities, generates cash, while repaying loan principal or returning capital to the shareholders by means of such activities as share buy-backs (while reducing liabilities) consume cash.

The first two activities can be sources of **internal funding**, while the last will generate external funds. As can be seen in Figure 8.1, each year the directors appropriate cash (funds) from the company's operations equivalent to its profit, after covering recurring operating cash flows, less dividends (ie retained earnings for the year), plus depreciation, plus the difference between the opening and closing balance of all the recurrent items accrued in the balance sheet.

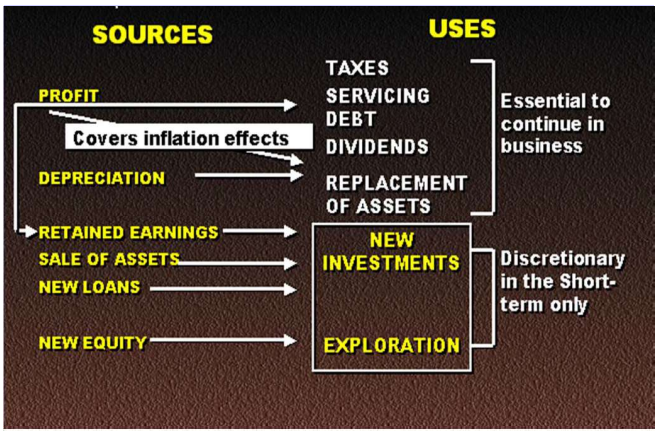

FIG 8.1 - Schematic representation of the sources and application of funds.

They make further adjustments to account for the cash flow relating to investment and financing activities, which collectively will capture all changes in assets and liabilities generating or consuming cash. For example, a reduction in non-cash assets, say the sale of a property or equipment, or an increase in liabilities, say the drawing down of a new loan, will generate cash. By contrast an increase in fixed assets, say a new mine development, or a reduction in liabilities, say repayment of principal on a loan, will consume cash.

The cash outflows relating to the acquisition of significant depreciable capital items occur in discrete 'lumpy' amounts, even though these assets, as inputs to ongoing mine production, have the capacity to generate benefits over future periods during their useful lives. A fundamental principle of financial accounting is to match revenue with the corresponding expenses incurred to generate it in each period. This includes the cost of 'consuming' or 'wearing down' fixed assets acquired through lumpy investments in the past. This item of expense, which is called **depreciation** is not a cash cost, but merely an accounting convention attempting to match revenue and expenditure in each reporting period.

In the case of the mining industry, given its capital-intensity and the presence of accelerated depreciation, the amount of cash appropriated each year, in the form of tax savings, against depreciation can be considerable. In some cases, particularly during its early years, the bulk of the cash generated by a mining project is attributable to depreciation and a company may have significant cash flow even if it makes an accounting financial loss.

Investment activities are central to the mining industry given its capital intensity and generally long project lives. The investment characteristics at the exploration stages, however, are very different, as we will see in coming chapters, from those at the development and operational stages.

Main sources of funds

A company's main sources of financing fall into two broad classes:

1. **Equity (E),** or owners' or shareholders' funds: shareholders have control over the affairs of the company, but in return for this control, they also must bear the ultimate risk for the firm/project. Equity is typically secured through an initial public offering (IPO) process when a company first lists on a stock exchange, then from follow-on, subsequent or secondary equity raisings post the IPO.
2. **Debt (D),** or banks' or financiers' funds, which are generally secured by:
   - a senior floating claim on the firm's assets
   - specific collateral
   - the project to be funded or
   - are unsecured.

There is also a third (albeit quantitatively less significant) **hybrid** category of funds, which includes financial instruments displaying both the characteristics of equity and debt, such as preference shares and convertible notes.

Major integrated mining houses with strong, diversified balance sheets and large annual cash flows have little difficulty in raising debt funds either on:

- their balance sheet (eg conventional loans, bonds, notes and debentures) or
- from project-specific loans.

The type of funding must be appropriate to the specific stage of the project in the mineral cycle and its related risk. Companies finance high-risk exploration primarily with equity. They use a mixture of debt and equity for medium-risk development projects, with high levels of debt early in the project life decreasing as the project cash flows improve. Operators of lower-risk, established mining operations, seek an optimal and steady balance between equity and debt that optimises taxes and leverages shareholders' returns at an acceptable level of financial risk.

Table 8.1 indicates the overall importance of loan financing to the minerals sector, with loan and bond financings being the predominant sources of capital for the major minerals companies. Without the backing of a profitable operation, small to medium-size exploration companies typically rely more on equity as their main source of funds, even though equity raisings can become complex and, as it will be seen, expensive.

TABLE 8.1

Capital raisings in the global metals and mining sector 2007 - 2011 (source: Ernst & Young, 2012).

Proceeds ($ M)	2007	2008	2009	2010	2011
IPOs	21 400	12 406	2987	17 948	17 449
Follow ons	66 802	48 751	73 806	49 705	49 745
Convertibles	12 865	12 238	14 1431	5477	2365
Bonds	36 358	38 146	61 016	72 502	83 804
Loans	110 787	171 691	62 420	183 875	187 059
Total	248 212	283 232	214 660	329 507	340 422

SOURCES OF EQUITY

General considerations

The prevailing 'outsider' system of corporate ownership strongly influences corporate financing in Australia (Trench, 2002). A similar situation applies in the United States, the United Kingdom and Canada. The Australian system is characterised by rapid ownership dispersion, stock market floats and relatively weak, contract-focused relationships between companies and financing institutions. By contrast, in Germany, France, Japan and Chile, where an 'insider' system operates, company ownership is typically concentrated, with fewer share floats and stronger relationships of companies with banks and financiers and also with governments.

Traditionally the exploration and mining sector has relied largely on equity to fund its operations, in combination with retained earnings. This is because mining operations become established, with average debt for this sector historically seldom exceeding 40 or 50 per cent of the total funds employed.

While equity markets in Australia are well developed and satisfy the significant demand arising from the mining industry, companies also obtain significant funds off-market.

Off-market sources of initial equity

Apart from internally generated funds, which probably represent the lowest-cost source of capital, new off-market equity funds include:

- privately sourced **seed** and **venture capital** from 'business angels' and other 'venture capitalists'
- other lower-risk and generally more significant **off-market placements**
- **farm-outs/joint ventures**
- **royalty-based finance** arrangements.

'Business angels' are generally astute technical or financial specialists investing up to a few hundreds of thousands of dollars for five to ten years to help detect and address missing critical success factors and develop high-risk high-return opportunities to the point where they can seek formal external funding or be profitably sold. The main advantage of **venture capital** is that it is often the only source of capital available to start up a mining project. Based on a persuasive business plan, venture capitalists will invest amounts in the order of $0.5 M to $10 M for between, say, three and seven years. They aim to achieve high capital gains by disposing of their investment at a favourable time, rather than maintaining their investment in the company and waiting for eventual dividends.

Venture capital has, however, some drawbacks. For instance, the original project promoters are likely to only be able to retain a minority position in their project. They also experience the added pressures of working with an active board that has a contractual attitude towards management, and a tendency to go well beyond the provision of general direction and governance into the sphere of day-to-day technical and managerial decisions.

