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Letter from the Editor

“A Re-introduction to the *Business Valuation Review*”

Victor E. Jarosiewicz, PhD, ASA, CFA, CAIA

As incoming editor for the *Business Valuation Review*, I want to take this opportunity to remind our readers of its history, its purpose, and its benefits—both to readers and to authors—and to give a sense of how easy it is to contribute your knowledge and improve our profession.¹

A Primer on the *Business Valuation Review*

The *Business Valuation Review* is the quarterly peer-reviewed journal of the Business Valuation Committee of the American Society of Appraisers. *Business Valuation Review* goes back to 1982, when its founding editor, James Schilt, ASA, started publishing issues of what was then *Business Valuation News*, and he continued to publish it for two decades. In 2002, Jay Fishman, FASA, became editor for five years. Roger Grabowski, ASA, was the next editor from 2007 to 2012. From 2012 until this year, Dr. Dan McConaughy was editor, and with his retirement I have now taken over the role. During these nearly four decades, hundreds of issues with several hundred articles have helped present new ideas, revisit (and when necessary revise) old ideas, and expand our base of knowledge and practical applications of that knowledge. I have heard from the most experienced appraisers in the profession that they use this publication as their source for in-depth knowledge to continue developing their expertise.

An important distinction about the journal: *The journal is a peer-reviewed journal, not a newsletter*. Each has its place and its valuable purpose, and each can educate its readership. Both keep members updated, but the journal needs to use its structure and peer-reviewed process to help elevate the profession.

Purpose and Usefulness of the Journal

Business valuation at its core is the task of determining a value given an expectation of benefits in exchange for that value. That will not change, but how well we understand, measure, and estimate those benefits and their value should: Just as scholars and professionals continue to innovate, we should want to learn how to improve our knowledge and our skills.

With that in mind, here are some present and future (nonexhaustive) goals for the journal: (1) to invite different perspectives, on both perennially controversial matters and also more narrow but important niche topics, but just as importantly on issues we may take as well established but benefitting from a fresh reevaluation; (2) to push further to invite and integrate the very broad (though often very technical) academic scholarly research that has much to contribute to our client-centered valuation work, but do so in a way that makes clear how “technical” or “theoretical” advances can be practically applied in a consistent, reliable, verifiable, and effective manner; (3) to provide opportunities for aspiring (young or old) minds to share hard lessons learned from practice and demonstrate their expertise, either as authors or as reviewers and even as editorial team members; and (4) to promote awareness of the knowledge base and expertise of our profession to the rest of the finance and business communities, by inviting members of those communities to contribute and comment upon the knowledge presented and to cite it and make inquiries to the authors and reviewers and associate editors for expertise that helps their clients.

Authors are encouraged to submit original works and obtain the benefits of peer review.

Understanding the Value of the “Double-Blind” Review Process

Double-blind peer review means that the identities of the reviewers and authors are concealed from each other throughout the review process. It is that process that is so incredibly valuable to each person involved. How many valuation reports never get reviewed and never receive any feedback that might help improve the methods or the reporting quality? How many appraisers and analysts have never been in a position to offer constructive feedback and to learn how to improve their own work from the process of providing that feedback and seeing work from another perspective? Even in litigation or other adversarial settings, where the aim may be to discredit and criticize, sometimes we learn something from the other side—think how much more we learn from

constructive criticism. That is the essence of the double-blind peer-review process. No party (other than the assigning editorial team member, who protects the integrity of the peer-review process) knows the true identity of the other party; ad hominem attacks are not permitted, and only review comments on the pros and cons of the merits of the submitted article are shared.

Caveat: Some articles are rejected because the editor judges them not ready, or because the editor agrees with reviewers that the submission needs substantial work to be ready, for publication. Even those articles that are rejected still receive substantive review comments, which benefit each party in the review process, and most of those articles can be resubmitted after considering and responding to the comments causing rejection in the first place. A substantial portion of articles are either accepted (with minor proofreading tweaks) or are asked to resubmit after revisions responding to reviewer and editor comments, which help improve an author's work for clarity and intellectual contribution.

Submission Guidelines and the Peer-Review Process

In the simplest sense, the submission guidelines and the process are summarized as follows: the journal seeks new contributions to the business valuation body of knowledge; using a “double-blind” peer-review process, the journal relies on the expertise of reviewers to examine the submission and comment on its novelty, validity, and contribution, and recommend to the editorial team whether to publish, to ask for revisions and a resubmission, or to reject the submission.

Original works (not identical to content previously published in another peer-reviewed journal) contributing to the business valuation profession are requested. The topic, central question, or motivating reason for the article is open to anything that is relevant to valuations—what is important is that the content help advance our knowledge of some aspect of business valuations beyond what is already published and known and that it be verifiable.

There is no set format, nor minimum/maximum length, though articles too short or too long to make a central point clearly are much more likely to be rejected. That said, some practical advice is in order: write to make a point (and typically only one point) and write for clarity. It is better to focus only on one central issue and examine its implications or include useful examples and illustrative calculations, rather than to take on a very broad topic that should be parsed into several individual (even if related) articles or chapters. Cite others' work (including your own prior published work) and do not plagiarize. Obtain a “friendly review” before submitting your work. Just as with client valuation reports, check your math,

check your exhibits, check your arguments and logic, and check your grammar and clarity. Any obvious flaws are grounds for rejection.

An important caveat: content clearly intended to self-promote, to infer that “only the author is an expert,” or to rehash existing knowledge or existing debates or controversies—without at least a novel perspective or new contribution—will be desk-rejected; I will not waste reviewers’ or readers’ time. That said, occasional content not intended for peer review (such as letters to or from the editor, or authors’ brief responses to opposing points of view, supported with new logic, new data, or new analyses) may be approved by the editor and editorial team when the content and tone are professional and contribute understanding or appropriate detail to an ongoing topic of interest to the readership.

There is no limit to the scope of what might make for a useful contribution to the profession. From time to time, thematically organized special issues may be appropriate. All topics, including some that may be more about the profession or craft of valuations than the technical aspects of valuation analyses and reports, are welcome. I strongly encourage authors, particularly new or would-be authors, to seek feedback or guidance from the journal on topics or specific questions relating to articles they are working on or contemplating.

A Long View of the Business Valuation Profession

I think our profession is in a pretty healthy place. Due to the strong economy there seems to be plenty of work all up and down the spectrum of small to large business valuation projects, with no sign of a slowdown in sight. Regulation continues to be the big issue—sometimes for the better and sometimes not. In areas such as tax-related valuations, we have well-established regulations that enable appraisers to exercise their judgement and also know the “rules of the road.” But in other areas such as ESOP-related valuations we have no formal regulations. Between those two extremes we have the world of financial reporting valuation, where self-regulation is the game, though new credentials such as the CEIV seek to raise the bar and establish expectations for a new standard.

Again, it helps me to take a long-term view of the state of the profession: *Business Valuation Review* was first published in 1982. USPAP was developed in the 1980s. The SEC’s online EDGAR service didn’t even launch until 1996. Even business valuation-specific credentials were introduced within the last three decades. Competition for valuation services was less crowded then, and less cumulative knowledge and expertise existed. Now, computerized, automated valuation models are common-

place; we compete with each other and with machines—and we haven't even seen artificial intelligence (AI) really muscle in yet. Globalization of businesses, standards, and valuation practices has influenced the evolution of our industry but opened new opportunities as well. What we need to do is (1) continue to increase and improve our knowledge base, but also (2) increase and improve our ability to learn, understand, and profitably apply that expanding knowledge base. I would like to see *Business*

Valuation Review serve both of those needs for our valuation profession.

Endnote

1. This content is reprinted with permission and adapted from “A Conversation with the New Editor of *Business Valuation Review™*,” *Business Valuation Update* 25, no. 6 (2019), accessed at http://bit.ly/BVU_new_BVR_editor, June 11, 2019.

Almost Forty Years of Business Valuation Review

Victor E. Jarosiewicz, PhD, ASA, CFA, CAIA

In this, my first issue as editor, I want to review how far this journal has come in its 37 years of existence and (re-)introduce new and old readers to the wealth of knowledge developed over those years. What follows is my summary of a chronological stream of articles that I found noteworthy (with no lack of respect meant for the other content published over so many years). These articles span both the entire timeline since the journal's inception as well as a broad range of topics and article styles. They also fit well with the renewed call for new contributors and ideas as well as the description of what this journal is about, recently published in *Business Valuation Update*¹ and summarized in the lead article of the current issue.² The original versions of the earlier articles³ summarized here are reprinted in this *Business Valuation Review* issue (though if you intend to cite them, use the original citation, as described online on the <https://bvreview.org> permanent digital object identifier [DOI] page for each corresponding article).

The 1980s—The Early Years

(March 1982) The very first issue and article was by the founding editor of (what is now) *Business Valuation Review*, Jim Schilt, ASA, CFA: <https://bvreview.org/doi/abs/10.5791/0882-2875-1.1.1>. This first article focused on "Goodwill and Excess Earnings," a topic that went back as far as Prohibition and the Treasury's ARM-34 in the 1920s and that this journal has dealt with more than 100 times⁴ in the nearly 800 articles published to date—clearly, a primary and recurring topic. The article includes historical legal cases, contemporaneous references, and a discussion of the merits, uses, and abuses of the excess earnings method.

¹"A Conversation with the New Editor of Business Valuation Review™," *Business Valuation Update* 25, no. 6 (2019), accessed at <https://www.bvreources.com/articles/business-valuation-update/a-conversation-with-the-new-editor-of-business-valuation-review>, June 11, 2019.

²See "A Re-introduction to the *Business Valuation Review*™," *Business Valuation Review* 38 (2019).

³Originally, all the summarized articles were intended to be reprinted, but that would have required an issue approaching 300 pages in print. The current edition contains all the summarized articles up until 2009.

⁴See http://bit.ly/BVReview_goodwill and http://bit.ly/BVReview_excess_earn.

(December 1984) Two years later, Schilt again takes issue with the excess earnings method, along with other common practices in appraisals, in "Challenging Standard Business Appraisal Methods": <https://bvreview.org/doi/abs/10.5791/0882-2875-3.4.4>. This time he includes considerable analysis of data of stocks traded publicly at the time, as well as an extensive analysis of reference articles and court cases.

The 1990s—New Contributors

(March 1990) The next notable article, by John Emory, ASA, was actually prepared at the request of ASA's BVC to explain "Why Business Valuation and Real Estate Appraisal Are Different": <https://bvreview.org/doi/abs/10.5791/0882-2875-9.1.3>. This is a great, short (five-page) read that quickly and succinctly points out the many differences between real estate and business valuation—most of which I do not believe to be taught or obvious (until pointed out) to a practitioner from either field. I believe it is a great primer, and one that I wish I had when I first started in valuations.

(September 1990) Thomas Woodley, CPA, and Keith Fairchild, PhD, prepared an enlightening article, surveying investment banking firms engaged in M&A transactions: "Valuation of Privately-Held Companies: A Survey of Investment Banking Firms" <https://bvreview.org/doi/abs/10.5791/0882-2875-9.3.81>. Their survey asked about their methods used for business valuation and included a fictitious case study of a private company, which survey respondents were asked to value. The overall conclusion is that those professionals engaged in actual transactions of private businesses typically used the same valuation methods as business appraisers. From those respondents who completed the valuation as part of their survey response, the value conclusions varied substantially but (excluding outliers) with a reasonably close clustering around a mean value. Overall, this is a valuable data point for when we wonder if our valuations are somehow different from those performed by investment bankers.

