

**Dealing with Cash, Cross Holdings and Other Non-Operating
Assets: Approaches and Implications**

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The Value of Cash and Cross Holdings

Most businesses hold cash, often in the form of low-risk or riskless investments that can be converted into cash at short notice. The motivations for holding cash vary across firms. Some hold cash to meet operating needs whereas others keep cash on hand to weather financial crises or take advantage of investment opportunities. In the first part of this paper, we will begin by looking at the extent of cash holdings at publicly traded firms and some of the motives for the cash accumulation. We will also look at how best to value these cash holdings in both discounted cash flow and relative valuation models. In the second part of the paper, we will turn to a trickier component – cross holdings in other companies. We will begin by looking at the way accountants record these holdings and the implications for valuation. We will then consider how to incorporate the value of these cross holdings in a full information environment, followed by approximations that work when information about cross holdings is partial or missing.

Most firms, private and public, have assets on their books that can be considered to be non-operating assets. The first and most obvious example of such assets is cash and near-cash investments – investments in riskless or very low-risk investments that most companies with large cash balances make. The second is investments in equities and bonds of other firms, sometimes for investment reasons and sometimes for strategic ones. The third is holdings in other firms, private and public, which are categorized in a variety of ways by accountants. Finally, there are assets that do not generate cash flows but nevertheless could have value –undeveloped land in New York or Tokyo or an overfunded pension plan. When valuing firms, little or no serious attention is paid to these assets and the consequences can be serious. In this paper, we examine some of the challenges associated with valuing non-operating assets and common errors that can enter valuations of these assets.

Cash and Near Cash Investments

On every firm's balance sheet, there is a line item for cash and marketable securities, referring to its holding of cash and near cash investments. Investments in short-term government securities or commercial paper, which can be converted into cash quickly and with very low cost, are considered near-cash investments. We will begin by considering the motives for holding cash and the extent of such holdings at companies. We will then discuss various approaches used to categorize cash holdings and how best to deal with cash holdings in both discounted cashflow and relative valuations.

Why do companies hold cash?

Every business has some cash on its books and many have very large cash balances, as a percent of their values. Keynes provided three motives for individuals to hold money. He suggested that they hold cash for transactions, as a precaution against unanticipated expenses and for speculative purposes.¹ It can be argued that firms accumulate cash for the same reasons, but there is an added incentive. The separation of

¹ Keynes, J.M., *The General Theory of Employment, Interest and Money* (New York: Harcourt, Brace and World, 1936)

management and stockholders at large publicly traded companies can create an additional incentive for firms (or at least the managers in these firms) to accumulate cash.²

1. *Operating (Transactions) Motive*

Firms need cash for operations and the needs are likely to be different for different businesses. For instance, retail firms have to have cash available in the cash registers of the stores to run their businesses. Furthermore, these firms need access to cash to replace depleted inventory and to meet their weekly payrolls.³ In contrast, a computer software company may be able to get away with a much smaller operating cash balance. We would expect cash needs for operations to be a function of the following variables:

- Cash oriented versus Credit oriented businesses: Firms that are in cash oriented businesses (fast food restaurants, discount retailers) will require more cash for operations than firms that operate in credit oriented businesses.
- Small versus Large transactions: Firms that generate their revenues in multitudes of small transactions are more likely to require cash for their businesses than firms that generate revenues in a few large transactions. It is unlikely that a firm like Boeing, which receives its revenues on a few large transactions, will receive or pay cash on most of its transactions. As a related point, there should be some economies of scale that allow larger firms to maintain lower (proportional) operating cash balances than smaller firms.⁴
- Banking system: As banking systems evolve, fewer and fewer transactions will be cash based. As a consequence, we would expect cash requirements to decrease as banking systems get more sophisticated, allowing customers to pay with credit cards or checks.

² Opler, Tim, Lee Pinkowitz, René Stulz and Rohan Williamson, 1999, *The determinants and implications of corporate cash holdings*, Journal of Financial Economics, v52, 3-46. This paper examines the determinants of cash holdings and notes that many of the variables that lead companies to have low debt ratios (significant growth opportunities, high risk) also lead to large cash balances.

³ Miller, M. H., and Orr D., 1966. *A Model of the Demand for Money by Firms*. Quarterly Journal of Economics, 413-435. They develop a simple model for computing the optimal operating cash balance, as a function of the opportunity cost of holding cash and cash requirements for operations.

⁴ Faulkender, M., 2002, *Cash Holdings among Small Businesses*, Working Paper, SSRN. This paper finds that there are economies of scale and that cash balances decrease as firms get bigger.

While we can debate how much operating cash is needed in a firm, there can be little argument that banking technology and investment opportunities have improved for most firms in most economies, leading to lower operating cash requirements across the board.

2. *Precautionary Motives*

The second reason for holding cash is to cover unanticipated expenses or to meet unspecified contingencies. For example, cyclical firms will accumulate cash during economic booms and draw on that cash in the event of a recession to cover operating deficits. In general, therefore, we would expect this component of the cash balance to be a function of the following variables:

- Volatility in the economy: Firms should accumulate more cash, other things remaining equal, in unstable and volatile economies than they do in mature economies. There is a far greater likelihood of shocks in the former and thus a much higher need for cash.⁵
- Volatility in operations: In any given economy, we would expect firms with more volatile operating cashflows to hold higher cash balances to meet contingencies than firms with stable cashflows. Technology companies often have large cash balances precisely because they are so uncertain about their future earnings.
- Competitive Environment: One factor that adds to instability is the presence of strong competition in the business in which a firm operates. We would expect firms that operate in more intensely competitive sectors to hold more cash than otherwise similar firms that protected from competition.⁶
- Financial Leverage: A firm that has a higher debt ratio, for any given operating cash flow, has committed itself to making higher interest payments in the future.

⁵ Custodio, C. and C. Raposo, 2004, *Cash Holdings and Business Conditions*, Working Paper, SSRN. This paper finds strong evidence that financially constrained firms adjust their cash balance to reflect overall business conditions, holding more cash during recessions. Firms that are not financially constrained also exhibit the same pattern, but the linkage is much weaker. Their findings are similar to those in another paper by Baum, C.F., M. Caglayan, N. Ozkan and O. Talvera, 2004, *The Impact of Macroeconomic Uncertainty on Cash Holdings for Non-financial Service Firms*, Working Paper, SSRN.

⁶ Haushalter, D., S. Klasa and W.F. Maxwell, 2005, *The Influence of Product Market Dynamics on the Firm's Cash Holdings and Hedging Behavior*, Working Paper, SSRN. In this paper, the authors find evidence that firms that share growth opportunities with strong rivals are more likely to accumulate higher cash balances, and that these cash holdings provide strategic benefits to the firms.

Concerns about being able to make these payments should lead to higher cash balances.

3. *Future Capital Investments*

If capital markets were efficient and always accessible with no transactions costs, firms could raise fresh capital when needed to invest in new projects or investments. In the real world, firms often face constraints and costs in accessing capital markets. Some of the constraints are internally imposed (by management) but many are external, and they restrict a firm's capacity to raise fresh capital to fund even good investments. In the face of these constraints, firms will set aside cash to cover future investment needs; if they fail to do so, they run the risk of turning away worthwhile investments. We would expect this part of the cash balance to be a function of the following variables:

- Magnitude of and Uncertainty about future investments: The need to hold cash will be greatest in firms that have both substantial expected investment needs and high uncertainty about the magnitude of these needs. After all, firms that have large but predictable investment needs can line up external funding well in advance of their need, and firms with small investment needs can get away without setting aside substantial cash balances.⁷
- Access to capital markets: Firms that have easier and cheaper access to capital markets should retain less cash for future investment needs than firms without this access. Thus, we would expect cash balances to be higher (in proportional terms) in smaller companies than in larger ones, in private businesses than in publicly traded firms and in emerging market companies as opposed to developed market companies. Cash balances should also decrease with an increase in the financial choices that firms have to raise capital. Thus, the capacity to access corporate bond markets in addition to conventional banks for debt should allow non-financial corporations to reduce their cash balances.⁸

⁷ Acharya, V., H. Almeida and M. Campello, 2005, *Is Cash Negative Debt? A Hedging Perspective on Corporate Financial Policies*, Working Paper, SSRN. They present a twist on this argument by noting that firms that have to make significant investments when their operating cash flows are low, which they categorize as a hedging need, will maintain much larger cash balances to cover these investments.

⁸ Pinkowitz, Lee and Rohan Williamson, 2001, *Bank power and cash holdings: Evidence from Japan*, Review of Financial Studies 14, 1059-1082. They compare cash holdings of firms in Japan, Germany and

- Information asymmetry about investments: Firms will generally face far more difficulty raising capital at a fair price for investments where external investors have less information about the potential payoffs than the firm does.⁹ Thus, we would expect firms to acquire larger cash balances in businesses where projects are difficult to assess and monitor. This may explain why cash holdings tend to be higher in firms that have substantial R&D investments; both lenders and equity investors face difficulties in evaluating the possibility of success with these investments.

4. Strategic Cash Holdings

In some cases, companies hold cash not because they have specific investments in mind that they want to finance with the cash but just in case. “Just in case of what?” you might ask. These companies view cash as a strategic weapon that they can use to take advantage of opportunities that may manifest in the future. Of course, these opportunities may never show up but it would still be rational for firms to accumulate cash. In fact, the advantage of having cash is greatest when cash is a scarce resource and capital markets are difficult to access or closed. In many emerging markets, for instance, companies hold huge cash balances and use the cash during economic crises to buy assets from distressed firms at bargain prices. The advantage to holding cash becomes much smaller in developed markets but it will still exist.

5. Management Interests

As we noted at the start of the section, the one variable that sets aside publicly traded companies from individuals is the separation of management and ownership. The cash may belong to the stockholders but the managers maintain the discretion on whether it should be returned to stockholders (in the form of dividends and stock buybacks) or held by the firm. In many firms, it can be argued that managers have their own agendas to

the United States and conclude that the median Japanese firm holds two and half times more cash than the median German or US firm. They hypothesize (and provide evidence) that these higher cash balances reflect banks extracting rents from Japanese firms by forcing them to hold more cash than they need. In particular, they note that cash balances in Japan were higher during periods of high bank power.

⁹ Myers, S. and N. Majluf, 1984, *Corporate financing and investment decisions when firms have information that investors do not have*, Journal of Financial Economics. v13, 187-221.

pursue and that cash provides them with the ammunition to fund the pursuit.¹⁰ Thus, a CEO who is intent on empire building will accumulate cash, not because it is good for stockholders, but because it can be used to fund expansion.¹¹ If this rationale holds, we would expect cash balances to vary across companies for the following reasons:

- Corporate Governance: Companies where stockholders have little or no power over stockholders, either because of corporate charter amendments, inertia or shares with different voting rights, will accumulate more cash than companies where managers are held to account by stockholders.¹²
- Insider Holdings: If insiders hold large blocks of the company and also are part of the management of the company, we would expect to see larger cash balances accumulating in the company.¹³

There is also evidence that firms that accumulate cash tend to report sub-par operating performance, at least on average.¹⁴

¹⁰ Jensen, Michael C, 1986, *Agency costs of free cash flow, corporate finance and takeovers*, American Economic Review, v76, 323-329.

¹¹ There have been several papers that show that companies with large cash holdings are more likely to make poor investments and overpay for acquisitions with the cash. See Harford, J. 1999. *Corporate Cash Reserves and acquisitions*. Journal of Finance, v54, 1969-1997; Blanchard, O., F. Lopez-de-Silanes, and A. Shleifer, 1994, *What do Firms do with Cash Windfalls?*, Journal of Financial Economics, v36, 337-360; Harford, J., S. A. Mansi and W.F. Maxwell, *Corporate Governance and a Firm's Cash Holdings*, Working Paper, SSRN. The last paper finds that companies with weak stockholder rights do not have higher cash balances but that they tend to dissipate cash much more quickly on poor investments than firms with stronger stockholder rights.

¹² Dittmar, A., J. Mahrt-Smith, and H. Servaes, 2003, *International corporate governance and corporate cash holdings*, Journal of Financial and Quantitative Analysis, v38, 111-133. Pinkowitz, Stulz and Williamson, 2003, *Do firms in countries with poor protection of investor rights hold more cash?*. Working Paper, SSRN. Both papers find that companies in countries where stockholders have less power tend to hold more cash. Their results are confirmed by Guney, Y., A. Ozkan and N. Ozkan, 2003, *Additional International Evidence on Corporate Cash Holdings*, Working Paper, SSRN. They compare cash holdings across 3989 companies in Japan, France, Germany and the UK and conclude that the stronger the protections for stockholders, the lower the cash holdings at companies.

¹³ Zhang, R., 2005, *The Effects of Firm- and Country-level Governance Mechanisms on Dividend Policy, Cash Holdings and Firm Value: A Cross Country Study*, Working Paper, SSRN. This paper finds that cash holdings are higher at companies where ownership is concentrated.

