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**Risk**

by Michael J. Mard, CPA/ABV, ASA

**Risk vs. Return**

The fundamental logic for the statement “risk vs. return” rests with the axiom that investors are risk-averse. This axiom assumes investors are using their own funds and not other people’s (or taxpayer’s) money, as the recent causes of the current recession might imply. The axiom that investors are risk-averse, of course, begs the question - what is risk? Statistically speaking, risk measures the variance in expected returns. In English:

*Risk* can be defined as the degree of certainty (or lack thereof) of achieving future expectations at the times and in the amounts expected.<sup>1</sup>

Put simply, the higher the risk an investor undertakes, the higher the return the investor expects. This can be demonstrated by the graph in Exhibit 2 (Page 5).<sup>2</sup>

Risk and return are limited; there are some things that you will not do for any amount of money. For instance, we could promise to pay you one trillion dollars (a number recently in vogue) if you would jump off the thirtieth floor of a building without a parachute or other device. You would not accept so risky an “investment.” (P.S. We’ll pay by check.)

Businesses follow this curved behavior, too. For instance, a business’s expected return could be augmented by increasing risk, by obtaining debt and investing it in the business. Invest the bank’s or public shareholder’s money in the business to get even more return. Of course, like jumping off the building, this process also has limits. Too much debt can overburden a company’s cash flow; the bankruptcy courts are now filled with companies such as this.

Still, financially and economically speaking, a company’s average rate of return is a critical number to determining value. McKinsey says about this key value driver:

...in the forest of numbers, it is all too easy to forget the fundamentals: A company’s value depends on its return on invested capital (ROIC) and its ability to grow. All other considerations – gross margins, cash tax rates, collection periods, and inventory turns – are, well, just details.<sup>3</sup>

McKinsey’s use of the term “return on invested capital” is reconcilable with a company’s average expected return or, more specifically, a company’s weighted average cost of capital (WACC).<sup>4</sup> Essentially, we will reconcile ROIC with WACC by using a fair value approach to the WACC.

The WACC is merely the average expected return of the debt of the company, net of tax, weighted with the expected return of the equity of the company. The expected return of the debt of the company is merely weighting the interest rate paid (after-tax) with the amounts of the principal of the debt. The expected return of the equity is a little more complicated.

**Capital Asset Pricing Model**

The expected return of the equity of the company has its origins in the Capital Asset Pricing Model (CAPM). The model, in laymans terms, establishes that the expected return of the equity is the sum of the risk-free rate of return (think Treasury Bills), added to the premium expected from a riskier market portfolio, adjusted for changes or variances.

**Continued on Page 5**

# Using Sampling to Test Financial Records

by Michael A. Crain, CPA/ABV, ASA, CFA, CFE

Auditors and courts commonly encounter practical problems when the amount of records (or other items) is too large to be observed in their entirety to make judgments about truth. One common solution to the problem of voluminous information is to draw a sample of the items from a population and observe the sample. Sampling, however, leads to questions about inferences that can be made from the sample to the population.

Sampling is used in a variety of contexts. In this article, I limit the discussion to the testing of records to assess whether monetary amounts that someone claims as true are indeed true to a reasonable degree of certainty. In this context, sampling observes less than 100% of all the items and makes inferences about the nature of all the items.

Auditors typically perform tests in order to give an opinion on a firm's financial statements. Those tests are performed on monetary amounts that appear on the financial statements by observing documents and other information. Because the volume of records is too large to practically test all of them, sampling is often used. When properly applied, findings from observing samples provide auditors with a reasonable basis to form conclusions about a population. Further, sampling is addressed in the American audit literature for public companies by the U.S. Public Company Accounting Oversight Board<sup>1</sup> and the American Institute of Certified Public Accountants for private firms.<sup>2</sup>

In addition to auditors drawing conclusions about the truth of someone's assertions by examining samples, courts have also relied on evidence drawn from samples in a variety of contexts. For instance, the Federal Judicial Center's *Reference Manual on Scientific Evidence*, 2nd ed. addresses sampling by discussing topics that affect

the strength of the evidence.<sup>3</sup>

Sampling theory is based on well-established statistical and probability principles. Unfortunately for practitioners, sampling theory is mathematical. Further, the theory covers different areas because samples are used for many reasons that makes understanding the theory even more complicated. To make matters worse, disciplines that use sampling tend to develop their own jargon and, therefore, sampling terminology differs across disciplines.