(March 1992) Lawrence Gooch, ASA, in his article "Capital Charges and the Valuation of Intangibles," <https://bvreview.org/doi/abs/10.5791/0882-2875-11.1.5>, provides an introduction and overview of the residual income approach to valuing intangible assets and updates

our understanding of the accompanying concept and analysis of contributory asset charges (“capital charges”). Illustrating his analysis with tables prepared from Lotus 123⁵ (a spreadsheet program popular before Excel) and with a detailed, step-by-step analysis of several examples, and going further with mathematical derivations of relevant formulas in the endnotes, I believe this article represents a substantial contribution to our knowledge base as far as valuing intangibles and calculating capital charges. It is a relatively long article, including appendices, so it is not reprinted in this issue but is worth a read for its presentation and mathematical derivations.

(March 1993) Daniel Larson presents an interesting examination of beta and lack of trading activity for smaller companies: “The Effect of Trading Activity on Beta”: <https://bvreview.org/doi/abs/10.5791/0882-2875-12.1.20>. What I found interesting was a univariate (single predictor variable) regression analysis revealing what appears to be⁶ a linear relationship between trading volume and beta, which at the time of the article had not received much attention in valuations. Another notable aspect is the reference to published (academic) research addressing different aspects of the problem, incorporating the existing knowledge on the topic before applying it to the issue addressed in the article. As a very short five-page article, some limitations include a lack of clarity on the data and actual analysis (e.g., a more complete description of the data sample used, explanation of the estimation of the regression model, etc.) and a strong causal inference⁷ that may not be supportable today. Nonetheless, I thought it is a useful article drawing attention to what might be a less-acknowledged aspect

⁵Side note: How many of you remember or know about Lotus 123? Against early versions of Excel, it was the Betamax vs. VHS version of spreadsheets. Remember Betamax? Like Betamax, Lotus 123 was initially superior in technology and quality but did not survive the commercial success of its rival, eventually being phased out (though not until 2014). See https://en.wikipedia.org/wiki/Lotus_1-2-3.

⁶Caveat: As an appraiser, prior to my PhD, I was cautioned against using and relying on regression analyses, because of the knowledge required to properly understand them. If anything, my PhD work taught me that the caution wasn’t worded strongly enough. Regression analysis is very useful and is a commonly used tool in research. However, it is very much a GIGO (Garbage In, Garbage Out) method and prone to misuse and misinterpretation. This caution is not meant to reflect judgment on the analysis in the article, which I have chosen because it highlights the use of an analytical tool to consider a puzzling dilemma not just in valuations but overall in finance, but rather to discourage application of regression analysis without a proper understanding of its methods, assumptions, and limitations.

⁷Claims or inferences of causality (i.e., X causes Y) have become increasingly challenged for regression analyses, particularly in the absence of analyses pinpointing the causal link to that particular X-Y relationship and disproving alternative causal relationships. In my understanding, back in 1993, this was not as strongly challenged as it is nowadays.

(trading liquidity) of a core topic (small public company) in valuations.

(March 1994) Christian Bendixen, ASA, draws upon a presentation at the preceding (1993) ASA International Conference by Prof. Wayne Ferson and Dennis Locke, ASA,⁸ to focus on “Improved Estimation of Equity Risk Premiums”: <https://bvreview.org/doi/abs/10.5791/0882-2875-13.1.22>. The essence of this work comes from analyzing the variance of equity risk premiums over time (rather than accepting the long-term calculation as the de facto standard) and demonstrating that the risk premium estimates are sensitive to the sample period and to the prevailing interest rate environment.⁹ He ends with a call for appraisers to consider such adjustments in their own calculations.

(September 1997) Prof. Steven Bolten, ASA, CBA, and his doctoral student Yan Wang examine “The Impact of Management Depth on Valuation”: <https://bvreview.org/doi/abs/10.5791/0882-2875-16.3.143>. Relying on management changes within public firms that were announced in the *Wall Street Journal* during a sample period in late 1996, and using a methodology described as “analogous[ly] applied in judging the impact of control premiums,” they found an inverse relationship between management depth (i.e., number of named executives) and the stock price decline following a management departure¹⁰ and observed that for firms with the fewest executives (less than six), the impact of departure on stock price post-announcement was 9.43%; they conclude that their work supports the assumption that lack of management depth and loss of a key person affect the valuation of a firm. While not by itself authoritative, this is a valuable example of an attempt to quantify with market data one of the many factors we routinely consider in valuations but typically evaluate in a subjective or qualitative manner.

The 2000s—A New Millennium, New Perspectives

(June 2004) Jim Schilt, ASA, CBA, CFA, returns again (by 2002 having handed over the *Business Valuation Review* editorship to Jay Fishman, FASA) to revisit

⁸This work was eventually published in a top-tier research journal as Ferson and Locke, “Estimating the Cost of Capital through Time: An Analysis of the Sources of Error,” *Management Science* 44 (1998):485–500.

⁹Bendixen finds an inverse relationship between equity risk premium and interest rates, suggesting a constant total expected return, which is certainly novel and counterintuitive. He discusses limitations and interpretations of this finding in his work.

¹⁰Bolten and Wang split their sample into stock price declines and increases and considered only the decreases, which induces sample selection bias (i.e., their findings are only a conditional average—the results are based on the condition that the sample contains only declines in stock price, but not all departures led to stock price declines).

“CAPM and Business Valuation”:¹¹ <https://bvreview.org/doi/abs/10.5791/0882-2875-23.2.60>. A great, simple, two-page introduction and treatise on CAPM and its use by business appraisers, it lays out CAPM and the issues that arise in using it, in simple, easy-to-follow language, with a number of references to both academic and practitioner publications dealing with or contributing to the topic.

(June 2005) Ronald Longhofer, JD, CFA, CFE, presents an analysis and discussion of “The Residual Income Method of Business Valuation”: <https://bvreview.org/doi/abs/10.5791/0882-2875-24.2.65>. The Residual Income Method (RIM) goes by various names nowadays, but Longhofer acknowledges that it is related to the Economic Value Added (EVA) concept first publicized by G. Bennett Stewart in 1991. In an elegantly consistent set of exhibits, RIM is shown to result in the same value conclusion as DCF, using either the direct method of valuing equity or the indirect method of valuing invested capital, either for a typical, established firm or for a young, startup firm. Unfortunately, no explanation is included as to the sources of the input assumptions, including how WACC (or capital structure) was determined for each of the scenarios considered, or why maintaining the same assumptions for cost of capital across different firms (no growth, growth, startup) is reasonable. In spite of these limitations, it makes for a good, simple introduction to the model, versions of which are used for a variety of applications including valuation of intangible assets (i.e., using contributory charge models).

(Winter 2006) James Morris, PhD, presents a detailed analysis of “Growth in the Constant Growth Model”: <https://bvreview.org/doi/abs/10.5791/0882-2875-25.4.153>. In any valuation analysis relying on the income approach, we inherently have to assess the conditions necessary to use the Gordon growth model in perpetuity. This article presents a thorough analysis, comparing direct to equity versus invested capital methods and drawing on empirical data as well as prior academic research, and it is presented in a well-laid-out fashion, including useful tips for Excel modeling of the analysis.

(Spring 2008) George Hawkins, ASA, CFA, presents a short primer on using “Regression Analysis in Valuation Engagements”: <https://doi.org/10.5791/0882-2875-27.1.30>. Going further than prior articles introducing or employing regression analysis, this article goes so far as to explain how to utilize Excel (version 2007, though other versions have equivalent functionality) to employ regression analysis to determine correlations between

¹¹Jim Schilt also wrote repeatedly and extensively in *Business Valuation Review* on beta and other topics of importance to business valuation. This 2004 article focuses on CAPM in particular.

variables. It strongly cautions readers not to interpret statistically significant results as implying causal relationships, but I will go further and issue a much more detailed caveat here, drawing upon my experiences from my PhD training and subsequent research work:

Regressions are nothing more than a mathematical tool and cannot prove or disprove causal relationships.

From personal experience, it is an Olympic sport in academia to beat each other up over claims of causality and to point out flaws and limitations of the various regression models we employ. The article’s examples rely on one explanatory variable (housing starts to explain sales in the divorce example), but the typical three main concerns for regressions are present: endogeneity, omitted variable bias, and sample selection. Endogeneity is simply the idea that the “independent” explanatory variable is not actually independent, but rather is co-determined (by something else) along with the dependent variable. Endogeneity is problematic because it can (and typically does) lead to biased estimates—biased in the sense that the estimates do not reflect the true expected value of the estimated coefficients (i.e., the relationships between predictor variables and dependent variables). Insofar as endogeneity is due to the explanatory variable(s) being a function of other variables that also determine the dependent variable, it can be seen as a special case of omitted variable bias (OVB). OVB is bad because regression analysis tries to find a set of coefficients—given the existing sample of data and the existing set of explanatory variables—that best explain the variance of the dependent variable with the variance of the *included* explanatory variable(s). In figurative language, regressions try to “load up” or “soak up” variance onto the explanatory variables, so if the wrong variables (or not all the right variables) are present, the model will load (deviate from zero) the coefficients for the variables included (that should have instead loaded onto the variables that were omitted), leading to biased estimates. A related issue is that of selection bias, which means that the sample data don’t follow a random distribution¹² (and, as the article discusses, that is a core assumption of linear regressions) and also result in biased estimates. To borrow and creatively repurpose an example from Dr. Nassim Taleb’s research,¹³ sample selection means that if all we ever witnessed is white swans, a regression model will not be able to predict

¹²Even here this is a simplification. The more appropriate statement is that the residuals (the differences between actual data and values predicted by the regression equation) don’t follow a random distribution (i.e., the average or expected value of the residuals isn’t zero), but that is still a simplification of all the assumptions inherent in linear regressions.

¹³Nassim Nicholas Taleb, *The Black Swan: The Impact of the Highly Improbable*, vol. 2 (New York: Random House, 2007).

black swans. Indeed, we may not even know that we need to include a color variable in the model as a predictor in the first place. One additional concern, which is best illustrated by Anscombe's Quartet¹⁴ (an illustration of four distinct data patterns that result in identical linear regression statistics), is using a linear model to predict what may actually be a nonlinear relationship (e.g., a linear regression fitting a linear model through a clearly curved set of data points—it will still estimate linear coefficients, and depending on the model statistics it may be judged to be statistically significant, even though conceptually incorrect).

The preceding paragraph was a lengthy cautionary tale on using regression analysis. I do not mean to browbeat what I think is actually a very good, informative article, nor dissuade anyone from using regression analyses. However—and meant as a compliment of the article, because it is easy to read and to follow—it might be taken as an example or guide, and the cautions it contains may not keep prospective users from an unpleasant experience if they come up against someone well versed in regressions and all their pitfalls. Nevertheless, as Dr. George Box wrote, “All models are wrong, but some are useful,”¹⁵ and linear regressions certainly have their usefulness in quantitative analyses, being able to discern statistical relationships between a (dependent) variable of interest and a set of explanatory variables (the article focused on univariate—single explanatory variable—models, though regressions can be analyzed using any number¹⁶ of explanatory variables).