From a company's point of view, equity funding provided by venture capitalists has a number of **significant advantages**. These include:

- it may be the only way of funding higher-risk projects
- unlike the obligation to pay interest on debt, there is no obligation to pay a dividend on ordinary shares, even though this would be desirable at some stage in the project life; similarly, there is no provision for repayment of initial shareholders' capital contributions as contrasted to principal repayment at the maturity date of a loan
- the shareholders' liability is also limited to their investment in the company; this means that their liability does not extend to other personal assets if, in case of liquidation, the total assets of the company are insufficient to satisfy all creditors' claims.

There are, however, some **disadvantages** as well:

- there is the dilution effect of additional equity issues; by contrast, debt finance does not cause dilution of ownership

- equity issues are complex and entail high transaction costs relating to the preparation of a prospectus and related underwriting
- funds may not be available when needed as their availability is a function of economic and commodity price cycles.

On-market sources of equity

There are a number of ways to raise equity 'on-market.' These include **initial public offerings (IPOs)** and through follow-on, **subsequent,** or **secondary equity raisings.**

For new mining companies, IPOs typically occur on the Australian Stock Exchange (ASX), but also on overseas stock exchanges such as on the Toronto Stock Exchange (TSX) in Canada or on the London Alternative Investment Market (AIM). The share issues in these IPOs can include:

- **ordinary** fully paid shares, which generally represent the bulk of equity funds sought, and largely determine the financial structure of the company
- **contributory** or partly paid shares, which, while popular, are quantitatively subordinate and are used to provide a reliable source of equity funds through calls on shareholders when funds are actually needed
- **preference** shares conferring the payment of dividends, which are often fixed to their holders ahead of ordinary shareholders. Preference shares are issued to attract funds from interested but more risk-averse potential investors
- **options** that are used as a sweetener for equity issues or as a reward to executives and other employees designed to encourage them to work in ways that enhance the company value.

Subsequent equity raisings include:

- right issues (where entitlements are proportional to the size of each shareholder's equity stake)
- placements
- dividend re-investment
- shareholder share purchase plans (where entitlements are equal for all shareholders, large or small)
- employees' share schemes.

Bonus issues and share splits, by contrast, do not raise new equity, and even though they were once popular, they are now uncommon.

In Australia capital raisings are generally highly regulated and costly. The *Corporation Act 2001* and Australian Stock Exchange rules require significant disclosure documentation generally in the form of a **prospectus.** A Profile Statement or an Offer Information Statement may be required for a smaller raising of less than $5 M. However, some offers are exempt from full disclosure and documentation requirements when targeted solely at sophisticated and professional investors for example.

The choice of the process, type and timing of subsequent equity raisings by companies depends upon a number of factors. These include:

- prevailing equity market conditions
- the urgency for additional funds required by the company (with most but not all significant equity raisings requiring shareholder approval)
- the level of concentration of ownership across the share register of the company (which can influence the choice between rights issue and a shareholder purchase plan)
- the placement capacity of the company at the time (for example, whether shareholder approval is required to fully accommodate a proposed private placement).

According to Peirson *et al* (2004) the major costs in an IPO include:

- Compiling and printing a prospectus, (inclusive of independent experts' reports such as those detailing geological documentation and prevailing commodity market conditions and forecasts) at $300 000 to $500 000.
- Stockbroker management and/or underwriting of the IPOs or of subsequent share issues. Broker fees and underwriting costs typically vary between over one per cent and seven per cent of the size of the float or the underwritten proportion thereof. This percentage also depends on the standing of the company and whether the IPO price has been set at a realistic level.

The total cost for a large float ranges between perhaps two and six per cent of the funds raised, while small ones absorb a much larger proportion of the funds raised (perhaps even more than 20 per cent).

There were 78 metals and mining IPOs listed in 2011 (Trench, 2012), compared to 66 similarly focused IPOs in 2010 (Trench, 2011); both years witnessing a significant number of new listings. This compared with IPO numbers of less than five per year in the late 1990s and around 15 per year in 2001/02 and 2002/03, when commodity prices were still weak. This figure then rose to 60 IPOs per year in 2005/06 as commodity (and equity) markets strengthened - see Kreuzer, Etheridge and Guj (2007).

The general investor perception is that subscribing to an Initial Public Offering is a strategy for easy money. In practice however, shareholder returns from IPOs are highly variable. Mining and metals-focused IPOs listing on the Australian Stock Exchange in calendar years 2010 and 2011 illustrate the volatility of shareholder returns. The investment performance of the metals and mining IPOs of 2011 in their first calendar year was in stark contrast to their 2010 predecessors. While the 2010

IPO group rose on average by 61 per cent by calendar year-end, the corresponding 2011 IPOs fell by 17 per cent from listing par values.

During commodity booms, most resource company stocks open at a listing premium relative to their issue price. This may be because the listing price has been set too low under the risk-averse influence of the underwriting stockbrokers. Underwriters have a propensity for curbing the project proponents' excessive optimism and most sacrifice the potential rewards of a higher-priced IPO so that they are not exposed to a potentially costly under-subscribed float. Less risk-averse investors are willing to pay listing premiums when general market sentiment is buoyant and there is a strong appetite for cyclical stocks.

As we shall see in Chapter 10, the difference between the **fundamental value** of exploration and mining assets and their market value (ie the market premium) may represent the so-called **real option value** (ROV) of the assets.

During periods of resources boom and strong general equity market performance such as in 2010, there is generally a strong investor appetite for cyclical stocks such as mining company shares. Furthermore, the heightened risk appetite extends beyond mining companies to include support for mineral exploration companies.

When market support pushes share prices higher, there is a trend for companies to respond by financing their mergers and acquisitions with shares rather than cash, particularly late in an economic cycle. Depending on how the offers are written (Rappaport and Sirower, 1999), this type of deal is difficult to evaluate. This is because of the ambiguous signals that the management of the acquiring company sends to the capital market. Logic dictates that if they truly believed that their shares were poised for a great leap forward, they would be better placed to use cash instead of scrip – thus benefiting from the impending increase in share value. A possible interpretation is that companies who favour scrip bids may have considered that their shares were overvalued.

Resource sector initial public offerings are generally small

In a recent study, Kreuzer, Etheridge and Guj (2007) analysed the floats of the 179 junior exploration companies listed on the Australian Stock Exchange in the period between July 2001 and June 2006. They found that the 'typical' junior explorer raised just $A4 M at initial public offering (IPO) to finance a two year, mainly greenfields, exploration program. The capital raised at IPO entitled its investors to approximately half of the company, with the balance in the hands of the promoters, vendors, seed capital investors or a combination of these groups. Of the $A4 M raised at IPO, the typical company intended to spend approximately two-thirds on exploration, with the remainder covering corporate overheads and the costs of the IPO. Trench (2012) made similar findings in analysing the 78 IPOs listed on the ASX in 2011, where the average raising was $A7.79 M, and the median ('typical') capital raising was $A4.3 M.

Figure 8.2 shows the combined market capitalisation of the largest 150 mineral resources companies listed on the ASX in January, 2012. At this time, the size of the two diversified global mining houses, BHP Billiton (BHP) and Rio Tinto (RIO), at approximately $A329 B, was larger than the combined value of the next 148 companies, as well as all of the other resources companies. Two other companies – Newcrest Mining (NCM) and Fortescue Metals Group (FMG), had market capitalisation exceeding $A10 B. Only 30 of the 850 listed mining and exploration companies exceeded A$1 B in capitalisation at that date.