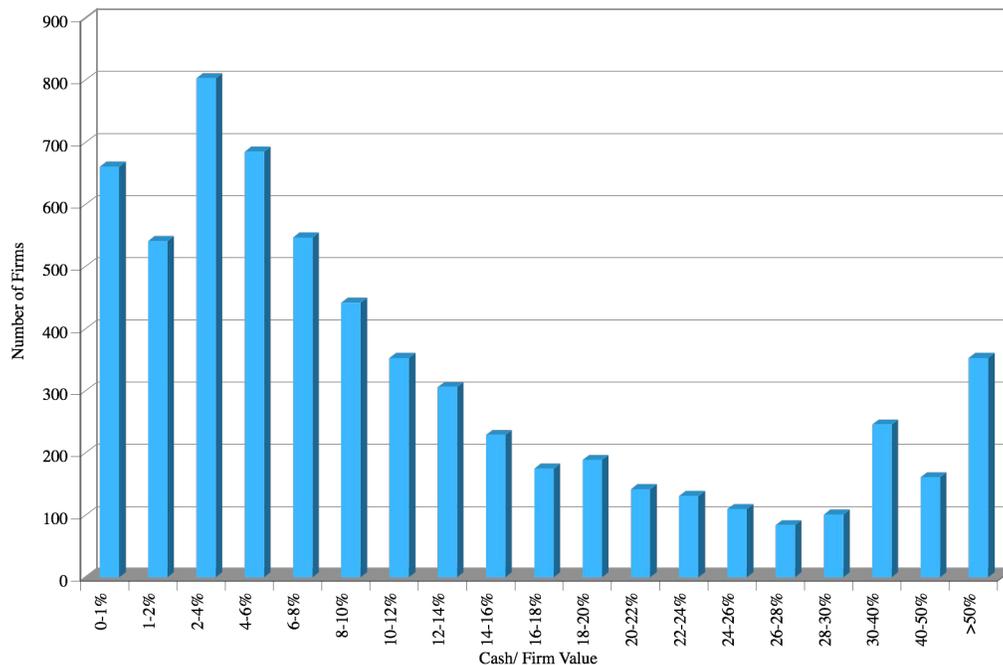
¹⁴ Mikkelsen, W. H. and Partch, M., 2003, *Do persistent large cash reserves hinder performance?*, Journal of Financial and Quantitative Analysis v38, 257-294.

The Extent of Cash Holdings

Cash holdings vary widely not only across companies at any point in time but for for the same companies across time. To get a sense of how much cash (and near-cash investments) companies hold, we looked at three measures of cash holdings.

- The first is cash as a percent of the overall market value of the firm, defined as the sum of the market values of debt and equity. Figure 1 presents the distribution of this measure for companies in the United States in January 2005.

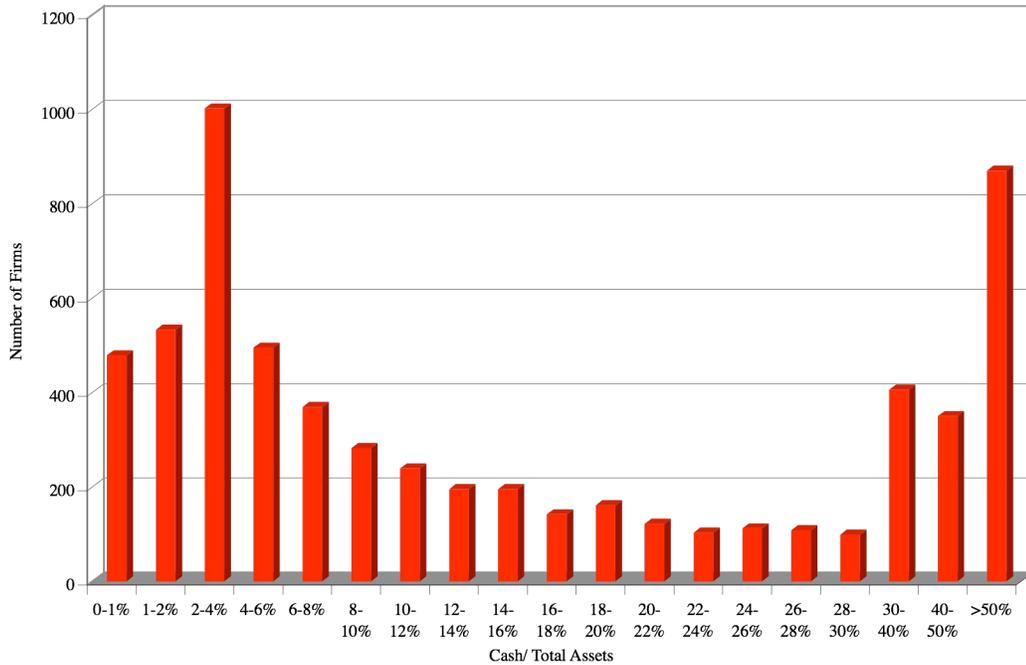
Figure 1: Cash as a percent of Firm Value - US Companies



While the median is 6.07% for this ratio, there are more than 300 firms where cash is in excess of 50% of firm value. There are also a significant number of firms where cash is less than 1% of firm value.

- The second measure is cash as a percent of the book value of all assets. The difference between this measure and the previous one is that it is scaled to the accountant's estimate of how much a business is worth rather than the market's judgment. Figure 2 reports on the distribution of cash to book value of assets for companies in the United States in January 2005.

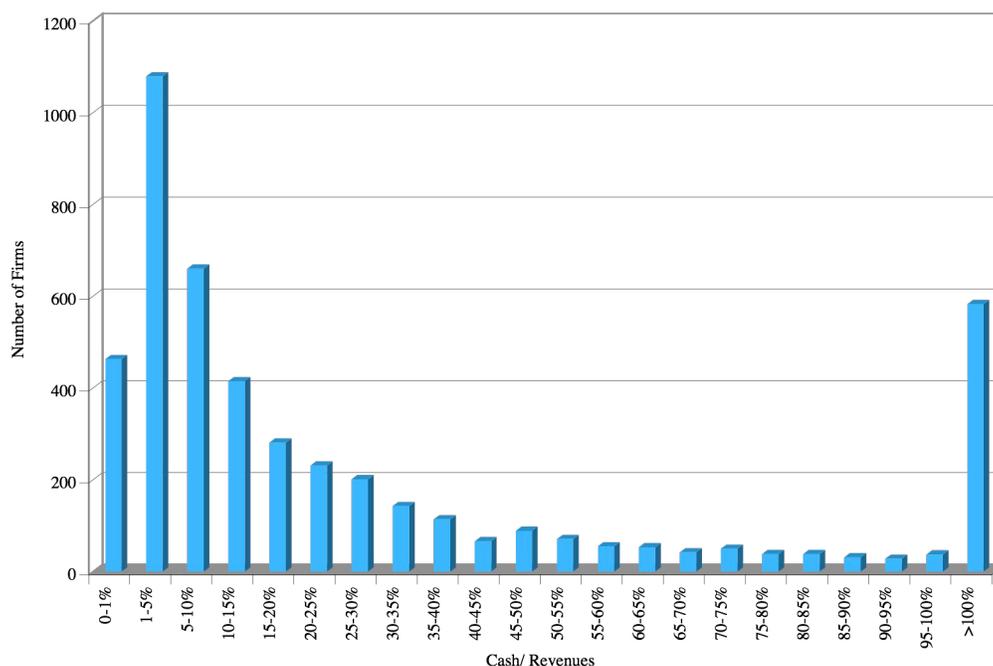
Figure 2: Cash as a percent of Book Value of Assets



The median for this measure is 7.14%, slightly higher than the median for cash as a percent of firm value.

- The third measure relates cash to a firm's revenues, providing a linkage (if one exists) between cash holdings and operations. Figure 3 provides the distribution of cash as a percent of revenues for companies in the United States in January 2005.

Figure 3: Cash as a percent of Revenues



The median for this measure is 3.38%, but there are a large number of positive outliers with this measure as well. Many young, high growth firms have cash that exceeds 100% of revenues in the most recent financial year.

While figures 1 through 3 provide useful information about the differences across all firms, it is still instructive to look underneath at differences across sectors when it comes to cash holdings. We computed the average values of the three measures outlined above – Cash/ Firm value, Cash/ Book Assets and Cash/Revenues – for different industries in the United States and the results are reported in Appendix 1 (at the end of the paper).¹⁵

Categorizing Cash Holdings

Given the different motives for holding cash, it should come as no surprise that analysts have tried to categorize cash holdings in many ways. The most common one in practice separates the cash balance into an operating cash balance and excess cash. A more useful categorization from a valuation perspective is one that divides cash into wasting cash and non-wasting cash, based upon where the cash is invested.

¹⁵ The updated versions of these ratios will be accessible on my web site under updated data.

Operating versus Non-operating (Excess) Cash

In the last section, we outlined why companies may hold cash for operating purposes. For many analysts, determining how much cash is needed for operating purposes is viewed as a key step in analyzing cash. Once that determination has been made, operating cash is considered to be part of working capital and affects cash flows, and cash held in excess of the operating cash balance is either added back to the estimated value of the operating assets or netted out against total debt outstanding to arrive at a net debt number. Making the determination of how much cash is needed for operations is not easy, though there are two ways in which this estimation is made:

- Rule of thumb: For decades, analysts have used rules of thumb to define operating cash. One widely used variation defined operating cash to be 2% of revenues, though the original source for this number is not clear. Using this approach, a firm with revenues of \$ 100 billion should have a cash balance of \$ 2 billion. Any cash held in excess of \$ 2 billion would be viewed as excess cash. The disadvantage of this approach is that it does not differentiate across firms, with large and small firms in all industries treated equivalently.
- Industry average: An alternative approach that allows us to differentiate across firms in different industries uses the industry averages reported in Appendix 1. Based upon the presumption that there is no excess cash in the composite cash holdings of the sector, the industry averages become proxies for operating cash. Any firm that holds a cash balance greater than the industry average will therefore be holding excess cash.
- Cross Sectional Regressions: When examining the motives for cash holdings, we referenced several papers that examine the determinants of cash holdings. Most of these papers come to their conclusions by regressing cash balances at individual companies against firm-specific measures of risk, growth, investment needs and corporate governance. These regressions can be used to obtain predicted cash balances at individual companies that reflect their characteristics.

Wasting versus Non-wasting Cash

In our view, the debate about how much cash is needed for operations and how much is excess cash misses the point when it comes to valuation. Note that even cash needed for operations can be invested in near-cash investments such as treasury bills or commercial paper. These investments may make a low rate of return but they do make a fair rate of return. Put another way, an investment in treasury bills is a zero net present value investment, earning exactly what it needs to earn, and thus has no effect on value. We should not consider that cash to be part of working capital when computing cash flows.

The categorization that affects value is therefore the one that breaks the cash balance down into wasting and non-wasting cash. Only cash that is invested at below market rates, given the risk of the investment, should be considered wasting cash. Thus, cash left in a checking account, earning no interest, is wasting cash. Given the investment opportunities that firms (and individual investors) have today, it would require an incompetent corporate treasurer for a big chunk of the cash balance to be wasting cash. As an illustration, almost all of Microsoft's \$ 33 billion in cash is invested in commercial paper or treasury bills and the same can be said for most companies.

As an analyst, how would you make this categorization? One simple way is to examine interest income earned by a firm as a percent of the average cash balance during the course of the year and comparing this book interest rate on cash to a market interest rate during the period. If the cash is productively invested, the two rates should converge. If it is being wasted, the book interest rate earned on cash will be lower than the market interest rate. Consider a simple example. CybetTech Inc. had an average cash balance of \$ 200 million in the 2004 financial year and it reported interest income of \$ 4.2 million from these holdings. If the average treasury bill rate during the period was 2.25%, we can estimate the wasting cash component as follows:

Interest income for 2004 = \$ 4.2 million

Book interest rate on average cash balance = Interest income/ Average Cash Balance

$$= 4.2/ 200 = 2.1\%$$

Market interest rate (treasury bills) = 2.25%

Proportion of cash balance which is wasting cash = $1 - \text{Book interest rate} / \text{Market interest rate} = 1 - .021 / .0225 = 0.0667$ or 6.67%

Thus, 6.67% of \$ 200 million (\$13.34 million) would be treated as wasting cash and considered like inventory and accounts receivable to be part of working capital but the remaining \$186.66 million would be viewed as non-wasting cash and added on to the value of the operating assets of the firm.

Dealing with Cash holdings in Valuation

While valuing cash in a firm may seem like a trivial exercise, there are pitfalls in the analysis that can cause large valuation errors. In this section, we will consider how best to deal with cash in both discounted cashflow and relative valuations.

1. Valuing Cash in a Discounted Cashflow Valuation

There are two ways in which we can deal with cash and marketable securities in discounted cashflow valuation. One is to lump them in with the operating assets and value the firm (or equity) as a whole. The other is to value the operating assets and the cash and marketable securities separately. As we will argue in this section, the latter approach is a much more reliable one and less likely to result in errors.

Consolidated Valuation

Is it possible to consider cash as part of the total assets of the firm and to value it on a consolidated basis? The answer is yes and it is, in a sense, what we do when we forecast the total net income for a firm and estimate dividends and free cash flows to equity from those forecasts. The net income will then include income from investments in government securities, corporate bonds and equity investments¹⁶. While this approach has the advantage of simplicity and can be used when financial investments comprise a small percent of the total assets, it becomes much more difficult to use when financial investments represent a larger proportion of total assets for two reasons.