(December 2009) Lawrence Levine, ASA, provides a nice digest of current research articles in his “Valuation Research Notes”: <https://bvreview.org/doi/abs/10.5791/0882-2875-28.4.224>. The research, though created by academic scholars, is relevant to business valuations, and the summaries include salient points from each article without any judgment or interpretation, leaving it to the reader to dig deeper and draw their own conclusions.

The 2010s—Big Thinking, Big Changes¹⁷

The Fall 2010 issue was particularly noteworthy for several articles. Richard K. Ellsworth, ASA, PE, CFA, presents “Customer Renewal Probabilities and Population Life Expectancy”: <https://bvreview.org/doi/abs/10.5791/0897-1781-29.3.110>.

¹⁴Francis J. Anscombe, “Graphs in Statistical Analysis,” *American Statistician* 27 (1973):17–21.

¹⁵George E. P. Box, “All Models Are Wrong, but Some Are Useful,” *Robustness in Statistics* 202 (1979).

¹⁶“Any number” has a limit—too many variables relative to data points render a regression inestimable.

¹⁷The articles that follow are not reprinted in this issue but are worth a read and are accessible on the bvreview.org website using the DOIs provided.

In the same issue, David Smith, ASA, CFA, presents another article on “Valuation of Customer Relationships—Choice, Application, and Results of Various Attrition Analysis Methodologies”: <https://bvreview.org/doi/abs/10.5791/0897-1781-29.3.100>. These articles, along with many others, represent a shifting focus toward valuation of intangible assets and the increased emphasis on new analytical tools beyond the basic valuation methods and approaches for valuing a business.

In the same Fall 2010 issue, two opposing articles took up the issue of discounts for lack of marketability (DLOMs): Robert Comment, PhD, AVA, presents a summarized version of his analysis of marketability discounts being “double-counted” in DCF analysis and redundant in “Business Valuation, DLOM, and Daubert: The Issue of Redundancy,” <https://bvreview.org/doi/abs/10.5791/0897-1781-29.3.83>, while Dr. Shannon Pratt, CFA, ARM, ABAR, FASA, MCBA, CM&AA, responds “In Defense of Discounts for Lack of Marketability”: <https://bvreview.org/doi/abs/10.5791/0897-1781-29.3.97>. DLOMs being a central topic to business valuations, particularly of closely held businesses, these two articles form part of the greater debate that spans at least 129 *Business Valuation Review* articles.¹⁸

In the next issue, Winter 2010, Roger J. Grabowski, ASA, highlights how the “Great Recession” and the dramatic decline in U.S. Treasury yields affected “Developing the Cost of Equity Capital: Risk-Free Rate and ERP during Periods of ‘Flight to Quality’”: <https://bvreview.org/doi/abs/10.5791/0897-1781-29.4.172>. This was a particularly hot topic during those years when the “risk-free rate” was first reduced to “near-zero” and continues to be relevant.

In that same Winter 2010 issue, Dr. Keith Sellers, Dr. Brett King, and Dr. Yingping Huang demonstrate the strengths (and limitations) of the option-pricing method (used in conformance with the AICPA’s “Valuation of Privately-Held-Company Equity Securities Issued as Compensation”) in allocating enterprise value between the various components of a complex capital structure, in “Using Binomial Lattice Models to Value the Components of a Complex Capital Structure”: <https://bvreview.org/doi/abs/10.5791/0897-1781-29.4.145>. Having employed binomial lattice models and closed-form (Black-Scholes) option-pricing models for those and other valuation purposes, I found the article relevant and informative.

(Fall 2011) Eric Nath, ASA, brings a different perspective on cost of capital estimation in “The Biggest Business Valuation Myth”: <https://bvreview.org/doi/full/>

¹⁸See http://bit.ly/BVReview_DLOM.

10.5791/BVR-D-11-00011.1. It introduces the Pepperdine Private Cost of Capital research¹⁹ and, using very direct criticisms, challenges appraisers with a number of conceptual and empirical issues inherent in using CAPM and, indeed, in using any historical public market returns as proxies for expected or required returns.

(Summer/Fall 2012) Brian H. Lee, ASA, Daniel L. McConaughy, PhD, ASA, Mary Ann K. Travers, ASA, and Steven R. Whitehead present “The Long-Term Relationships between Capital Expenditures and Depreciation and Long-Term Net Working Capital to Sales across Industries”: <https://bvreview.org/doi/full/10.5791/12-00015.1>. Expanding upon an earlier work on the topic by McConaughy and Bordi,²⁰ and using 15 years of data (1997–2011) from Capital IQ, it examines these relationships in great detail over time and by industry and gives an example of the potential effect upon capitalized value (e.g., terminal value) of replacing the simplified assumption of CAPEX=DEPR in perpetuity with a relationship based on long-term empirical data specific to an industry.²¹

(Spring 2015) Robert Morrison, ASA, BV/IA, writes about the updates in USPAP and related appraisal reporting and record-keeping issues in a lengthy letter, “From the Chair of the Business Valuation Committee: Draft Reports, Oral Reports, Record Keeping, and USPAP”: <https://bvreview.org/doi/10.5791/0882-2875-34.1.39>. I found it an enlightening review of how changes in USPAP affecting business valuations are proposed—and then withdrawn—along with an analysis of potential implications for our profession. Ultimately, the article ends anticlimactically with the standards effectively retaining their status quo, but in doing so shows the gyrations of policy-making related to USPAP.

In 2015, two other articles take aim at two perennial hot topics, CAPM and the size premium. First, in Spring 2015, Dr. Pablo Fernandez presents a direct challenge to CAPM in his article “CAPM: An Absurd Model”: <https://bvreview.org/doi/10.5791/0882-2875-34.1.4>. In Winter 2015, Dr. Aswath Damodaran challenges our thinking about “The Small Cap Premium: Where Is the Beef?”: <https://bvreview.org/doi/10.5791/0882-2875-34.4.152>. I

¹⁹See <https://bschool.pepperdine.edu/institutes-centers/centers/applied-research/research/pcmsurvey/>.

²⁰Daniel McConaughy and Lorena Bordi, “The Long Term Relationship between Capital Expenditures and Depreciation Across Industries: Important Data for Capitalized Income Based Valuations,” *Business Valuation Review* 23 (2004):14–18.

²¹The article also draws on and cites prior work examining the CAPEX=DEPR question, including Gilbert Matthews, “CapX = Depreciation Is Unrealistic Assumption for Most Terminal Values; Frequent Error Causes Overvaluation,” *Business Valuation Update* 8 (2002):1, 3. See also Jay B. Abrams, “Forecasting Cash Flow: Mathematics of the Payout Ratio,” *Business Valuation Review* 22 (2003):66–76.

find both articles appealing because they are from academics who are known to and interact extensively with business valuation practitioners, and because they present significant intellectual challenges worth considering by scholars and practitioners alike.²²

(Winter 2016) Gilbert Matthews, CFA, presents an in-depth, detailed review of “Stock-for-Stock Mergers: An Empirical Study of Fairness Determinations in Fairness Opinions”: <https://bvreview.org/doi/10.5791/BVR-D-16-00015.1>. In a follow-up to his prior analysis on cash transaction fairness opinions,²³ Matthews examines stock-for-stock mergers (where the selling shareholders retains an equity interest in the ongoing enterprise). I appreciate this article for its extensive analysis of the substantive valuation aspects of fairness opinions (which I find are a trove of enlightening and useful information).

(Summer 2017) Raymond Rath, ASA, CEIV, CFA, discusses the newly created ASA designation: “Certified in Entity and Intangible Valuations (CEIV)—Advancing the Quality of Valuations”: <https://bvreview.org/doi/10.5791/CEIV-1.1>. Given the ever-increasing importance of the valuation of intangible assets, this new designation is something we ought to consider and understand better. As stated in the abstract: “This article provides an overview of various efforts to advance valuation quality over the years. An overview of the Mandatory Performance Framework and the Application of the MPF is provided, as is a discussion of the CEIV designation and related requirements.” As our valuation profession continues to evolve, articles such as this one that educate us on how ASA is responding to that evolution are noteworthy.

Closing Thoughts, for Now

First of all, thanks to the existing editors emeritus (Jay Fishman, FASA; Roger Grabowski, ASA; and Dan McConaughy, PhD, ASA) for suggestions of relevant articles to include in this review. In all, I include archived articles from the 1980s, 1990s, 2000s, and the current decade of the 2010s. These are but a small sample of the nearly 800 articles published and available online from the *Business Valuation Review*. Consider this virtual library an extension to all the education, training, and knowledge you gain from courses, conferences, newsletters, and peers to develop and maintain your competence as a professional appraiser.

In reviewing all the issues of *Business Valuation Review*, I found that although some authors have

²²Although I have my own perspectives on both topics, and thus a number of disagreements with the content presented, I deeply respect the criticisms and thought-provoking questions leveled by both scholars.

²³See Gilbert E. Matthews, “Valuation Methods in Fairness Opinions: An Empirical Study of Cash Transactions,” *Business Valuation Review* 31 (2012):55–74, <https://bvreview.org/doi/full/10.5791/12-00009.1>.

contributed many articles (prior editors and associate editors/editorial review board members, in particular, contributing extensively over the years), the majority of our knowledge base has actually come from a wide array of authors, contributing perhaps only a few times or even once, and representing many different perspectives—from research academicians to professors of practice to established “old guard” names in our profession to

relatively new and unknown names; all have had a role in expanding our knowledge and challenging our thinking to make us better in our business valuation profession. I encourage each person reading this to take time to review this store of knowledge presented in the reprinted articles and all the other articles available online, and to add your own knowledge and expertise in an article submission to help advance the profession.

GOODWILL AND EXCESS EARNINGS

James H. Schilt, A.S.A., C.F.A.

The question of monetary worth of the goodwill of a business enterprise is primarily one of fact, not law. For this reason, it is difficult to find in the case law general legal principles that can be said to be precise in solving this particular valuation problem. Reviewing a considerable body of literature, corporate experience, and an extensive number of tax and legal determinations confirms the lack of a universally accepted method or formula for business valuation. Moreover, there are many subjective elements in appraisal methods, and as observed by reviewing many court cases this is largely responsible for the great disparity in goodwill values given by professionals for the same company. Unfortunately, the courts have created a great deal of confusion in not having achieved any uniformity or consistency which can be relied on other than that all relevant factors must be considered. There is a tendency by the courts to uphold any reasonable method of appraisal even though some different method may be presumed to yield more accurate results.

Broad Definition

In business appraisal the elusive quarry is the monetary value of goodwill. In my own experience, I have run across two schools of thought regarding this nebulous intangible asset. I think both can be identified by quoting from important court cases. The broad version is that "goodwill is the advantage or benefit which is acquired by the establishment beyond the mere value of the capital, stock, funds, or property employed therein, in consequences of the general public patronage

and encouragement which it receives from constant or habitual customers, on account of its local position, or common celebrity, or reputation for skill and affluence, or punctuality, or from other accidental circumstances, or necessities, or even from ancient partialities or prejudices." This concept was originally set forth in the writings of Justice Story in the mid-nineteenth century,¹ and was quoted by the California Supreme Court in 1867² and the U.S. Supreme Court in 1893.³ The above appears to be an elucidation of Lord Eldon's classic dictum of 1810 that the essence of goodwill is the probability that the old customers will return to the old stand.

