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## RELEVANT FINANCIAL THEORIES & DEFINITIONS

*“Finance at its core is sustainable.”<sup>1</sup>*  
-Wendy Jeffus

Most, if not all, endowments, hospitals, and governments use finance with the goal to continue their organizations into perpetuity. Common stocks are traditionally valued using discounted cash flow (DCF) models that assume an infinite life of the asset. A quick look through some of the relevant financial theories is a good place to start to understand the importance of “∞” in finance and sustainability.<sup>2</sup>

$$Present\ Value_{firm} = \sum_{t=1}^{\infty} \frac{Free\ Cash\ Flow\ to\ the\ Firm_t}{(1 + Required\ Return)^t}$$

*“In valuation, first principles remain essential: Every valuation multiple has an implicit DCF model behind it.”<sup>3</sup>*  
-Brian Michael Nelson, CFA

**Time Value of Money** – the idea that a dollar today is worth more than a dollar in the future due to its potential to earn interest. *The essential nature of investment is that current consumption is reduced in hopes of greater future consumption.*<sup>4</sup>

**Real Assets and Financial Assets** – *Real assets* represent land, water, buildings, equipment, and knowledge that can be used to produce goods and services. *Financial assets* represent claims to the income generated by real assets.

**Agency Problems** – agency issues arise due to conflicts of interest between managers and owners.

**Risk Aversion** – an investor’s reluctance to accept risk; this is overcome by offering investors a higher risk premium.

**Fundamental Analysis** – generally focuses on forecasting the firm’s future dividends or earnings, discounting them at the required rate of return and comparing the resulting estimated price with the current stock price. It assumes that stock prices should be equal to the discounted value of the

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<sup>1</sup> But Mark Carney, the former governor of the Bank of England, notes one important caveat—the “tragedy of the horizon,” which describes the idea that climate change is not priced into models because it is assumed to be “beyond the horizon” of analysis; and “once climate change becomes a defining issue for financial stability, it may already be too late.” Source: Future of Sustainability in Investment Management: From Ideas to Reality, CFA Institute, p. 19. Available at: <https://www.cfainstitute.org/-/media/documents/survey/future-of-sustainability.pdf>, Retrieved July 24, 2022.

<sup>2</sup> ∞ is the mathematical symbol for *infinity*. For a more detailed review of the Free Cash Flow Valuation method, see “Refresher Reading: Free Cash Flow Valuation,” CFA Institute, Available at <https://www.cfainstitute.org/en/membership/professional-development/refresher-readings/free-cash-flow-valuation>, Retrieved July 7, 2022.

<sup>3</sup> *Value Trap: Theory of Universal Valuation*, Brian Michael Nelson, CFA cited from “Investing’s First Principles: The Discounted Cash Flow Model” Available at <https://blogs.cfainstitute.org/investor/2022/01/19/investings-first-principles-the-discounted-cash-flow-model/>, Retrieved July, 7, 2022.

<sup>4</sup> Cited from *Essentials of Investments*, 9<sup>th</sup> edition by Zvi Bodie, Alex Kane, and Alan J. Marcus.

expected future cash flows the stock is expected to provide to investors. *Note: Common stock is a claim on the residual value of the firm (limited liability).*

**Fundamental Analysis Conundrum** – without fundamental analysis the market would surely be inefficient, and abnormal profit opportunities would exist leading to profitable fundamental analysis.

**Efficient Markets** – with efficient markets, profitable arbitrage opportunities will quickly disappear. Even if the market is efficient, there is a role for portfolio management because of the need to identify risk and choose the appropriate level of risk, take into account tax consideration, liquidity needs, or the need to diversify away from the client’s industry. Most studies of the efficient market hypothesis suggest the stock market is reasonably efficient.