In addition to these broad challenges in understanding sampling, the nature of the data that is being sampled can differ across disciplines. For instance, in the natural sciences, data tends to be normally distributed and follows a bell-shaped curve. But in economics and accounting, data often is distributed in ways that do not naturally fall into a bell curve. Accounting events often occur in a way that is called a Poisson distribution. For instance, monetary

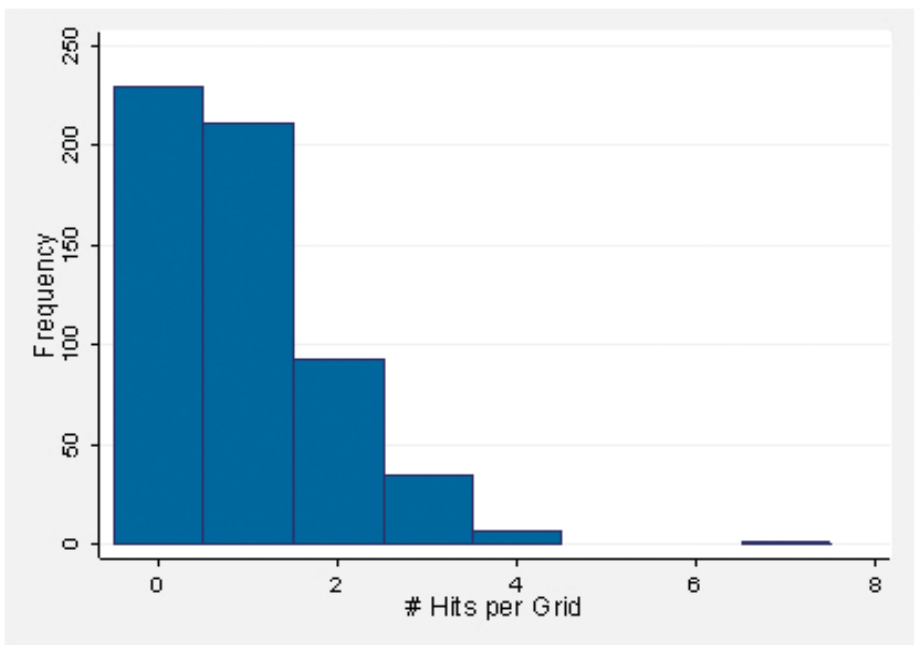
amounts of bank checks are limited to \$0.01 on the low end and theoretically unlimited on the high end. Most of a firm's bank checks might range from, say, \$500 to \$10,000 each and only a few are ever written for more than \$25,000. Thus, you get a curve that is skewed to the right rather than being bell shaped.

Other areas of life have events that do not follow a bell curve and are distributed in other ways. Another example of events that occurred in a Poisson distribution is the way German bombs fell on areas of London during World War II (see Exhibit 1).<sup>4</sup> Similar to distributions of bank checks, the number of bombs that fell on areas of London is not less than zero and only a few times did a high number occur. Thus, we observe the same sort of Poisson distribution as we see in accounting data.

Identifying the proper distribution of the data matters because if we were to apply some sort of classic statistical

Continued on Page 5

Exhibit 1



## Upcoming Events:

### September:

September 22, 2009: M. Mard will attend the FASB Valuation Resource Group meeting

September 22-23, 2009: M. Crain will attend the AICPA Forensic and Valuation Services Executive Committee meeting

September 23, 2009: S. Hyden will attend the Appraisal Issues Task Force meeting

## Our Principals are being published...again!

Look for these books recently or soon to be published featuring chapters by our principals:

### Michael A. Crain:

Chapter: *Professional Standards for Experts*

Publication: *The Comprehensive Guide to Lost Profits Damages, 2009 edition*, Business Valuation Resources, LLC

#### Overview:

Financial experts may be subject to standards of professional practice from a number of sources when they measure lost profits damages and give related expert testimony. The sources can include governmental regulators as well as professional membership organizations and societies. In addition, there may be other ways a technical community may establish professional standards of practice. This chapter will review some of the standards commonly associated with financial experts.

Chapter: *Discounting Lost Profits in Damage Measurements*

Publication: *The Comprehensive Guide to Lost Profits Damages, 2009 edition*, Business Valuation Resources, LLC

#### Overview:

In business litigation, a court may award compensatory damages to an injured firm. As this Guide has already discussed, this type of damages is usually to compensate for the entity's lost profits, its loss of enterprise value, or its extra costs. This section focuses on the discounting of future lost profits to measure damages.

Considerations in discounting can vary widely, due primarily to the unique facts and circumstances in a case. Legal issues may cause differences, too, as the law in the United States (as interpreted by various courts in state and federal jurisdictions) has not defined a single, uniform method by which to discount lost profits.

The time value of money may also be a large economic adjustment in damages measurements, making the timing of events an important consideration in the calculations. A business, for instance, might make a claim for lost profits into the future. Essentially, the injured business is asking for an award now for profits it would have received in the future, but-for the injury. In some cases, an award might occur several years before the business might have received the profits, had it not been injured.