Narrow Definition

The narrow school can be summarized by quoting Standard Oil Company of California v. Moore: "In measuring the value of the good will of such a business, appropriate factors to be considered are: (1) What profit has the business made over and above an amount fairly attributable to the return on the capital investment and to the labor of the owner? (2) What is the reasonable prospect that this additional profit will continue into the future, considering all the circumstances existing and known as of the date of valuation? See Kimball Laundry Co. v. United States, 388 U.S. 1, 16-17, 69 S. Ct. 1434, 93 L. Ed. 1765."⁴ (Emphasis added)

In Kimball Laundry, the court stated that it would be theoretically possible to arrive at a total value of the business by not adding the capitalized value of excess income to a valuation of the physical property, but by capitalization of all income. However, it failed to use this method on the basis that the hazards of predicting future earning power were too great.

Certainly earnings projections are difficult to make and often are not very reliable. Corporate executives, economists and financial analysts often fail miserably in this regard.⁵ In spite of the problems and the fact that the growth rate may change from time to time, there is only one best estimate at any given time, regardless of the degree of uncertainty associated with it. (The same would hold true for capitalization rates.)

Excess Earnings Method

The excess earnings method was given official sanction by the Internal Revenue Service in 1920 in Appeals and Review Memorandum Number 34 as a method of computing loss of goodwill by breweries (as of March 1, 1913) because of prohibition.⁶

According to the IRS goodwill formula, one determines the average tangible assets used in the business in the five or more years prior to the date of valuation and applies the percentage return on tangible assets that prevail in the industry of which the company is a part, or 8% to 10% if no industry figures are available. The resultant figure is deducted from the average annual earnings computed over the same period and the result is the return on intangible assets. This figure is capitalized at a rate of 15% to 20%. The capitalized value or goodwill is added to the tangible to arrive at the going concern value of the company.

Recent IRS Philosophy

The IRS has taken an important step in an effort to try and control the

usage of the ARM 34 approach. Revenue Ruling 59-60 states that: "The formula approach may be used in determining the fair market values of intangible assets only if there is no better basis therefore available."⁷ The IRS also makes some interesting comments in its Appellate Conferee Valuation Training Program textbook, published in 1957, regarding the formula approach. ". . . All that can be said for ARM 34 or a similar formulas method of capitalization using two rates of interest, is that you hope to get a good answer based upon two bad guesses. It is difficult enough to get one reasonably accurate rate of capitalization using normal appraisal methods such as the comparison with market prices for publicly-held stocks. To get two fairly accurate rates, one for tangibles and the other for intangibles, other than by the use of pure guess-work, is impossible. . . . To attempt to segregate value based on earnings as between normal income and that induced by whatever goodwill or other intangible assets the business may possess, is to aspire to a higher degree of clairvoyance than has yet been demonstrated as obtainable by mere man."⁸

While the IRS may wish to disown a formula-type approach, the same text still speaks about goodwill being attributed to "greater than customary profits." Revenue Ruling 59-60 has more or less set the standards for determining fair market value of closely held corporations. Issued in 1959, for estate and gift tax purposes, the ruling has been widely adopted as a guide by business appraisers in determining fair market value regardless of the purpose. Unfortunately, under Section 4 "Factors to Consider" is the following statement: "In the final analysis, goodwill is based upon earnings capacity. The presence of goodwill and its value, therefore, rests upon the excess of net earnings over and above fair return on the net tangible assets." The ruling does, however, allude to the fact that "such factors as the prestige and renown of the business, the ownership of a trade or brand name, and a record of successful operation over a prolonged period in a particular locality also may furnish support for the inclusion of intangible value." Revenue Ruling 68-609 repeated the formula of ARM 34 along with the caveat that it should be used only if there was "no better basis available."⁹

General Use of Excess Earnings Formula

The excess earnings formula receives wide recognition beyond the IRS. For example, the Small Business Administration in its book Buying and Selling a Small Business, states that "as a practical matter, above-average earnings are normally considered the best evidence of the existence of goodwill, and the value placed on the goodwill at the time of its sale is often determined by capitalizing these extra earnings." The author adds additional confusion to the subject by warning that average earnings for an industry are not necessarily normal earnings and then walks away from the problem by using the expression "above-normal earnings."

The Bank of America in its Small Business Reporter series has a pamphlet entitled, How to Buy or Sell a Business, which suggests a formula that prescribes the use of "extra or excess" earnings to estimate the value of intangibles. One of the newest reference books in the field, published in late 1981, The Professional Handbook of Business Valuation,¹⁰ in addition to one of the standard texts on the subject, the Business Valuation Handbook,¹¹ prescribes the excess earnings method in addition to other approaches to determine the value of goodwill.

The State of California and probably many other jurisdictions as well, sets forth a formula for evaluating goodwill for inheritance and estate tax purposes that is similar to ARM 34.¹² The major difference are that unless a "fair return"

on net tangible assets is determined 15% will be considered proper, and any excess return is multiplied by the "number of years purchase period" (i.e., the number of years of accumulation of earnings prudent buyer would require for payback of the purchase price) which will be five years "unless the nature of the character of the business in any particular case require a different figure."

In 1975 California passed Assembly Bill No. 11, which allows compensation to a business owner for loss of goodwill due to eminent domain proceedings. Section 1263.510 of the Code of Civil Procedure now states that: "Within the meaning of this article, 'goodwill' consists of the benefits that accrue to a business as a result of its location, reputation for dependability, skill or quality, and any other circumstances resulting in probable retention of old or acquisition of new patronage." Although the statute does not address the issue of valuation, it leaves the door open to methods other than excess earnings.

Real World

According to the excess earnings formula, a higher capitalization rate is required on intangibles in the business than on the tangible assets. This is due to the belief that intangible assets are less "real" and hence need a higher return to support them. In the real world, however, earnings based on goodwill are often less vulnerable to competition than earnings based on such things as plant and equipment. Moreover, a company requiring a relatively small capital investment can often expand its sales and profits faster than one that needs a large plant investment per dollar of sales. Also publicly traded companies that show a high return on invested capital tend to sell at higher price-earning multiples and thus lower capitalization or discount rates than companies that do not enjoy this advantage.

The profits of a business enterprise are the joint product of the three major classes of resources--land, labor and capital. To try to separate profits that originate from the tangible assets from profits that originate from the efforts of management and labor, for example, is not in accordance with common sense.

Market Valuations

One can readily observe corporate valuations as computed by the stock market and see that the excess earnings school flies in the face of reality. For example, while valuations vary among types of companies and from period to period, the majority of stocks in certain industries which earn a high return on capital will sell at large premiums over net worth, indicating substantial goodwill value even though many companies do not have returns in excess of the industry norm. The same holds true for groups that historically sell at around or below book value even though several companies that make up the group earn an above average return.

Aside from the stock market, there are incorporated and unincorporated businesses that change hands daily at prices above the market value of their tangible assets even though they do not have excess earnings.

Although a business might possess goodwill without current earnings ("the old stand" might possess a valuable lease or "on account of its local position, or common celebrity, or reputation for skill and affluence") the most satisfactory method to use in valuing a going concern is to capitalize earning capacity. This

method is somewhat similar in nature to goodwill as it attaches to the business rather than the tangible assets employed. As long as valuation is based upon capitalization of earnings, the goodwill element is taken into consideration automatically. The actual amount of goodwill is the residual after subtracting the value of the net tangible assets.

The multiple to apply to earnings may be obtained from the price-earnings ratios of publicly traded common stocks of companies in the same or comparable businesses. Even if one cannot be confident that the corporations are sufficiently similar at least it can be used to test the soundness of valuation arrived at by other means. Another method is to capitalize earnings at a reasonable return or investment based on money market rates and relative risk.¹³

Since the value of any business asset is the present worth of future benefits to be enjoyed by the owner, it must be stressed that values are future-oriented, and that historic results should only be used as a guide to the future. Past earnings also must be carefully reviewed for inconsistencies and inequities.

Conclusion

In the final analysis, what is usually sought in estimating goodwill is to assist the appraiser in determining the fair market value of the total business concern, or what would it sell for were the market composed of "a willing buyer and a willing seller, neither of whom is under any compulsion to buy or sell, and both of whom having reasonable knowledge of all relevant facts."¹⁴

It appears that the reason for the wide currency of the excess earnings method is that it allows the courts, professionals and businessmen to have a determinable peg on which they can hang their valuation, and the fact that they have no clear-cut measure of the value of the business other than what is shown on the balance sheet. However, the support seems to be on the side of those who use the broad version of goodwill.

¹J. Story. Commentaries on the Law of Partnership, Sec. 99 at 179; (6 ed 1868).

²Bell v. Ellis 33 Cal. 620

³Metropolitan Nat. Bank v. St. Louis Post Dispatch Co. 149 U.S. 436. 4251 F.2d 188 (9th Cir. 1957)

⁵See D. Dreman, "Tricky Forecasts," Barrons, July 24, 1978.

⁶ARM 34, 2 CB 31

⁷Rev. Rul. 59-60, 1959-1 CB 237

⁸[1978] 49 Fed. Est. & Gift Tax Rep. (CCH)

⁹Rev. Rul. 68-609, 1968-2 CB 327

¹⁰J. Schnepper, The Professional Handbook of Business Valuation (Addison-Wesley Book Publishing Co., Menlo Park, California, 1981).

¹¹G. Desmond and R. Kelley, Business Valuation Handbook (Valuation Press, Inc., Llano, California, 1977).

¹²Cal. Rev. & Tax Code Sec. 13951.

¹³For a general discussion see J. Schilt, "A Rational Approach to Capitalization Rates for Discounting the Future Income Stream of a Closely Held Company," The Financial Planner, January, 1982.

¹⁴U.S. Treas. Reg. Sec. 20.2031-1(b)

Challenging Standard Business Appraisal Methods

James Schilt, C.F.A. A.S.A.

Habit with him was all the test of truth,
'It must be right: I've done it from my youth'
George Crabbe 1754-1832

Excess Earnings Method

Constant use ingrains certain ways of doing things into the system and though logic would have us do otherwise habit takes over. Examples of this can be found in the valuation of a closely held business. One method of valuation that should be excoriated is the excess earnings/formula approach.

This method was given official sanction by the Treasury Department in 1920 in Appeals and Review Memorandum (A.R.M.) 34¹ as a method for valuing goodwill of breweries and distillers that was lost with the advent of Prohibition. Although the method itself probably dates back to the previous century.

According to the Treasury goodwill formula, one determines the average annual tangible assets used in the business in the five or more years prior to the date of valuation and applies the percentage return on tangible assets that prevails in the industry of which the company is a part, or 8% to 10% if no industry data are available. The resultant figure is deducted from the average annual earnings computed over the same period and the result is the "excess earnings", or the return on intangible assets. This figure is capitalized at a rate of 15% to 20%. The resultant capitalized value represents the intangibles or goodwill and is added to the tangible assets to arrive at the fair market value of the company.

The ruling was somewhat restricted in use by Revenue Ruling (Rev. Rul.) 65-192² which stated that "(T)he formula approach may be used in determining the fair market values of intangible assets only if there is no better basis therefor available"³

In 1959, the Treasury Department issued Rev. Rul. 59-60,⁴ which outlines in some detail the factors that should be considered in valuing the closely held company. While the ruling was issued for estate and gift tax purposes, it is widely used by appraisers as a guideline regardless of the purpose of the appraisal.