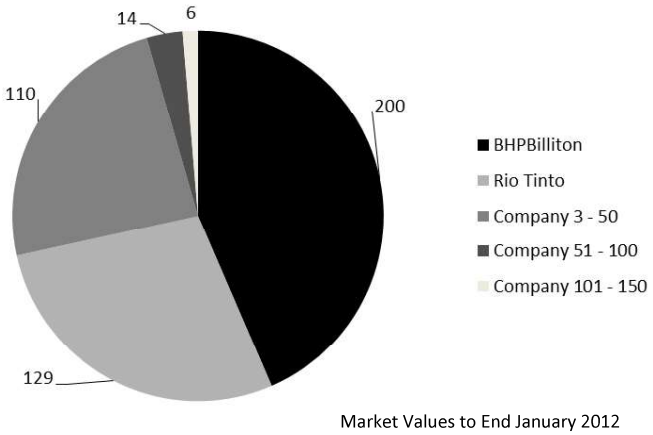

FIG 8.2 - Market valuation of the Australian metals and mining sector in $A B – end of January 2012 (largest 150 companies by capitalisation) (source: Gresham Partners 2012).

The size threshold for inclusion in the largest 100 companies at the end of January 2012 was $A 178 M. This figure has remained in the same order of magnitude for some time, being A$116 M in 2006 (Trench, Pridmore and Lau, 2006), rising to $A228 M in 2007 prior to the global financial crisis (Trench, Thompson and Lau, 2007), then falling back to $A173 M in 2008 (Trench, Thompson and Lau, 2008) as the impact of the GFC lowered values, before rising again to around $A300 M in January 2011 (Trench, 2011).

The size distribution of mining companies in Australia is highly positively skewed. Most of the 850-strong ASX-listed minerals companies, which continue to rise in number, are not large enough to become part of the Standard and Poors or ASX index.

Criteria for inclusion in a stock market index

Relatively few mining companies are included in any of the main stock market indices in Australia. To be included a company share must display:

1. liquidity
2. free float
3. high capitalisation.

These three investable weight factors (IWF) determine which of the companies listed on the Australian Stock Exchange are captured by its various indices. In February 2012, there were 2226 companies listed on this exchange. Of these, only the six largest mining companies (BHP Billiton, Rio Tinto, Newcrest Mining, Fortescue Metals, Iluka Resources and Alumina Limited) were included in the S&P/ASX 50, thus gaining broader international exposure. A further 39 companies (ie to a total of 45) were included in the S&P/ASX 200 index, which is used by many domestic passive fund managers. So the majority of exploration companies are therefore not on the 'radar screen' of large, index using institutional investors.

In aggregate, 80 out of the total of about 850 listed mining companies (ie 35 more than in the S&P/ASX 200) appear in the S&P/ASX 300. They are typically small to medium-size mining and mining project development companies. The remaining 770 or so small exploration companies do not appear as index constituents at all.

Most equity funds come from investment institutions including:

- superannuation funds
- life insurance companies
- unit trusts
- investment companies.

Some fund managers actively manage their funds with the objective of maximising returns, albeit under some risk exposure. But many funds are passively managed or index-bound. That is, their managers seek to achieve returns equivalent to movement in a relevant index. Furthermore, many institutional fund managers are often constrained to invest in certain main S&P/ASX index shares by risk-management policy, regulation, or by rate-of-growth objectives in combination with the sheer magnitude of the funds to be invested. As a result, institutional investors do not represent a good source of equity funds for small to medium-size exploration and mining companies. Even general public investors, who leverage their portfolios using margin loans, are constrained by the banks to select shares from the benchmark S&P/ASX 300 index.

It is clear that small to medium-size enterprises (SMEs) are at a disadvantage. This is because their low capitalisation falls well below that necessary to create portfolio critical mass, even though during resource booms they can display very high levels of growth and rates of return.

Innovative investment vehicles for the resources industry

It is possible to achieve critical capitalisation for inclusion in an appropriate index by aggregating the value of a number of the shares of small and medium size companies using innovative investment vehicles, such as **Specialised Listed Investment Companies (LICs)**. Such a strategy can make them meaningful investment targets for large institutions.

The basic concept of LICs raising equity funds for investment in diversified portfolios of shares, debt securities, property and other assets is not new. Yet Australian LICs have traditionally been small compared with those in the United Kingdom and the United States. There has recently been significant growth both overseas and in Australia in LICs of various sizes specialising in resources stocks.

Fiscal and policy incentives

There has been significant political debate in many resources-rich countries, including Australia, about the fiscal treatment of small and medium size companies. From time to time this results in government policy makers introducing specific fiscal and policy incentives for this sector. Notable examples are:

- the Canadian **'flow-through' shares**
- the Australian **pooled development funds (PDFs)**
- the award of **specific government grants for exploration activity.**

A **flow-through share** scheme has been in place in Canada since 1983. It has allowed deduction of 100 per cent (enhanced to 115 per cent in 2000 through the Investment Tax Credit for Exploration legislation) of eligible exploration expenses from the taxable income of private investors. This has assisted Canada to become the world's largest mineral explorer for much of this period. In 2011, for example, annual mineral exploration and deposit appraisal expenditure in Canada amounted to almost $C4 B.

Even though there has been considerable political lobbying, the Australian government has not pursued such a scheme in the past three decades. This is presumably because a similar scheme operating in the boom of the late 1960s and early 1970s was open to abuse.

The Australian government has, however, allowed the establishment of **pooled development funds (PDFs)** to provide equity capital for eligible activities of Australian small to medium-size enterprises (SMEs), under stringent compliance rules. The *Pooled Developed Funds Act* 1992 requires that a PDF must invest 65 per cent of the capital it raises within five years. Also, there must be a minimum of ten per cent equity in new Australian companies with total assets of less than $50 M. This initiative is designed to establish an eligible business or substantially expand existing capacity or markets.

The Australian Government taxes PDFs at a concessionary rate. Their taxable income has the following components:

- SME income is taxed at 15 per cent (instead of 30 per cent)
- unregulated (ie non-SME) income is taxed at 25 per cent as an incentive for PDFs to invest uncommitted funds in SMEs instead of in interest-bearing securities.

In addition, capital gains on disposal of PDF shares and PDF dividends are tax-exempt. Lion Selection Group, for example, utilised the PDF legislation to focus upon resources sector investments, especially during the downturn in the minerals sector in the late 1990s and early 2000s – but it has since shifted its business model towards that of a standard fund manager, albeit one focused on the mineral resources sector.

Etheridge and Uttley (2003) proposed the dedicated drill fund concept as a specialised form of pooled development fund. They argued that Australian junior company exploration programs have been unnecessarily long and protracted because of their struggle to secure drilling funds. Yet, the first mineralised drilling intersection is usually when most value is added to an exploration/mining project as reflected in rapidly rising share prices. A good example of rapid value appreciation occurred with the dramatic rise in the share price of Sandfire Resources (ASX Code SFR) following their discovery of the DeGrussa copper sulfides in Western Australia in 2009.

