
CASH IS KING: ESTIMATING CASH FLOWS

The value of an asset comes from its capacity to generate cash flows. When valuing a firm, these cash flows should be after taxes, prior to debt payments and after reinvestment needs. There are thus three basic steps to estimating these cash flows. The first is to estimate the operating income generated by a firm on its existing assets and investments. While you can obtain an estimate of this from the income statement, the accounting income has to be substantially adjusted for technology firms to yield a true operating income. The second is to estimate the portion of this operating income that would go towards taxes. We will investigate the difference between effective and marginal taxes at this stage, as well as the effects of substantial net operating losses carried forward. The third is to develop a measure of how much a firm is reinvesting back for future growth. While this reinvestment will be divided into reinvestment in tangible and long-lived assets (net capital expenditures) and short term assets (working capital), you will again use a much broader definition of reinvestment to include investments in R&D and acquisitions as part of capital expenditures.

Defining the Cash Flow to the Firm

In chapter 2, the cash flow to the firm was defined as the cash flow before debt payments, but after taxes and reinvestment needs. It was defined to be:

$$\begin{aligned} & \text{Earnings before interest and taxes (1 - tax rate)} \\ & - (\text{Capital Expenditures} - \text{Depreciation}) \\ & - \text{Change in Non-cash Working Capital} \\ & = \text{Free Cash Flow to the Firm} \end{aligned}$$

In this chapter, you take a closer look at each of these items, with an emphasis on technology firms. You begin by defining earnings before interest and taxes (operating income), follow up by examining the tax rate to use to measure the after-tax operating

income and conclude with a discussion of a firm's reinvestments, both in net capital expenditures and working capital.

Operating Earnings (EBIT)

A key input to the free cash flow to the firm is the operating income. The income statement for a firm provides a measure of the operating income of the firm in the form of the earnings before interest and taxes (EBIT). For most technology firms, there are two important considerations in using this measure. One is to obtain as updated an estimate as possible, given how much these firms change over time. The other is that reported earnings at these firms may bear little resemblance to true earnings because of limitations in accounting rules and the firms' own actions.

Updated Earnings

Firms reveal their earnings in their financial statements and annual reports to stockholders. Annual reports are released only at the end of a firm's financial year, but you are often required to value firms all through the year. Consequently, the last annual report that is available for a firm being valued can contain information that is sometimes six or nine months old. In the case of firms that are changing rapidly over time, it is dangerous to base value estimates on information that is this old. Instead, use more recent information. Since firms in the United States are required to file quarterly reports with the SEC (10-Qs), and reveal these reports to the public, a more recent estimate of key items in the financial statements can be obtained by aggregating the numbers over the most recent four quarters. The estimates of revenues and earnings that emerge from this exercise are called "trailing 12-month" revenues and earnings and can be very different from the values for the same variables in the last annual report.

There is a price paid for the updating. Unfortunately, not all items in the annual report are revealed in the quarterly reports. You have to either use the numbers in the last annual report (which does lead to inconsistent inputs) or estimate their values at the end

of the last quarter (which leads to estimation error). For example, firms do not reveal details about options outstanding (issued to managers and employees) in quarterly reports, while they do reveal them in annual reports. Since you need to value these options, you can use the options outstanding as of the last annual report, or assume that the options outstanding today have changed to reflect changes in the other variables. (For instance, if revenues have doubled, the options have doubled as well..)

For technology firms, and especially young technology firms, it is critical that you stay with the most updated numbers you can find, even if these numbers are estimates. These firms are often growing exponentially, and using numbers from the last financial year will lead to under valuing them. Even those that are not are changing substantially from quarter, and updated information might give you a chance to capture these changes.

Illustration 4.1: Updated Earnings for Technology Firms

Amazon and Motorola have financial years that end in December, making their last annual reports (10-Ks) the final reports available prior to valuing them. Ariba's financial year ends in September. Consequently, when Ariba was valued in June 2000, the last 10-K was as of September 1999 and several months old, and the firm had released two quarterly reports (10-Qs), one in December 1999 and one in March 2000. To illustrate how much the fundamental inputs to the valuation have changed in the six months, the information in the last 10-K is compared to the trailing 12-month information in the latest 10-Q for revenues, operating income and net income.

Ariba: Trailing 12-month versus 10-K (in thousands)

	<i>Six Months ending March 2000</i>	<i>Six months ending March 1999</i>	<i>Annual September 1999</i>	<i>Trailing 12- month</i>
Revenues	\$63,521	\$16,338	\$45,372	\$92,555
EBIT	-\$140,604	-\$8,315	-\$31,421	-\$163,710
R & D	\$11,567	\$3,849	\$11,620	\$19,338

Net Income	-\$136,274	-\$8,128	-\$29,300	-\$157,446
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The trailing 12-month revenues are twice the revenues reported in the latest 10-K, and the firm's operating loss and net loss have both increased more than five-fold. Ariba in March 2000 was a very different firm from Ariba in September 1999. Note that these are not the only three inputs that have changed. The number of shares outstanding in the firm has changed dramatically as well, from 35.03 million shares in September 1999 to 179.24 million shares in the latest 10-Q (March 2000) to 235.8 million shares in June 2000. The most recent number of shares outstanding will be used in the valuation.

For Rediff.com, the filings made by the firm with the Securities and Exchange Commission, just prior to its initial public offering, were used. These filings included financial statements on the last four quarters, ending March 2000. The trailing 4-quarter data on revenues, operating income and other expenses are used as the basis for projections in the valuation.

Cisco's financial year ends in July, making its last 10-K the most dated of the five firms being analyzed. In the table below, Cisco's trailing 12-month (through December 1999) revenues, earnings, R&D and net income and compared to the numbers from the last 10-K:

Cisco: Trailing 12-month versus 10-K (in millions)

	<i>Annual July 1999 (Last 10-K)</i>	<i>Trailing 12- month</i>
Revenues	\$12,154	\$14,555
EBIT	\$ 3,455	\$3,911
R & D	\$1,594	\$1,705
Net Income	\$ 2,051	\$ 2,560

Note that while the differences are large, they are not as dramatically different as they are for Ariba. The importance of updating information is clearly much greater when dealing with younger firms than it is for more mature firms.

Adjustments to Operating Earnings

The reported operating earnings at technology firms are misleading for three reasons. The first is the treatment of research and development expenses as an operating expense, when, in fact, it is the single most critical component of capital expenditures at many of these firms. The second and lesser adjustment is for operating lease expenses, a financing expense that is treated in financial statements as an operating expense. The third factor to consider the effects of the phenomenon of “managed earnings” at these firms. Technology firms sometimes use accounting techniques to post earnings that beat analyst estimates, resulting in misleading measures of earnings.