Chapter: *Intellectual Property Overview*

Publication: *The Comprehensive Guide to Lost Profits Damages, 2009 edition*, Business Valuation Resources, LLC

#### Overview:

Financial models for IP valuation in transactions and IP damages measurements are significantly different. Since IP litigation usually seeks to stop the wrongful conduct of the offender with an injunction, IP damage models typically focus on historic activity. This makes the model and the effort in its creation more similar to an accounting analysis. By comparison, IP transactional valuations are prospective and focus on the particular expectations of the business as well as the industry and economic conditions. The models also differ in their treatment of taxes. Since the injured party will pay taxes on the damages that it receives, IP damage models use pre-tax income

**Continued on Page 4**

## Published (from Page 3)

or cash flows.

### **Steven D. Hyden:**

Chapter: *Asset Approach*

Publication: *Financial Valuation, Application and Models, 3rd edition*, John Wiley & Sons, Inc.

#### Overview:

In the valuation of a business or business enterprise, the asset approach presents the value of all the tangible and intangible assets and liabilities of the company. As typically used, this approach starts with a book basis balance sheet as close as possible to the valuation date and restates the assets and liabilities, including those that are unrecorded, to fair value (financial reporting) or fair market value (tax and other purposes). On the surface, the asset approach seems to be simple, but deceptively so. The application of this approach introduces a number of complicating factors that must be addressed before a satisfactory analysis is concluded.

### **Michael J. Mard:**

Chapter: *Fair Value*

Publication: *Financial Valuation, Application and Models, 3rd edition*, John Wiley & Sons, Inc.

#### Overview:

Our accounting model has changed. No longer is accounting based solely on historical cost; in fact, it never was. It has always been a mixed attribute; a little historical cost and a little fair value. The more pronounced change, however, has been from hierarchal guidance predominately rules based to principles based. Accounting has always been regulatory driven. Up to now, professionals could cite a specific rule to document compliance, a "one size fits all." Now, though, the citations must be principles driven, "do what's right given the circumstances."

### **Michael J. Mard and Steven D. Hyden:**

Chapter: *Business Combinations*

Publication: *Financial Valuation, Application and Models, 3rd edition*, John Wiley & Sons, Inc.

#### Overview:

Until June 29, 2001, when the Financial Accounting Standards Board (FASB or Board) issued new financial reporting standards for intangible assets [Statement of Financial Accounting Standards (SFAS) 141, Business Combinations, revised 2007, and SFAS 142, Goodwill and Other Intangible Assets], the recording of intangible assets on accounting statements was often inconsistent or incomplete. Collectively, the two Statements ended pooling of interests and goodwill amortization and substituted a framework for analyzing goodwill for impairment.

This regulatory change reflected the FASB's recognition of the need for international comparability of accounting standards, to bring U.S. accounting standards more in line with worldwide GAAP. As a result of capitalizing intangible assets and goodwill, the income statement bears additional amortization reflecting the write-off of these capitalized assets. While many critics suggested that the elimination of pooling of interests would result in distorted income statements and believed that the pooling of interests method resulted in greater consistency (and comparability with cash flow) of the reported income statements, the Board's desire to promote greater international comparability of financial statements overrode the critics desire to leave well enough alone.

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## Sampling (from Page 2)

test—which usually assumes a bell curve distribution—the statistical findings may be flawed.

What does all of this have to do with sampling of evidence to find the truth? Sampling is a theoretically sound and valid way to assess information when the population size is too large to examine for practical reasons (e.g., too costly, time constraints). However, to make good judgments about whether

the findings from a sample can be reasonably inferred to a population requires knowledge of some complex areas. Without applying sampling properly, findings can lead to weaker inferences or, alternatively, require testing of all the observations in a large population that can be costly.

### (Footnotes)

<sup>1</sup> PCAOB, “Audit Sampling,” [http://www.pcaobus.org/standards/interim\\_standards/auditing\\_standards/au\\_350](http://www.pcaobus.org/standards/interim_standards/auditing_standards/au_350).

<http://www.aicpa.org/download/members/div/auditstd/AU-00350.PDF>, accessed Aug 8, 2009.

<sup>2</sup> AICPA, “Audit Sampling,” <http://www.aicpa.org/download/members/div/auditstd/AU-00350.PDF>, accessed Aug 8, 2009.

<sup>3</sup> [http://www.fjc.gov/public/pdf.nsf/lookup/sciman00.pdf/\\$file/sciman00.pdf](http://www.fjc.gov/public/pdf.nsf/lookup/sciman00.pdf/$file/sciman00.pdf), accessed Aug 8, 2009.

<sup>4</sup> The data was measured by dividing an area in South London into 0.25 km grids and counting the number of bomb hits in each grid. Most grids experienced either zero or one hit.