In their subsequent argument, Etheridge and Uttley (2003) advocate the establishment of dedicated 'drill funds' spending in excess of 80 per cent of the funds raised on drill-testing robust targets. The concept envisages a major company partnering the fund with an option to acquire between 50 and 60 per cent of high-value discoveries. While such 'drill funds' remain at the proposal stage, the concept may deserve serious consideration from government. The drill fund concept has not been widely applied in the sector, with companies preferring to raise funds through traditional pathways when markets improved from 2003 levels and risk appetite returned to the sector. It will be interesting to see whether PDFs, drill funds, or other supportive financing mechanisms, become more popular when markets weaken in the future.

To promote economic multipliers from mineral exploration success and subsequent mine development, the Australian states and the Northern Territory have also initiated specific activities and related grants to support mineral exploration. Prominent among these are completion of new, high-resolution geophysical surveys and, in some cases, provision of direct funds (under competitive bid process) for the drill-testing by listed companies of high-risk, high-reward exploration targets. Examples include South Australia's PACE programs (Plan for Accelerating Exploration), the 'Bringing Forward Discovery' initiative in the Northern Territory, the Collaborative Drilling Initiative (CDI) in Queensland, the 'New Frontiers' initiative in New South Wales, the Victorian Initiative for Minerals and Petroleum (VIMP), and Western Australia's Exploration Incentive Scheme (EIS).

Joint venture farm-outs

A joint venture (JV) is a contractual arrangement where two or more parties cooperate to enhance the potential performance of a project that neither of them would develop entirely at their own cost and risk. Joint ventures include two stages:

1. A **farm-in/farm-out stage,** where the 'farming in' party progressively acquires a predetermined percentage of the equity in a project from the diluting, 'farming out', party for a specific consideration, which frequently includes a commitment to fund exploration or development work in the minerals sector. As a source of funds, the farm-out stage of a joint venture is similar to a partial asset sale.
2. A **joint venture proper stage,** which commences after the joint venture participants reach the desired level of equity ownership**.** During this stage participants contribute to the joint venture's expenses and share its produce (not profit) generally in proportion to their equity. As a consequence, the joint venture ceases to be a source of funds for the diluting company, unless the agreement is 'geared' or includes progressive payments unrelated to dilution of equity.

Specialty finance (royalty) companies

Specialty finance (royalty) companies provide funds for acquisition, development or expansion, mainly of operating gold mines or advanced projects, in exchange for an appropriate metal royalty on production. This source of funding differs from gold loans (discussed below in the debt sources of funds section) in that the financiers share in the risk of the project. As examples, New York and Toronto-listed Franco Nevada has developed a global royalty portfolio as a specialist finance provider to the minerals sector, including a number of royalties over Australian mines. On a lesser scale, London-based Anglo Pacific Group is active as a provider of royalty-related finance. ASX-listed Royalco Resources has also entered the market to provide royalty finance to companies but is presently of smaller scale to its international counterparts.

THE COST OF EQUITY – BALANCING RISK AND RETURN

Utility theory suggests that **'economically rational'** investors will select, from the various opportunities open to them, the course of action that maximises their utility (Hirshleifer, 1980). To the extent that the magnitude of an individual's utility is a function of their risk tolerance, investors tend to **maximise their**

wealth, while minimising their risk exposure. But, depending on their degree of risk-aversion, they will be willing (within limits) to trade risk for higher returns[1].

So a rational investor will not shift money from riskless Government Bonds (returning the risk-free rate of return (R_F) to a risky project unless he or she receives a suitable **risk premium** for bearing the additional risk.

The risk of any individual investment is characterised by two components:

1. **idiosyncratic risk,** which is unsystematic and unique, and depends on the characteristics of the specific investment; this risk can be diversified away (see Figure 8.3) by constructing a portfolio of a reasonable number of investments (15 to 20) where the individual returns are ideally poorly correlated
2. **systematic or market risk,** which depends on broader movements in the economy at large and which cannot be diversified away by portfolio effects (also shown in Figure 8.3).

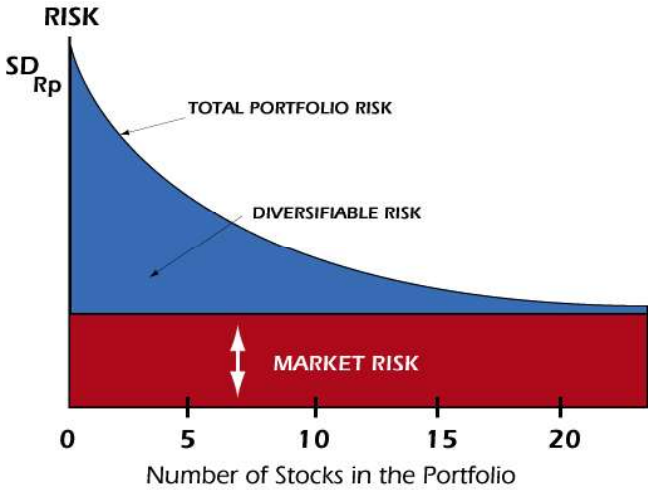

FIG 8.3 - Diversified portfolio effect.

Trench (2002) points out how, for example, the performance of a nickel-producing company is correlated with demand derived from the steel industry, which in turn is one of the best indicators of aggregate economic activity. Its risk is therefore mainly systematic. By contrast, the success of a nickel exploration company and a possible new nickel mine development project is dependent on whether the relevant drill holes are mineralised or barren, and on the local ground conditions. The major part of its risk is unique and independent of economic conditions.

An investor in a diversified **market portfolio** (ie in a portfolio including all securities weighted by their respective market capitalisation, say the All Ordinaries Index) would legitimately expect to receive a return on the market portfolio (R_M) adequate to compensate for bearing the market or systematic risk, but not any unique risk. Naturally, R_M should be greater than the risk-free return (ie R_F), ie it should incorporate a **market risk premium (R_M - R_F).**

The market portfolio premium has varied over time, with a tendency towards a gradual decrease. For instance, according to Officer (quoted in the Independent Pricing and Regulatory Tribunal of New South Wales, 2002) the market risk premium from 1882 up until 1987 averaged around 7.9 per cent on an arithmetic mean, or more correctly 6.6 per cent on a geometric mean. If the average is extended to 1997, these values drop to 7.1 per cent and 5.7 per cent respectively. In post-World War II times (until 1991) the arithmetic mean fell to 6.6 per cent according to Hathaway (also quoted in Independent Pricing and Regulatory Tribunal of New South Wales, 2002). A number of recent surveys display a high level of annual variability, with recent annual or shorter arithmetic means in the range of three per cent to 7.1 per cent.

An average of six per cent is generally used as a general approximation, even though it may be naïve to assume that future market performance will necessarily follow a linear extension of the past. Six per cent as a best estimate concurs with a study by Adams (2009) that concluded the generic equity premium based upon various time-windows of US equity returns sits in the range 5.5 - 6 per cent.

To the extent that idiosyncratic risk is diversifiable, financial markets neglect it in determining the return that equity investors should expect to justify investing or maintaining their funds in specific securities or projects. This is also known as the **cost of equity (R_E)**. Different investments within the market portfolio, however, respond differently to overall economic influences. In some cases they are sensitive to and amplify general market movements, while in others they react less than average to them. Investors must be compensated for this range of variations in the behaviours of different investments by providing a higher risk premium for those that are more volatile than the market portfolio and conversely. The adjustment is achieved through the use of a beta (ß) index, reflecting how the return on the project is sensitive to and would amplify or abate general market movements. Thus, the applicable risk premium becomes ß × (R_M - R_F), where a ß > 1 denotes sensitivity to the market.