**Characteristics of Effective Markets:**

- Competition among market makers and brokers leading to low-cost transfer of funds
- Adequate trading activity to ensure sales happen in a timely fashion
- Prices quickly reflect public information

**CAPM** the capital asset pricing model (CAPM) is the equilibrium model that underlies all modern financial theory. While the strict assumptions of the CAPM do not hold, it comes to useful conclusions: 1) investors should diversify, 2) systematic risk is the risk that matters, 3) a well-diversified portfolio can be suitable for a wide range of investors after being adjusted for tax and liquidity differences, and 4) differences in risk tolerances can be handled by changing the asset allocation decisions in the complete portfolio.

**WACC** - the weighted-average cost of capital (WACC) for a company represents the minimum return that a company must earn on existing asset base to satisfy its creditors, owners, and other providers of capital. The basic formula<sup>5</sup> is shown here:

$$R_{WACC} = \frac{E}{D + E} K_E + \frac{D}{D + E} K_D (1 - t_c)$$

- where, E = the market value of equity
- D = the company’s debt
- K<sub>E</sub> = the cost of equity (CAPM)
- K<sub>D</sub> = the cost of debt
- t<sub>c</sub> = corporate tax rate

**Active and Passive Strategies** – active strategies attempt to identify mispriced securities, forecast broad market trends, or incorporate investor preferences into security selection. Passive strategies can also incorporate investor preferences into portfolio design, but do not seek to identify mispriced securities.

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<sup>5</sup> The formula can become more complex with a more complicated capital structure, as different weights and costs are assigned to various securities (i.e., preferred equity, straight debt, convertible debt, exchangeable debt, warrants, options, pension liabilities, executive stock options, governmental subsidies, etc.).

*“Finance is the art of turning chaos into error.”*

-Elliott Smith, Boston College

**Behavioralism**<sup>6</sup> – the psychology of investors, “all market participants, regardless of expertise, may exhibit behavior that differs from that assumed in traditional finance.”<sup>7</sup>

**Standard Utility (satisfaction) Theory of Investments** – investors desire more wealth and less risk, but wealth provides a diminishing marginal utility (a gain of \$1K provides less utility than a loss from losing \$1K); this gives rise to risk aversion.

**Prospect Theory** – is an alternative behavioral theory that suggests that investor utility depends on the change in wealth from the start of the investment rather than on the starting level of wealth.

**Industrial Policy** – is direct government involvement in capital allocation. If markets do not have allocational efficiency, then there is perhaps a role for greater government intervention in capital markets.

**Model Misspecification** – when the financial model doesn't account for everything it should.

#### *Financial Toolkit*

**Real Options Analysis** – valuing corporate decisions like a potential expansion or abandonment (e.g. stranded assets) may require the use of a decision tree to help clarify the expected value of a potential capital budgeting decision. This analysis can help managers evaluate issues that could materially impact the financial outcome of a project.

**Incremental Cashflows** – represent the difference between a firm's future cash flows with a project and the cash flows without.<sup>8</sup>

**Equivalent Annual Costs** – represent the present value of a project's costs calculated on an annual basis; it is used to compare two things with different lives.

**Scenario Analysis** – scenario analysis is used to take into account different assumptions regarding macroeconomic variables; economic, industry or business developments; as well as corresponding strategic responses by industry players.

**Sensitivity Analysis** – sensitivity analysis is used to analyze the effect of a project profitability of possible changes in sales, costs, etc.

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<sup>6</sup> Behavioral finance theory proposes that markets fail to reflect economic fundamentals under the following three conditions: 1) when individual investors behave irrationally, 2) when systematic patterns of irrational behavior emerge among investors, and 3) when there are limits to arbitrage in financial markets. See McKinsey & Company Valuation, 5<sup>th</sup> edition by Koller, Goedhart & Wessels pp.382-383.

<sup>7</sup> “Behavioral Finance and Investment Processes,” CFA Institute, Available at: <https://www.cfainstitute.org/en/membership/professional-development/refresher-readings/behavioral-finance-investment-processes>, Retrieved July 7, 2022.

<sup>8</sup> For a brief review of Incremental Cash Flows, see "Incremental Cash Flows" by Jack Yeager, available at <https://www.youtube.com/watch?v=8cHDYxbIXqw>, Retrieved September 9, 2022.