Adjustments for R&D Expenses

A significant shortcoming of accounting statements is the way in which they treat research and development expenses. Under the rationale that the products of research are too uncertain and difficult to quantify, accounting standards have generally required that all R&D expenses to be expensed in the period in which they occur. This has several consequences, but one of the most profound is that the value of the assets created by research does not show up on the balance sheet as part of the total assets of the firm. This, in turn, creates ripple effects for the measurement of capital and profitability ratios for the firm.

Capitalizing R&D Expenses

Research expenses, notwithstanding the uncertainty about future benefits, should be capitalized. To capitalize and value research assets, you make an assumption about how long it takes for research and development to be converted, on average, into

commercial products. This is called the *amortizable life* of these assets. This life will vary across firms and reflect the commercial life of the products that emerge from the research. To illustrate, research and development expenses at a pharmaceutical company should have fairly long amortizable lives, since the approval process for new drugs is long. In contrast, research and development expenses at a software firm, where products tend to emerge from research much more quickly should be amortized over a shorter period.

Once the amortizable life of research and development expenses has been estimated, the next step is to collect data on R&D expenses over past years ranging back the amortizable life of the research asset. Thus, if the research asset has an amortizable life of 5 years, the R&D expenses in each of the five years prior to the current one have to be obtained. For simplicity, it can be assumed that the amortization is uniform over time, which leads to the following estimate of the residual value of research asset today:

$$\text{Value of the Research Asset} = \sum_{t=-(n-1)}^{t=0} \text{R \& D}_t \frac{(n+t)}{n}$$

Thus, in the case of the research asset with a five-year life, you cumulate 1/5 of the R&D expenses from four years ago, 2/5 of the R & D expenses from three years ago, 3/5 of the R&D expenses from two years ago, 4/5 of the R&D expenses from last year and this year's entire R&D expense to arrive at the *value of the research asset*.

Finally, the operating income is adjusted to reflect the capitalization of R&D expenses. First, the R&D expenses that were subtracted out to arrive at the operating income are added back to the operating income, reflecting their re-categorization as capital expenses. Next, the amortization of the research asset is treated the same way that depreciation is and netted out to arrive at the adjusted operating income:

$$\begin{aligned} \text{Adjusted Operating Income} &= \text{Operating Income} + \text{R \& D expenses} - \\ &\text{Amortization of Research Asset} \end{aligned}$$

The adjusted operating income will generally increase for firms that have R&D expenses that are growing over time.


 *R&Dconv.xls*: This spreadsheet allows you to convert R&D expenses from operating to capital expenses.

Illustration 4.2: Capitalizing R&D expenses: Cisco, Motorola and Ariba

Of the five firms that are being analyzed, three – Cisco, Motorola and Ariba – have significant research and development expenses, which are currently being treated as operating expenses. To get a reasonable measure of operating earnings at these firms, you have to convert these expenses into capital expenses.

The first step in this conversion is determining an amortizable life for R & D expenses. How long will it take, on an expected basis, for research to pay off at these firms? Table 4.2 reports on the amortizable lives used for each of the three companies in the analysis which have significant R&D expenses and the justification for doing so:

Table 4.2: Amortizable Lives for Research and Development Expenses

Company	Amortizable Life	Justification
Ariba	3 years	Technology is evolving rapidly, and payoff from R&D is likely to be quick.
Cisco	5 years	Firm has a mix of research, some with speedier payoff and some where the firm will have to wait longer.
Motorola	5 years	Firm has a mix of research, some with speedier payoff and some where the firm will have to wait longer.

Amazon and Rediff.com do not have significant R&D expenses, which is not surprising given their businesses.

The second step in the analysis is collecting research and development expenses from prior years, with the number of years of historical data being a function of the amortizable life. Table 4.3 provides this information for each of the firms:

Table 4.3: Historical R&D Expenses (in millions)

	<i>Ariba</i>	<i>Cisco</i>	<i>Motorola</i>
Current year	\$19.34	\$1,594.00	\$3,438.00
-1	\$11.62	1026.00	2893.00
-2	\$4.50	698.00	2748.00
-3	\$1.90	399.00	2394.00
-4		211.00	2197.00
-5		89.00	1860.00

For Ariba and Cisco, the current year's information reflects the R&D in the trailing 12 months, while for Motorola, the R&D is from the most recent financial year.

The portion of the expenses in prior years that would have been amortized already and the amortization this year from each of these expenses is considered. To make estimation simpler, these expenses are amortized linearly over time; with a 5-year life, 20% is amortized each year. This allows you to estimate the value of the research asset created at each of these firms, and the amortization of R&D expenses in the current year. The procedure is illustrated for Cisco in the table below:

Table 4.4: Value of Research Asset

<i>Year</i>	<i>R&D Expense</i>	<i>Unamortized at the end of the year</i>		<i>Amortization this year</i>
Current	\$ 1,594.00	100.00%	\$ 1,594.00	
-1	\$ 1,026.00	80.00%	\$ 820.80	\$ 205.20
-2	\$ 698.00	60.00%	\$ 418.80	\$ 139.60
-3	\$ 399.00	40.00%	\$ 159.60	\$ 79.80
-4	\$ 211.00	20.00%	\$ 42.20	\$ 42.20
-5	\$ 89.00	0.00%	\$ -	\$ 17.80
Value of the Research Asset =			\$3,035.40	

	Amortization this year =	\$484.60
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The value of the research asset and the amortization in the current year are estimated and reported in Table 4.5 for Ariba and Motorola.

The final step in the process is the adjustment of the operating income to reflect the capitalization of research and development expenses. make the adjustment by adding back R&D expenses to the operating income (to reflect its reclassification as a capital expense) and subtract out the amortization of the research asset, estimated in the last step.

Table 4.5 summarizes the adjusted operating income for each of the three firms:

Table 4.5: Adjusted Operating Income

	<i>Ariba</i>	<i>Cisco</i>	<i>Motorola</i>
Value of Research Asset =	\$ 28.59	\$ 3,035.40	\$ 8,798.20
Amortization: R&D Asset =	\$ 6.01	\$ 484.60	\$ 2,418.40
EBIT	\$ (163.70)	\$ 3,455.00	\$ 3,216.00
+ Current year's R&D	\$ 19.34	\$ 1,594.00	\$ 3,438.00
- R&D Amortization	\$ 6.01	\$ 484.60	\$ 2,418.40
Adjusted EBIT	\$ (150.37)	\$ 4,564.40	\$ 4,235.60

Note that Cisco and Motorola have adjusted operating incomes that exceed their reported operating incomes by about a billion dollars each.