- The cost of equity or capital used to discount the cash flows has to be adjusted on an ongoing basis for the cash. In specific terms, you would need to use an unlevered beta

¹⁶ Thus, if cash represents 10% of the firm value, the unlevered beta used will be a weighted average of the beta of the operating assets and the beta of cash (which is zero).

that represents a weighted average of the unlevered beta for the operating assets of the firm and the unlevered beta for the cash and marketable securities. For instance, the unlevered beta for a steel company where cash represents 10% of the value would be a weighted average of the unlevered beta for steel companies and the beta of cash (which is usually zero). If the 10% were invested in riskier securities, you would need to adjust the beta accordingly. While this can be done simply if you use bottom-up betas, you can see that it would be much more difficult to do if you obtain a beta from a regression.¹⁷

- As the firm grows, the proportion of income that is derived from operating assets is likely to change. When this occurs, you have to adjust the inputs to the valuation model – cash flows, growth rates and discount rates – to maintain consistency.

What will happen if you do not make these adjustments? You will tend to misvalue the financial assets. To see why, assume that you were valuing the steel company described above, with 10% of its value coming from cash. This cash is invested in government securities and earns a riskfree rate of say 2%. If this income is added on to the other income of the firm and discounted back at a cost of equity appropriate for a steel company – say 11% - the value of the cash will be discounted. A billion dollars in cash will be valued at \$800 million, for instance, because the discount rate used is incorrect.

Separate Valuation

It is safer to separate cash and marketable securities from operating assets and to value them individually. We do this almost always when we use approaches to value the firm rather than just the equity. This is because we use operating income to estimate free cash flows to the firm and operating income generally does not include income from financial assets. Once you value the operating assets, you can add the value of the cash and marketable securities to it to arrive at firm value.

Can this be done with the FCFE valuation models described in the earlier chapters? While net income includes income from financial assets, we can still separate cash and marketable securities from operating assets, if we wanted to. To do this, we would first back out the portion of the net income that represents the income from

¹⁷ The unlevered beta that you can back out of a regression beta reflects the average cash balance (as a percent of firm value) over the period of the regression. Thus, if a firm maintains this ratio at a constant level, you might be able to arrive at the correct unlevered beta.

financial investments (interest on bonds, dividends on stock) and use the non-cash net income to estimate free cash flows to equity. These free cash flows to equity would be discounted back using a cost of equity that would be estimated using a beta that reflected only the operating assets. Once the equity in the operating assets has been valued, you could add the value of cash and marketable securities to it to estimate the total value of equity.

If cash is kept separate from other assets, there is one final adjustment that has to be factored into the valuation. To estimate sustainable or fundamental growth, we link growth in net income to returns on equity and growth in operating income to return on capital.¹⁸ These returns should be computed using only the non-cash earnings and capital invested in operating assets:

$$\text{Non-cash Return on Equity} = \frac{\text{Net Income} - \text{Interest Income from Cash}}{\text{Book Value of Equity} - \text{Cash}}$$

$$\text{Return on invested Capital} = \frac{\text{EBIT} (1 - \text{tax rate})}{\text{Book Value of Equity} + \text{Book Value of Debt} - \text{Cash}}$$

These are the also the returns we should be comparing to the costs of equity and capital to make judgments on whether firms are generating excess returns on their investments. Including cash in the picture (which we almost always do with return on equity and sometimes with return on capital) just muddies the waters.

Illustration 1: Consolidated versus Separate Valuation: All Equity Firm

To examine the effects of a cash balance on firm value, consider a firm with investments of \$1,000 million in non-cash operating assets and \$200 million in cash. For simplicity, let us assume the following.

- The non-cash operating assets have a beta of 1.00 and are expected to earn \$120 million in net income each year in perpetuity and there are no reinvestment needs (to match the assumption of no growth).
- The cash is invested at the riskless rate, which we assume to be 4.5%.
- The market risk premium is assumed to be 5.5%
- The firm is all equity funded

¹⁸ Growth rate in net income = Return on equity * Equity Reinvestment Rate (or Retention Ratio); Growth rate in operating income = Return on capital * Reinvestment Rate. The reinvestment rate is the sum of reinvestment (net cap ex and change in working capital) divided by the after-tax operating income.

Under these conditions, we can value the equity, using both the consolidated and separate approaches.

Let us first consider the consolidated approach. Here, we will estimate a cost of equity for all of the assets (including cash) by computing a weighted average beta of the non-cash operating and cash assets.

$$\begin{aligned} \text{Beta of the firm} &= (\text{Beta}_{\text{Non-cash assets}})(\text{Weight}_{\text{Non-cash assets}}) + (\text{Beta}_{\text{Cash assets}})(\text{Weight}_{\text{Cash assets}}) \\ &= (1.00)\left(\frac{1200}{1400}\right) + (0.00)\left(\frac{200}{1400}\right) = 0.8571 \end{aligned}$$

$$\text{Cost of Equity for the firm} = 4.5\% + 0.8571(5.5\%) = 9.21\%$$

Expected Earnings for the firm

$$= \text{Net Income from operating assets} + \text{Interest income from cash}$$

$$= (120 + 0.045 * 200)$$

$$= 129 \text{ million (which is also the FCFE since there are no reinvestment needs)}$$

$$= \frac{\text{FCFE}}{\text{Cost of equity}}$$

$$\begin{aligned} \text{Value of the equity} &= \frac{129}{0.0921} \\ &= \$1400 \text{ million} \end{aligned}$$

The equity is worth \$1,400 million.

Now, let us try to value them separately, beginning with the non-cash investments.

$$\begin{aligned} \text{Cost of Equity for non-cash investments} &= \text{Riskless rate} + \text{Beta} * \text{Risk Premium} \\ &= 4.5\% + 1.00(5.5\%) = 10\% \end{aligned}$$

Expected earnings from operating assets = \$120 million (which is the FCFE from these assets)

$$\begin{aligned} &= \frac{\text{Expected Earnings}}{\text{Cost of Equity for non - cash assets}} \\ \text{Value of non-cash assets} &= \frac{120}{0.10} \\ &= \$1,200 \text{ million} \end{aligned}$$

To this, we can add the value of the cash, which is \$ 200 million, to get a value for the equity of \$1,400 million.

To see the potential for problems with the consolidated approach, note that if we had discounted the total FCFE of \$129 million at the cost of equity of 10% (which reflects only the operating assets) we would have valued the firm at \$1,290 million. The loss in value of \$110 million can be traced to the mishandling of cash.

Interest income from cash = $4.5\% \times 200 = \$ 9$ million

If we discount the cash at 10%, we would value the cash at \$90 million instead of the correct value of \$200 million – hence the loss in value of \$ 110 million.

Gross Debt, Net Debt and the Treatment of Cash

In much of Latin America and Europe, analysts net cash balances out against debt outstanding to come up with a net debt value, which they use in computing debt ratios and costs of capital. In firm value calculation, therefore, the differences between using the gross debt approach and the net debt approach will show up in the following places:

- Assuming that the bottom-up beta of the company is computed, we will begin with an unlevered beta and lever the beta up using the net debt to equity ratio rather than the gross debt to equity ratio, which should result in a lower beta and a lowest cost of equity when using the net debt ratio approach.
- When computing the cost of capital, the debt ratio used will be the net debt to capital ratio rather than the gross debt ratio. If the cost of debt is the same under the two approaches, the greater weight attached to the cost of equity in the net debt ratio approach will compensate (at least partially) for the lower cost of equity obtained under the approach. In general, the cost of capital obtained using the gross debt ratio will not be the same as the cost of capital obtained under the net debt approach.
- The cashflows to the firm are the same under the two approaches, and once the value is obtained by discounting the cashflows back at the cost of capital, the adjustments under the two approaches for debt and cash are the same. In the gross debt approach, we add the cash balance back to the operating assets and then subtract out the gross debt. In the net debt approach, we accomplish the same by subtracting out the net debt.

The reason that the two approaches will yield different values lies therefore in the difference in the costs of capital obtained with the two approaches. To understand why

assets is 1.42 and that the firm has \$500 million in outstanding debt (with a pre-tax cost of debt of 5.90%). Finally, assume that the market value of equity is \$ 1 billion, that the firm faces a tax rate of 40% and that the equity risk premium is 5%.

Gross Debt Valuation

Gross Debt to Capital Ratio = Gross Debt/ (Gross Debt + Equity) = 500/(500 + 1000) = 33.33%

Levered Beta = Unlevered Beta (1 + (1- tax rate) (Gross Debt/ Market Equity))
 = 1.42 (1 + (1- .40) (500/1000)) = 1.846

Cost of Equity = Riskfree Rate + Beta * Risk Premium = 4% + 1.846 (5%) = 13.23%

Cost of Capital = 13.23% (1000/1500) + 5.90% (1-.4) (500/1500) = 10.00%

Expected After-tax Operating Income = Capital Invested * Return on capital
 = 1000 *.125 = \$125 million

Value of Operating Assets = Expected after-tax operating income/ Cost of capital
 = 125/ .10 = \$1250 million

Expected Cash Earnings = \$250 million * .04 = \$ 10 million

Value of Cash = Expected Cash Earnings/ Riskfree Rate = \$10 million/ .04 = \$250 million

Value of Firm = Value of operating assets + Cash = \$1,250 + \$250 = \$1500 million

Value of Equity = Value of Firm – Gross Debt = \$1,500 - \$500 = \$1,000 million

Net Debt Valuation

Net Debt = Gross Debt – Cash = \$ 500 - \$250 = \$250 million

Net Debt to Capital Ratio = Net Debt/ (Net Debt + Equity) = 250/(250 + 1000) = 20%

Levered Beta = Unlevered Beta (1 + (1- tax rate) (Net Debt/ Market Equity))
 = 1.42 (1 + (1- .40) (250/1000)) = 1.644

Cost of Equity = Riskfree Rate + Beta * Risk Premium = 4% + 1.644 (5%) = 12.22%

Cost of Capital = 12.22% (1000/1200) + 5.90% (1-.4) (250/1250) = 10.41%

Expected After-tax Operating Income = Capital Invested * Return on capital
 = 1000 *.125 = \$125 million

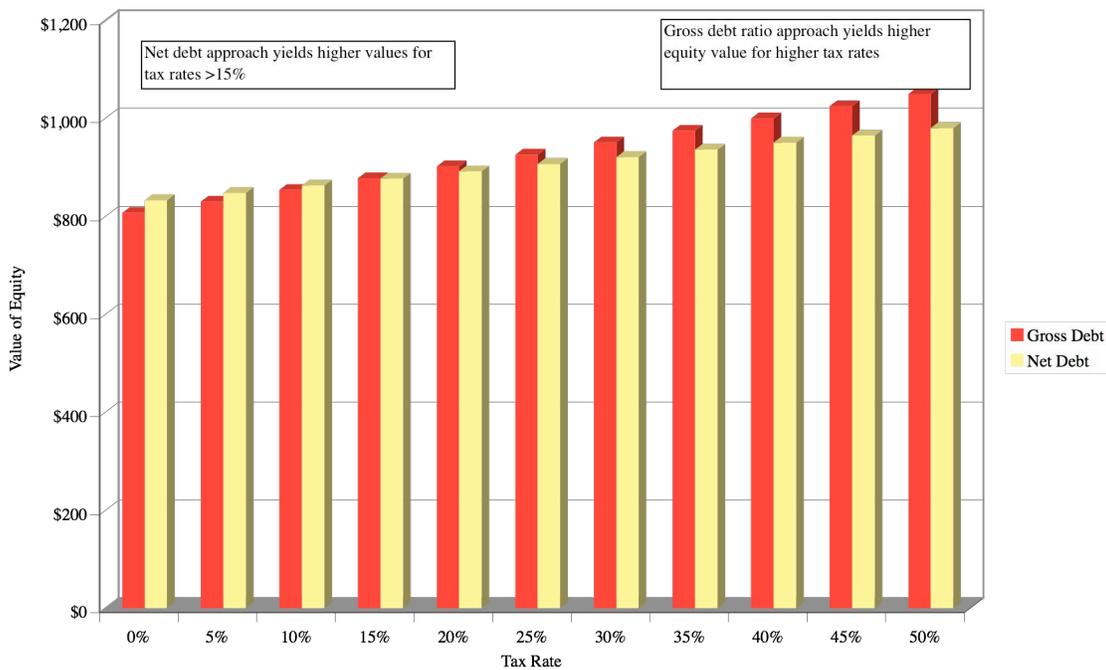
Value of Operating Assets = Expected after-tax operating income/ Cost of capital
 = 125/ .1041 = \$1200.45 million

Value of Equity = Value of Operating Assets – Net Debt = \$1,200.45 - \$250 = \$950.45 million

Reconciling the two approaches

In the specific case that we examined, the value of equity is lower using the net debt ratio approach than with the gross debt ratio approach but that is not always the case. Figure 5 reports the value of the firm described above for tax rates varying from 0 to 50%.

Figure 5: Tax Rate and Equity Value - Gross Debt and Net Debt Approaches



For tax rates less than 15%, the net debt value approach delivers a higher value for equity than the gross debt ratio approach. In fact, the equity value is identical if we assume a zero tax rate and that the cost of debt is the riskfree rate.