The Department states that the following factors are basic and require examination in each case:

- a) Nature of business and the history of the enterprise from its inception.
- b) Economic outlook in general, and condition and outlook of the specific industry in particular.
- c) Book value of the stock and financial condition of the business.
- d) Earning capacity of the company.

- e) Dividend-paying capacity.
- f) Any goodwill or other intangibles.
- g) Sales of the stock and size of the block of stock to be valued.
- h) Market prices of stocks or corporations engaged in the same or a similar line of business whose stock is actively traded in a free and open market, either on an exchange or over-the-counter.

These factors have become part of the generally accepted principles of the appraisers' art. Unfortunately, tucked away in the nether regions of the ruling is the statement that "The presence of goodwill and its value, therefore, rests upon the excess of net earnings over and above a fair return on the net tangible assets" (emphasis added).

Some fourteen years later the Treasury Department saw fit to update and restate A.R.M. 34 and other decisions with Rev. Rul. 68-609⁹ by repeating the earlier instructions along with the caveat that the formula should not be used if there is a better basis available for determining the fair market value of intangibles.

In spite of repeated warnings by the I.R.S. the excess earnings method has received wide popularity as a preferred method of business appraisal. Pamphlets for the entrepreneur issued by the Bank of America⁸ and the Small Business Administration⁹ prescribe the formula method; standard appraisal manuals published in the past decade have commended this approach; articles in professional journals have recommended the formula; and it has been set forth uncritically in such legal reference material as American Jurisprudence;¹⁰ Mertens, Federal Taxation¹¹ and various ALI-ABA programs.¹²

The courts have also had a hand in furthering the concept of "excess earnings" in the valuation of goodwill. For example, the U.S. Supreme Court in Kimball Laundry,¹³ the California¹⁴ Supreme Court in Standard Oil v. Moore¹⁴ and the U.S. Tax Court in Concord Control.¹⁵ Moreover, the State of California and other jurisdictions as well prescribe the formula for the valuation of goodwill for inheritance and gift tax purposes "unless the facts and circumstances of a particular case require the use of a different method."¹⁶

It is doubtful that many of these authorities have given much consideration as to just how unrealistic this widely used method can be; and actually believe that only companies with income in excess of the norm have goodwill.

Illustrated below is an example of two similar companies in the same industry. The principal difference between the two firms is that Corporation A has more fixed assets than Corporation B and thus has twice the net worth or invested capital. If the industry return on net worth is 10 percent (by coincidence equal to the 10 percent called for in the formula if no industry figure is available), then Corporation A has no "excess earnings" or goodwill component as its net income is just equal to the industry, or the 10 percent hurdle rate. Corporation A's fair market value, according to the formula, is limited to the \$10,000,000 it has in net tangible assets. On the other hand, while Corporation B's earnings are equal to A and although it is twice as profitable in relation to return on invested capital, it is still valued less than A according to the formula which capitalizes goodwill less liberally than the earnings applicable to the tangible assets.

TABLE 1

	<u>Corporation A</u>	<u>Corporation B</u>
1. Average Earnings	\$ 1,000,000	\$1,000,000
2. Average Value of Net Tangible Assets	\$10,000,000	\$5,000,000
3. Required Rate of Return on Tangible Assets	10%	10%
4. Earnings From Tangible Assets (3. x 2.)	\$ 1,000,000	\$ 500,000
5. Excess Earnings (1. - 4.)	Ø	\$ 500,000
6. Capitalization Rate on Excess Earnings	20%	20%
7. Goodwill (5. ÷ 6.)	Ø	\$2,500,000
8. Fair Market Value (2. + 7.)	<u>\$10,000,000</u>	<u>\$7,500,000</u>

To observe the real world one only has to look at stock market quotations. The illustration below uses actively quoted common stocks of major computer firms. The value placed on these companies is far different than what the excess earnings/formula method calls for. The two companies with the highest return on net worth, Commodore International and Apple Computer, do have the highest goodwill component in the market value of their common stock; however, most of the others do not show any correlation between return on net tangible assets and amount of goodwill imputed in the value. (Several of the marginal companies have negative goodwill components but this factor would probably change if a premium were to be paid to acquire control).

TABLE 2

<u>Company</u>	<u>5 Yr. Avg. Earned on Net Worth</u>	<u>Market Value 8/10/84</u>	<u>5 Yr. Avg. Net Worth</u>	<u>Goodwill Component 8/10/84</u>
Commodore Int'l	39.9%	23	\$2.72	746%
Apple Computer	32.4	25	2.97	742
Prime Computer	25.6	16	3.42	368
Triad Systems	23.7	9.8	4.92	99
Int'l. Business Machines	21.1	113	31.13	263
Wang Laboratories	20.6	27	3.78	614
Cray Research	17.8	48	7.32	556
Hewlett-Packard	16.3	38	8.08	370
Applied Magnetics	14.7	9.6	8.76	10
Tandem Computers	13.1	15	4.75	216
Digital Equipment	13.0	87	46.66	54
Honeywell, Inc.	12.9	56	44.15	27
SCI Systems	12.4	14	2.46	469
Data General	11.4	47	17.32	171
Control Data	9.8	27	41.77	(35)
Sperry Corp.	9.7	38	53.48	(29)
Electronics Associates	8.2	3	5.69	(47)
Amdahl Corp.	7.7	11	7.64	44
Burroughs Corp.	7.7	54	50.48	7

Source: Value Line Investment Survey. Calculations by author.

For those readers who wish to challenge the excess earnings/formula approach, there exist numerous authorities to cite, a prime source being the Internal Revenue Service. In the I.R.S. Appeals Officer Valuation Training Program coursebook it is stated:

All that can be said for A.R.M. 34 or a similar formula method of capitalization using two rates of interest, is that you hope to get a good answer based on two bad guesses. It is difficult enough to get one reasonable accurate rate of capitalization using normal appraisal methods such as the comparison with market prices for publicly-held stocks. To get two fairly accurate rates, one for tangibles and another for intangibles, other than by the use of pure guesswork, is impossible.¹⁷

Over the decades the courts have referred to four texts more often than others as authorities on business valuation; Bonbright, *The Valuation of Property*¹⁸; Dewing, *The Financial Policy of Corporations*¹⁹; Graham, Dodd & Cottle, *Security Analysis*²⁰; and O'Neal, *Close Corporations*.²¹ Yet as far back as 1937, Professor Bonbright in speaking about this method said:

Everything depends on the choice of the two rates of capitalization; and know no more about the proper choice of these rates than is known about the choice of a single, overall rate. Even the basic assumption that excessive earnings are the more evanescent earnings has never been well documented by statistical evidence (footnote omitted).²²

Messrs. Graham, Dodd and Cottle in referring to the Treasury formula that values goodwill less liberally than the tangible assets comment that "Nothing faintly resembling this procedure can be detected in the calculation of investors, speculators, and financial analysts with respect to marketable common stocks."²³ Then why does the excess earnings/formula method receive such wide acceptance? An explanation according to the same three authors is that:

(T)he private owner has no clear-cut measure of the value of his business other than that shown on his balance sheet. Hence he always starts with this figure and often ends with it; any adjustment he makes will be in the direction of adding a tentative increment for "goodwill," which is calculated along conservative lines. If a formal valuation becomes necessary-for example, when estate taxes are due-he is likely to apply a standard formula which may go back to the last century.²⁴

The excess earnings/formula has also been treated critically in professional journals. In 1966 the Iowa Law Review published a rather comprehensive article by Professor Neuhauser entitled, "The Two-Step Method of Valuation: One Step Backward?"²⁵ Commerce Clearing House, which has consistently included worthwhile articles on business appraisal in its journal, TAXES - The Tax Magazine, published three articles in recent years that are adverse to the method: Schilt, "An Objection to the Excess Earnings Method of Business Appraisal (1980)²⁶; Fox, "Closely Held Business Valuation: The Uninformed Use of the 'Excess Earnings/Formula Method." (1982)²⁷; and Hen szey, "Going Concern Value After Concord Control"(1983)²⁸

In challenging the excess earnings method and exception might be made when it is used in the valuation of non-marketable professional goodwill. Several authorities agree that a "fair return" should be allocated to the partner's capital investment before calculating the intangible value.²⁹ Many appraisers would also claim that the excess earnings method is enterprises.³⁰ The only apparent virtue in the method, however, appears to be that of a last resort "if there is no better basis therefor available."

Weighted Average Method

Another often used technique in the appraisal of the business enterprise is to take a weighte d average of entirely different methods with the hope of obtaining one good answer. The appraiser may take the book value of the net tangible assets, capitalized dividends, capitalized earnings and the price-earnings ratio of similar publicly-traded stocks (a form of earnings capitalization) even though the Trea sury states that no useful purpose³¹ is served by taking an average of these factors and basing the valuation on the result.

Book value usually plays a significant part in the averaging of different valuation methods. It has long been recognized, however, that net asset values per book have little relationship to going concern value. For example, the price-earnings ratios of the stock market vary directly with growth in earnings per share and, to some extent, return on net tangible assets rather than the amount of the assets per share. What is important to the investor in both private and public companies are profitable assets not expensive assets.

Dividend-paying capacity was used in the two most often-cited cases using weighted average approaches: Central Trust Co. v. U.S.³² and Bader v. U.S.³³ Revenue Ruling 59-60 considers dividend-paying capacity as being "fundamental and requiring careful analysis in each case"³⁴ along with book value and earning capacity. Dividend-paying capacity is used rather than actual payments as cash dividends are usually not paid by a close corporation because of double taxation of the corporation and the income recipients.

It is almost impossible to accurately estimate dividend-paying capacity of the close corporation. The private business enterprise has less access than the publicly-held company to outside capital and, therefore, should retain more of its earnings. "The assumption of a dividend rate higher than the historical rate due to a perceived 'dividend capacity' would require assuming a reduction³⁵ in retained earnings, which affect future earnings and consequently dividend capacity". Further difficulty is encountered when you consider the fact that publicly-traded stocks are valued on the basis of earning power rather than on current dividends. Since dividends are dependent upon earnings, the capitalization of the latter would appear to be the superior method of valuation.

The capitalization of earnings may take the form of discounting historical, current or projected income or cash flow, and is similar to what is done by investors in the stock market when they refer to the price-earnings ratio which is the reciprocal of the capitalization rate. An average of the various methods dealing with earnings, however, is logical as they all deal with the income stream.

The theory behind using a weighted average of the methods involving earnings, assets, dividends and market is to minimize the defects in any one method and to assure that no single one will be determinative.³⁶ Book value, or even better, liquidating value, is appropriate if there are little or no earnings. Since the worth of any business asset is the present value of the expected income stream capitalization of earnings would seem to be the most logical method for the majority of operating companies. The capitalization rate may be taken from the rates applied by the stock market to similar corporations, with necessary adjustments, or from alternative investment opportunities. As dividends are a subcategory of earnings they should not be given independent weight unless the valuation concerns outside minority shareholders.

In the law there is wide use of the terms "investment value" and "market value." Investment value has been taken to mean capitalization of past earnings along with book value and dividend history. The market value method refers to valuing the private corporation on the basis of what similar public corporations sell for in relation to such yardsticks as earnings and possibly book value and dividend yield. Since what is termed investment value must have some relationship to what is happening in the marketplace these methods overlap and add further confusion for the reviewer.