Capitalizing Other Operating Expenses

While R&D expenses are the most prominent example of capital expenses being treated as operating expenses, there are other operating expenses that arguably should be treated as operating expenses. Consumer product companies such as Gillette and Coca Cola could argue that a portion of advertising expenses should be treated as capital expenses, since they are designed to augment brand name value. For many new technology firms, including e-tailers such as Amazon.com, the biggest operating expense item is selling, general and administrative expenses (SG&A). These firms could argue

that a portion of these expenses should be treated as capital expenses, since they are designed to increase brand name awareness and bring in new customers. America Online, for instance, used this argument to justify capitalizing the expenses associated with the free trial CDs that it bundled with magazines in the United States.

While this argument has some merit, you should remain wary about using it to justify capitalizing these expenses. For an operating expense to be capitalized, there should be substantial evidence that the benefits from the expense accrue over multiple periods. Does a customer who is enticed to buy from Amazon, based upon an advertisement or promotion, continue as a customer for the long term? There are some analysts who claim that this is indeed the case, and attribute significant value added to each new customer.¹ It would be logical, under those circumstances, to capitalize these expenses using a procedure similar to that used to capitalize R&D expenses.

- Determine the period over which the benefits from the operating expense (such as SG&A) will flow.
- Estimate the value of the asset (similar to the research asset) created by these expenses. If the expenses are SG&A expenses, this would be the SG&A asset.
- Adjust the operating income for the expense and the amortization of the created asset.

Adjusted Operating Income = Operating Income + SG&A expenses for the current period
– Amortization of SG&A Asset

Illustration 4.3: Should you capitalize S,G &A expense? Amazon & Rediff.com

¹ As an example, Jamie Kiggen, an equity research analyst at Donaldson, Lufkin and Jenrette, valued an Amazon customer at \$ 2,400 in an equity research report in 1999. This value was based upon the assumption that the customer would continue to buy from Amazon.com, and an expected profit margin from such sales.

Let us consider S,G & A expenses at Amazon and Rediff.com. To make a judgment on whether you should capitalize this expense, you need to get a sense of what these expenses are and how long the benefits accruing from these expenses last. For instance, assume that an Amazon promotion (the expense of which would be included in S, G & A) attracts a new customer to the web site, and that customers, once they try Amazon, continue, on average, to be customers for three years. You would then use a three year amortizable life for S,G & A expenses, and capitalize them the same way you capitalized R& D: by collecting historical information on S,G & A expenses, amortizing them each year, estimating the value of the selling asset and then adjusting operating income.

You decided that, on balance, selling, general and administrative expenses should continue to be treated as operating expenses and not capitalized for Amazon for two reasons. First, retail customers are difficult to retain, especially online, and Amazon faces serious competition not only from B&N.com and Borders.com, but also from traditional retailers like Walmart, setting up their online operations. Consequently, the customers that Amazon might attract with its advertising or sales promotions are unlikely to stay for an extended period just because of the initial inducements. Second, as the company has become larger, its selling, general and administrative expenses seem increasingly directed towards generating revenues in current periods rather than future periods.

For Rediff.com, S,G and A expenses were capitalized for three reasons. First, its business as an internet portal will allow it to retain customers it attracts with its advertising and sales promotions for an extended period. Second, the fact that Rediff serves the Indian market (and is thus less likely to face competition from global giants²) and the small size of the company does provide it with the potential at least for a large

² Rediff offers the portal in Indian languages. A Yahoo! would therefore have to go to considerable effort to match it.

and longer term payoff from selling expenses. Finally, Rediff could very well use the investments in S,G and A as a lever to enter into other businesses in the future. A 3-year amortization period was used for these expenses. Table 4.6 below summarizes the estimates of the asset created by capitalizing S,G and A expenses and the amortization on that asset:

Table 4.6: Capitalizing S,G & A Expenses: Rediff.com (in thousands)

<i>Year</i>	<i>S,G&A Expense</i>	<i>Unamortized portion</i>		<i>Amortization this year</i>
Current	5276.00	1.00	5276.00	
-1	1550.00	0.67	1033.33	\$ 727.67
-2	0.00	0.33	0.00	\$ 0.00
-3	0.00	0.00	0.00	\$ 0.00
Value of S,G & A Asset =			\$6,309.33	
Amortization of S,G&A Asset this year =				516.67

Note that Rediff has been in existence only two years and there are no S,G&A expenses from two and three years ago.

The reported operating loss at Rediff.com of -\$ 6.915 million can now be adjusted for the capitalization of S,G and A expenses (shown in thousands):

Reported EBIT	=	- \$6,915
+ S,G and A expenses in current financial year	=	\$5,276
- Amortization of S,G and A asset	=	\$ 517
Adjusted EBIT	=	- \$2,156

Adjustments for Financing Expenses

The second adjustment is for financing expenses that accountants treat as operating expenses. The most significant example is operating lease expenses, which are treated as operating expenses, in contrast to capital leases, which are presented as debt. In

chapter 3, it was noted that there is no distinction between the two from the financial standpoint, and that you should convert operating leases into debt.

Converting Operating Leases into Debt

In chapter 3, the basic approach for converting operating leases into debt was presented. You discount future operating lease commitments back at the firm's pre-tax cost of debt. The present value of the operating lease commitments is then added to the conventional debt of the firm to arrive at the total debt outstanding.

Once operating leases are re-categorized as debt, the operating incomes can be adjusted in two steps. First, the operating lease expense is added back to the operating income, since it is a financial expense. Next, the depreciation on the leased asset is subtracted out to arrive at adjusted operating income:

$$\text{Adjusted Operating Income} = \text{Operating Income} + \text{Operating Lease Expenses} - \text{Depreciation on leased asset}$$

If you assume that the depreciation on the leased asset approximates the principal portion of the debt being repaid, the adjusted operating income can be computed by adding back the imputed interest expense on the debt value of the operating lease expense:

$$\text{Adjusted Operating Income} = \text{Operating Income} + \text{Debt value of operating lease expense} * \text{Interest rate on debt}$$

Illustration 4.4: Adjusting Operating Income for Operating Leases

Ariba, Cisco and Amazon all have operating leases that they provide more details on in their financial statements. The present value of operating leases is reported in Table 4.7 for each of the firms, using the pre-tax cost of borrowing for each firm as the discount rate and convert the lump-sum that these firms report in their financial statements into annuities.