There are two factors causing the equity value difference. The first is that we used the same cost of debt used under the two approaches for computing the cost of capital for operating assets. If there is default risk, the cost of debt used for computing the cost of capital should be higher under the net debt approach than under the gross debt approach. To see why, consider the cost of debt of 5.90% used in the last example and assume that this is the cost of debt for the entire company on its total debt of \$ 500 million. In the net

debt approach, \$ 250 million of this debt is used to fund cash and is at the riskfree rate. The pre-tax cost of borrowing on the remaining debt (used to fund operating assets) therefore has to be much higher:

Pre-tax cost of borrowing under net debt = $(.059*500 - .04*250)/250 = 7.80\%$

In the gross debt approach, only a third of the cash is funded with debt- this works out to \$83.33 million at the riskless rate. The cost of the remaining debt is as follows:

Pre-tax cost of borrowing under gross debt = $(.059*500 - .04*83.33)/416.67 = 6.28\%$

If we use these different pre-tax costs of debt in computing the operating cost of capital, the values of equity are identical using both the gross debt and net debt approaches under a zero tax rate assumption.

The second factor is that the net debt approach nullifies the tax advantage that you receive on the debt used to fund cash, whereas the gross debt approach preserves the tax advantage on all debt, even if it is used to fund cash.¹⁹ As the tax rate increases, this difference between the two valuations will increase. The bottom line is that the difference in values between the two approaches will increase as tax rates and the default risk increase. As to which one yields the better estimate of value, we remain undecided. The net debt approach makes the more realistic assumption about the tax advantage of debt being canceled out by the tax liability on the income from cash. However, the net debt ratio can become negative (if cash exceeds debt)²⁰ and shifting cash balances over time can add to its volatility. On balance, we are inclined to use the gross debt approach to value operating assets and keep cash as a separate asset.

Should you ever discount cash?

In general, we would argue that a dollar in cash should be valued at a dollar and that no discounts and premiums should be attached to cash, at least in the context of an

¹⁹ In the net debt ratio approach, we are assuming that any tax benefits from debt (used to fund cash) are exactly offset by the tax costs associated with receiving interest income on the cash;

²⁰ When net debt ratios become negative, analysts should continue to use the negative values, even though it may give rise to some discomfort. In effect, this will mean that the levered beta will be lower than the unlevered beta and that the debt ratio in the cost of capital calculation will be a negative number.

intrinsic valuation. There are two plausible scenarios where cash may be discounted in value; in other words, a dollar in cash may be valued at less than a dollar by the market.²¹

1. The cash held by a firm is invested at a rate that is lower than the market rate, given the riskiness of the investment.
2. The management is not trusted with the large cash balance because of its past track record on investments..

1. Cash Invested at below-market Rates

The first and most obvious condition occurs when much or all the cash balance does not earn a market interest rate. If this is the case, holding too much cash will clearly reduce the firm's value. While most firms in the United States can invest in government bills and bonds with ease today, the options are much more limited for small businesses and in some markets outside the United States. When this is the case, a large cash balance earning less than a fair rate of return can destroy value over time.

Illustration 3: Cash Invested at below market rates

In Illustration 1, we assumed that cash was invested at the riskless rate. Assume, instead, that the firm was able to earn only 3% on its cash balance of \$200 million, while the riskless rate is 4.5%. The estimated value of the cash kept in the firm would then be

$$\text{Estimated value of cash invested at 3\%} = \frac{(0.03)(200)}{0.045} = 133.33$$

The value of cash that is invested at a lower rate is \$133.33 million. In this scenario, if the cash is returned to stockholders, it would yield them a surplus value of \$66.67 million. In fact, liquidating any asset that has a return less than the required return would yield the same result, as long as the entire investment can be recovered on liquidation.²²

2. Distrust of Management:

While making a large investment in low-risk or riskless marketable securities by itself is value neutral, a burgeoning cash balance can tempt managers to accept large investments or make acquisitions even if these investments earn sub-standard returns. In

²¹ There is a third scenario. When interest income from cash (which is riskless) is discounted back at a risk adjusted discount rate (see illustration 1), cash will be discounted in value, but for the wrong reasons.

²² While this assumption is straight forward with cash, it is less so with real assets, where the liquidation value may reflect the poor earning power of the asset. Thus, the potential surplus from liquidation may not be as easily claimed.

some cases, these actions may be taken to prevent the firm from becoming a takeover target.²³ To the extent that stockholders anticipate such sub-standard investments, the current market value of the firm will reflect the cash at a discounted level. The discount is likely to be largest at firms with few investment opportunities and poor management and there may be no discount at all in firms with significant investment opportunities and good management.

Illustration 4: Discount for Poor Investments in the Future

Return now to the firm described in Illustration 1, where the cash is invested at the riskless rate of 4.5%. Normally, we would expect the equity in this firm to trade at a total value of \$1,400 million. Assume, however, that the managers of this firm have a history of poor acquisitions and that the presence of a large cash balance increases the probability from 0% to 30% that the management will try to acquire another firm. Further, assume that the market anticipates that they will overpay by \$50 million on this acquisition. The cash will then be valued at \$185 million.

Estimated Discount on Cash Balance

$$\begin{aligned} &= (\Delta \text{Probability}_{\text{acquisition}}) (\text{Expected Overpayment}_{\text{acquisition}}) \\ &= (0.3) (\$50 \text{ million}) \\ &= \$15 \text{ million} \end{aligned}$$

$$\begin{aligned} \text{Value of Cash} &= \text{Cash Balance} - \text{Estimated Discount} = \$200 \text{ million} - \$15 \text{ million} \\ &= \$185 \text{ million} \end{aligned}$$

The two factors that determine this discount – the incremental likelihood of a poor investment and the expected net present value of the investment – are likely to be based upon investors' assessments of management quality. Cash is more likely to be discounted in the hands of management that is perceived to be incompetent than in the hands of good managers.

Separate versus Consolidated Valuation: Summary

It is easy to see why so many valuations make mistakes with cash holdings. The differences between the approaches are subtle and the inputs have to be fine-tuned to

²³ Firms with large cash balances are attractive targets, since the cash can be used to offset some of the cost of making the acquisition.

reflect the approach used. At the risk of repeating what has been said in the last few pages, we have summarized the differences between the approaches in table 1.

Table 1: Differences between Cash Valuation Approaches

| | <i>Consolidated Valuation</i> | <i>Separate Valuation</i> |
|--------------------|---|---|
| Objective | Value firm as a whole with cash as part of the assets. | Value non-cash assets separately from the cash. |
| Earnings | Should include interest income from cash and marketable securities. | Should exclude interest income from cash and marketable securities. (If using net income to estimate cash flows to equity, you need to remove the after-tax interest income.) |
| Reinvestment | Should consider reinvestment in both operating assets and cash. | Should be reinvestment only in operating assets. |
| Unlevered Beta | Should be the weighted average of the unlevered beta of operating assets and the beta of cash (generally zero). Weights should be based upon estimated values of operating assets and cash. | Unlevered beta of just the operating assets. |
| Accounting Returns | Should be measured using total earnings (including earnings from cash) and capital inclusive of cash. | Should be measured using non-cash earnings and cash should be removed from capital measure. |
| Growth Rate | Growth rate should reflect growth in consolidated earnings (including earnings from cash). | Growth rate should be only in operating earnings. |
| Final valuation | The present value of the cash flows will already include cash. Do not add cash to it. | The present value of the cash flows is the value of the operating assets. Cash has to be added to it. |

There are two mistakes that we are trying to avoid. The first is double counting cash, by including income from cash in the cash flows and also adding back cash to the value at the end. The other is miscounting cash, which occurs when you apply the wrong discount rate to the income from cash. This happens, for instance, when you include interest income from cash in the cash flows and discount the cash flows back at a cost of equity that reflects only the operating assets. At a more subtle level, it also happens when we fail to adjust the cost of debt in the gross debt and net debt approaches to reflect our assumptions about how cash is funded.

2. Dealing with Cash in a Relative Valuation

If analysts are sometimes imprecise when dealing with cash in a discounted cashflow valuation, they are often even sloppier in incorporating cash into relative valuation. In this section, we will consider how best to consider cash when computing multiples and comparing them across companies.

Equity Multiples

The most widely used equity earnings multiple is the price earnings ratio and it is interesting that few analysts who use it seem to consider the consequences of having large cash balances for this multiple. If a firm has operating assets and a large cash balance, the different rates of return and levels of risk on the two investments will make the price earnings ratio a function of the size of the cash balance. To see why, consider a firm with \$ 1 billion invested in operating assets and \$ 250 million in cash. Assume that the operating assets generate a 12.5% after-tax return, with a cost of capital of 10%, and that the cash earns 4%, with a cost of capital of 4%. For simplicity, assume that the earnings from both components will stay fixed in perpetuity and that the firm has no debt. We can estimate the value of and an intrinsic price earnings ratio for each component:

| <i>Component</i> | <i>Capital Invested</i> | <i>After-tax Earnings</i> | <i>Value</i> | <i>PE</i> |
|------------------|-------------------------|---------------------------|----------------------|------------------------|
| Operating Assets | 1000 | 125 | $125 / .10$ =1250 | $1250 / 125$ =10.00 |
| Cash | 250 | 10 | $10 / .04$ =250 | $250 / 10$ =25.00 |
| Firm | 1250 | 135 | 1500 | 11.11 |

In this case, cash trades at a much higher multiple of earnings because it is riskless and the price earnings ratio for the firm will rise as cash increases as a proportion of firm value. Note, though, that the effect of cash on PE ratios can shift quickly if we introduce growth into the picture, in conjunction with excess returns. If there is expected growth in the earnings from operating assets, the value of the operating assets (and the implied PE ratio) will increase.²⁴ At some growth rate, the PE ratio for operating assets will exceed the PE ratio for cash. Once this happens, increasing the cash holdings of a firm (as a percent of its value) will reduce the price earnings ratio rather than increase it.

What relevance does this have for relative valuation? In most relative valuations, analysts compare the price earnings ratios of firms in a sector, even though these firms have very different cash holdings. The analysis above suggests that this can often skew recommendations towards or against firms with larger cash balances. In mature sectors, where growth is low or moderate, firms with larger cash balances will trade at higher PE ratios, not because they are over valued but because cash commands a higher multiple of earnings than operating assets do. In high growth sectors, firms with higher cash balances will often trade at lower price earnings ratios but that will not make them bargains. The only cases where cash holdings will not matter is if all firms in a sector have similar holdings (as a percent of market capitalization) or the even more unusual scenario where cash and operating earnings command the same multiple. There is a very simple solution to this comparison problem. We can compute the price earnings ratios for all firms using non-cash equity and the non-cash earnings:

$$\text{Price Earnings Ratio (cash adjusted)} = \frac{\text{Market Capitalization} - \text{Cash}}{\text{Net Income} - \text{Interest Income from Cash}}$$

This ratio will not be affected by cash holdings.

The problems created by cash holdings also spill over when analysts use price to book equity ratios. In fact, cash should generally trade at or close to book value but operating assets can trade at price to book ratios that are significantly different from one. Using the example from the previous section:

| <i>Component</i> | <i>Capital Invested</i> | <i>After-tax Earnings</i> | <i>Value</i> | <i>P/BV</i> |
|------------------|-------------------------|---------------------------|--------------|---------------------|
| Operating Assets | 1000 | 125 | 1250 | 1250/1000 = 1.25 |
| Cash | 250 | 10 | 250 | 250/250 = 1.00 |
| Firm | 1250 | 135 | 1500 | 1.20 |

In this case, cash trades at a lower price to book ratio than the operating assets do and the presence of cash will push down the price to book ratio for the firm. Of course, the reverse will occur in firms where operating assets generate sub-par returns and trade at below book value. Here again, the solution to the problem is to net cash out of both the market value and book value of equity when computing price to book ratios.

²⁴ This statement is true only if the firm earns excess returns on its investments. Growth with zero excess

$$\text{Price Book Ratio (cash adjusted)} = \frac{\text{Market Capitalization} - \text{Cash}}{\text{Book value of equity} - \text{Cash}}$$

The failure to deal with cash explicitly in relative valuation is becoming a larger and larger issue as cash holdings diverge across firms even within the same sector.

Firm & Enterprise Value Multiples

In general, analysts have been more cognizant of the effects of cash when using firm value multiples. In fact, most analysts use enterprise value, which nets cash out of the market value of debt and equity, to compute these multiples in the numerator. Since the denominator is usually a variation of operating income (EBITDA, after-tax operating income), the resulting multiple should not be affected by cash holdings. There are two areas, though, where analysts have to show caution:

- The cash balance that is netted out against firm value usually is from the most recent financial statements. To the extent that there are seasonal factors affecting expenses and cash balances, using the most recent cash balance can skew the multiple. For instance, assume that a firm builds up a large cash balance towards the end of every December to meet large cash outflows that it expects to incur in January. Using this cash balance to compute enterprise value will result in a low enterprise value multiple (and perhaps a buy recommendation). In the presence of seasonal variation in the cash balance, it makes more sense to look at the average cash balance over the year rather than the most recent cash balance.
- When using enterprise value to capital ratios, cash should be netted out against the book value of capital, just as it was in the price to book calculation:

$$\text{EV/ Capital Invested} = \frac{\text{Market Value of Equity} + \text{Market Value of Debt} - \text{Cash}}{\text{Book value of Equity} + \text{Book value of Debt} - \text{Cash}}$$

The failure to adjust for cash in the denominator will generally bias multiples downward and more so for companies with significant cash balances.