Market Comparison Method

The use of comparable publicly-traded stocks is one of the most useful techniques available to the appraiser for determining the fair market value of the close corporation. Moreover, it is sanctioned by statutory and judicial rulings. Rev. Rul. 59-60 states specifically that among the factors that are "fundamental and require careful analysis in each case...(is) the market price of stocks of corporations engaged in the same or similar line of business having their stock traded in a free and open market, either on an exchange or over-the-counter."³⁷

Good comparisons are often difficult to come by and, in some cases, similar publicly traded stocks may not be found when attempting to value the privately-held company. The I.R.S. acknowledges this in its valuation training program coursebook. "In the usual case, we will find reliable and helpful comparatives to be in short supply and therefore the appraiser should adopt a liberal attitude for his or her analysis."³⁸

The use of the stock market to establish the price-earnings ratio, or its reciprocal, the capitalization rate to discount earnings saves the appraiser from using a multiple or divisor that is less objective. Accordingly, almost all the modern literature on the subject suggests the use of price-earnings ratios established in the marketplace for stocks of similar publicly owned corporations.³⁹ (Unfortunately, these same authors fail to have an answer when no comparisons are found).

It is understood that, as the court stated in Richter v. U.S.: "The comparative appraisal method produces, nevertheless, no magic formula which rigidly gives the exact valuation answer. Companies are rarely identical in size, operation, or product, and allowances must be made as the statute says, 'for all other factors'."⁴⁰

What needs to be pointed out, however, is that shares that trade on an exchange or over-the-counter almost always represent minority interest regardless of the daily trading volume. Accordingly, the appraiser should not take the average price-earnings ratio of comparative publicly-traded stocks and use this multiple against earnings of the close corporation to obtain an estimate of fair market value, which is too often done.

Premiums paid to shareholders whose stock is actively traded in the marketplace in order to acquire control have exceeded 200 percent during the past decade but the median premium has remained at about 50% during at least the past six years.⁴¹ The price paid to acquire control is generally determined through active negotiation between the partners. Even in an unfriendly offer to purchase a large block of stock or control, the price represents the results of research by the buyer into the management, earning capacity, financial condition, excess assets, synergistic opportunities, etc. "(C)ontrol value is developed through analysis and negotiation...not by arbitrarily applying a particular premium to minority interest price."⁴²

The number of offers to buy control and the premiums paid have been inversely related to the level of the stock market during the same period.⁴³ This is only natural as in weak markets stocks tend to sell below their intrinsic value. As there is no reliable percentage over stock market value to use as a control premium the appraiser must consider the then current market conditions. While we have emphasized the premium for control, there are times when the public becomes overly enthusiastic for stocks in certain industries and whole businesses may be worth considerably less than would be indicated by the actively traded minority shares.⁴⁴

The reader should not be confused with placing a premium for control on ownership interests in a private business as many authorities would advocate. They reason that since a discount is usually deducted for minority interest the opposite should be true for control. What they have failed to realize is that when proper consideration is given⁴⁵ to all the pertinent factors in the appraisal problem control has been taken into account.

The intent of this article is to bring to the attention of the reviewer that he or she should look with a critical eye before accepting some of the time-honored methods of determining the fair market value of the closely held business enterprise. As Shakespeare said in Much Ado About Nothing: "O, What men dare do! What men may do! What men daily do, not knowing what they do!"

FOOTNOTES

- 1) 2 C.B. 31 (1920)
- 2) 1965-2 C.B. 259.
- 3) Id.
- 4) C.B. 1959-1, 237.
- 5) Id. Sec. 4.01.
- 6) Id. Sec. 4.02(f).
- 7) 1968 - 2 C.B. 237.
- 8) "How to Buy or Sell a Business," Small Business Reporter (San Francisco: Bank of America, 1982).
- 9) V. Bunn, "Buying and Selling a Small Business," (Washington, D.C.: Small Business Administration, 1969).
- 10) 16 Am. Jur. Proof of Facts, 2d, "Forensic Economics - Valuation of Business and Business Losses," Sec. 57 et. seq. (1978); 34 Am. Jur. 2d 925, Federal Taxation, Par. 8975 et. seq. (1984). In paragraph 8975 it is stated that "Goodwill is an expectation of earnings in excess of a fair return on the capital invested in the business" (emphasis in original).
- 11) 10 Mertens, "The Law of Federal Income Taxation" Sec. 59.30 (Zimet rev. ed. 1976).
- 12) E.g., D. Hardee, "Valuation Problems in a Closely Held Business, "ALI-ABA Resource Materials, Estate Planning for Interests in a Closely Held Business (1981) Sec. IIh.; "How to Value Marital Property in Divorce: The Difference It Can Make," ALI-ABA Video Law Review (Feb. 26, 1982).
- 13) 338 U.S. 1; 69 S. Ct. 1434; 93 L. Ed. 1765 (1949).
- 14) 251 F. 2d 188 (9th Cir. 1957).
- 15) 35 TCM 1345 (1976) aff'd 615 F. 2d 1153 (6th Cir. 1980). On appeal, the Sixth Circuit remanded the case to the Tax Court for purposes of explaining its method of determining the value of the intangible assets and its reasons for choosing that method. In this particular case the Tax Court and the Court of Appeals ruled that the intangible value was going concern value rather than goodwill although the same excess earnings formula was used. Supplemental opinion, 78 TC 742 (1982), acq. IRB 1984-17,5.
- 16) Administrative Code, Title 18, Sec. 13951.6.

- 17) "IRS Valuation Guide for Income Estate and Gift Taxes," CCH Federal Tax Report No. 19 (5/4/82), at 118. Also see adverse comments in section entitled, "Comparing Stock Market Evaluation to the Formula Approach," at 123.
- 18) J. Bonbright, "The Valuation of Property," (Charlottesville, Virginia: The Michie Company, 1937) (1965 reprint).
- 19) A. Dewing, "The Financial Policy of Corporations," (5th ed. 1953).
- 20) B. Graham, D. Dodd & S. Cottle, "SECURITY ANALYSIS Principles and Technique," (New York: McGraw-Hill Book Co., 4th ed. 1962).
- 21) F. Hodge O'Neal, "Close Corporation: Law and Practice," (Chicago: Callahan & Co., 2d ed. 1971).
- 22) Supra, fn. 19, at 243.
- 23) Supra, fn. 21, at 554.
- 24) Supra, fin. 21, at 553.
- 25) P. Neuhauser, "The Two-Step Method of Valuation: One Step Backwards?" 51 Iowa L. Rev. 321 (1966).
- 26) 58 TAXES 123 (1980).
- 27) 60 TAXES 832 (1982).
- 28) 61 TAXES 699 (1983).
- 29) E.g., J. Hempstead, "Putting a Value on a Law Practice," 7 Family Advocate 14 (1984).
- 30) E.g., R. Miles, Basic Business Appraisal, (New York: John Wiley & Sons, 1984) at 248.
- 31) Supra, fn. 4, Sec. 7.
- 32) 305 F. 2d 393 (Ct. Cl. 1962).
- 33) 172 F. Supp. 833 (D. Ill. 1959).
- 34) Supra, fn. 4. Sec. 4.01.
- 35) R. Longenecker, "A Practical Guide to Valuation of Closely Held Stock," 122 TRUSTS & ESTATES 32 (1983).
- 36) "Valuation of Dissenters' Stock Under Appraisal Statutes," 79 Harv. L. Rev. 1453 (1966).
- 37) Supra,fn. 4, Sec. 4.01(h).

- 38) Supra, fn. 17, at 136.
- 39) But see, J. Vinso & B. Marcus, "Valuing the Closely-Held Company," (Los Angeles: U.S.C., School of Bus., Working Paper No. 1, June 1984).
- 40) 439 F. 2d 1204 (Ct. Cl. 1971).
- 41) M. Salter & W. Weinhold, "Merger Trends and Prospects for the 1980's" U.S. Dept. of Commerce, December 1980; M. Bradley, "Interfirm Tender Offers and the Market for Corporate Control" 54 J of Business 345, (1980); K. Bodenstein & J. Hansen "Paying a Premium for Control," The National Law Journal, June 22, 1981; "PREMIUMS What Do They Really Measure?," Mergers & Acquisitions, Summer 1983; D. Austin & M. Jackson "Tender Offer Update: 1984" Mergers & Acquisitions, Spring 1984; W. Jurek, "1984 Mergers and Acquisitions Sourcebook," (Santa Barbara, Calif: Quality Services Co., 1984) at 355 (quoting J.H. Morgan & Co. of Oakbrook, Ill, research).
- 42) K. Bodenstein & J. Hansen, op. cit.
- 43) D. Austin & M. Jackson, op. cit.
- 44) W. Lyons & M. Whitman, "Valuing Closely Held Corporation and Public Traded Securities with Limited Marketability: Approaches to Allowable Discounts from Gross Values, "33 The Business Lawyer 2214 (1978).
- 45) G. Arneson, "The Case of No Majority - Control Premium" 59 TAXES 190 (1981).

WHY BUSINESS VALUATION AND REAL ESTATE APPRAISAL ARE DIFFERENT

by John D. Emory, ASA

With the onset of appraiser licensing and certification, The American Society of Appraisers (ASA) Business Valuation Committee believes it is appropriate to highlight and discuss some of the differences between business valuation and real estate appraisal. These differences are very significant and should be more widely understood in the context of regulation.

Disciplines

While both real estate appraisal and business valuation are sophisticated professional disciplines with conceptual commonality, the procedures, language, knowledge, and experience required are very different. This flows from the fact that what is being appraised is quite different.

Business valuation has to do with the value of the rights inherent in ownership of a commercial, industrial or service organization pursuing an economic activity. Real estate appraisal involves the valuation of land, improvements and associated rights.

Knowledge

The knowledge and experience base required by real estate appraisers and business appraisers is significantly different. For example, in a 1989 paper prepared for the Wisconsin Legislature by the Wisconsin Appraisers Coalition and entitled "What Appraisers Do," the following quote regarding real estate appraisal appears:

"In addition to a detailed knowledge of real estate appraisal research and analysis techniques, appraisers must be more or less conversant with the fields of building, civil engineering, architecture, surveying, forestry, soil science, agriculture, accounting, real estate brokerage, lending, urban land economics, government real estate regulations, and real estate law."

The business appraisal discipline draws heavily on the theory and practice of corporate finance and security analysis in addition to the requisite understanding of economics, business management and accounting. The umbrella labeled "corporate finance" really covers the financing of all kinds of business entities, regardless of whether they happen to be in the form of a corporation, partnership or sole proprietorship. The basic thrust of security analysis is the appraisal of an interest in an operating entity.

The business appraiser must be conversant with generally accepted accounting principles (GAAP), operating business financial statements, income tax law, federal and state securities laws and sources of data for particular industries. Business valuation often requires adjustment to financial statements and/or tax returns including inventory accounting, depreciation, non-recurring events and non-operating assets. The commercial real estate appraiser, while possibly relying on audited financial statements for verification purposes, is less concerned with GAAP earnings and more concerned with cash flow from operations plus estimates of capital additions.

Stock

The business appraiser often values securities, as ownership of a business corporation is represented by capital stock. A shareholder has no direct claim on a corporation's assets because a corporate entity intervenes between the assets and the shareholder. In real estate, an owner generally has a direct claim on the asset.

