

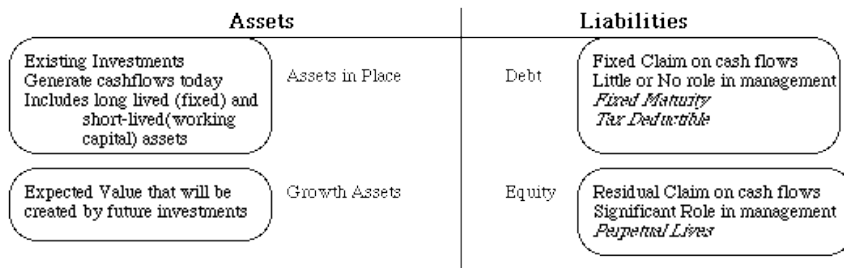
A Primer on Financial Statements

Much of the information that is used in valuation and corporate finance comes from financial statements. An understanding of the basic financial statements and some of the financial ratios that are used in analysis is therefore a necessary first step for either pursuit. There is however a difference between what accountants try to measure in financial statements, and what financial analysts would like them to measure. Some of this difference can be traced to the differences in objective functions - accountants try to measure the current standing and immediate past performance of a firm, whereas financial analysis is much more forward looking.

In this primer, we begin with an inventory of the information we would like to obtain on a firm, and then examine how accounting statements attempt to provide this information, and where they might fall short.

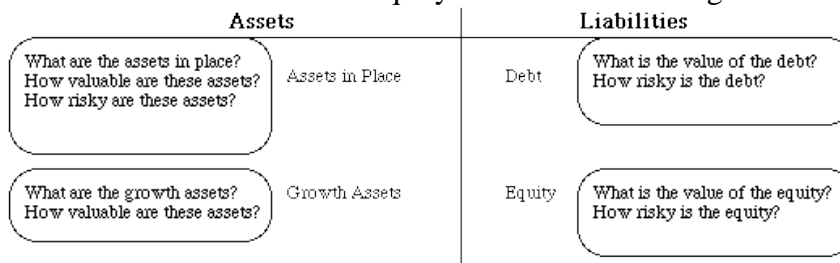
Informational Needs

Before looking at accounting principles and the details of accounting statements, let us start with a much more fundamental issue. When analyzing a firm, what are the questions to which we would like to know the answers? To do so, let us revert back to the description of a firm, from a financial standpoint:



When doing a financial analysis of a firm, we would like to be able to answer the following questions —

- What are the assets that the firm has in place already, and how much are they worth?
- What are the growth assets of the firm and what is their value?
- What is the firm earning on its assets in place, and what can it expect to earn on these same assets as well as its growth assets?
- What is the mix of debt and equity that the firm is using to finance these assets?



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- How much risk is there in this firm, and what is the cost of its debt and equity financing?

As we will see in this chapter, accounting statements allow us to get some information on all of these questions, but they fall short in terms of both the timeliness with which they provide this information and the way in which they measure asset value, earnings and risk. In the chapters that follow, we will examine some of the ways in which we can get beyond these limitations.

How Accountants measure earnings

The two basic principles that govern how accountants measure earnings seem to be the following:

- The first is the principle of accrual accounting. In accrual based accounting the revenue from selling a good or service is recognized in the period in which the good is sold or the service is performed (in whole or substantially). A corresponding effort is made on the expense side to match expenses to revenues.
- The second is the categorization of expenses into operating, financing and capital expenses. Operating expenses are expenses that, at least in theory, provide benefits only for the current period; the cost of labor and materials expended to create products which are sold in the current period would be a good example. Financing expenses are expenses arising from the non-equity financing used to raise capital for the business; the most common example is interest expenses. Capital expenses are expenses that are expected to generate benefits over multiple periods; for instance, the cost of buying land and buildings are treated as capital expenses.