The capital asset pricing model (CAPM) captures this relationship between risk and the related cost of equity funds as follows:

$$R_E = R_F + ß\times (R_M - R_F)$$

where:

R_E = return on equity
R_F = return on government bonds
R_M = return on the diversified market portfolio
ß (Beta) = index of the sensitivity of a security returns to market

1 We develop this issue further in Chapter 10.

So if the risk-free rate of interest (R_F) is five per cent, the market premium is six per cent, and the beta (β) index of a specific exploration company is 1.35, ie reasonably sensitive to the market, the cost of equity would be:

$$\text{Cost of equity } (R_E) = 5\% + 1.35 \times 6\% = 13.1\%$$

SOURCES OF DEBT

Some general considerations

In raising debt funds either for their operations or for new developments, or both, companies essentially have access to two types of lending:

1. **corporate finance,** where a bank lends to the company and has recourse to secure its debt on the company's total assets and on the company's cash flows to service its debt
2. **project finance,** where the capital investment involved will be repaid and serviced only by the cash flows generated by the project with no (or limited) recourse on all the other company's assets.

Irrespective of its type, debt can be characterised by its:

- term, either **short-term**, ie with maturity of less than 12 months or **long-term,** ie with maturity of more than 12 months; the terms of loans should ideally match the life of the investments they are funding
- degree of security, whereby loans can either be secured, senior or un-subordinated, ie guaranteed by specific assets or by a floating claim against the borrowing firm's assets or unsecured or subordinated
- marketability, ie whether the relevant debt instruments can be traded on secondary capital markets, where, by contrast with primary markets, no new funds are raised
- type of interest rate, whether fixed or variable. Nowadays swaps are commonly used to convert variable-rate to fixed rate loans.

From a company's point of view, debt finance has a number of advantages. First, funds are available flexibly and when they are actually needed. Second, the transaction costs of establishing a loan are lower than those of equity and, because of the tax-deductibility of interest expenses, debt leverages returns on shareholders' equity. Finally, contrary to the providers of equity, lenders do not acquire ownership of and control over the firm, so there is no dilution of ownership.

There are, however, a number of disadvantages. For example, because interest expenses are unrelated to fluctuating profit levels, higher levels of debt bring about additional 'financial risk.' Also, floating security over company's assets extends financial risk to projects other than those being funded with debt. Even in project finance, restrictive covenants may limit the capacity to use other company assets as security to raise funds for new projects. While senior lenders have no formal control over the company as long as it regularly services its debt, they can acquire a critical influence on its affairs if there are liquidity problems.

To make use of debt, a company must either have currently positive net cash flows, or expect to become cash-flow-positive in a sustainable way in the foreseeable future. Small to medium-size exploration companies, without the backing of a profitable operation are not cash-flow-positive and consequently cannot service debt. They must rely entirely on equity to fund their operations, even though it is complex and expensive to raise. This is the case until they make a discovery and can secure project finance by convincingly establishing project feasibility. Major integrated mining houses, by contrast, with strong, diversified balance sheets and large annual cash flows have little difficulty in raising debt funds both on their balance sheet (eg conventional loans, bonds, notes and debentures) or project-backed. But even exploration subsidiaries of major integrated mining houses display the highest level of investment in exploration at times of boom when new equity is easy to raise in the capital markets.

Long-term debt

Companies use long-term debt for mine construction and development, and for ongoing corporate funding needs. In most cases, lenders ensure that it is secured by a senior claim on the firm's assets.

Long-term debt can be either marketable or non-marketable. It includes:

- Long-term **commercial bank loans,** mostly at a variable-rate, with fully drawn advances having terms of one to ten years. Variable interest rates are based on the government bond rate plus a margin between 1.5 per cent and four per cent depending on the lender's level of perceived risk. Fixed-rate bank loans, by contrast, tend to have shorter terms of one to five years. In both cases interest is generally calculated on a daily basis and charged monthly in arrears. Loans are mostly on an interest-only basis with balloon principal repayments. On rare occasions a schedule of progressive principal repayments (credit terms typical of the **mortgage loans** frequently used by property developers) applies.

  Although banks are reluctant to grant long-term debt at a fixed rate of interest, it is possible to utilise a **swap** agreement to achieve the same result as if the loan had been issued on a fixed rate. While no principal changes hands, if in any period the variable rate rises above the agreed swap rate, then the merchant bank providing the swap will remit the difference

to the borrower. Swaps are desirable because they make a company's liabilities more predictable, thus reducing the perception of financial risk in the eyes of institutional investors.

- Specific **project finance,** secured mainly by the fortune of the project, is becoming an important source of funds to the resources industry for mine development.
- **Marketable long-term debt papers** that are issued directly to lenders and traded on secondary markets.
- **Debentures,** which are long-term (one to five years), fixed-interest instruments mostly written by finance companies, secured by specific assets or floating charge over the company's assets. Debentures require the issuing of a prospectus and Australian Stock Exchange listing and are therefore expensive. Furthermore, the trust deed imposes restrictions on further senior debt and on the company's level of total liabilities. To obviate these difficulties, companies often combine a bank loan with a swap, to achieve long-term fixed interest. As a consequence debentures are becoming a less popular mean of raising funds.
- **Corporate bonds,** issued by large companies, with a credit rating of AA+ or better. They are generally **placed** with private or institutional investors. Hence, there is no need for a prospectus making this source of funds cheaper than debentures. They are generally issued at a fixed interest rate and are unsecured. Australian dollar denominated **Eurobonds** are sometimes issued on medium to long terms outside Australia. While their interest rates may be comparatively low, it is advisable to hedge against exposure to currency risk when using these vehicles.
- **Unsecured notes** are similar to debentures but, as the name implies, are unsecured. The trust deed is less restrictive and hence they are more risky to the debt provider. Consequently lenders are justified in demanding a higher rate of interest.
- **Financial leases,** which are normally used to fund the use plant and equipment. The mining company (the lessee) obtains the right to use the plant and equipment, which remains the property of the lessor, by paying rental with no immediate requirement for significant capital outflows. There may or may not be an opportunity to purchase the equipment at expiry of the lease. In the past it was possible to structure the lease agreement in a manner that did not generate a liability in the lessee's balance sheet. This arrangement is referred to as an operating lease. Nowadays, most lease agreements generate a definite liability for the lessee, which must be recognised in their balance sheet. While there are a number of desirable aspects to sourcing funding through leasing, the implicit interest rate may be higher than that of an equivalent loan. An effect similar to leasing is achieved by **contracting out** aspects of mine development or operations to a contractor, which supplies the use of the necessary plant and equipment.
- **Commodity (gold)/derivative loans and advance sales contracts:** companies have used gold loans for construction and development of gold mines during periods of very high gold price contango and low gold leasing rates. Under these circumstances a gold loan may be competitive relative to conventional borrowing even though leasing rates are not tax-deductible in spite of being a form of interest. The bank buys gold and lends it to the company. The company then sells this gold to finance the development of the project, pledging to deliver gold to the bank at a future date from its production. Commodity/derivatives linked facilities have become less frequent due to lower contangos and progressively higher leasing rates. More recently, as it will be seen, merchant banks have made it a requirement of project finance packages for the development of nickel and base metal mines for the proponents to sell forward a significant proportion of their production while the loan is outstanding. In some cases, customers (off-take parties) have contributed funds towards the development cost of projects to secure supplies for their smelters. Two examples are Inco (subsequently acquired by Brazilian mining company Vale) financing the Emily Ann nickel project in the Southern Goldfields region of Western Australia (Rothschild & Sons (Australia) Limited, 2000), and Chinese mining-smelting-refining company Jinchuan financing the Savannah nickel project in the Kimberley region. In some cases, to support desirable developments, customers have actually bought and paid for future production in advance. This practice is known as **customer finance.**