Note that the cash adjustment is robust to various actions that can be taken by the firm that reduce or augment the cash balance. A firm that pays a large dividend or buys back stock will reduce its cash balance but the market value of equity will also decline by an

returns has no effect on value or the price earnings ratio.

equivalent amount. A firm that borrows a substantial sum just before the end of a fiscal year will report a higher cash balance but it will also report more debt outstanding.

The final caveat that we should add relates to divestitures of portions of existing business, especially towards the end of a fiscal year, when computing enterprise value to operating income or cash flow multiples. The divestiture will replace operating assets with a large cash balance (the proceeds of the divestiture) but the operating income or EBITDA from last year will include the earnings from the assets that were divested. To get a more realistic estimate, we have to either remove the portion of the EBITDA that is attributable to the divested assets or use a projected number that does not include earnings from these assets.

How does the market value cash?

In the last section, we considered how best to value cash in both a discounted cash flow and in a relative valuation. Ultimately, though, the discussion cannot be complete without examining how the market values cash. After all, if the market systematically misestimates the value of cash, there will be no payoff to the analyst who values it correctly. Pinkowitz and Williamson (2002) tried to estimate the value that markets were attaching to cash by regressing the market values of firms against fundamental variables that should determine value (including growth, leverage and risk) and adding cash as an independent variable.²⁵ They concluded that the market values a dollar in cash at about \$1.25, with a standard error of \$0.093. Consistent with the motivations for holding cash, they found that cash is valued more highly in the hands of high growth companies with more uncertainty about future investment needs than in the hands of larger, more mature companies. Surprisingly, they find no relationship between how the market values cash and a firm's access to capital markets. In an interesting contrast, another study that applies the same technique to non-US markets finds that a dollar in cash is valued at only \$0.65 in emerging markets with weak stockholder protection.²⁶

²⁵ Pinkowitz, L. and R. Williamson, 2002, *What is a dollar worth? The Market Value of Cross Holdings*, Working Paper, Georgetown University.

²⁶ Pinkowitz, L., R. Stulz and R. Williamson, 2003, *Do firms in countries with poor protection of investor rights hold more cash?*. Working Paper, SSRN.

Schwetzler and Reimund (2004) extend this analysis to look at cash holdings in German companies.²⁷ Relating the enterprise value of German firms to their cash to sales ratios, they conclude that firms that have lower cash holdings than the median for the industries in which they operate trade at lower values whereas firms that hold excess cash (relative to the median) trade at higher values. Faulkender and Wang (2004) find contradictory evidence, at least in the aggregate.²⁸ They conclude that the marginal value of a dollar in cash across all firms is \$0.96. In other words, markets discount cash by a small amount rather than add a premium. Furthermore, the marginal value of cash decreases as the cash holding increases and as firms borrow more money. The marginal value of cash is also lower for firms that pay dividends rather than buy back stock, reflecting the tax disadvantages accruing to dividends during the sample period. Finally, the marginal value of cash is much higher for firms that are capital constrained and have significant investment opportunities. They attribute the differences between their findings and the findings in earlier studies to the fact that they used equity values rather than enterprise values to estimate the value of cash.

It should be noted that all of these studies are based upon very large samples of diverse firms. While they all try to control for differences across firms using proxies for growth and risk, the regressions themselves have limited explanatory power and the proxies are not precise. For instance, the historical sales growth is an imperfect proxy for future growth; this can translate into large shifts in the coefficients on cash. The bottom line is that the studies all agree that the market treats a dollar in cash differently in the hands of different firms, and that we cannot automatically assume that cash will be valued at face value at all firms.

Financial Investments

So far in this paper, we have looked at holdings of cash and near-cash investments. In some cases, firms invest in risky securities, which can range from investment-grade bonds to high-yield bonds to publicly traded equity in other firms. In

²⁷ Schwetzler, B. and C. Reimund, 2004, *Valuation Effects of Corporate Cash Holdings: Evidence from Germany*, HHL Working Paper, SSRN.

this section, we examine the motivation, consequences and accounting for such investments.

Reasons for holding risky securities

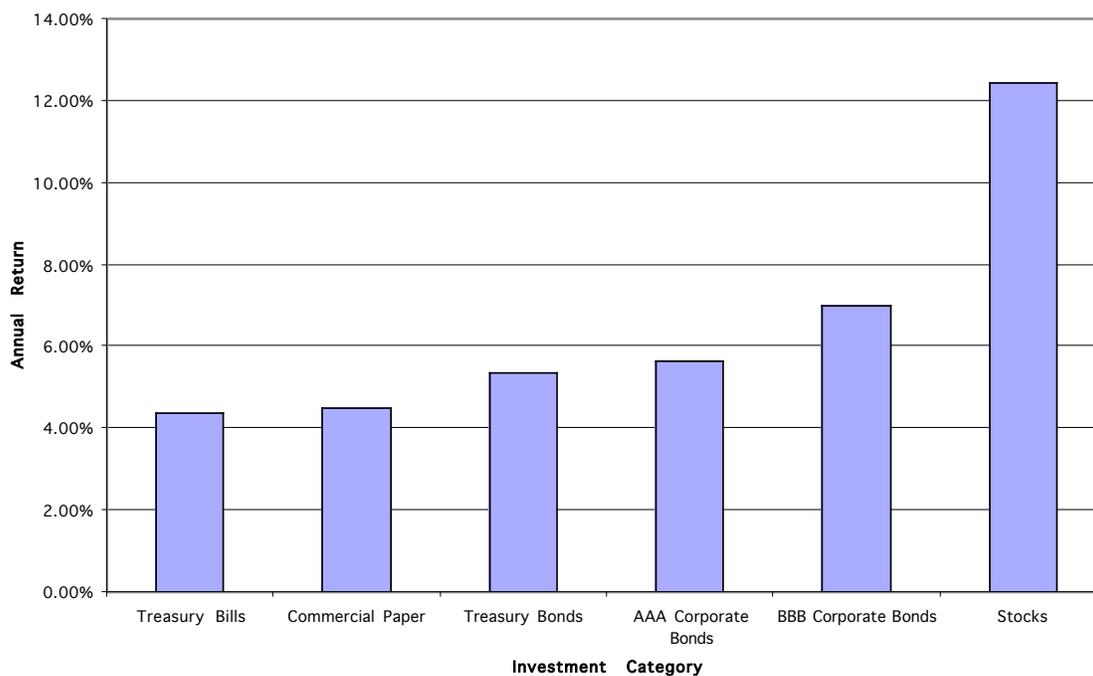
Why do firms invest in risky securities? Some firms do so for the allure of the higher returns they can expect to make investing in stocks and corporate bonds, relative to treasury bills. In recent years, there has also been a trend for firms to take equity positions in other firms to further their strategic interests. Still other firms take equity positions in firms they view as under valued by the market. And finally, investing in risky securities is part of doing business for banks, insurance companies and other financial service companies.

1. To make a higher return

Near-cash investments such as treasury bills and commercial paper are liquid and have little or no risk, but they also earn low returns. When firms have substantial amounts invested in marketable securities, they can expect to earn considerably higher returns by investing in riskier securities. For instance, investing in corporate bonds will yield a higher interest rate than investing in treasury bonds and the rate will increase with the riskiness of the investment. Investing in stocks will provide an even higher expected return, though not necessarily a higher actual return, than investing in corporate bonds. Figure 6 summarizes returns on risky investments – corporate bonds, high-yield bonds and equities – and compares them to the returns on near-cash investments between 1990 and 2000

²⁸ Faulkender, M. and R. Wang, 2004, *Corporate Financial Policy and the Value of Cash*, Working Paper, SSRN.

Figure 16.1: Returns on Investments - 1990-2000



Source: Federal Reserve

Investing in riskier investments may earn a higher return for the firm, but it does not make the firm more valuable. In fact, using the same reasoning that we used to analyze near-cash investments, we can conclude that investing in riskier investments and earning a fair market return (which would reward the risk) has to be value neutral

2. To invest in under valued securities

A good investment is one that earns a return greater than its required return (given its risk). That principle, developed in the context of investments in projects and assets, applies just as strongly to financial investments. A firm that invests in under valued stocks is accepting positive net present value investments, since the return it will make on these equity investments will exceed the cost of equity on these investments. Similarly, a firm that invests in under priced corporate bonds will also earn excess returns and positive net present values.

How likely is it that firms will find under valued stocks and bonds to invest in? It depends upon how efficient markets are and how good the managers of the firm are at finding under valued securities. In unique cases, a firm may be more adept at finding good investments in financial markets than it is at competing in product markets.

Consider the case of Berkshire Hathaway, a firm that has been a vehicle for Warren Buffet's investing acumen over the last few decades. At the end of the second quarter of 1999, Berkshire Hathaway had \$69 billion invested in securities of other firms. Among its holdings were investments of \$12.4 billion in Coca Cola, \$6.6 billion in American Express and \$3.9 billion in Gillette. While Berkshire Hathaway also has real business interests, including ownership of a well regarded insurance company (GEICO), investors in the firm get a significant portion of their value from the firm's passive equity investments.

Notwithstanding Berkshire Hathaway's success, most firms in the United States steer away from looking for bargains among financial investments. Part of the reason for this is their realization that it is difficult to find under valued securities in financial markets. Part of the reluctance on the part of firms to make investments can be traced to a recognition that investors in firms like Proctor and Gamble and Coca Cola invest in them because of these firms' competitive advantages in product markets (brand name, marketing skills, etc.) and not for their perceived skill at picking stocks.

3. Strategic Investments

During the 1990s, Microsoft accumulated a huge cash balance. It used this cash to make a series of investments in the equity of software, entertainment and internet related firms. It did so for several reasons²⁹. First, it gave Microsoft a say in the products and services these firms were developing and pre-empted competitors from forming partnerships with the firms. Second, it allowed Microsoft to work on joint products with these firms. In 1998 alone, Microsoft announced investments in 14 firms including ShareWave, General Magic, RoadRunner and Qwest Communications. In an earlier investment in 1995, Microsoft invested in NBC to create the MSNBC network to give it a foothold in the television and entertainment business.

Can strategic investments be value enhancing? As with all investments, it depends upon how much is invested and what the firm receives as benefits in return. If the side-benefits and synergies that are touted in these investments exist, investing in the equity of

²⁹ One of Microsoft's oddest investments was in one of its primary competitors, Apple Computer, early in 1998. The investment may have been intended to fight the anti-trust suit brought against Microsoft by the Justice Department.

other firms can earn much higher returns than the hurdle rate and create value. It is clearly a much cheaper option than acquiring the entire equity of the firm.

4. Business Investments

Some firms hold marketable securities not as discretionary investments, but because of the nature of their business. For instance, insurance companies and banks often invest in marketable securities in the course of their business, the former to cover expected liabilities on insurance claims and the latter in the course of trading. While these financial service firms have financial assets of substantial value on their balance sheets, these holdings are not comparable to those of the firms described so far in this paper. In fact, they are more akin to the raw material used by manufacturing firms than to discretionary financial investments.

Dealing with marketable securities in valuation

Marketable securities can include corporate bonds, with default risk embedded in them, and traded equities, which have even more risk associated with them. As the marketable securities held by a firm become more risky, the choices on how to deal with them become more complex. We have three ways of accounting for marketable securities.

1. The simplest and most direct approach is to obtain or estimate the current market value of these marketable securities and add the value on to the value of operating assets. For firms valued on a going-concern basis, with a large number of holdings of marketable securities, this may be the only practical option.
2. The second approach is to estimate the current market value of the marketable securities and net out the effect of capital gains taxes that may be due if those securities were sold today. This is the best way of estimating value when valuing a firm on a liquidation basis.
3. The third and most difficult way of incorporating the value of marketable securities into firm value is to value the firms that issued these securities and estimate their value. This approach tends to work best for firms that have relatively few, but large, holdings in other publicly traded firms.

Illustration 5: Microsoft's cash and marketable securities

Between 1991 and 2000, Microsoft accumulated a large cash balance, as a consequence of holding back on free cash flows to equity that could have been paid to stockholders. In June 2000, for instance, table 2 reports Microsoft's holdings of near-cash investments:

Table 2: Cash and Near-cash Investments: Microsoft

| | 1999 | 2000 |
|--|-----------------|-----------------|
| Cash and equivalents: | | |
| Cash | \$635 | \$849 |
| Commercial paper | \$3,805 | \$1,986 |
| Certificates of deposit | \$522 | \$1,017 |
| U.S. government and agency securities | \$0 | \$729 |
| Corporate notes and bonds | \$0 | \$265 |
| Money market preferreds | \$13 | \$0 |
| Cash and equivalents | \$4,975 | \$4,846 |
| Short-term investments: | | |
| Commercial paper | \$1,026 | \$612 |
| U.S. government and agency securities | \$3,592 | \$7,104 |
| Corporate notes and bonds | \$6,996 | \$9,473 |
| Municipal securities | \$247 | \$1,113 |
| Certificates of deposit | \$400 | \$650 |
| Short-term investments | \$12,261 | \$18,952 |
| <i>Cash and short-term investments</i> | <i>\$17,236</i> | <i>\$23,798</i> |

When valuing Microsoft, we should clearly consider this \$24 billion investment as part of the firm's value. The interesting question is whether there should be a discount, reflecting investor's fears that the company may use the cash to make poor investments in the future. Over its life, Microsoft has not been punished for holding on to cash, largely as a consequence of its impeccable track record in both delivering ever-increasing profits on the one hand and high stock returns on the other. We would add the cash balance at face value to the value of Microsoft's operating assets.