The income statement is where accountants attempt to measure how profitable a firm was during the financial period. In the following table, we summarize the key parts of the income statement, and some key measurement issues:

Item	Accounting Principles	Issues in Measurement
Revenues	Only revenues from sales during the period should be included in revenues (i.e., not cash revenues). Thus, cash received from sales made in previous periods is not included in sales, and sales from the current period, even if not collected, is included.	<ul style="list-style-type: none"> • In the case of <u>contract work</u>, or multi-year projects, revenues can be posted as the work in completed. • Some firms, to inflate income in the current period, try to record as much in sales before the end of the period.
(minus) Operating Expenses (not including depreciation)	Only those expenses incurred to create revenues in the current period should be included as part of operating expenses. Labor, material, marketing and general and administrative costs are all operating expenses. If material purchased in the current period is not used in	<ul style="list-style-type: none"> • Accounting rules require that <u>research and development costs</u> be shown as operating expenses in the period in which they are incurred. (Clearly, this violates the principle that operating expenses should only include expenses

	<p>production, it is carried over as inventory into the next period.</p> <p>Inventory has to be valued to estimate operating expenses, and firms can choose to value inventory based upon what they paid for the material bought at the end of the period (FIFO), at the beginning of the period (LIFO) or an average price.</p>	<p>designed to generate revenues in the current period)</p> <ul style="list-style-type: none"> • If assets are leased, and the lease qualifies for treatment as an operating lease, then operating lease expenses are also treated as operating expenses. • Finally, one-time restructuring charges can qualify for treatment as operating expenses.
(minus) Depreciation and Amortization	<p>Any expense that is expected to generate income over multiple periods is called a capital expense. A capital expense is written off over its lifetime, and the write-off each year is called depreciation (if it is a tangible asset like machinery) or amortization (if it is an intangible asset such as a copyright).</p> <p>Since the value that an asset loses each period is subjective, depreciation schedules are mechanized. They can broadly be classified into two groups — straight line depreciation, where an equal amount gets written off each period, and accelerated, where more of the asset gets written off in the earlier years and less in later years.</p>	<ul style="list-style-type: none"> • In the US, depreciation has to be based on what was originally paid for the asset (book value). In some high-inflation economies, firms are allowed to revalue assets. • The accounting depreciation may bear little or no resemblance to the economic depreciation (which measures the loss in value from using the asset). • Firms in the US are allowed to use different depreciation methods for tax and reporting purposes. For tax purposes, they tend to use accelerated depreciation (since it reduces taxable income and taxes). For reporting purposes, they tend to use straight line depreciation.
= Operating Income (EBIT)	<p>When operating expenses and depreciation are subtracted from revenues, we estimate operating income. This is designed to measure the income generated by a firm's assets in place.</p>	<ul style="list-style-type: none"> • To the extent that R&D expenses are really capital expenses, operating lease expenses are really financing expenses, and accounting depreciation is really not economic depreciation, the operating income can be misleading.
(minus) Interest Expenses	<p>The most direct source of interest expenses is debt taken on by the firm either from a direct lender (such as a bank) or from bonds issued to the public. Interest expenses also</p>	<ul style="list-style-type: none"> • Interest expenses are tax deductible. They need to be subtracted out to arrive at taxable income.

	<p>include imputed interest computed on leases that qualify as capital leases.</p> <p>If firms have substantial interest income from cash and marketable securities that they hold, it is usually shown at this point.</p>	<ul style="list-style-type: none"> Some firms have non-cash interest expenses. While they are tax deductible, they need to be tracked for cash flow purposes.
= Taxable Income	<p>If the depreciation reported is the tax depreciation, netting the interest expenses from the operating income should yield the taxable income.</p>	<ul style="list-style-type: none"> To the extent that firms use different approaches for computation (especially for depreciation) for tax and reporting purposes, the taxable income in the reported statements will be different (and generally higher) than the taxable income in the tax books.
(minus) Taxes	<p>These are the taxes due and payable on income in the current period. Generally speaking, it can be computed as</p> $\text{Tax} = \text{Taxable Income} * \text{Tax Rate}$	<ul style="list-style-type: none"> Firms usually report an "effective" tax rate computed by dividing the taxes by the reported taxable income. Since the reported taxable income is usually higher than the true taxable income, the effective tax rate will usually be lower than the firm's true average tax rate.
= Net Income	<p>The income after taxes and interest is the net income.</p>	<ul style="list-style-type: none"> If a firm has preferred stockholders, the preferred dividend will be subtracted from the net income to arrive at net income to common stockholders.
(minus) Losses (+ Profits) not associated with operations	<p>These are expenses (or income) not associated with operations.</p>	
(minus) Profits or Losses associated with Accounting Changes	<p>Changes in accounting methods (such as how inventory is valued) can result in earnings effects.</p>	
/ Number of Shares outstanding	<p>The actual number of shares outstanding is referred to as primary shares. When there are options and</p>	<ul style="list-style-type: none"> Options, warrants and convertibles are all equity. Just adding the shares that the holders

	convertibles outstanding, the shares embedded in these options is sometimes added on to arrive at fully diluted shares.	of these options are entitled to is a poor way of dealing with the claims that these option holders have on the equity of the firm.
= Earnings per Share	The earnings per share can be computed on a primary or fully diluted basis.	