Short-term debt

Short-term borrowing, that is debt instruments with maturity of less than twelve months, is the main tool for day-to-day liquidity and operational cash management. This is because the operational cash flows of many mining operations are neither smoothly distributed over time on accurately predictable, and the consequences of lack of liquidity at times of peak demand on the company's cash is potentially dire. There are a number of facilities to secure short-term debt. Aside from trade credit, the cheapest forms of short-term borrowing include:

- overdraft accounts
- loans secured by inventories or by accounts receivable (factoring) and similar very short-term instruments
- bridging finance

- marketable debt papers including promissory notes, bills of exchange, bank bills (often as revolving facilities) and non-bank bills, all of which are sold at a discount to their face value.

HYBRIDS BETWEEN EQUITY AND DEBT

There are a number of hybrid financial securities that display the characteristics of both equity and debt. These include **preference shares,** which are legally equity but which financially display more of the characteristics of debt. They have preference over ordinary shares in terms of receiving dividends and capital repayments. Dividends are often fixed and in many ways resemble interest payments. Generally, they can be converted into ordinary shares at any time or at the end of a specified term. In some cases, the contributed capital can be redeemed. This is not dissimilar from the repayment of a loan principal, making this type of share very similar to a fixed-interest loan. The main difference is that preference shares are less secure, ranking after other creditors in the case of liquidation, the quasi-interest dividends are not deductible for the purpose of assessing income tax and, in some cases, they have a right to participate with ordinary shares in profit distributions.

Hybrids also include **unsecured convertible notes** that can be converted into ordinary shares or redeemed at maturity. From a legal point of view, these are initially treated as debt but, ultimately, after conversion into shares, they become equity. As convertible notes generally have definite terms and fixed rates of interest, they are effectively equivalent to a fixed-term loan plus an option. The value of this option makes it possible for companies to issue convertible notes at a lower level of interest than would have applied to a corresponding conventional fixed-interest term loan.

PROJECT FINANCE

The very future of the mining sector is dependent upon the successful delivery of new mines, replacing currently operating mines as reserves gradually deplete. In this respect, the successful financing of new mine projects is one of the critical elements underpinning the industry's future.

Some introductory considerations

A standard definition of project finance is:

> *Financing of project development based on a financial structure with no, or more often limited, recourse on the corporate assets of the sponsoring company, where project debt and equity used to finance the project are secured only by the project assets and serviced and repaid from the project cash flows.*

Project finance packages are project specific, highly structured and take into account tax implications. They are generally syndicated packages of different loan facilities provided by different lenders and coordinated by a lead merchant bank. Packages offer flexibility to match the varying funding needs of different stages of the project development, commissioning and initial operations over time. As a result, they are typically a mix of short and long-term, floating or fixed rate loans with different principal repayment profiles, currency denominations and related details.

Banks tailor the terms and repayment schedules to fit prospective, but conservatively estimated, cash flows from the project. Naturally, the project must have the capacity to provide an expected rate of return that is sufficient to both ensure that the borrowing is adequately secure and serviced, as well as providing reasonable returns on equity funds. Thus, determination of an appropriate discount rate to be used in the evaluation may be a challenge. In packages requiring a substantial proportion of forward sales the discount rate to be used must be reduced accordingly to recognise the fact that the major source of risk, ie commodity price volatility, has been hedged.

Most current project finance (PF) arrangements are negotiated by companies to share risks and to underpin financial structures that shift some, but not all, of the risk from the corporation to the lender. Lenders may receive some reassurance from a requirement for borrowers to provide project completion guarantees backed by equity (hurt money) and to maintain specific financial ratios while the loans are outstanding.

Much of the initial project financing focused on large projects and companies, but more recently, small- to medium-size enterprise (SME) promoters have become more sophisticated and persuasive in their approaches to merchant banks. Project finance arrangements often come into play when venture capitalists realise their gains by vending into either an Initial Public Offering or to other equity investors.

Merchant banks have also become more effective in identifying and valuing potential assets and growth opportunities, irrespective of the influence of their corporate owners. In this context, they have gone upstream and taken a project facilitation role by:

- locating initial sources of venture capital
- identifying and introducing potential joint venture participants
- protecting juniors from potential takeovers.

There have even been instances where merchant banks have provided minor participation funds prior to the finalisation of feasibility studies, subject to risk-reward considerations and repayment at the earliest opportunity. The rewards for successful relationship banking with project sponsors may even go beyond the project finance fees by securing additional business, such as, supporting a possible listing, hedging arrangements, margins, and foreign exchange transactions.

As with equity, the availability of project finance is somewhat cyclical, depending on market sentiment and commodity booms. Whether funds are available depends on the strength of the project and on a detailed and robust (bankable) feasibility study. Lead advisor banks generally have specialised mining analysis departments that, prior to project finance negotiations, will carry out thorough technical and Discounted Cash Flow modelling and evaluation of the project, as well as risk analysis on a one hundred per cent equity basis.

Banks generally require free access to and time to digest additional information about a project, particularly in regards to:

- the grade and size of the resources and reserves, related models, and on the prospectivity of the surrounding tenements
- the technical feasibility of the proposed mine design and the realism of the related capital and operating cost estimates
- the potential position of the proposed operation on the supply (cost) curve for its commodity
- the marketability of mine outputs, in particular for those mines set to produce an intermediate metal product
- the reputation, experience and track record of the company management and its consultants in managing similar developments and operations
- how sensitive the financial performance of the project would be to variations in the value of its main inputs and to changes in the adopted mine design
- the realism of various production schedules under different scenarios, which must display a sufficiently long tail of ore beyond the life of the PF loans.

In carrying out due diligence, banks review source data and construct their own models and project cash flows focusing mainly on the 'downside' of the project. They tend to disregard sponsor tendencies to focus primarily on the 'upside.' If a project's proponents are to be successful in obtaining project finance, the project must satisfy a number of financial ratio tests, the most critical of which (Amos, 1995, p 15) are:

- **the project life ratio,** calculated as the net present value (NPV) of the operating surplus for the life of the project at the end of the period divided by the loan principal outstanding at the beginning of the period
- **the loan life ratio,** which is the NPV of the operating surplus for the life of the loan at the end of the period divided by the loan principal outstanding at the beginning of the period.

Acceptable values for these ratios depend on the commodity, location, sovereign risk, the size of the project and the individual bank's strategic objectives (Amos, 1995).