The more interesting component is the \$17.7 billion in 2000 that Microsoft shows as investments in riskier securities. Microsoft reports the following information about these investments (see table 3).

Table 3: Investments in Risky Securities and Investments

| | | Unrealized | | |
|--|------------|------------|--------|----------------|
| | Cost Basis | Gains | Losses | Recorded Basis |
| | | | | |

| | | | | |
|--|----------|---------|----------|----------|
| <i>Debt securities recorded at market:</i> | | | | |
| Within one year | \$498 | \$27 | \$0 | \$525 |
| Between 2 and 10 years | \$388 | \$11 | -\$3 | \$396 |
| Between 10 and 15 years | \$774 | \$14 | -\$93 | \$695 |
| Beyond 15 years | \$4,745 | | -\$933 | \$3,812 |
| Debt securities recorded at market | \$6,406 | \$52 | -\$1,029 | \$5,429 |
| <i>Equities</i> | | | | |
| Common stock and warrants | \$5,815 | \$5,655 | -\$1,697 | \$9,773 |
| Preferred stock | \$2,319 | | | \$2,319 |
| Other investments | \$205 | | | \$205 |
| Equity and other investments | \$14,745 | \$5,707 | -\$2,726 | \$17,726 |

Microsoft has generated a paper profit of almost \$3 billion on its original cost of \$14.745 billion and reports a current value of \$17.726 billion. Most of these investments are traded in the market and are recorded at market value. The easiest way to deal with these investments is to add the market value of these securities on to the value of the operating assets of the firm to arrive at firm value. The most volatile item is the investment in common stock of other firms. The value of these holdings has almost doubled, as reflected in the recorded basis of \$9,773 million. Should we reflect this at current market value when we value Microsoft? The answer is generally yes. However, if these investments are overvalued, we risk building in this overvaluation into the valuation. The alternative is to value each of the equities that the firm has invested in, but this will become increasingly cumbersome as the number of equity holdings increases. In summary, then, you would add the values of both the near-cash investments of \$23.798 billion and the equity investments of \$17,726 billion to the value of the operating assets of Microsoft.

Premiums or Discounts on Marketable Securities?

As a general rule, you should not attach a premium or discount for marketable securities. Thus, you would add the entire value of \$17,726 million to the value of Microsoft. There is an exception to this rule, though, and it relates to firms that make it their business to buy and sell financial assets. These are the closed-end mutual funds of which there are several hundred listed on the US stock exchanges, and investment companies, such as Fidelity and T. Rowe Price. Closed-end mutual funds sell shares to investors and use the funds to invest in financial assets. The number of shares in a closed-

end fund remains fixed and the share price changes. Since the investments of a closed-end fund are in publicly traded securities, this sometimes creates a phenomenon where the market value of the shares in a closed-end fund is greater than or less than the market value of the securities owned by the fund. For these firms, it is appropriate to attach a discount or premium to the marketable securities to reflect their capacity to generate excess returns on these investments.

A closed-end mutual fund that consistently finds undervalued assets and delivers much higher returns than expected (given the risk) should be valued at a premium on the value of their marketable securities. The amount of the premium will depend upon how large the excess return is and how long you would expect the firm to continue to make these excess returns. Conversely, a closed-end fund that delivers returns that are much lower than expected should trade at a discount on the value of the marketable securities. The stockholders in this fund would clearly be better off if it were liquidated, but that may not be a viable option.

Illustration 6: Valuing a closed-end fund

The Pierce Regan Asia fund is a closed-end fund with investments in traded Asian stocks, valued at \$4 billion at today's market prices. The fund has earned an annual return of 13% over the last 10 years, but based upon the riskiness of its investments and the performance of the Asian market over the period, we would have expected it to earn 15% a year.³⁰ Looking forward, your expected annual return for the Asian market for the future is 12%, but you expect the Pierce Regan fund to continue to under perform the market by 2% each year (and earn only 10%).

To estimate the discount from its net assets you would expect to see on the fund, let us begin by assuming that the fund will continue in perpetuity and earning 2% less than the return on the market index also in perpetuity.

³⁰ The expected return can be obtained on a risk-adjusted basis by using the beta for the stocks in the fund and the overall market returns in the Asian equity markets that the fund invests in. A simpler technique would be to use the overall market return as the expected return, thus making the implied assumption that the fund invests in average risk stocks in these markets.

$$\begin{aligned} &= \frac{(\text{Excess Return})(\text{Fund Value})}{\text{Expected return on the market}} \\ \text{Estimated discount} &= \frac{(0.10 - 0.12)(4000)}{0.12} \\ &= -\$667 \text{ million} \end{aligned}$$

On a percent basis, the discount represents 16.67% of the market value of the investments. If you assume that the fund will either be liquidated or begin earning the expected return at a point in the future – say 10 years from now – the expected discount will become smaller.

Holdings in Other Firms

In this category, we consider a broader category of non-operating assets, which include holdings in other companies, public as well as private. We begin by looking at the differences in accounting treatment of different holdings and how this treatment can affect the way they are reported in financial statements.

Accounting Treatment

The way in which cross holdings are valued depends upon the way the investment is categorized and the motive behind the investment. In general, an investment in the securities of another firm can be categorized as a minority, passive investment; a minority, active investment; or a majority, active investment, and the accounting rules vary depending upon the categorization.

Minority, Passive Investments

If the securities or assets owned in another firm represent less than 20% of the overall ownership of that firm, an investment is treated as a minority, passive investment. These investments have an acquisition value, which represents what the firm originally paid for the securities, and often a market value. Accounting principles require that these assets be sub-categorized into one of three groups – investments that will be held to maturity, investments that are available for sale and trading investments. The valuation principles vary for each.

1. For investments that will be held to maturity, the valuation is at historical cost or book value and interest or dividends from this investment are shown in the income statement.
2. For investments that are available for sale, the valuation is at market value, but the unrealized gains or losses are shown as part of the equity in the balance sheet and not in the income statement. Thus, unrealized losses reduce the book value of the equity in the firm and unrealized gains increase the book value of equity.
3. For trading investments, the valuation is at market value and the unrealized gains and losses are shown in the income statement.

In general, firms have to report only the dividends that they receive from minority passive investments in their income statements, though they are allowed an element of discretion in the way they classify investments and, subsequently, in the way they value these assets. This classification ensures that firms such as investment banks, whose assets are primarily securities held in other firms for purposes of trading, revalue the bulk of these assets at market levels each period. This is called marking-to-market and provides one of the few instances in which market value trumps book value in accounting statements.

Minority, Active Investments

If the securities or assets owned in another firm represent between 20% and 50% of the overall ownership of that firm, an investment is treated as a minority, active investment. While these investments have an initial acquisition value, a proportional share (based upon ownership proportion) of the net income and losses made by the firm in which the investment was made is used to adjust the acquisition cost. In addition, the dividends received from the investment reduce the acquisition cost. This approach to valuing investments is called the equity approach.

The market value of these investments is not considered until the investment is liquidated, at which point the gain or loss from the sale, relative to the adjusted acquisition cost is shown as part of the earnings in that period.

Majority, Active Investments

If the securities or assets owned in another firm represent more than 50% of the overall ownership of that firm, an investment is treated as a majority active investment³¹. In this case, the investment is no longer shown as a financial investment but is instead replaced by the assets and liabilities of the firm in which the investment was made. This approach leads to a consolidation of the balance sheets of the two firms, where the assets and liabilities of the two firms are merged and presented as one balance sheet. The share of the firm that is owned by other investors is shown as a minority interest on the liability side of the balance sheet. A similar consolidation occurs in the other financial statements of the firm as well, with the statement of cash flows reflecting the cumulated cash inflows and outflows of the combined firm. This is in contrast to the equity approach, used for minority active investments, in which only the dividends received on the investment are shown as a cash inflow in the cash flow statement.

Here again, the market value of this investment is not considered until the ownership stake is liquidated. At that point, the difference between the market price and the net value of the equity stake in the firm is treated as a gain or loss for the period.

Valuing Cross Holdings in other Firms – Discounted Cash Flow Valuation

Given that the holdings in other firms can be accounted for in three different ways, how do you deal with each type of holding in valuation? The best way to deal with each of them is to value the equity in each holding separately and estimate the value of the proportional holding. This would then be added on to the value of the equity of the parent company. Thus, to value a firm with holdings in three other firms, you would value the equity in each of these firms, take the percent share of the equity in each and add it to the value of equity in the parent company. When income statements are consolidated, you would first need to strip the income, assets and debt of the subsidiary from the parent company's financials before you do any of the above. If you do not do so, you will double count the value of the subsidiary.

Why, you might ask, do we not value the consolidated firm? You could, and in some cases because of the absence of information, you might have to. The reason we

³¹ Firms have evaded the requirements of consolidation by keeping their share of ownership in other firms below 50%.

would suggest separate valuations is that the parent and the subsidiaries may have very different characteristics – costs of capital, growth rates and reinvestment rates. Valuing the combined firm under these circumstances may yield misleading results. There is another reason. Once you have valued the consolidated firm, you will have to subtract out the portion of the equity in the subsidiary that the parent company does not own. If you have not valued the subsidiary separately, it is not clear how you would do this.

Full Information Environment

If we adopt the approach of valuing each holding separately and taking the proportionate share of that holding, we do need the information to complete these valuations. In particular, we need to have access to the full financial statements of the subsidiary. If the subsidiary is a publicly traded company that operates independently, this should be relatively straightforward. Things become more complicated when the holdings are in other private businesses or the accounts of the parent and the subsidiary are intermingled. In the former case, the financial statements may exist but not be public. In the latter, the transactions between the parent and the subsidiary – intra company sales or loans – can make the financial statements misleading. Assuming that the information can be extracted on cross holdings, these are the steps involved in valuing a company with cross holdings:

Step 1: If the company has any majority cross holdings, use the financial statements that isolate the parent company to value the parent company. If only consolidated statements are available, strip the subsidiary's numbers from the consolidated statement, and then value the parent company as a stand-alone entity, and estimate the value of the equity in the parent company by adding back cash and subtracting out debt.

Step 2: Value each of the subsidiaries that the parent company has holdings in as independent companies, using risk, cash flow and growth assumptions that reflect the businesses that the subsidiaries operate in. Value the equity in each subsidiary.

Step 3: To value the equity in the parent company with the cross holdings incorporated into the estimate, add the proportional share of each subsidiary's equity (estimated in step 2) to the value of equity in the parent company.

Illustration 7: Valuing Holdings in other company

Segovia Entertainment is an entertainment firm that operates in a wide range of entertainment businesses. The firm reported \$300 million in operating income (EBIT) on

capital invested of \$1,500 million in the current year; the total debt outstanding is \$500 million. A portion of the operating income (\$100 million), capital invested (\$400 million) and debt outstanding (\$150 million) represent Segovia's holdings in Seville Television, a television station owner. Segovia owns only 51% of Seville and Seville's financials are consolidated with Segovia.³² In addition, Segovia owns 15% of LatinWorks, a record and CD company. These holdings have been categorized as minority passive investments and the dividends from the investment are shown as part of Segovia's net income but not as part of its operating income. LatinWorks reported operating income of \$75 million on capital invested of \$250 million in the current year; the firm has \$ 100 million in debt outstanding. We will assume the following:

- The cost of capital for Segovia Entertainment, without considering either its holdings in either Seville or LatinWorks, is 10%. The firm is in stable growth, with operating income (again not counting the holdings) growing 5% a year in perpetuity.
- Seville Television has a cost of capital of 9% and it is also in stable growth, with operating income growing 5% a year in perpetuity
- LatinWorks has a cost of capital of 12% and it is in stable growth, with operating income growing 4.5% a year in perpetuity.
- None of the firms has a significant balance of cash and marketable securities
- The tax rate for all of these firms is 40%.

We can value Segovia Entertainment in three steps:

1. Value the equity in the operating assets of Segovia, without counting any of the holdings. To do this, we first have to cleanse the operating income of the consolidation.