How Accountants Value Assets

The assets of a firm are measured and reported on in a firm's balance sheet. In general, the assets of a firm can be categorized into fixed assets, current assets, intangible assets and financial assets. There seem to be three basic principles that underlie how accountants measure asset value:

- *An Abiding Belief in Book Value as the Best Estimate of Value*: Accounting estimates of asset value begin with the book value, and unless a substantial reason to do otherwise is given, the historical cost is viewed as the best estimate of the value of an asset.
- *A Distrust of Market or Estimated Value*: When a current market value exists for an asset that is different from the book value, accounting convention seems to view this market value with suspicion. The market price of an asset is often viewed as both much too volatile and easily manipulated to be used as an estimate of value for an asset. This suspicion runs even deeper when values are estimated for an asset based upon expected future cash flows.
- *It is better to under estimate value than over estimate it*: When there is more than one approach that can be used to value an asset, accounting convention seems to take the view that the more conservative (lower) estimate of value should be used rather than the less conservative (higher) estimate of value. Thus, when both market and book value are available for an asset, accounting rules often require that you use the lesser of the two numbers.

The principles governing the accounting measurement of each of these asset categories is provided below, together with key measurement issues.

Item	Principles governing measurement	Measurement Issues
Fixed Assets	Fixed assets refer to tangible assets with long lives. Generally accepted accounting principles in the United States require the valuation of fixed assets at historical costs, adjusted for any estimated loss in value from the aging of these assets. The loss in value is called depreciation.	<ul style="list-style-type: none"> • The accounting depreciation of an asset follows mechanistic rules — straight line (where an equal amount is written off each year) or accelerated. It bears no resemblance to economic depreciation.

		<ul style="list-style-type: none"> • In the presence of inflation, the use of historical cost can result in significant under valuation of older fixed assets • The asset value has little or no relationship to the earning power of the asset.
<p>Current Assets</p>	<p>Current assets refer to assets with short lives (generally less than a year). Included here are items like inventory of both raw materials and finished goods, accounts receivable and cash.</p> <p>The accounting convention is for accounts receivable to be recorded as the amount owed to the firm, based upon the billing at the time of the credit sale. Firms can set aside a portion of their income to cover <u>expected bad debts</u>, from credit sales, and accounts receivable will be reduced by this reserve.</p> <p>Cash is valued at face value, and <u>inventory can be valued using one of three approaches</u> — the cost of the materials bought at the end of the period (FIFO), at the beginning of the period (LIFO) or a weighted average.</p>	<ul style="list-style-type: none"> • The discretion given firms on valuing inventory and considering expected bad debts does give rise to game playing. During periods of inflation, for instance, switching from FIFO to LIFO will decrease reported earnings. If inventory changes are only made for reporting purposes, neither the true income of the firm nor its cash flows is affected.
<p>Financial Investments</p>	<p>Financial investments are categorized into three types:</p> <p><i>Minority, passive investments:</i> where the financial investment in another firm is less than 20% of the ownership of the firm. If this investment is long term, it is recorded at book value and the interest or dividend from it is shown in the income statement. If it is short term, it is marked to market, and the gains or losses recorded each period.</p> <p><i>Minority, active investments:</i> where the financial investment in another firm is between 20 and 50% of the ownership of the firm. Here, the investment is recorded at the original acquisition cost, but is adjusted for the proportional share of profits or</p>	<ul style="list-style-type: none"> • Financial investments have an observable market value. When they are recorded at book value, and the book value is much lower than the market value, it does seem to suggest that they are misvalued.