Table 4.7: Debt Value of Operating Leases

Year	<i>Cisco</i> <i>Pre-tax cost of debt = 6.2%</i>		<i>Amazon</i> <i>Pre-tax cost of debt = 8.0%</i>		<i>Ariba</i> <i>Pre-tax cost of debt = 9.25%</i>	
	Commitment	Present Value	Commitment	Present Value	Commitment	Present Value
1	\$ 156.00	\$ 146.89	\$ 68.30	\$ 63.24	\$ 5.10	\$ 4.67
2	\$ 143.00	\$ 126.79	\$ 39.40	\$ 33.78	\$ 5.20	\$ 4.35
3	\$ 122.00	\$ 101.86	\$ 20.50	\$ 16.27	\$ 5.29	\$ 4.06
4	\$ 109.00	\$ 85.69	\$ 1.00	\$ 0.74	\$ 5.40	\$ 3.79
5	\$ 97.00	\$ 71.80	\$ -	\$ -	\$ 5.42	\$ 3.49
6 and beyond	\$ 448.0	\$ 294.39	\$ -	\$ -	\$ 9.78	\$ 5.75
Debt Value of leases =		\$ 827.43		\$ 114.03		\$ 26.10

The operating lease expenses after year 5 for Cisco are treated as an annuity³. The present value of operating leases is treated as the equivalent of debt, and is added on to the conventional debt of the firm.

Finally, you adjust the operating income for the imputed interest expense on the debt value of operating leases. Table 4.8 summarizes the net effect of this adjustment for each of the three firms that have operating leases:

Table 4.8: Imputed Interest Expense on Operating Leases

	Amazon	Ariba	Cisco
Debt value of operating leases	\$ 114.33	\$ 26.10	\$ 827.40
Pre-tax cost of debt	8.00%	9.25%	6.20%
Imputed interest expenses on operating lease debt	\$ 9.15	\$ 2.41	\$ 51.30

These imputed interest expenses will be added to the stated operating income to arrive at adjusted operating income estimates for each of these firms.

³ It is treated as a three-year annuity, reflecting the average annual operating lease expenses over the first five years – about \$145 million. Dividing the lump-sum payment in year 6 by this average yields three years.



Oplease.xls: This spreadsheet allows you to convert operating lease expenses into debt.

Managed Earnings; Consequences and Adjustments

Technology firms have become particularly adept at meeting and beating analyst estimates of earnings each quarter. While beating earnings estimates can be viewed as a positive development, some technology firms adopt accounting techniques that are questionable to accomplish this objective. When valuing these firms, you have to correct operating income for these accounting manipulations to arrive at the correct operating income.

The Phenomenon of Managed Earnings

In the 1990s, firms like Microsoft and Intel set the pattern for technology firms. In fact, Microsoft beat analyst estimates of earnings in 39 of the 40 quarters during the decade, and Intel posted a record almost as impressive. As the market values of these firms, other technology firms followed in their footsteps in trying to deliver earnings that were higher than analyst estimates by at least a few pennies. The evidence is overwhelming that the phenomenon is spreading. For an unprecedented 18 quarters in a row from 1996 to 2000, more firms beat consensus earnings estimates than missed them.⁴ In another indication of the management of earnings, the gap between the earnings reported by firms to the Internal Revenue Service and that reported to equity investors has been growing over the last decade.

Given that these analyst estimates are expectations, what does this tell you? One possibility is that analysts consistently under estimate earnings and never learn from their mistakes. While this is a possibility, it seems extremely unlikely to persist over an entire decade. The other is that technology firms particularly have far more discretion in how

⁴ I/B/E/S Estimates

they measure and report earnings and are using this discretion to beat estimates. In particular, the treatment of research expenses as operating expenses gives these firms an advantage when it comes to managing earnings.

Does managing earnings really increase a firm's stock price? It might be possible to beat analysts quarter after quarter, but are markets as gullible? They are not, and the advent of "whispered earnings estimates" is in reaction to the consistent delivery of earnings that are above expectations. What are whispered earnings? Whispered earnings are implicit earnings estimates that firms like Intel and Microsoft have to beat to surprise the market, and these estimates are usually a few cents higher than analyst estimates. For instance, on April 10, 1997, Intel reported earnings per share of \$2.10 per share, higher than analyst estimates of \$2.06 per share, but saw its stock price drop 5 points, because the whispered earnings estimate had been \$2.15. In other words, markets had built into expectations the amount by which Intel had beaten earnings estimates historically.

Why do firms manage earnings?

Firms generally manage earnings because they believe that they will be rewarded by markets for delivering earnings that are smoother and come in consistently above analyst estimates. As evidence, the point to the success of firms like Microsoft and Intel, and the brutal punishment meted out, especially at technology firms, for firms that do not deliver expectations.

Many financial managers also seem to believe that investors take earnings numbers at face value, and work at delivering bottom lines that reflect this belief. This may explain why any attempts by the Financial Accounting Standards Board (FASB) to change the way earnings are measured are fought with vigor, even when the changes make sense. For instance, any attempts by FASB to value the options granted by these firms to their managers at a fair value and charging them against earnings or change the way to mergers are accounted for have been consistently opposed by technology firms.

It may also be in the best interests of the managers of firms to manage earnings. Managers know that they are more likely to be fired when earnings drop significantly, relative to prior periods. Furthermore, there are firms where managerial compensation is still built around profit targets, and meeting these targets can lead to lucrative bonuses.

Techniques for Managing Earnings

How do firms manage earnings? One aspect of good earnings management is the care and nurturing of analyst expectations, a practice that Microsoft perfected during the 1990s. Executives at the firm monitored analyst estimates of earnings, and stepped in to lower expectations when they believed that the estimates were too high.⁵ There are several other techniques that are used and you will consider some of the most common in this section. Not all the techniques are hurtful to the firm, and some may indeed be considered prudent management.

1. *Planning ahead:* Firms can plan investments and asset sales to keep earnings rising smoothly.
2. *Revenue Recognition:* Firms have some leeway when it comes when revenues have to be recognized. As an example, Microsoft, in 1995, adopted an extremely conservative approach to accounting for revenues from its sale of Windows 95, and chose not to show large chunks of revenues that they were entitled (though not obligated) to show.⁶ In fact, the firm had accumulated \$1.1 billion in unearned revenues by the end of 1996 that it could borrow on to supplement earnings in weaker quarter.

⁵ Microsoft preserved its credibility with analysts by also letting them know when their estimates were too low. Firms that are consistently pessimistic in their analyst presentations lose their credibility and consequently their effectiveness in managing earnings.

⁶ Firms that bought Windows 95 in 1995 also bought the right to upgrades and support in 1996 and 1997. Microsoft could have shown these as revenues in 1995.