## Risk (from Page 1)

The CAPM states that there is a linear relationship between an asset’s beta and its required return. This, in turn, implies that the beta of a portfolio of assets, and thus its required return, will be a linear combination of the underlying betas of the individual assets, weighted by the percentage of portfolio value (at market value) invested in each asset.

Many professionals adjust this model for risk related specifically to smaller business. The Modified CAPM adds *unsystematic* risk, that is, risk that is specific to the business itself. These models embody the following assumptions:

1. Investors are risk-averse, single-period, expected-utility-of-terminal-wealth maximizers, who select their holdings of securities on the basis of the mean and variance of the probability distribution of returns;
2. Investors can borrow or lend unlimited amounts at a common and exogenously determined riskless rate;
3. Investors have homogeneous expectations (they agree about the means, variances, and covariances of returns among all securities);
4. Perfect capital markets exist – investors are price takers – there are no taxes or transaction costs – all investors have equal and costless access to information;

5. The quantities of securities are fixed.

The CAPM asserts that the only variable that determines the differences in expected returns is the risk coefficient and that the relationship between this risk coefficient and expected return is linear. The CAPM is a conclusive model based on Modern Portfolio Theory, which attempts to describe how investors should behave under given assumptions. To summarize the conclusion, because investors can and do hold efficient portfolios that diversify away unsystematic (company-specific) risk, they will price their investments and expect compensation based upon the systematic (market) risk associated with those investments.

In an efficient market, the CAPM states that the expected return of an asset should equal its required return. If this is not the case, then market value does not equal present value of future cash flows and prices must adjust (cash

flows will not adjust because the CAPM is a one-period model). This mathematical relationship has a significant impact on how value should be perceived.

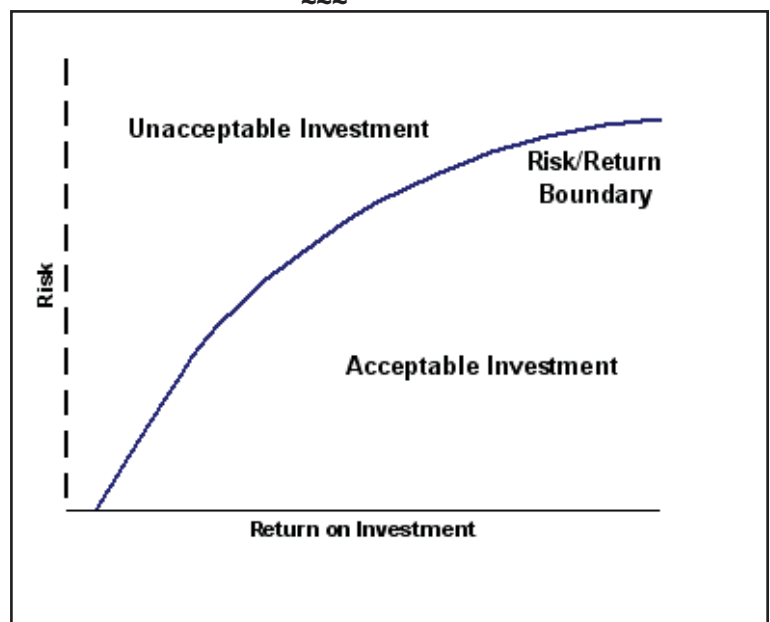
### (Endnotes)

<sup>1</sup> David Laro and Shannon Pratt. *Business Valuation and Taxes* (Hoboken, NJ: John Wiley & Sons, Inc., 2005), p. 160.

<sup>2</sup> Douglas W. Hubbard, “Risk vs. Return,” *Information Week Online*, June 30, 1997.

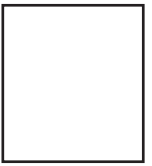
<sup>3</sup> Tim Koller, et.al. *Valuation: Measuring and Managing the Value of Companies*, 4th ed. (Hoboken, NJ: John Wiley & Sons, Inc., 2005), p. 133.

<sup>4</sup> *Ibid.*, pp. 693 – 699.



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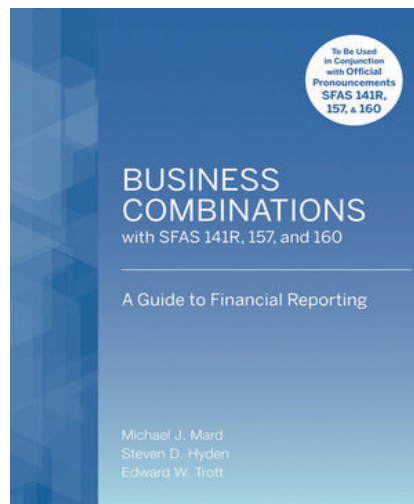
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