Operating income from Segovia's operating assets = \$ 300 - \$ 100 = \$ 200 million

Capital invested in Segovia's operating assets = \$1500 - \$ 400 = \$ 1100 million

Debt in Segovia's operating assets = \$ 500 - \$ 150 = \$ 350 million

Return on capital invested in Segovia's operating assets = $\frac{200(1-0.4)}{1100} = 10.91\%$

³² Consolidation in the U.S. requires that you consider 100% of the subsidiary, even if you own less. There are other markets in the world where consolidation requires only that you consider the portion of the firm

$$\begin{aligned} \text{Reinvestment rate} &= \frac{g}{\text{ROC}} = \frac{5\%}{10.91\%} = 45.83\% \\ &= \frac{\text{EBIT}(1-t)(1-\text{Reinvestment rate})(1+g)}{\text{Cost of capital} - g} \\ \text{Value of Segovia's operating assets} &= \frac{200(1-0.4)(1-0.4583)(1.05)}{0.10-0.05} \\ &= \$1,365 \text{ million} \end{aligned}$$

$$\begin{aligned} \text{Value of equity} &= \text{Value of operating assets} - \text{Value of debt} \\ &= 1365 - 350 = \$1,015 \text{ million} \end{aligned}$$

2. Value the 51% of equity in Seville Enterprises.

Operating income from Seville's operating assets = \$ 100 million

Capital invested in Seville's operating assets = \$ 400 million

Debt invested in Seville = \$ 150 million

$$\text{Return on capital invested in Seville's operating assets} = \frac{100(1-0.4)}{400} = 15\%$$

$$\begin{aligned} \text{Reinvestment rate} &= \frac{g}{\text{ROC}} = \frac{5\%}{15\%} = 33.33\% \\ &= \frac{\text{EBIT}(1-t)(1-\text{Reinvestment rate})(1+g)}{\text{Cost of capital} - g} \\ \text{Value of Seville's operating assets} &= \frac{100(1-0.4)(1-0.3333)(1.05)}{0.09-0.05} \\ &= \$1,050 \text{ million} \end{aligned}$$

$$\begin{aligned} \text{Value of Seville's equity} &= \text{Value of operating assets} - \text{Value of debt} \\ &= 1050 - 150 = \$900 \text{ million} \end{aligned}$$

Value of Segovia' equity stake in Seville = 0.51 (900) = \$ 459 million

3. Value the 15% stake in LatinWorks

Operating income from LatinWorks's operating assets = \$ 75 million

Capital invested in LatinWorks's operating assets = \$ 250 million

$$\text{Return on capital invested in LatinWorks's operating assets} = \frac{75(1-0.4)}{250} = 18\%$$

that you own. This is called proportional consolidation.

$$\text{Reinvestment rate} = \frac{g}{\text{ROC}} = \frac{4.5\%}{18\%} = 25\%$$

$$= \frac{\text{EBIT}(1-t)(1-\text{Reinvestment rate})(1+g)}{\text{Cost of capital} - g}$$

$$\begin{aligned} \text{Value of LatinWorks's operating assets} &= \frac{75(1-0.4)(1-0.25)(1.045)}{0.12-0.045} \\ &= \$470.25 \text{ million} \end{aligned}$$

$$\begin{aligned} \text{Value of LatinWork's's equity} &= \text{Value of operating assets} - \text{Value of debt} \\ &= 470.25 - 100 = \$370.25 \text{ million} \end{aligned}$$

$$\text{Value of Segovia' equity stake in LatinWorks} = 0.15 (370.25) = \$ 55 \text{ million}$$

The value of Segovia as a firm can now be computed (assuming that it has no cash balance).

Value of equity in Segovia

$$\begin{aligned} &= \text{Value of equity in Segovia} + 51\% \text{ of equity in Seville} + 15\% \text{ of equity in LatinWorks} \\ &= \$1,015 + \$459 + \$55 = \$1,529 \text{ million} \end{aligned}$$

To provide a contrast, consider what would have happened if we had used the consolidated income statement and Segovia's cost of capital to do this valuation. We would have valued Segovia and Seville together.

Operating income from Segovia's consolidated assets = \$ 300 million

Capital invested in Segovia's consolidated assets = \$1,500 million

Consolidated Debt = \$ 500 million

$$\text{Return on capital invested in Segovia's operating assets} = \frac{300(1-0.4)}{1500} = 12\%$$

$$\text{Reinvestment rate} = \frac{g}{\text{ROC}} = \frac{5\%}{12\%} = 41.67\%$$

$$= \frac{\text{EBIT}(1-t)(1-\text{Reinvestment rate})(1+g)}{\text{Cost of capital} - g}$$

$$\begin{aligned} \text{Value of Segovia's operating assets} &= \frac{300(1-0.4)(1-0.4167)(1.05)}{0.10-0.05} \\ &= \$2,205 \text{ million} \end{aligned}$$

Value of equity in Segovia:

$$\begin{aligned} &= \text{Value of operating assets} - \text{Consolidated debt} - \text{Minority Interests in Seville} + \\ &\text{Minority interest in LatinWorks} \\ &= 2205 - 500 - 122.5 + 22.5 = \$1,605 \text{ million} \end{aligned}$$

Note that the minority interests in Seville are computed to be 49% of the book value of equity at Seville.

$$\begin{aligned}\text{Book Value of Equity in Seville} &= \text{Capital invested in Seville} - \text{Seville's debt} \\ &= 400 - 150 = 250\end{aligned}$$

$$\begin{aligned}\text{Minority interest} &= (1 - \text{Parent company holding}) \text{ Book value of equity} \\ &= (1 - 0.51) 250 = \$122.5 \text{ million}\end{aligned}$$

The minority interests in LatinWorks are computed as 15% of the book value of equity in LatinWorks which is \$250 million (Capital invested – Debt outstanding). It would be pure chance if the value from this approach were equal to the true value of equity, estimated above, of \$1,529 million.

You can see from the discussion of how best to value holdings in other firms that you need a substantial amount of information to value cross holdings correctly.

Partial Information Environment

As a firm's holdings become more numerous, estimating the values of individual holdings will become more onerous. In fact, the information needed to value the cross holdings may be unavailable, leaving analysts with less precise choices:

1. Market Values of Cross Holdings: If the holdings are publicly traded, substituting in the market values of the holdings for estimated value is an alternative worth exploring. While you risk building into your valuation any mistakes the market might be making in valuing these holdings, this approach is more time efficient, especially when a firm has dozens of cross holdings in publicly traded firms.

2. Estimated Market Values: When a publicly traded firm has a cross holding in a private company, there is no easily accessible market value for the private firm. Consequently, you might have to make your best estimate of how much this holding is worth, with the limited information that you have available. There are a number of alternatives. One way to do this is to estimate the multiple of book value at which firms in the same business (as the private business in which you have holdings) typically trade at and apply this multiple to the book value of the holding in the private business. . Assume for instance that you are trying to estimate the value of the holdings of a pharmaceutical firm in 5 privately held biotechnology firms, and that these holdings collectively have a book value of \$ 50 million. If biotechnology firms typically trade at 10 times book value, the estimated market value of these holdings would be \$ 500 million. In fact, this approach can be

generalized to estimate the value of complex holdings, where you lack the information to estimate the value for each holding or if there are too many such holdings. For example, you could be valuing a Japanese firm with dozens of cross holdings. You could estimate a value for the cross holdings by applying a multiple of book value to their cumulative book value.

Note that using the accounting estimates of the holdings, which is the most commonly used approach in practice, should be a last resort, especially when the values of the cross holdings are substantial.

Valuing Cross Holdings in other Firms – Relative Valuation

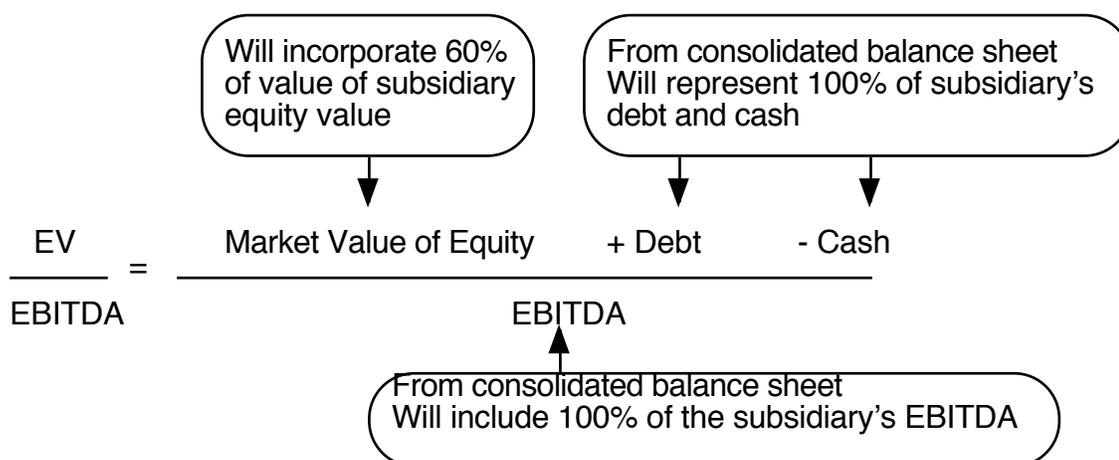
Much of what was said about cash and its effects on relative valuation can be said about cross holdings as well but the solutions are not as simple. To begin with, consider how different types of holdings affect equity multiples.

- Minority passive investments: Only dividends received on these investments are shown as earnings in the income statement. Since most firms pay out less in dividends than they have available in earnings, this is likely to bias upwards the price earnings ratios for firms with substantial minority, passive holdings (since the market value of equity will reflect the value of the holdings but the net income will not).
- Minority active and majority holdings: These are less problematic, because the net income should reflect the proportion of the subsidiary's earnings.³³ Though the earnings multiples will be consistent, with both the market value of equity and earnings including the portion of the subsidiary owned by the parent company, finding comparables can become difficult, especially if the subsidiary is large and has different fundamentals (cash flow, growth and risk) than the parent company.

With firm value multiples, we run into a different set of problems, again depending upon how a cross holding is categorized.

³³ With majority holdings, this will happen indirectly. Full consolidation will initially count 100% of the earnings of the subsidiary in the parent company's earnings but the portion of these earnings that are attributable to minority stockholders in the subsidiary will be subtracted out to arrive at the net income of the parent company.

- Minority passive and active investments: Firm value multiples are usually based upon multiples of operating measures (revenues, operating income, EVITDA). In minority investments, none of these numbers will incorporate the corresponding values for the subsidiary in which the parent company has a minority holding. In fact, all adjustments for minority investments occur below the operating income line. As a consequence, firm value multiples will be biased upwards when there are significant minority investments, since the firm value will incorporate the value of these holdings (at least in the market value of equity) but the denominator (revenues or operating income) will not.
- Majority investments: The consolidation that follows majority investments can wreak havoc on firm value multiples. To see why, assume that company A owns 60% of company B and reports consolidated financial statements. Assume also that you are trying to compute the enterprise value to EBITDA multiple for this firm. The figure below shows how each input into the multiple will be affected by the consolidation:



Analysts often try to fix the inconsistency problem by adding back minority interest, which is the accountant's estimate of the value of the 40% of company B that does not belong to company A, to the numerator. The problem, however, is that they should be adding back 40% of the market value of the subsidiary to the numerator if they want to construct a composite enterprise value to EBITDA multiple.

$$\frac{EV}{EBITDA} \text{ (consolidated)} = \frac{\text{Market Value of Equity} + \text{Debt} - \text{Cash} + \text{Market Value of Minority Interests}}{EBITDA}$$

We can use the techniques suggested in the last section, including applying a price to book multiple to the minority interest, to complete this estimation. As with equity multiples, the problem will be finding comparable firms with the same mix of businesses. A much more effective way of dealing with majority holdings would be to compute a pure parent company enterprise value to EBITDA multiple:

$$\frac{\text{EV}}{\text{EBITDA}} (\text{parent}) = \frac{\text{Market Value of Equity} + \text{Parent Debt} - \text{Parent Cash} - \text{Market Value of Majority Holding}}{\text{Parent EBITDA}}$$

This can then be compared to other companies that are similar to the parent company.

Illustration 8: Estimating Enterprise Value to EBITDA with Cross Holdings

In Illustration 7, we estimated a discounted cash flow value for Segovia, a firm with two holdings – a 51% stake in Seville Television, and a 15% stake of LatinWorks, a record and CD company. The first holding was categorized as a majority, active holding (resulting in consolidation) and the second as a minority, passive holding. Here, we will try to estimate an enterprise value to EBITDA multiple for Seville, using the following information.

- The market value of equity at Segovia is \$1,529 million and the consolidated debt outstanding at the firm is \$500 million. The firm reported \$500 million in EBITDA on its consolidated income statement. A portion of the EBIT (\$100 million), EBITDA (\$180 million) and debt outstanding (\$150 million) represent Segovia's holdings in Seville Television.
- Seville Television is a publicly traded firm with a market value of equity of \$459 million.
- LatinWorks is a private firm with an EBITDA of \$120 million on capital invested of \$250 million in the current year; the firm has \$100 million in debt outstanding. The estimated value of the equity in the firm is \$370.25 million.
- None of the firms have significant cash balances.

If we estimate an enterprise value to EBITDA multiple for Segovia using its consolidated financial statements, we would obtain the following.

$$\begin{aligned}
 &= \frac{\text{Market value of equity} + \text{Value of Debt} - \text{Cash}}{\text{EBITDA}} \\
 \text{EV/EBITDA} &= \frac{1529 + 500 - 0}{500} \\
 &= 4.06
 \end{aligned}$$

This multiple is contaminated by the cross holdings. There are two ways we can correct for these holdings. One is to net out the value of the equity in the cross holdings (in Seville and Latin Works) from the market value of equity of Segovia and the debt of the Seville from the debt of the consolidated holding and to then divide by the EBITDA of just the parent company.

Value of equity in LatinWorks = 370.25 million

$$\text{EV/EBITDA}_{\text{No holdings}} = \frac{(1529 - 0.51 * 459 - 0.15 * 370.25) + (500 - 150)}{500 - 180} = 5.70$$

The alternative is to adjust just the denominator to make it consistent with the numerator. In other words, the EBITDA should include only 51% of the Seville's EBITDA and should add in the 15% of the EBITDA in Latin Works.

$$\text{EV/EBITDA}_{\text{Holdings}} = \frac{1529 + 500}{500 - 0.49 * 180 + 0.15 * 120} = 4.72$$

We prefer the first approach, since it results in multiples that can be more easily compared across firms. The latter yields an enterprise value to EBITDA multiple that is a composite of three different firms.