3. *Book revenues early*: In an opposite phenomenon, firms sometimes ship products during the final days of a weak quarter to distributors and retailers and record the revenues. Consider the case of MicroStrategy, a technology firm that went public in 1998. In the last two quarters of 1999, the firm reported revenue growth of 20% and 27% respectively, but much of that growth was attributable to large deals announced just days after each quarter ended, with some revenues attributed to the just-ended quarter.⁷ In a more elaborate variant of this strategy, two technology firms, both of which need to boost revenues, can enter into a transaction swapping revenues.
4. *Capitalize operating expenses*: Just as with revenue recognition, firms are given some discretion in whether they classify expenses as operating or capital expenses, especially for items like software R&D. AOL's practice of capitalizing and writing off the cost of the CDs and disks it provided with magazines, for instance, allowed it to report positive earnings through much of the late 1990s.
5. *Write offs*: A major restructuring charge can result in lower income in the current period, but it provides two benefits to the firm taking it. Since operating earnings are reported both before and after the restructuring charge, it allows the firm to separate the expense from operations. It also makes beating earnings easier in future quarters. To see how restructuring can boost earnings, consider the case of IBM. By writing off old plants and equipment in the year they are closed, IBM was able to drop depreciation expenses to 5% of revenue in 1996 from an average of 7% in 1990-94.

⁷ Forbes magazine carried an article on March 6, 2000, on Microstrategy, with this excerpt: "On Oct. 4 MicroStrategy and NCR announced what they described as a \$52.5 million licensing and technology agreement. NCR agreed to pay MicroStrategy \$27.5 million to license its software. MicroStrategy bought an NCR unit which had been a competitor for what was then \$14 million in stock, and agreed to pay \$11 million cash for a data warehousing system. Microstrategy reported \$17.5 million of the licensing money as revenue in the third quarter, which had closed four days earlier."

The difference, in 1996 revenue, was \$1.64 billion, or 18% of the company's \$9.02 billion in pretax profit last year. Technology firms have been particularly adept at writing off a large portion of acquisition costs as “in-process R&D” to register increases in earnings in subsequent quarters. Lev and Deng (1997) studies 389 firms that wrote off in-process R&D between 1990 and 1996⁸; these write offs amounted, on average, to 72% of the purchase price on these acquisitions, and increased the acquiring firm’s earnings 22% in the fourth quarter after the acquisition.

6. *Use reserves*: Firms are allowed to build up reserves for bad debts, product returns and other potential losses. Some firms are conservative in their estimates in good years, and use the excess reserves that they have built up during these years to smooth out earnings in other years.
7. *Income from Investments*: Firms with substantial holdings of marketable securities or investments in other firms often have these investments recorded on their books at values well below their market values. Thus, liquidating these investments can result in large capital gains which can boost income in the period. Technology firms such as Intel have used this route to beat earnings estimates.

Adjustments to Operating Income

To the extent that firms manage earnings, you have to be cautious about using the current year’s earnings as a base for projections. In particular,

- Any expense (or income) that is truly a one-time expense (or income) should be removed from the operating income and should not be used in forecasting future operating income. While this would seem to indicate that all extraordinary charges should be expunged from operating income, there are some extraordinary charges that seem to occur at regular intervals – say once every four or five years. Such expenses

⁸ Only 3 firms wrote off in-process R&D during the prior decade (1980-89).

should be viewed as “irregular” rather than extraordinary expenses and should be built into forecasts. The easiest way to do this is to annualize the expense. Put simply, this would mean taking one-fifth of any expense that occurs once every five years, and computing the income based on this apportioned expense.

- You would view revenue growth that is being sustained by questionable accounting practices skeptically. It is very likely that this growth is not sustainable and will be reversed in future periods.
- Smoothing earnings, by itself, is not a problem as long as it is not viewed as an indicator of the risk (or lack of it) in the firm. Firms with smooth earnings can have very volatile operations.

Illustration 4.5: Estimating Operating Income for Firms

In Table 4.9, the estimates of earnings before interest and taxes are reported for Amazon, Ariba, Cisco, Motorola and Rediff.com. The two adjustments are for R&D (or S,G &A) expenditures and operating leases, described in the earlier sections. You also correct the operating income for any one-time losses or income.

Table 4.9: Adjusted Operating Income Estimates

	<i>Ariba</i>	<i>Cisco</i>	<i>Motorola</i>	<i>Amazon</i>	<i>Rediff.com</i>
EBIT	\$ (163.70)	\$ 3,455.00	\$ 2,364.00	\$ (276.00)	\$ (6.92)
+ Extraordinary Losses (Gains)	\$ -	\$ -	\$ 852.00	\$ -	0
+ Current year's R&D or S,G&A	\$ 19.34	\$ 1,594.00	\$ 3,438.00	\$ -	\$ 5.28
- R&D or S,G & A Amortization	\$ 6.01	\$ 484.60	\$ 2,418.40	\$ -	\$ 0.52
EBIT adjusted for R&D and SG&A	\$ (150.37)	\$ 4,564.40	\$ 4,235.60	\$ (276.00)	\$ (2.16)

+ Interest expense on Operating lease debt	\$ 2.41	\$ 51.30	\$ -	\$ 9.15	0
EBIT adjusted for R&D and operating leases	\$ (147.96)	\$ 4,615.70	\$ 4,235.60	\$ (266.85)	\$ (2.16)

Motorola operating income was adjusted for two one time items - the firm reported \$1.932 billion in special charges related to its Iridium project and \$ 1.18 billion in one-time gains. The net loss of \$832 million reduced operating income and was added back to arrive at the adjusted operating income.

The Tax Effect

To compute the after-tax operating income, you multiply the earnings before interest and taxes by an estimated tax rate. This simple procedure can be complicated by three issues that often arise when you look at technology firms. The first is the wide differences you observe between effective and marginal tax rates for these firms, and the choice you face between the two in valuation. The second issue arises usually with new technology firms, and is caused by the large losses they often report, leading to large net operating losses that are carried forward and can save taxes in future years. The third issue arises from the capitalizing of research and development expenses. The fact that R&D expenditures can be expensed immediately lead to much higher tax benefits for the firm.

Effective versus Marginal Tax rate

You are faced with a choice of several different tax rates. The most widely reported tax rate in financial statements is the *effective tax rate*, which is computed from the reported income statement as follows:

$$\text{Effective Tax Rate} = \text{Taxes Due} / \text{Taxable Income}$$

The second choice on tax rates is the *marginal tax rate*, which is the tax rate the firm faces on its last dollar of income. This rate depends on the tax code and reflects what firms have to pay as taxes on their marginal income. In the United States, for instance, the federal corporate tax rate on marginal income is 35%; with the addition of state and local taxes, most firms face a marginal corporate tax rate of 40% or higher.