	<p>losses made by the firm each period. (Equity approach)</p> <p><i>Majority, active investments:</i> where the financial investment in another firm is a controlling interest. Here, the financial statements of the two firms (income statement and balance sheet) have to be consolidated. The entire assets and liabilities of the two firms are consolidated, and the share of the firm held by others is called a minority interest.</p>	
Intangible Assets	<p>When one firm acquires another and the acquisition is accounted for with <u>purchase accounting</u>, the difference between the acquisition price and the book value of the acquired firm is called goodwill. It is amortized over 40 years, though the amortization is not tax deductible.</p> <p>When firms acquire patents or copyrights from others, they are allowed to show these assets as intangible assets on the balance sheet. The amortization of these assets is usually tax deductible.</p>	<ul style="list-style-type: none"> • <u>Goodwill</u> is really not an asset. If the book value measures assets in place and the market value paid is fair, the difference really is a measure of growth assets. When firms overpay on acquisitions, goodwill may reflect the overpayment more than any intangible assets owned by the firm. • The treatment of patents as intangible assets, when they are acquired from others, does create an inconsistency. When patents are developed through internal research, they do not show up on the balance sheet.

How Accountants Value Liabilities

The principles that underlie how accountants measure liabilities and equity are the following:

- The first is a rigid categorization of financing into either debt or equity based upon the nature of the obligation created by the financing. For an obligation to be recognized as a liability, it must meet three requirements -
- It must be expected to lead to a future cash outflow or the loss of a future cash inflow at some specified or determinable date,
- The firm cannot avoid the obligation, and
- The transaction giving rise to the obligation has happened.

In keeping with the earlier principle of conservatism in estimating asset value, accountants recognize as liabilities only cash flow obligations that cannot be avoided. If an obligation is a residual obligation, accountants see the obligation as equity.

- The second principle is that the value of both the liabilities and equity in a firm are better estimated using historical costs with accounting adjustments, rather than with expected future cash flows or market value. The process by which accountants measure the value of liabilities and equities is inextricably linked to how they value assets. Since assets are primarily valued at historical cost or book value, both debt and equity also get measured primarily at book value. In the section that follows, we will examine the accounting measurement of both liabilities and equity.

In the following table, we summarize how accountants measure liabilities and equity:

Item	How it is measured	Measurement Issues
Current Liabilities	Current liabilities refer to liabilities that will come due in the next year. It includes short term debt, accounts and salaries payable, as well as long term debt coming due in the next year. These amounts reflect the actual amounts due, and should be fairly close to market value.	<ul style="list-style-type: none"> • In general, current liabilities should be recorded at values close to the true value.
Long Term Debt	This can include both long term bank debt and corporate bonds outstanding. Accountants measure the value of long term debt by looking at the present value of payments due on the loan or bond at the time of the borrowing, using the interest rate at the time of the borrowing. The present value is not recomputed, however, as interest rates change after the borrowing.	<ul style="list-style-type: none"> • When interest rates increase after long term debt is issued, the debt reported on the books will be higher than the actual market value of the debt. The book value will be lower than market value if interest rates decrease after the debt is borrowed. • When debt is issued in a foreign currency, the value has to be adjusted to reflect changes in exchange rates. • When debt is convertible, the debt is shown at book value. When it is converted, it is treated as equity.
Other Long Term Liabilities	There are three primary items that go into this. First, if leases qualify for treatment as <u>capital leases</u> , the present value of lease payments is shown as long term debt. Second, if a firm's <u>defined benefit pension plan or health care plan</u> is underfunded, the underfunding is shown as a long	<ul style="list-style-type: none"> • These long term liabilities, unlike long term debt, are not interest bearing. While they may represent liabilities in the broadest sense, the absence of a cash flow claim implies that we should be cautious about treating it as debt. It is also not clear what claims these

	<p>term liability. Third, if a firm has managed to <u>defer taxes on income</u> (for instance, by the use of accelerated depreciation and favorable inventory valuation methods), the deferred taxes is shown as a liability.</p>	<p>claim holders would have, if the firm failed to meet its obligations.</p>
Preferred Stock	<p>Preferred stock generally comes with a fixed dividend. In some cases, the dividend is cumulated and paid, if the firm fails on its obligations. Preferred stock is valued on the balance sheet at its original issue price, with any cumulated unpaid dividends added on. Convertible preferred stock is treated similarly, but it is treated as equity on conversion.</p>	<ul style="list-style-type: none"> Accountants have historically treated preferred stock as quasi-equity or even as equity. They rest their arguments on the facts that preferred stockholders cannot force a firm into default, and that it has no finite life. To a financial analyst, preferred stock looks like very expensive, unsecured debt.
Common Equity	<p>The accounting measure of equity is a historical cost measure. The value of equity shown on the balance sheet reflects the original proceeds received by the firm when it issued the equity, augmented by any earnings made since (or reduced by losses, if any) and reduced by any dividends paid out during the period.</p>	<ul style="list-style-type: none"> When companies buy back stock for short periods, with the intent of reissuing the stock or using it to cover option exercises, they are allowed to show the repurchased stock as <u>treasury stock</u>, which reduces the book value of equity. Firms are not allowed to keep treasury stock on the books for extended period, and have to reduce their book value of equity by the value of repurchased stock in the case of actions such as stock buybacks. Since these buybacks occur at the current market price, they can result in significant reductions in the book value of equity. Firms that have significant losses over extended periods or carry out massive stock buybacks can end up with negative book values of equity.