Formal valuations of common and/or preferred stock are required for various legal situations which typically fall within several classes: (1) for purposes of estate, gift and income taxes and for employee benefit plans; (2) as a basis for reorganization, recapitalization and merger or other intercompany plans; and (3) for the purpose of determining fair value under appraisal statutes of the various states. These valuations are governed by corporate or tax law. Real estate appraisers are normally not experienced or trained in such valuations.

Most formal valuations are concerned with closely held stock — stock that has no public market. Of the millions of corporations in the United States, less than 20,000 could be considered truly public companies.

Generally, real estate appraisers do not value common stock unless they are appraising the going concern value (a real estate value standard) of real-estate oriented corporate businesses such as hotels, restaurants, bowling alleys, and retail stores. It should be noted that in business valuation, unlike in real estate appraisal, the concept of going concern value is not a standard of value but an assumption about the business status.

Minority Discounts

Minority (partial) interests are common to both real estate and business. Both are typically worth less than their pro-rata portion of the whole. However, such minority interests are very different in essence and in determination.

A partial interest exists in a real estate property when there is co-ownership. The distinguishing characteristic of co-ownership is the co-tenants unity in their right to possession of the property. A dissatisfied co-tenant typically can sell his undivided fractional interest, seek a voluntary partition of the property or demand a partition of the property by the court. The appraisal emphasis is on the value of the property in total.

A business valuation of a minority interest is most often of common stock which has no direct claim on a company's assets and partition is not an available option. A minority stock's value may have little relationship to its pro-rata share of the value of the company as a whole. In addition, minority stock of a closely held company does not have marketability. This gives rise to a discount for lack of marketability.

The business appraiser must master studies involving the public marketplace for equities and control premiums or discounts in order to properly estimate the level and magnitude of discounts or premiums warranted in any particular assignment.

Terms

A major difference between real estate appraisal practice and business appraisal practice is that many terms apparently in common between the two actually have different meanings. This has caused enormous miscommunications and many erroneous appraisal results.

For example, "income" to be capitalized in a business appraisal is usually net of depreciation and amortization expense, whereas "income" to be capitalized in a real estate appraisal for value purposes is not. Real estate tends to appreciate if reasonably maintained, while business assets such as machinery and equipment tend to depreciate. Thus, important valuation terms such as net

income and cash flow have different, yet well accepted, definitions depending on whether they are being used in business or real estate appraisal.

Another ambiguous term is "fair market value". In real estate terminology, it is often used synonymously with fair value or market value, and incorporates the concept of highest and best use of the property. As such it tends to relate to an ideal or typical value resulting from a somewhat perfect market. In business appraisal, fair market value is much more closely defined and more transaction oriented: it is the price at which a transaction could be expected under conditions existing as of the valuation date.

"Fair value" as used in real estate terminology is different from the rather specific interpretation of fair value established by courts as a statutory stand of value applicable to a business appraisal.

Intangibles

Real estate appraisal does not deal adequately with the whole area of intangible business assets such as patents, trademarks, copyrights, goodwill, customer lists, employment contracts, covenants not to compete, exploration rights, "intangible drilling costs," franchises and licenses. The more a company depends on its intangible assets to generate earnings, the more important such assets are in any business enterprise value. In addition, a business appraiser may be asked to appraise these intangible assets separately. Items included as intangible assets are rapidly expanding with the evolution of law and judicial precedents. For instance, in land condemnation more attention is being given to goodwill and business values. In divorce, marital property may include professional education or homemakers' services.

In a real estate assessment for property taxes, the value of intangible business assets apart from real estate values is becoming of major importance. In Wisconsin, a major shopping mall has been assessed recently on the basis of its sale price, which was \$115 million. The mall claims the assessment should have been based solely on the property's real estate value (appraised at \$67 million) and should not include values attributable to going concern value. The mall contends that the sale price includes such things as service income, advertising, anchor tenants, reputation, market penetration, management know-how and mall activities which are not of real estate and ought not to be assessed.

The expanding importance of international markets, foreign competition, rapidly changing technology and uncontrollable market forces can have dramatic impact on business values. These forces have usually only indirect effects on or take a longer period of time to affect real estate values.

Volatility

Due to the interaction of the many intangible and tangible assets and the tendency of business markets to change more rapidly than real estate markets, business values are usually more volatile than real estate values. For example, real estate valuation does not directly take into account changing retail fashions, styles or fads, which are vital to the business of companies dealing directly with consumers, and can have significant effect on business values.

Debt Consolidations

Real estate is usually appraised as though it were free and clear of debt. In business valuation, the value of a business is generally considered to be the owner's equity (all assets less all liabilities).

Collateralization

The great majority of real estate appraisals relate to asset collateralization for lending. Relatively few business appraisals are done for lending purposes.

Location

The role of location in real estate value is usually much more important than it is in business value. The traditional question in real estate is "What are the three most important aspects to real estate value?" and the traditional answer is "Location, Location and Location." A business can be established in many locations and is usually portable. However, real estate by definition is not portable. Site and local knowledge such as zoning regulations thus are much more important to real estate appraisal than to business valuations.

Mergers and Acquisitions

Business valuation is extremely important in the very active area of mergers, acquisitions, divestitures and leveraged buyouts of operating entities, divisions, companies, subsidiaries and a variety of business assets. As real estate appraisers don't typically appraise operating businesses, with their multitudes of intangible and tangible assets, the real estate appraiser is not well equipped to deal with the many complexities in the above situations. Conversely, the business appraiser often does not understand many elements of income producing real estate such as locational impact, expense ratios, how management impacts values, capital improvements, etc.

Approaches to Value

In real estate appraisal there are three universally accepted approaches to value – the income approach, the cost approach and the market approach. In business appraisal, there is no universal acceptance of specific approaches. The value of an operating business stems almost entirely from its ability to generate income. While larger, commercial properties tend to be valued with a greater emphasis on income (cash flow), other types of real estate (single-family, empty warehouses, and factory buildings, etc.) do not consider income valuation and emphasize replacement cost or market comparables. Owner occupied real estate (single-family) value is primarily based on expected future advantages, amenities and the pleasure of owning and occupying a particular property.

Income capitalization approaches are conceptually similar in business appraisal and in real estate appraisal. However, in most cases estimating an income stream for an operating business is very different than estimating an income stream for an apartment or office building or similar income producing property. Furthermore, in business valuation, the risks of an operating business are very different in assessment and quantification than real estate risks.

In the market comparison approach, the real estate appraiser, other than for larger commercial properties, is most often looking for examples of what similar properties have sold for in meaningful proximity – what did the houses next door and down the street sell for, or what have been the most recent sale prices of similar factory buildings or warehouses in the desired locality?

The business appraiser, on the other hand, seeks financial data arising from transactions in comparable businesses, typically publicly traded companies, to help determine applicable valuation parameters. Examples of such parameters are price/earnings, price/cash flow, price/sales and price/book value, both on a company as a whole (enterprise) basis, and/or on a minority per share basis. Basing a valuation of closely held companies' stock on an analysis of the prices paid for publicly held companies stock is a method accepted by appraisers, the courts, and the IRS (Revenue Ruling 59-60 – The Magna Carta of business valuation).

In essence, market comparisons in business valuation are used to determine appropriate

market capitalization rates. For instance, a price/earnings ratio of 10 means that earnings (income) are being capitalized at 10%.

The cost approach of real estate appraisers is somewhat akin to the asset approach of business appraisers. However, except for assets that may be liquidated, the business appraiser is not interested in assets per se, but rather in assets as they contribute to the value of the business enterprise.

Definitions

The following definitions from the Uniform Standards of Professional Appraisal Practices as formulated by the Appraisal Foundation are helpful in this discussion. The Appraisal Foundation, an appraisal industry group, has been charged by Congress to set minimum appraisal standards for Federal agency related work.

Real Estate –	an identifiable parcel or tract of land including improvements, if any.
Real Property –	the interests, benefits and rights inherent in the ownership of real estate.
Business Assets –	tangible and intangible resources other than personal property and real estate that are employed by business enterprises in their operations.
Business Enterprise –	a commercial, industrial or service organization pursuing an economic activity.
Business Equity –	the interests, benefits and rights inherent in the ownership of a business enterprise or a part thereof.
Personal Property –	identifiable portable and tangible objects which are considered by the general public as being "personal", e.g., furnishings, artwork, antiques, gems, jewelry and collectibles.

With the passage of the Financial Institutions Reform Recovery and Enforcement Act of 1989, commonly known as the S&L Bail Out Bill, the Uniform Standards of Professional Appraisal Practice have become the minimum standards for licensed or certified real estate appraisers allowed to work for Federal agencies after June 1991. Two of the ten standards therein are for business appraisals, two are for personal property appraisals, one is for machinery and equipment appraisals and five are for real estate appraisals. The need for different standards demonstrates the differences between the several appraisal disciplines.

As the American Society of Appraisers offers education and professional accreditation in real property (real estate), business valuation, machinery and equipment, personal property, public utilities, technical valuation, appraisal review and management, and other valuation disciplines, its members are well situated to be aware of appraisal differences and as such are concerned with the form and substance of potential regulation.

Further in-depth information on the subject of differences between real estate appraisal and business valuation can be found in Chapter 19, "Comparison between Business Appraisal Practices and Real Estate Appraisal Practices," Valuing Small Businesses and Professional Practices, Shannon P. Pratt, Dow Jones-Irwin 1986. Portions of this paper were taken from that book and other pertinent sources.

This paper was prepared at the request of the American Society of Appraisers by its Business Valuation Committee. Since 1984 business valuation has been the fastest growing valuation discipline in the country.

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Valuation Of Privately-Held Companies: A Survey Of Investment Banking Firms

**by THOMAS T. WOODLEY, CPA and
KEITH WM. FAIRCHILD, Ph.D.**

In our function as business appraisers most of our appraisals are performed without the benefit of another appraiser's corroborating opinion either supporting or disputing our opinion. Unless, of course, the appraisal is subject to contest in the court room or other similar forum. This lack of sounding board upon which to validate our opinions has, over time, allowed self-doubt to creep into our conscience. We became critical of our ability to appraise companies and we began to question whether we could accurately determine what is the "fair market value" for a firm. Due to these apprehensions, and not wishing to lapse into an unconscious "since we are the 'experts' we must be right" attitude, we undertook a survey to inquire upon, and verify, the valuation approaches we have read, studied and used. We wanted first-hand feed-back on what methods the "experts" were using to appraise companies.

Because our focus was upon confirming the valuation methods used in assessing "fair market value" we decided to focus our survey not upon other business appraisers, who might have read the same books, or gone to the same seminars as we had, but rather upon those institutions actually either buying, selling or underwriting companies. We reasoned that a survey of such institutions would put to rest our concerns as to whether we were using the same valuation methods the "market makers" were using. Secondarily, and more as an afterthought, we wondered whether these same institutions were smarter than we were; that is, did they have some sophisticated ability that given a set of facts on a company, they all would or could come up with the same market value for the firm. We decided to see.