A final ratio of importance is the **debt service ratio,** of which there are a number of formulations. In general, banks require a minimum cash debt cover ratio of 1.5, calculated as follows:

(Annual cash flow + interest expenses + principal repayments)/(interest expenses + principal repayments)

This measure differs from the corresponding and frequently quoted interest cover ratio based on accrual-based financial accounting rather than cash figures, calculated as follows:

(Earnings before interest and tax)/interest expenses

From a lender's risk-minimisation point of view, payout periods and repayment profiles must be as short as possible without hindering the success of the project. This may mean that debt has to be serviced preferentially to equity.

Sponsors often push for as much debt as possible, while merchant banks usually insist on as much equity ('hurt money') as possible to underpin some of the risks.

Risk underpinning

Few, if any, current project finance deals are truly **no-recourse** as the relevant arrangements may include significant restrictive covenants that further encumber the company's assets without the consent of the project lenders. This may entail limits being placed on further borrowings, on the issuing of shares and on the amount of dividends to be paid.

In the majority of recent project finance loans, banks have retained some recourse on the sponsor's balance sheet, at least until physical completion of the project. After this point, their interests are secured mainly by the fortune of the project.

Banks insist on stringent specifications regarding physical completion and acceptable, predefined, operational performance. They insist that the sponsor should bear the risk of achieving the relevant milestones on time and on budget. On the other hand, junior sponsors must be able to raise adequate equity capital to cover feasibility costs and possible project cost over-runs if they are to qualify for project finance. As a result, sponsors may react by transferring some of this risk to contractors through turn-key contracts, but this may add significantly to project costs. Even after successful completion tests, banks may still insist on stringent risk-management measures being in place before lessening or relinquishing recourse to sponsors.

When the project has passed the physical completion and operational performance tests, the banks become partially or fully exposed to a variety of major risks, including those relating to whether:

- the operations proceed according to plan, with projected production schedules being achieved and ore reserves and grade estimates being reconciled with the metal produced

- producers sell the mine's output at the estimated prices, keeping in mind the issue of commodity price volatility and that the lead time to production may have been up to four years (banks may make it a condition that some of this marketing risk be mitigated by an appropriate level of hedging while the loans are in place)
- management is competent and operates the project successfully
- there is compliance with the necessary legal conditions to secure and maintain a valid title and other statutory and environmental requirements; there may also be exposure to some **sovereign risk,** which in its mildest form may express itself as bearable changes in the regulatory and fiscal regime affecting returns over time, while at the limit may culminate in expropriation of the project.

Rather than being a true non-recourse source of funding, project finance may be more of a risk-sharing mechanism. For it to be successful and result in a lower cost of funds, the relevant arrangements should shift various sources of risk to those parties better equipped to bear it. The matrix suggested by Deer (1987) illustrates the process of risk attribution well. A version of it appears in Table 8.2 and illustrates where key stakeholders are well placed to share key risks – such as a customer or customers being most closely aligned to market risks for example.

If a project is large and reasonably secure, the lead bank may decide to either unbundle or accept (securitise) the project credit risk, or both, so that syndicate investors can raise money by selling secured bonds domestically or source funds from low-interest Euromarkets and other global capital markets.

TABLE 8.2

Project-finance risk-sharing (source: Deer, 1987).

Type of Risk	Banks	Borne by borrower	Other
Reserves	X (subject to audit)		
Completion		X or	X (eg contractors)
Operating	X (following completion test) and/or	X (depending on conditions)	
Marketing	X (limited)	X or	X (eg customers)
Management	X		
Legal	X		
Force majeure	X	X (limited)	

THE FINANCIAL STRUCTURE OF MINING COMPANIES

Cost of debt, financial leverage and financial risk

A prudent amount of secured borrowing by credit-worthy companies is inherently significantly cheaper than the cost of equity. The cost of debt (R_D) is further reduced after tax as the relevant interest expenses before tax (I) are deductible in determining the company's assessable income. The result is that the rate of return on equity (RoE) generated by a project funded with a portion of debt is higher than that from a project funded entirely with equity. This effect is known as **financial leverage.** On a financial accounting accrual basis, gearing (borrowing) will leverage the return on equity on a period-by-period basis by a factor of:

$$PBIT/(PBIT - I)$$

where the **profit before interest and tax (PBIT)** must be greater than the interest expenses after tax ($I \times (1 - t)$), where t is the tax rate.

On a cash basis, the overall internal rate of return (IRR) of a project will also significantly increase with gearing, subject to the condition that in any period the PBIT plus depreciation plus the difference between the opening and closing balance of all other balance sheet items over the period must be greater than the corresponding after-tax interest expenses ($I \times (1 - t)$) for the period.

Hence, in theory at least, it would be in the shareholders' interest to make use of as much debt as possible and prudent. As a result, one might expect to find relatively high levels of debt in the balance sheet of most mining companies. However, this does not appear to be the case in practice because borrowing introduces a new dimension of **financial risk,** particularly if PBIT is close to $I \times (1 - t)$.

Financial structure of mining companies

The average amount of debt on total assets [D/(D + E)] differs widely from industry to industry. However, the risk that is inherent in the resources sector, when compared with the additional financial risk brought about by increasing the level of borrowing, seems to act as a disincentive to borrow. Because of their high level of risk, exploration companies have generally low, or zero, levels of debt, while mining companies, on average, have only moderate debt levels.

In a survey of gearing across the major mining companies globally, and to a lesser extent the mid-tiers, Ernst & Young (2012) found the relative use of debt to be at an all time low. Leverage has been reduced in 2011 from previous levels, and balance sheets are far stronger than they were going into the global financial crisis in 2008. The average gearing levels across a sample of majors had decreased to just 12 per cent at June 2011, compared with 69 per cent at December 2008.

This does not mean that individual mining projects may not display significantly higher, as well as lower, levels of debt. Indeed the level of debt used is not constant over time, and is generally high at the start of project developments. As already noted, project finance packages for individual developments in Australia can

cover up to 70 per cent of total funds, but are subject to repayment in the early stages of production.

Overall, ongoing levels of the corporate debt for mining companies in Australia seldom exceed half of total funds, even in aggressively geared growth companies. This behaviour is consistent with the 'traditional' view that the proportion of debt in the financial structure of a company can increase with beneficial leverage effects until both shareholders and lenders become anxious about the increasing financial risk, and therefore expect rapidly increasing returns to compensate for it. Even secured lenders become anxious because they know that the realisable value of a mining company's assets in the case of a liquidation fire sale may be much lower than its book value. As Figure 8.4 shows, the Weighted Average Cost of Capital (WACC or R_C) after-tax will fall as the percentage of debt employed increases from zero, then plateau and start rising rapidly again when suboptimal levels of debt are reached.

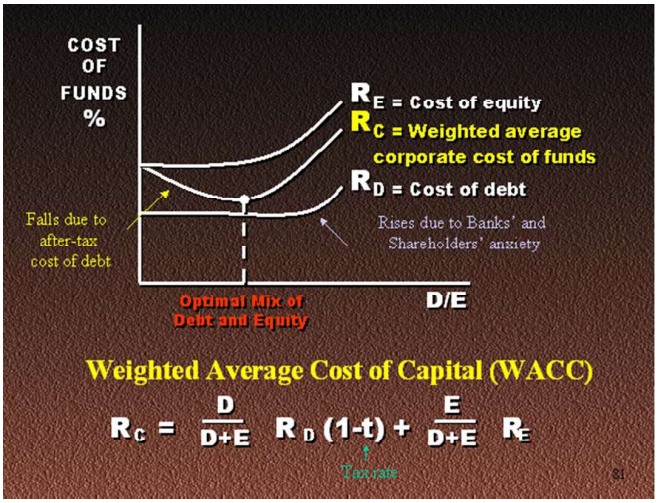

FIG 8.4 - Optimising the after-tax weighted average corporate cost of capital traditional view.