Other Non-Operating Assets

Firms can have other non-operating assets, but they are likely to be of less importance than those listed above. In particular, firms can have unutilized assets that do not generate cash flows and have book values that bear little resemblance to market values. An example would be prime real estate holdings that have appreciated significantly in value since the firm acquired them, but produce little if any cash flows. An open question also remains about over funded pension plans. Do the excess funds belong to stockholders and, if so, how do you incorporate the effect into value?

Unutilized Assets

The strength of discounted cash flow models is that they estimate the value of assets based upon expected cash flows that these assets generate. In some cases, however,

this can lead to assets of substantial value being ignored in the final valuation. For instance, assume that a firm owns a plot of land that has not been developed and that the book value of the land reflects its original acquisition price. The land obviously has significant market value but does not generate any cash flow for the firm yet. If a conscious effort is not made to bring the expected cash flows from developing the land into the valuation, the value of the land will be left out of the final estimate.

How do you reflect the value of such assets in firm value? An inventory of all such assets (or at least the most valuable ones) is a first step, followed up by estimates of market value for each of the assets. These estimates can be obtained by looking at what the assets would fetch in the market today or by projecting the cash flows that could be generated if the assets were developed and discounting the cash flows at the appropriate discount rate.

The problem with incorporating unutilized assets into firm value is an informational one. Firms do not reveal their unutilized assets as part of their financial statements. While it may sometimes be possible to find out about such assets as investors or analysts, it is far more likely that they will be uncovered only when you have access to information about what the firm owns and uses.

Pension Fund Assets

Firms with defined pension liabilities sometimes accumulate pension fund assets in excess of these liabilities. While the excess does belong to stockholders, they usually face a tax liability if they claim it. The conservative rule in dealing with overfunded pension plans would be to assume that the social and tax costs of reclaiming the excess funds are so large that few firms would ever even attempt to do it. An alternative approach would be to add the after-tax portion of the excess funds into the valuation. As an illustration, consider a firm that reports pension fund assets that exceed its liabilities by \$ 1 billion. Since a firm that withdraws excess assets from a pension fund is taxed at 50% on these withdrawals (in the United States), you would add \$ 500 million to the estimated value of the operating assets of the firm. This would reflect the 50% of the excess assets that the firm will be left with after paying the taxes.

A more practical alternative is to reflect the over funding in future pension contributions. Presumably, a firm with an over funded pension plan can lower its

contributions to the pension plan in future years. These lower pension plan contributions can generate higher cash flows and a higher value.

Joint Venture Investments

Joint venture investments present many of the same problems that cross holdings do. Depending upon the country and the nature of the joint venture investment, a firm can use the equity method, proportional consolidation or full consolidation to report on a joint venture investment.³⁴ In some cases, one of the joint venture partners will provide the primary backing for the debt in the joint venture. Finally, the joint venture will almost never be publicly traded, making it more akin to a private company cross holding than a publicly traded one. When working with joint venture investments, analysts have to begin by examining how the joint venture is accounted for in the books. If the joint venture investments are either proportionally or fully consolidated, the operating income of the parent company already includes the earnings from the joint venture; in the case of full consolidation, an adjustment has to be made for the proportion of the joint venture that does not belong to the firm (akin to the minority interest adjustment with majority cross holdings). If the joint venture investments are accounted for using the equity method, they have to be treated like minority cross holdings. In firm valuation, this will require valuing the proportional ownership in the joint venture and adding it on to the value of the operating assets. In equity valuation, the net income will include the proportional share of the joint venture earnings and there is no need to value the joint venture separately.

Conclusion

Investments in cash, marketable securities and other businesses (cross holdings) are often viewed as after thoughts in valuation. Analysts do not spend much time assessing the impact of these assets on value but they do so at their own risk. In this paper, we first considered the magnitude of investments in cash at firms and the

³⁴ The equity method and full consolidation are similar to the approaches used with cross holdings. In proportional consolidation, the firms involved in the joint venture have to consolidate the proportion of the

motivations for accumulating this cash. We followed up by looking at how best to assess the value of cash in both discounted cash flow and relative valuation. Cash is riskless and generally earns low rates of return and this makes it different from the operating assets of a firm. The safest way to deal with cash is to separate it from operating assets and to value it separately in both discounted cash flow and relative valuation. We also considered how to incorporate the values of financial investments, cross holdings and other non-operating assets into value.

joint venture revenues, operating expenses and operation income that is attributable to them. In the balance sheet, they have to report on the proportion of the joint venture assets and liabilities that belong to them.

Appendix 1: Industry Averages: Cash Ratios – January 2005

| <i>Industry</i> | <i>Number of firms</i> | <i>Cash as % of Firm Value</i> | <i>Cash as % of Total Assets</i> | <i>Cash as % of Revenues</i> |
|--------------------------|------------------------|--------------------------------|----------------------------------|------------------------------|
| Advertising | 35 | 8.89% | 13.68% | 14.80% |
| Aerospace/Defense | 67 | 7.18% | 11.89% | 7.77% |
| Air Transport | 46 | 20.26% | 16.74% | 14.07% |
| Apparel | 65 | 13.84% | 13.23% | 10.51% |
| Auto & Truck | 25 | 6.19% | 6.45% | 6.32% |
| Auto Parts | 60 | 6.24% | 7.50% | 6.94% |
| Bank | 499 | 13.01% | 3.31% | NA |
| Bank (Canadian) | 7 | 3.79% | 0.49% | NA |
| Bank (Foreign) | 5 | 5.09% | 1.14% | NA |
| Bank (Midwest) | 38 | 10.79% | 3.18% | NA |
| Beverage (Alcoholic) | 22 | 8.69% | 10.70% | 3.47% |
| Beverage (Soft Drink) | 17 | 3.09% | 6.53% | 3.75% |
| Biotechnology | 90 | 13.06% | 44.95% | 48.32% |
| Building Materials | 49 | 9.91% | 8.60% | 7.71% |
| Cable TV | 21 | 3.79% | 9.00% | 12.21% |
| Canadian Energy | 11 | 6.60% | 10.44% | 14.92% |
| Cement & Aggregates | 13 | 5.24% | 9.32% | 8.46% |
| Chemical (Basic) | 16 | 6.37% | 5.67% | 4.63% |
| Chemical (Diversified) | 31 | 6.39% | 8.17% | 7.80% |
| Chemical (Specialty) | 92 | 8.06% | 12.29% | 15.10% |
| Coal | 11 | 2.53% | 4.21% | 6.18% |
| Computer Software/Svcs | 389 | 20.27% | 31.97% | 33.82% |
| Computers/Peripherals | 143 | 20.38% | 33.37% | 34.61% |
| Diversified Co. | 117 | 8.86% | 10.64% | 12.59% |
| Drug | 305 | 21.79% | 52.76% | 58.73% |
| E-Commerce | 52 | 20.67% | 39.46% | 35.98% |
| Educational Services | 38 | 13.79% | 23.19% | 24.56% |
| Electric Util. (Central) | 25 | 2.91% | 4.92% | 10.15% |
| Electric Utility (East) | 31 | 5.91% | 3.99% | 7.65% |
| Electric Utility (West) | 16 | 5.37% | 3.68% | 9.21% |
| Electrical Equipment | 93 | 11.43% | 18.64% | 22.20% |
| Electronics | 179 | 12.94% | 22.31% | 22.79% |
| Entertainment | 88 | 6.19% | 11.49% | 16.47% |
| Entertainment Tech | 31 | 10.71% | 28.78% | 31.00% |
| Environmental | 85 | 6.67% | 12.61% | 12.64% |
| Financial Svcs. (Div.) | 233 | 19.36% | 20.27% | 26.45% |
| Food Processing | 104 | 4.97% | 9.63% | 9.31% |
| Food Wholesalers | 20 | 7.70% | 9.40% | 9.98% |
| Foreign Diversified | 1 | 100.00% | 96.84% | 0.00% |
| Foreign Electronics | 12 | 13.98% | 13.72% | 9.27% |

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|-------------------------|-----|--------|--------|--------|
| Foreign Telecom. | 21 | 20.96% | 18.03% | 18.73% |
| Furn/Home Furnishings | 38 | 5.66% | 8.72% | 4.78% |
| Grocery | 23 | 9.02% | 9.15% | 3.85% |
| Healthcare Information | 32 | 21.68% | 33.49% | 31.50% |
| Home Appliance | 16 | 14.58% | 19.05% | 19.74% |
| Homebuilding | 34 | 8.11% | 10.23% | 14.52% |
| Hotel/Gaming | 77 | 10.34% | 13.38% | 17.86% |
| Household Products | 30 | 4.25% | 9.31% | 10.51% |
| Human Resources | 28 | 9.95% | 17.99% | 10.46% |
| Industrial Services | 200 | 13.44% | 19.52% | 15.40% |
| Information Services | 33 | 5.46% | 17.43% | 16.43% |
| Insurance (Diversified) | 1 | 23.02% | 26.25% | NA |
| Insurance (Life) | 43 | 15.53% | 4.25% | NA |
| Insurance (Prop/Cas.) | 78 | 17.62% | 6.96% | NA |
| Internet | 297 | 17.85% | 35.10% | 33.27% |
| Investment Co. | 21 | 1.46% | 1.89% | 4.36% |
| Investment Co.(Foreign) | 17 | 0.21% | 0.73% | 0.67% |
| Machinery | 133 | 9.40% | 11.20% | 9.84% |
| Manuf. Housing/RV | 19 | 11.92% | 14.98% | 8.16% |
| Maritime | 28 | 4.53% | 4.35% | 7.47% |
| Medical Services | 195 | 10.42% | 23.20% | 19.06% |
| Medical Supplies | 262 | 10.39% | 27.23% | 27.92% |
| Metal Fabricating | 38 | 4.58% | 7.31% | 3.56% |
| Metals & Mining (Div.) | 76 | 6.79% | 13.02% | 9.70% |
| Natural Gas (Distrib.) | 30 | 2.59% | 2.68% | 2.44% |
| Natural Gas (Div.) | 38 | 1.75% | 2.87% | 6.09% |
| Newspaper | 20 | 7.34% | 9.33% | 11.58% |
| Office Equip/Supplies | 28 | 9.19% | 11.60% | 7.67% |
| Oilfield Svcs/Equip. | 93 | 5.66% | 9.13% | 14.23% |
| Packaging & Container | 35 | 3.66% | 6.58% | 4.41% |
| Paper/Forest Products | 39 | 4.05% | 5.77% | 6.08% |
| Petroleum (Integrated) | 34 | 4.62% | 9.79% | 9.64% |
| Petroleum (Producing) | 145 | 7.96% | 12.60% | 15.40% |
| Pharmacy Services | 14 | 3.76% | 7.59% | 2.31% |
| Power | 24 | 12.50% | 21.16% | 30.96% |
| Precious Metals | 61 | 8.90% | 23.98% | 36.59% |
| Precision Instrument | 104 | 13.91% | 25.12% | 29.42% |
| Publishing | 43 | 6.38% | 7.95% | 5.29% |
| R.E.I.T. | 135 | 1.53% | 1.57% | 2.15% |
| Railroad | 18 | 3.80% | 3.94% | 6.68% |

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|---------------------------|-------------|---------------|---------------|---------------|
| Recreation | 78 | 11.06% | 16.04% | 14.25% |
| Restaurant | 84 | 7.61% | 9.82% | 7.50% |
| Retail (Special Lines) | 175 | 10.87% | 15.94% | 9.39% |
| Retail Automotive | 14 | 3.44% | 5.04% | 4.71% |
| Retail Building Supply | 9 | 3.11% | 5.67% | 2.52% |
| Retail Store | 49 | 6.42% | 7.20% | 3.43% |
| Securities Brokerage | 26 | 40.43% | 30.84% | 58.01% |
| Semiconductor | 124 | 21.94% | 35.54% | 47.58% |
| Semiconductor Equip | 16 | 17.86% | 30.90% | 43.56% |
| Shoe | 24 | 11.93% | 17.44% | 12.23% |
| Steel (General) | 24 | 3.13% | 4.59% | 4.05% |
| Steel (Integrated) | 14 | 5.14% | 4.75% | 3.10% |
| Telecom. Equipment | 120 | 21.55% | 33.96% | 39.37% |
| Telecom. Services | 137 | 13.41% | 17.74% | 19.26% |
| Thrift | 222 | 24.70% | 4.32% | NA |
| Tire & Rubber | 14 | 6.31% | 17.04% | 11.81% |
| Tobacco | 13 | 5.77% | 10.38% | 9.83% |
| Toiletries/Cosmetics | 23 | 9.00% | 11.23% | 11.44% |
| Trucking | 36 | 3.03% | 5.34% | 6.67% |
| Utility (Foreign) | 6 | 2.42% | 3.26% | 8.56% |
| Water Utility | 17 | 2.33% | 2.02% | 8.67% |
| Wireless Networking | 66 | 16.09% | 27.23% | 33.23% |
| Market | 7091 | 12.69% | 18.48% | 18.97% |