

Chapter 12: Valuation Techniques

Valuation techniques that are discussed in this chapter:

- A *ratio comparison approach*, which values an investment at more or less the same ratio of value to a salient economic variable as an existing comparable investment for which the same ratio is observable.
- A *competitive analysis approach*, which attributes positive net present value to any project of a organization that can identify its competitive advantages and a negative NPV to any project where competitors have the advantages.
- A *real options approach*, which refers to the application of the derivatives valuation methodology to value real assets

Because a organization often derives new opportunities out off information and relationships from past projects, a project should be evaluated on the ability to generate information and develop relationships and on the cash flows that the project generates.

To be competitive and earn profits, a organization has to have competitive advantages over its competitors. Examples of competitive advantages are:

- *barriers to entry*, which prevent other companies to enter their market.
- *economies of scale*, arise when per unit production costs decline when the scale of the production gets higher.
- *economies of scope*, arise when a specific product or service can be supplied more efficiently by a organization that makes a related product.

Managers who use the discounted cash flow method tend to focus on what can easily be measured, and thus tend to ignore the indirect cash flows from for example the economies of scope.

The assessment of a copper mine is based on identifying the cost of a blend of investments traded in the financial market that perfectly track the copper mine's future cash flows at the end of the years of interest.

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The forward contracts in combination with a series of zero-coupon bonds maturing at different dates, produce future cash flows equal to those of the copper mine.

Think about the case, where the mine owner is in effect willing to buy copper at its extraction cost as long as this cost is less than the value of the copper.

This is an option that is exercised or not depending upon whether the price of the copper, p_1 , is sufficiently high to cover the cost of extraction.

Brennan and Schwartz (1985) built a method for valuing mines that takes into account the owner's options, but does not need the observation of the market price of an option to buy the mineral being mined.

This method can be approximated with the binomial approach for valuing derivative assets. It supposes that the future price movements of the underlying asset follow a binomial process in which the price of the asset takes on one of only two possible values after one time period: high or low. The derivative asset also takes on a high or a low value. Though, the method holds simplifications that make mine valuation easier than it for real.

A mine can be seen as an option to extract (or purchase) minerals at a strike price equal to the cost of extraction. Like a stock option, the option to extract the minerals has a value that raises with both the volatility of the mineral price and the volatility of the extraction cost.

We can see vacant land as an option to acquire developed land where the exercise price is the cost of developing a building on the land. This more complicated type of option has a value that has an increasing amount of uncertainty about the value of development. The valuation approach works, because vacant land has payoffs like an option and because the possibility of arbitrage keeps prices in line.

Projects can normally be seen as mutually exclusive projects. Organizations can often choose between several projects and by adopting one it may pass up on another projects. For example, when there is not enough capital. An organization chooses for the project with the highest NPV.

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A organization can acquire a competitive advantage by being unlike from its competitors. Organizations that have the option to vary their output levels may want to choose a method of production that differs from that of their competitors.

By doing this the organization raises risk, thereby increasing the value of its flexibility option. It is important to highlight that the benefits of being unlike are not a principle, only a possibility, but the advantage associated with being diverse is greater when there is more uncertainty and when the organization has a higher flexibility to expand.

The ratio comparison approach supposes that a new investment should sell at about the same ratio of price to some relevant economic variable as an existing investment with an observable ratio.

The present value of a project can be attained by:

1. Acquiring the appropriate price/earnings ratio for the project from a comparison investment for which this ratio is known
2. Multiplying the price/earnings ratio from the comparison investment by the first year's net income of the project.

An organization should adopt a project when the ratio of its initial cost to earnings is lower than the price to earnings ratio of the comparison investment.

The price/earnings ratio of a portfolio of stock 1 and 2 is a weighted average of the price/earnings ratios of stocks 1 and 2, where the weights are the fraction of earnings produced by stock 1 and 2.

$$\frac{P}{NI} = w_1 \frac{P_1}{NI_1} + w_2 \frac{P_2}{NI_2}$$

Where

P/NI = price/earnings ratio of the portfolio

P_i / NI_i = price/earnings ratio of stock i ($i = 1$ or 2)

w_i = fraction of portfolio earnings from stock i .

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For the price/earnings ratio method the earnings of the project and the comparison portfolio must have the same growth rates. Analysts who use the method must also be particularly cautious that the earnings calculations reflect the true economic earnings of the organization.

Normally, one must not forget how accounting earnings differ from true economic earnings.

An raise in leverage, holding the organization's operations and total value constant, will raise or reduce the organization's net income per share and price/earnings ratio, depending on the relative sizes of the price/earnings ratio and the reciprocal of the yield on debt borrowing.

If a organization's stock price is high because earnings are expected to grow at an extraordinarily fast rate, then an raise in leverage could reduce the price/earnings ratio.

If the ratio to earnings of an all-equity organization is larger than $1/r_D$, where r_D is the interest rate on the organization's supposed risk-free perpetual debt, then an raise in leverage raises the price/earnings ratio. If the price/earnings ratio of an all-equity organization is less than $1/r_D$, then the raise in leverage lowers the price/earnings ratio of the organization. This is only true when we suppose:

1. The market value of the organization's assets is not influenced by its leverage ratio.
2. All debt is risk free.

The *unleveraged price/earnings ratio* is the ratio that would be real if the comparison investment were all equity financed, rather than the leveraged price/earnings ratio that one can see.

Organizations in a market full of competition should understand that they can only achieve a positive NPV from a project if they have an benefit over their competitors. When other organizations have competitive advantages, the project has a negative NPV. The real options and the ratio comparison approaches are based on a comparison between highly similar investments and reveal little about the relative pricing of extensively disparate classes of assets, so they are not effective for identifying whether broad asset classes are mispriced.

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