How Accountants Measure Profitability

While the income statement allows us to estimate how profitable a firm in absolute terms, it is just as important that we gauge the profitability of the firm is in terms of percentage returns. There are two basic gauges used to measure profitability. One is to examine the profitability

relative to the capital employed to get a rate of return on investment. This can be done either from the viewpoint of just the equity investors, or looking at the entire firm. Another is to examine profitability relative to sales, by estimating a profit margin.

The following table summarizes widely used accounting profitability measures, with measurement issues that come up with each.

Measure	Definition	Remarks
Return on Capital	$\text{EBIT} (1 - \text{tax rate}) / (\text{Book Value of Debt} + \text{Book Value of Equity})$	<ul style="list-style-type: none"> • If operating income is used (rather than after-tax operating income, this becomes a pre-tax return on capital • The book value of capital is used as a measure of capital invested in the firm. To the extent that the book value is not a reasonable estimate of this value, the return on capital will be mis-estimated.
Return on Assets	$\text{EBIT} (1 - \text{tax rate}) / (\text{Book Value of Assets})$	<ul style="list-style-type: none"> • The distinction between assets and capital lies in current liabilities, since the latter does not include it. • In finance, the return on capital can be compared to the cost of capital but the return on assets cannot.
Return on Equity	$\text{Net Income} / \text{Book Value of Equity}$	<ul style="list-style-type: none"> • This becomes a measure of the profitability of the equity invested in the firm. • A firm can increase its return on equity by raising net income or lowering the book value of equity. (The latter can happen when stock is bought back) • In some cases, the book value of equity can become negative (after extended losses). The return on equity can no longer be computed for these firms.
Net Margin	$\text{Net Income} / \text{Sales}$	<ul style="list-style-type: none"> • This measures the average profit earned by a firm on a dollar of sales. • Since it is after financial expenses, it will be lower for highly levered firms.
Operating Margin	$\text{EBIT} (1 - \text{tax rate}) / \text{Sales}$	<ul style="list-style-type: none"> • This ratio, since it is based upon income prior to interest expenses, is much more comparable across firms of different leverage.

How Accountants Measure Leverage

Accountants measure leverage, not surprisingly, using their book value measures of debt and equity. In the following table, we summarize the most widely used ratios for measuring leverage in accounting.

Leverage Measure	Definition	Remarks
Debt/Capital	Book Value of Debt / (Book Value of Debt + Book Value of Equity)	<ul style="list-style-type: none"> • Both these ratios are designed to measure the degree of leverage that a firm has, but both will be heavily influenced by how different book value is from market value. • In general, since the market value of equity is much higher than book value of equity for firms, while the market value of debt is comparable to book value, these ratios will overstate leverage. • Finally, these ratios will be affected by what gets defined as debt. Thus, operating leases will not show up as debt and affect leverage.
Debt/Equity	Book Value of Debt / Book Value of Equity	
Cash Fixed Charges Coverage Ratio	EBITDA / Cash Fixed Charges	<ul style="list-style-type: none"> • These ratios measure the capacity of a firm to meet its cash flow obligations. To the extent that the ratios are low, and/or there is variability in the earnings, a firm's default risk will increase. • Note that the fixed charges do not include discretionary expenses such as capital expenditures, which might be essential to the firm's long term survival.
Interest Coverage Ratio	EBIT / Interest Expenses	

In Summary

Financial statements remain the primary source of information for most investors and analysts. While an understanding of every detail and FASB rule may not be necessary, it is important that the basics be understood. This primer attempts to explain the basics of financial statements and the generally accepted accounting principles that underlie their construction, and the various financial ratios that often accompany financial analyses. As long as there is a recognition that financial statements and financial ratios are a means to an end, which is understanding and valuing the firm, they are useful.