Given that most of the taxable income of publicly traded firms is at the highest marginal tax bracket, why would a firm's effective tax rate be different from its marginal tax rate? There are at least three reasons:

1. Many firms, at least in the United States, follow different accounting standards for tax and for reporting purposes. For instance, firms often use straight line depreciation for reporting purposes and accelerated depreciation for tax purposes. As a consequence, the reported income is significantly higher than the taxable income, on which taxes are based⁹.
2. Firms sometimes use tax credits to reduce the taxes they pay. These credits, in turn, can reduce the effective tax rate below the marginal tax rate.
3. Finally, firms can sometimes defer taxes on income to future periods. If firms defer taxes, the taxes paid in the current period will be at a rate lower than the marginal tax rate. In a later period, however, when the firm pays the deferred taxes, the effective tax rate will be higher than the marginal tax rate.

In valuing a firm, should you use the marginal or the effective tax rates? If the same tax rate has to be applied to earnings every period, the safer choice is the marginal tax rate, because none of the three reasons noted above can be sustained in perpetuity. As new capital expenditures taper off, the difference between reported and tax income will

⁹ Since the effective tax rate is based upon the taxes paid (which comes from the tax statement) and the reported income, the effective tax rate will be lower than the marginal tax rate for firms that change accounting methods to inflate reported earnings.

narrow; tax credits are seldom perpetual and firms eventually do have to pay their deferred taxes. There is no reason, however, why the tax rates used to compute the after-tax cash flows cannot change over time. Thus, in valuing a firm with an effective tax rate of 24% in the current period and a marginal tax rate of 35%, you can estimate the first year's cash flows using the marginal tax rate of 24% and then increase the tax rate to 35% over time. It is critical that the tax rate used in perpetuity to compute the terminal value be the marginal tax rate.



taxrate.xls: There is a dataset on the web that summarizes average effective tax rates by industry group in the United States for the most recent quarter.

The Effect of Net Operating Losses

For firms with large net operating losses carried forward or continuing operating losses, you have to change tax rates over time. In the early years, these firms will have a zero tax rate, as losses carried forward offset income. As the net operating losses decrease, the tax rates will climb toward the marginal tax rate. As the tax rates used to estimate the after-tax operating income change, the rates used to compute the after-tax cost of debt in the cost of capital computation also need to change. Thus, for a firm with net operating losses carried forward, the tax rate used for both the computation of after-tax operating income and cost of capital will be zero during the years when the losses shelter income.

Illustration 4.6: Effective and Marginal Tax Rates for Firms

In table 4.10, the effective and estimated marginal tax rates are listed for the five companies that you will be valuing.

Table 4.10: Effective and Marginal Tax Rate, 1999

	<i>Amazon</i>	<i>Ariba</i>	<i>Cisco</i>	<i>Motorola</i>	<i>Rediff.com</i>
Taxable Income	-643.2	-136	3316	1283	-6.9

Taxes Paid	0	0	1220	392	0
Effective Tax Rate	0.00%	0.00%	36.79%	30.55%	0.00%
Marginal Tax Rate	0.00%	0.00%	35.00%	35%	0%

Three of the five firms that you are analyzing pay no taxes, since they report negative taxable income. Based upon their 1999 annual reports, Cisco and Motorola report effective tax rates of 36.79% and 30.55% respectively. In valuing both firms, the 35% federal marginal tax rate is used, though it is possible that state and local taxes could make the marginal tax rate higher.

For Amazon and Ariba, you will continue to use a 0% tax rate as long as the firms continue to lose money. In fact, the net operating losses that they have already accumulated and will continue to accumulate in future years will shelter the income they make in the first year or two that they are profitable. When they do begin paying taxes, you will use the 35% marginal tax rate for them as well. A similar procedure for Rediff.com, but the 38.5% marginal tax rate that applies to Indian firms is used instead¹⁰. Table 4.11 lists out the tax rates for Amazon, Ariba and Rediff.com for the next 10 years:

Table 4.11: Expected Tax Rates

	Amazon	Ariba	Rediff.com
1	0.00%	0.00%	0.00%
2	0.00%	0.00%	0.00%
3	18.40%	0.00%	0.00%
4	35.00%	0.00%	0.00%
5	35.00%	19.98%	21.13%
6	35.00%	35.00%	38.50%

¹⁰ The marginal tax rate for firms in India is 35%, with a 10% surcharge leading to a tax rate of 38.5%.

7	35.00%	35.00%	38.50%
8	35.00%	35.00%	38.50%
9	35.00%	35.00%	38.50%
10	35.00%	35.00%	38.50%

The tax rate remains 0% as long as the firms are losing money or have net operating losses to shelter their income, and increase to the marginal rates in the years in which they do not. The transition year for each of the firms is the year in which the net operating losses shelters some but not all income, resulting in a tax rate greater than 0% but less than the marginal tax rate. The details of the income that are forecast to arrive at these tax rates will be considered in the next chapter.

The Tax Benefits of R&D Expensing

In an earlier section, it was argued that R&D expenses should be capitalized. If you decide to do so, there is a tax benefit that you might be missing. Firms are allowed to deduct their entire R&D expense for tax purposes. In contrast, they are allowed to deduct only the depreciation on their capital expenses. To capture the tax benefit, therefore, you would add the tax savings on the difference between the entire R&D expense and the amortized amount of the research asset to the after-tax operating income of the firm:

$$\text{Additional tax benefit}_{\text{R\&D Expensing}} = (\text{R\&D} - \text{Amortization of Research Asset}) * \text{Tax Rate}$$

A similar adjustment would need to be made for any other operating expense that you choose to capitalize.

Illustration 4.7: Tax Benefit from Expensing

The tax benefit derived from the expensing of R&D and S,G and A expenses in is measured in Table 4.12:

Table 4.12: Tax Benefit from Expensing of R&D and S,G & A Expenses

	<i>Amazon</i>	<i>Ariba</i>	<i>Cisco</i>	<i>Motorola</i>	<i>Rediff.com</i>
R&D Expense	\$ -	\$ 19.34	\$ 1,594.00	\$ 3,438.00	\$ -

S,G & A Expense	\$ -	\$ -	\$ -	\$ -	\$ 5.28
Total	\$ -	\$ 19.34	\$ 1,594.00	\$ 3,438.00	\$ 5.28
Tax Benefit	\$ -	\$ -	\$ 557.90	\$ 1,203.30	\$ -
Amortization of R&D	\$ -	\$ 6.01	\$ 484.60	\$ 2,418.40	\$ -
Amortization of S,G&A	\$ -	\$ -	\$ -	\$ -	\$ 0.52
Total	\$ -	\$ 6.01	\$ 484.60	\$ 2,418.40	\$ 0.52
Tax Benefit	\$ -	\$ -	\$ 169.61	\$ 846.44	\$ -
Differential Tax Benefit	\$ -	\$ -	\$ 388.29	\$ 356.86	\$ -

Thus, Cisco derives a tax benefit that is \$388 million higher because it can expense R&D expenses rather than capitalize them. Note that Rediff.com and Ariba, which do not pay taxes, derive no marginal tax benefit right now, but will do so in future years.