By contrast, Modigliani and Miller (1963) maintained that theoretically, in frictionless capital markets, the risk-adjusted return expected by both shareholders and lenders would gradually adjust upwards as the level of debt increases and that, for this reason, in the final analysis the actual level of debt used to fund a project/company should not matter.

The WACC is calculated as:

$$WACC = (D/D+E) \times R_D \times (1-t) + (E/D+E) \times R_E$$

As can be seen from the following example, it is a relatively simple matter to calculate the after-tax WACC using the following assumptions:

- cost of equity (R_E) = 13.1 per cent
- cost of debt (R_D) = 6.5 per cent
- tax rate (t) = 30 per cent
- debt (D) as a percentage of total funds = D/(D + E) = 40 per cent

After-tax weighted average cost of capita (WACC) =

= 6.5% × 0.4 × (1- 0.3) + 13.1% × 0.6 = 9.68%

Note how the after-tax weighted average cost of capital at 9.68 per cent is considerably lower than the corresponding cost of equity at 13.1 per cent.

In Chapter 9 it will be argued that the before-tax **weighted average cost of capital (WACC)** is a suitable discount rate if project risk is similar to that of the firm as a whole, and the project is going to be funded with a mixture of debt and equity. The before-tax WACC should be used as the discount rate instead of the after-tax WACC, because the DCF model will deduct the interest expenses before calculating the taxable income and related tax, hence the tax shield due to the deductibility of interest expenses is incorporated in the model output.

In the early stages of project evaluation, however, it is customary to assess the financial robustness of a project by assuming 100 per cent equity funding and using the **cost of equity (R_E)** as the discount rate, particularly if the project is to be funded primarily with share issues and /or from retained earnings.

CONCLUSIONS

- Financial objectives and the management of exploration and mining companies differs from that of other sectors of the economy only in so far as their resources and reserves are depleting, they are capital-intensive, and that, particularly exploration, is very dependent on the availability and cost of raising equity funds.
- In spite of a high number of IPOs in times of boom, the mining sector is most prominent amongst the smaller companies listed on the Australian Stock Exchange by capitalisation because the amounts raised (ie typically $2.5 M to $6 M and on average only $4 M) and capitalisation of exploration and mining companies is relatively low.
- As a consequence, only a few resource companies qualify for inclusion in the main S&P/ASX 300 index. Large, index-using institutional investors tend not to be interested in the majority of explorers and miners too small to qualify for an index.
- Mergers, takeovers, listed investment companies (LICs) and PDFs are effective strategies to overcome this handicap and tap into institutional funds.
- Different financial structures are appropriate to different project stages:
  - on account of its risk, exploration up to feasibility is funded primarily by equity
  - development and construction makes use of significant levels of debt mainly in the form of project finance, but banks will require early repayments and risk mitigation by way of some

equity to guarantee project completion and possible cost over-runs
  - ongoing operations are funded with a lower (generally less than 50 per cent), appropriate and stable proportion of debt.
- Use of an appropriate but prudent level of debt in the financial structure of a project will increase/leverage the return on the equity invested in the project (RoE or IRR) because of the tax deductibility of interest expenses.
- Increased debt will, however, increase financial risk and consequently the after-tax weighted average cost of capital (WACC) of the firm.
- No-recourse or limited recourse project finance is becoming the prevalent way of funding new mine developments, with lead merchant banks putting together flexible, generally syndicated, packages of loans to best match the timing and nature of the project funding needs, as well as attribute risk to the parties best equipped to manage it efficiently and effectively.

REFERENCES

Adams, R, 2009. The cost of capital in the mining industry – An update [online]. Available from: <http://www.crugroup.com>.

Amos, Q G, 1995. Debt finance: The technical factors, in *Proceedings PACRIM '95* (The Australasian Institute of Mining and Metallurgy: Melbourne).

Collins, J C, 2001. *Good to Great – Why Some Companies Make the Leap – And Others Don't* (HarperCollins: New York).

Deer, P W, 1987. Project financing of Australian resources, in *Proceedings PACIFIC RIM CONGRSS '87*, pp 689-695 (The Australasian Institute of Mining and Metallurgy: Melbourne).

Ernst & Young, 2012. Mergers, acquisitions and capital raising in mining and metals: 2011 trends, 2012 outlook [online]. Available from: <http://www.ey.com>.

Etheridge, M and Uttley, P, 2003. Uncertainty, decision-making and value measurement – The fundamentals of the business of exploration, in *Proceedings AIG Conference* (The Australian Institute of Geoscientists: Perth).

Hirshleifer, J, 1980. *Price Theory and Applications* (Prentice-Hall: London).

Independent Pricing and Regulatory Tribunal of New South Wales, 2002. Weighted average cost of capital, discussion paper DP 56 [online]. Available from: <http://www.ipart.nsw.gov.au> [Accessed: 8 May 2006].

Kay, J, 1993. *Foundations of Corporate Success* (Oxford University Press: Oxford).

Kreuzer, O P, Etheridge, M A and Guj, P, 2007. Australian junior exploration floats, 2001-2006, and their implications for IPOs, *Resources Policy*, 32:159-182.

Modigliani, F and Miller, M H, 1963. Corporate income taxes and the cost of capital: A correction, *American Economic Review*, 53(3):433-443.

Peirson, G, Brown, R, Easton, S and Howard, P, 2004. *Business Finance*, eighth edition (McGraw-Hill Irwin: Sydney).

Porter, M E, 1980. *Competitive Strategy – Techniques for Analysing Industries and Competitors* (The Free Press: Cambridge).

Porter, M E, 1985. *Competitive Advantage – Creating and Sustaining Superior Performance* (The Free Press: Cambridge).

Porter, M E, 1990. *The Competitive Advantage of Nations* (MacMillan Business: London).

PriceWaterhouseCoopers, 2010. Review of global trends in the mining industry [online]. Available from: <http://www.pwc.com>.

Rappaport, A and Sirower, M L, 1999. Stock or cash? The trade-offs for buyers and sellers in mergers and acquisitions, *Harvard Business Review*, 77(6):147-160.

Rothschild & Sons (Australia) Limited, 2000. Getting financed, presentation.

Trench, A, 2002. Mine finance and accounting 282, course notes, Curtin University of Technology's Western Australian School of Mines.

Trench, A, 2011. *A Sharebuyer's Guide to Investing in the Australian Mining Boom* (Major Street Press: Melbourne).

Trench, A, 2012. Class of 2011: A continued focus on Australian gold for IPOs, quarterly newsletter Issue 19 (March 2012), pp 12-17 (University of Western Australia).

Trench, A, Pridmore, D and Lau, L, 2006. *Top Resource Stocks 2007* (Wrightbooks-Wiley: Milton).

Trench, A, Thompson, M and Lau, L, 2007. *Top Resource Stocks 2008* (Wrightbooks-Wiley: Milton).

Trench, A Thompson, M and Lau, L, 2008. *Top Resource Stocks 2009* (Wrightbooks-Wiley: Milton).