Reinvestment Needs

The cash flow to the firm is computed after reinvestments. Two components go into estimating reinvestment. The first is *net capital expenditures*, which is the difference between capital expenditures and depreciation. The other is *investments in non-cash working capital*. With technology firms, again, these numbers can be difficult to estimate.

Net Capital Expenditures

While capital expenditures and depreciation can easily be obtained for the current year for any firm in the United States¹¹, they should be used with the following cautions when estimating the net capital expenditures:

¹¹ It is actually surprisingly difficult to obtain the capital expenditure numbers even for large, publicly traded firms in some markets outside the United States. Accounting standards, in these markets, often allow firms to lump investments together and report them in the aggregate.

- Firms seldom have smooth capital expenditure streams. Firms can go through periods when capital expenditures are very high (as is the case when a new product is introduced or a new plant built), followed by periods of relatively light capital expenditures. Consequently, when estimating the capital expenditures to use for forecasting future cash flows, you should look at capital expenditures over time and normalize them by taking an average or you should look at industry norms.
- As mentioned in the discussion of operating income, research and development expenses are really capital expenditures. Consequently, R&D expenses need to be treated as capital expenditures, and the research asset that is created as a consequence needs to be amortized, with the amortization showing up as part of depreciation.
- Finally, in estimating capital expenditures, you should not distinguish between internal investments (which are usually categorized as capital expenditures in cash flow statements) and external investments (which are acquisitions). The capital expenditures of a firm, therefore, need to include acquisitions. Since firms seldom make acquisitions every year, and each acquisition has a different price tag, the point about normalizing capital expenditures applies even more strongly to this item. The capital expenditure projections for a firm that makes an acquisition of \$ 100 million approximately every five years should therefore include about \$ 20 million, adjusted for inflation, every year.

Illustration 4.8: Estimating Net Capital Expenditures

A detailed discussion of how net capital expenditures were estimated for Cisco and shorter summaries of the estimates for the other firms is presented in below. In the process, you will consider many of the issues raised in the section above.

To estimate net capital expenditures for Cisco, you begin with the estimates of capital expenditure (\$584 million) and depreciation (\$ 486 million) in the 10-K. Based

upon these numbers, you would have concluded that Cisco's net capital expenditures in 1999 were \$98 million.

The first adjustment you make to this number is to incorporate the effect of research and development expenses that were capitalized earlier in this chapter. This is accomplished by adding back the R&D expenses in the most recent financial year (\$1,594 million) and subtracting the amortization of the research asset (\$ 485 million).

The second adjustment is to bring in the effect of acquisitions that Cisco made during the last financial year. Table 4.13 summarizes the acquisitions made during the year and the price paid on these acquisitions:

Table 4.13: Cisco's Acquisitions: 1999 Financial Year(in millions)

<i>Acquired</i>	<i>Method of Acquisition</i>	<i>Price Paid</i>
GeoTel	Pooling	1344
Fibex	Pooling	318
Sentient	Pooling	103
American Internet Corporation	Purchase	58
Summa Four	Purchase	129
Clarity Wireless	Purchase	153
Selsius Systems	Purchase	134
PipeLinks	Purchase	118
Amteva Technologies	Purchase	159
		\$ 2516

Note that both purchase and pooling transactions are included, and that the sum total of these acquisitions is added on to net capital expenditures in 1999. You are assuming, given Cisco's track record, that its acquisitions in 1999 are not unusual and reflect Cisco's reinvestment policy. The amortization associated with these acquisitions is

already included as part of depreciation by the firm¹². Table 4.14 below summarizes the final net capital expenditures for Cisco, as well as similar adjustments for the other firms that you are valuing:

Table 4.14: Net Capital Expenditures

	<i>Amazon</i>	<i>Ariba</i>	<i>Cisco</i>	<i>Motorola</i>	<i>Rediff.com</i>
Capital Expenditures	\$ 275.00	\$ 61.87	\$ 584.00	\$ 2,684.00	\$ 1.75
- Depreciation	\$ 67.42	\$ 1.42	\$ 486.00	\$ 2,182.00	\$ 0.23
Net Cap Ex (from financials)	\$ 207.58	\$ 60.45	\$ 98.00	\$ 502.00	\$ 1.52
+ R & D Expenditures	\$ -	\$ 19.34	\$ 1,594.00	\$ 3,438.00	\$ -
- Amortization of R&D	\$ -	\$ 6.01	\$ 484.60	\$ 2,418.40	\$ -
+ S,G&A Expenditures	\$ -	\$ -	\$ -	\$ -	\$ 5.28
- Amortization of S,G&A	\$ -	\$ -	\$ -	\$ -	\$ 0.52
+Acquisitions	\$ -	\$ -	\$ 2,516.00	\$ -	\$ -
Adjusted Net Cap Ex	\$ 207.58	\$ 73.78	\$ 3,723.40	\$ 1,521.60	\$ 6.28

The adjusted net capital expenditures include capitalized R&D expenses (for Ariba, Cisco and Motorola), capitalized S,G & A expenses (for Rediff.com) and acquisitions (for Cisco). These numbers are better reflections of how much these firms are reinvesting back into their businesses.



capex.xls: There is a dataset on the web that summarizes capital expenditures, as a percent of revenues and firm value, by industry group in the United States for the most recent quarter.

¹² It is only the tax-deductible amortization that really matters. To the extent that amortization is not tax deductible, you would look at the EBIT before the amortization and not consider it while estimating net capital expenditures.

Non-Cash Working Capital Investments

The second component of reinvestment is the cash that needs to be set aside for working capital needs. Working capital needs are defined as non-cash working capital, and the cash flow effect is the period-to-period change in this number; increases represent cash outflows, while decreases are cash inflows. While some analysts include operating cash sometimes in working capital estimates, as long as cash earns a fair return (in the form of interest), it should not be included in computing cash flows.

Again, while you can estimate the non-cash working capital change fairly simply for any year using financial statements, this estimate has to be used with caution. Changes in non-cash working capital are unstable, with big increases in some years followed by big decreases in the following years. To ensure that the projections are not the result of an unusual base year, you should tie the changes in working capital to expected changes in revenues or costs of goods sold at the firm over time. The non-cash working capital as a percent of revenues is used, in conjunction with expected revenue changes each period, to estimate projected changes in non-cash working capital over time. You can obtain the non-cash working capital as a percent of revenues by looking at the firm's history or at industry standards. As a final point, non-cash working capital can be negative, which can translate into positive cash flows from working capital as revenue increases. It is prudent, when this occurs, to set non-cash working capital needs to zero¹³.

Illustration 4.9: Estimating Non-cash Working Capital Needs

The non-cash working capital investment varies widely across the five firms that you are valuing. The non-cash working capital items and their values are summarized in table 4.15 and presented them as a percent of revenue for each firm:

¹³ While it is entirely possible that firms can generate positive cash flows from working capital decreasing for short periods, it is dangerous to assume that this can occur forever.

Table 4.15: Non-Cash Working Capital Investments

	<i>Amazon</i>	<i>Ariba</i>	<i>Cisco</i>	<i>Motorola</i>	<i>Rediff.com</i>
Revenues	\$ 1,640.00	\$ 92.56	\$12,154.00	\$30,931.00	\$ 1,906.00
Accounts Receivable	220.65	5.16	1242	5125	827
Inventory & Other Current Assets	85.34	2.74	1357	7334	0
Accounts Payable	463.03	3.85	361	3015	334
Other current liabilities	261.59	42.53	2642	6897	0
Non-cash Working Capital	-418.63	-38.48	-404	2547	493
% of Revenues	-25.53%	-41.57%	-3.32%	8.23%	25.87%
Change from last year	\$ (308.55)	\$ (32.99)	(\$700.00)	(\$829.00)	\$ 493.00
Average over last 3 years	-15.16%	-23.33%	-3.16%	8.91%	NMF
Average for industry	8.71%	6.35%	-2.71%	7.04%	4.33%

The non-cash working capital is negative at three of the five firms that you are analyzing – Ariba, Cisco and surprisingly (for a retail firm) Amazon. Since non-cash working capital can be volatile over time, and three of these firms are young firms, two other statistics are reported. The first is the average non-cash working capital as a percent of revenues over the last 3 years for all of the firms except Rediff. The average continues to be negative for Amazon, Ariba and Cisco, and is slightly higher than the current working capital number at Motorola. The average non-cash working capital as a percent of revenues for other firms in the industry – specialty retailers for Amazon, business-to-business (B2B) service providers for Ariba, internet portals for Rediff.com, telecomm equipment for Cisco and semiconductors/ telecomm equipment for Motorola . For Amazon and Ariba, the non-cash working capital as a percent of revenues is much higher for the industries than for the firms, reflecting the larger size and relative maturity of the comparable firms in the group.

When valuing these companies, you will have to make an assumption about non-cash working capital to estimate free cash flows to the firm. For Motorola, it is assumed that that the current ratio of working capital to revenues (8.23%) will be maintained to

estimate cash flows. For Amazon, the non-cash working capital will be set at 3% of revenues, higher than the firm's current levels but lower than the industry average. There is some merit to the argument that internet retailers will be able to maintain a lower inventory than traditional retailers, but it is unlikely that suppliers will continue to fund operations (as they are doing now, with a negative working capital). For Ariba, non-cash working capital is set at 5% of revenues, slightly lower than the industry average but much higher than the current number. For Rediff.com, the current non-cash working capital proportion of 50.7% is adjusted down to 10%, higher than the average for the industry reflecting the greater difficulties that the firm will face in the Indian market.



wcdata.xls: There is a dataset on the web that summarizes non-cash working capital needs by industry group in the United States for the most recent quarter.

Illustration 4.10: Estimating Free Cash Flow to Firm

Now that you have estimates of the operating income, the tax rate, the net capital expenditures and changes in the non-cash working capital, you are in a position to estimate the free cash flows to the firms in the most recent period. Table 4.16 reports the free cash flows to the firm for all five firms:

Table 4.16: Free Cash Flows to Firm in most recent period (in millions of US \$)

	<i>Amazon</i>	<i>Ariba</i>	<i>Cisco</i>	<i>Motorola</i>	<i>Rediff.com</i>
EBIT	\$ (266.85)	\$ (147.96)	\$ 4,615.70	\$ 4,235.60	\$ (2.16)
Tax Rate	0.00%	0.00%	36.79%	30.55%	0.00%
EBIT (1-t)	\$ (266.85)	\$ (147.96)	\$ 2,917.52	\$ 2,941.48	\$ (2.16)
- Net Capital Expenditures	\$ 207.58	\$ 73.78	\$ 3,723.40	\$ 1,521.60	\$ 6.28
- Change in non-cash working capital	\$ (308.55)	\$ (32.99)	\$ (700.00)	\$ (829.00)	\$ 0.49
FCFF	\$ (165.88)	\$ (188.75)	\$ (105.88)	\$ 2,248.88	\$ (8.93)

Of the five firms that you are valuing, four had negative free cash flows to the firm in the most recent period. Of these three – Amazon, Ariba and Rediff – had negative operating

income, but Cisco had negative free cash flows because its reinvestment in 1999 was higher than its after-tax operating income. The challenge you will face in the coming chapters is in coming up with estimates of these cash flows in future years.

Summary

When valuing a firm, the cash flows that are discounted should be after taxes and reinvestment needs but before debt payments. In this chapter, you considered some of the challenges in coming up with this number for technology firms. The cash flow estimation process begins with the operating income, i.e., the income that the firm generated from its operations. To arrive at an estimate of this number, there are three adjustments that you make to the operating income that you see in financial statements. The first is for research and development expenses, which are categorized as operating expenses by accountants but should be treated as capital expenses. In fact, any operating expense that generates benefits over multiple periods should be treated similarly. The second is the conversion of operating lease expenses from operating expenses to financial expenses. The third is the cleansing the operating income of one-time or extraordinary gains or losses. Since the operating income tends to change fairly dramatically from period to period for young firms, you should use the most updated information that you can get on these firms.

To state this operating income in after-tax terms, you need a tax rate. Firms generally state their effective tax rates in their financial statements, but these effective tax rates can be different from marginal tax rates. While the effective tax rate can be used to arrive at the after-tax operating income in the current period, the tax rate used should converge on the marginal tax rate in future periods. For firms that are losing money and not paying taxes, the net operating losses that they are accumulating will protect some of their future income from taxation.

The reinvestment that firms make in their own operations is then considered in two parts. The first part is the net capital expenditure of the firm which is the difference between capital expenditures (a cash outflow) and depreciation (effectively a cash

inflow). In this net capital expenditure, you include the capitalized operating expenses (such as R&D) and acquisitions. The second part relates to investments in non-cash working capital, mainly inventory and accounts receivable. Increases in non-cash working capital represent cash outflows to the firm, while decreases represent cash inflows. Non-cash working capital at most firms tends to be volatile and may need to be smoothed out when forecasting future cash flows.