For our survey a case study was prepared in which a fictitious, privately-held grocery chain in Central Texas was targeted by a national publicly-held grocery chain for a "friendly" take-over. Five years' worth of financial statements (balance sheets, income statements, and statements of changes in financial position) were created along with a description of the background of the company, its competition, and the economic outlook for the geographical area. The publicly-held company that was seeking to acquire the local chain in the scenario was identified, as well as the reasons for wanting to buy the firm. A list of publicly traded comparable companies was included, as well as the information that was thought to be pertinent for valuation purposes. A deadline for completion was defined so as to allow all participants to use any and all outside information they might desire (such as current interest rates, stock prices, and economic forecasts) without confounding the results through analyses employing different economic circumstances. Essentially, the task was for each subject to determine what constitutes a "fair" value for the target firm and to describe the method(s) by which such a value had been determined. Additional data was gathered from the participants as to their revenue size and staffing to determine any correlation of results to size of responding firm.

The list of sample participants was accomplished by combing the roster of the Association for Corporate Growth to find individuals who describe themselves as knowledgeable in the field of corporate valuations and by noting every office in Standard & Poor's Directory of Security Dealers of North America that listed a corporate finance officer or department. A total of 406 questionnaires were mailed to those on the compiled list.

Results

The effort involved in arriving at a value for the scenario precluded most from performing the task of assigning a price for 100% control of the target firm. However, of the 406 questionnaires sent out, twenty-one (a 5.2% response rate) did provide estimates of value. A total of eighty-five responses were received (20.9%).

Of those responding eighty-one listed their revenue size. (See Table 1.) Of these an almost equal number were of small firms (annual revenues of less than \$10 million) and large firms (annual revenues greater than \$80 million), with the balance of the respondents scattered amongst the firms between these extremes.

Furthermore forty-two (49.4% of all responding firms) responded that they had separate merger and acquisition departments, with 14 as the average number of employees per department. Of those firms which determined a value for the case company, 68% stated that valuation decisions are made by groups which average three individuals.

Valuation

Of the twenty-one respondents who assigned a value to the firm, twenty identified themselves in terms of revenue size. Six had revenues of less than \$10 million, three had revenues of between \$10 and \$20 million, and eleven had revenues in excess of \$80 million. No one responded with a value from firms with revenues between \$20 and \$80 million.

Respondents were asked to give a minimum and maximum value for the stock of the target company as well as a most likely value. The range of responses varied from a low of \$3,850,000 to a high of \$59,300,000. The firm that supplied the high value was well outside the range of the other twenty respondents and was dropped from the analysis of value as a result. Table 2 summarizes the mean value of the responses from the twenty remaining firms.

As is seen by this table the general consensus is the target firm is worth approximately \$14,700,000. The mean minimum value of \$12,300,000 and mean maximum value of \$17,100,000 both fall within one-half of the standard deviation about the average most likely value for the firm. Thus, as a group, the respondents placed the value of the company within a relatively small range, plus or minus 16.5% about the mean-most likely value. Individually however, the estimates varied substantially more than this. An interesting note is that the book value of the fictitious firm was \$18,914,000, which is more than even the mean maximum price the respondents placed on it. Chart 1 displays each respondent's valuation.

When the responding firms are grouped by revenue size, the most likely value from the firms with less than \$10 million in annual revenue (six respondents) and those with greater than \$80 million in revenue (ten respondents) are quite close, \$16,200,000 and \$16,000,000 respectively. Both of these values are within 31% of the standard deviation about the mean of the most likely value for all firms. The remaining three respondents' (those firms with revenue between \$10 to \$20 million) mean most likely value was \$9,400,000. This reduced the overall mean value to its \$14,700,000 amount. Why these mid-size firms should report such a divergent value (even less than the average minimum value for all firms) is not determinable, although, in all likelihood it is due to the lack of sufficient respondents within this category.

If only those firms with M&A departments (nine respondents) are used in the compilation of values, the average most likely value is \$16,000,000. These respondents included three of the six small firms and six of the ten large firms.

Although the statistical significance is questionable (perhaps it is only coincidental) it nevertheless seems peculiar that the mean most likely value provided by those firms with revenues of

less than \$10 million (\$16,200,000) and those with revenues greater than \$80 million (\$16,000,000) are within plus or minus 1% of the \$16,000,000 value provided by those firms with M&A departments. Perhaps the "true" most likely value would really be within this range of values.

Methodologies

All of the respondents were asked to rank the various valuation techniques which they normally use in order of importance. Seventy-four of the eighty-five respondents provided rankings.

Price/earnings (P/E) and discounted cash flow (DCF) techniques were used by a majority. When all seventy-four respondents' rankings were tabulated, P/E and DCF were almost equally chosen. Since one approach is seldom used alone, but rather a variety of techniques in combination, it seemed justifiable to rank each alternative method based upon its selection as being one of each firm's top three preferred valuation methods. When, for example, the use of the P/E method is investigated, it is found that fifty-five respondents (74.3%) rank it as being either their first, second or third choice of valuation techniques. This is almost 10% better than the DCF approach, which forty-eight firms (64.9%) selected as being one of their first three choices. (Refer to Table 3.) Clearly a strong preference is exhibited for the P/E approach with almost three-quarters of the respondents expressing their use of it as one of their top three preferred methods. When stated in another fashion it is even more startling: 25% of the respondents do not rank this approach as being one of their first three choices.

Although chosen by 10% fewer respondents, DCF remains a close second with well over half of those surveyed using it. In third place, and well behind the first two choices, is the market value-to-book value (MV/BV) method. Twenty-five respondents (33.8%) selected it as being one of the three most commonly used methods. In a tenuous fourth place is discounted future earnings (DFE) with twenty firms (27%) selecting it. And in a tie for fifth and sixth place (yet in absolute terms only one number behind fourth place) is book value and liquidation value. These methods were chosen by nineteen firms (25.7%) as being used as one of their three top valuation approaches.

The remaining methods selected show insignificant use. Average premium/book value was used by 17.6%, payback and a catch-all category "other" were selected by 12.2% each and replacement value by 8.1%.

Method Applied To The Case Study

When the methods ranked by all seventy-four respondents are compared with those twenty-one firms who determined values for the target company, some striking similarities and one abnormality arise, as shown in Table 3. Again, an overwhelming choice is the use of P/E ratios with DCF an indisputable and firmly established secondary method for valuing firms. Furthermore, MV/BV has established its place in this hierarchy, although it shares a place with the "other category", which is the one revelation in the ranking exercise.

In the abstract, with all seventy-four respondents ranking various methodologies, the "other" category represents a very poor showing with only 12.2% of firms using it as one of their top three choices. However when confronted by an actual exercise in application, this catch-all category rises to share third place, with 28.6% of firms giving it a place among their top three valuation methods. Even when considered in the context of focusing solely upon the top two preferred methods, it is still selected by a significant 23.8% as being either their first or second choice to appraise the target company. Just what this "other" category represent is difficult to determine.

It could represent anything from comparable sales prices, the revenue to market value approach, to any subjective factor including one's intuition or experience.

With the exception of the "other" category, the rankings among the twenty-one firms which concluded the valuation problem parallel the results of all seventy-four respondents. This provides us with some assurance that the various values computed correlate with the overall rankings of methods selected by all respondents. In other words, the twenty-one values computed may be interpreted to be representative of the stated preferences of seventy-four respondents (except for the "other" category's influence on the final estimation of value).

In the final analysis, because of the varied values determined and the overwhelming preferences for both P/E and DCF as methods by which to value a firm, three questions remain: What overlap exists among the use of the top valuation methods? Are the mean most likely values determined by each respective method similar? And why with similar facts did we obtain such divergent values?

The Use And Overlap Of Valuation Methodologies

When considering the use of only primary or secondary valuation methods, of the forty-two firms which ranked the P/E approach as either their first or second approach, DCF was selected by 40.5% and DFE was selected by 21.4% as their alternative choice. (Refer to Chart 2.) When only those firms (forty-one) ranking DCF as either their first or second preferred valuation method are reviewed, 41.5% of them list P/E as their most frequently employed alternative, with MV/BV and DFE utilized by 26.8% and 24.4% respectively.

There exists a definite preference among those selecting either P/E or DCF as their primary or secondary methodology to use the other as an alternative. What is surprising is why, of those choosing DCF as a principal method, 24.4% would choose DFE as their alternative.

Perhaps the most interesting observation involves those firms which use MV/BV as their first or second method of choice. Fifty-seven point nine percent choose DCF and 42.1% choose P/E as alternatives. There appears to be, from the results, some connection among DCF and MV/BV users. Those principally using MV/BV clearly demonstrate a preference for DCF as their alternative method over P/E use. You will also note in Chart 2 that in comparing the DCF versus P/E user, there is an almost 8% increase in usage of MV/BV among the DCF users versus the P/E users.

Valuation By Method

One reason for the use of P/E ratios as a valuation technique is its ease of use. But just how valid an approach and how appropriate a value is derived from the use of either P/E or, for that matter, DCF? We looked at the results of the survey to determine if any correlation could be made between the valuation and the primary method chosen.

Eight firms selected P/E as their first choice in determining value. Of these firms, the mean most likely value of the target company is \$11,700,000 with a standard deviation of \$2,800,000. This is less than the average minimum value for all twenty respondents. Although providing for a tighter standard deviation about the mean, those firms selecting P/E as their first choice have apparently missed the mark in the valuation of the target company.

There are also eight firms which selected DCF as their primary choice. One of these accounted for the extreme high value of \$53,900,000 and was thus omitted from consideration. Averaging the remaining seven values results in a mean most likely value of \$15,900,000 with a standard deviation of \$6,000,000. This deviation is certainly much greater than that of the P/E method;

consequently when randomly used the DCF approach has a much greater chance of being wide of the mark. However, its average does come closer to the mean most likely value of \$14,700,000. Furthermore, it comes strikingly close to the previously mentioned values found by firms with M&A departments (\$16,000,000), those with revenues greater than \$80 million (\$16,000,000) and those with revenues less than \$10 million (\$16,200,000).

Conclusion

The valuation of companies remains an elusive task requiring considerable judgment and expertise. The discounted cash flow technique is the most theoretically correct approach from a financial perspective, yet there is substantial deviation inherent in the assumptions that are required for its implementation, as evidenced by the variability of values obtained by those who employed it in this situation. It is encouraging to find that it is, nonetheless, widely used by practitioners despite the difficulties.

The predominant use of P/E analysis undoubtedly reflects several factors. Besides the ease of its use, which makes it quite expedient, it also is indicative of the value that the market, as a whole, would place upon a dollar of earnings. In this sense, its use yields some insight into the price at which the marketplace would value a firm. The high correlation between the use of DCF and P/E analyses seem to suggest that the two techniques are used to provide verifications of each other.

The use of a variety of techniques by an individual may help explain why the same data produce such differing end values as demonstrated by this exercise. Additionally, the subjective factor, i.e. the "other" category, may also explain the disparate values derived by different individuals. While the marketplace provides the best measure of the "average" value determined by all individuals and techniques, valuation of a privately-held company requires that the individual view the firm from several different perspectives to arrive at a reasonable value.

From this survey it appears that those in the business of buying, selling or underwriting companies into the public market actually use the same valuation approaches as do professional business appraisers.

Regardless of the method used, taken individually each single appraisal will, more likely than not, miss the mark established by the average of a group of appraisals. We have shown by this study that there will never be just one correct value for a company, but a range of values. Indirectly this gives us a small degree of negative assurance for we realize that though we may at times misprice an investment or disagree with another appraiser's valuation of a company, we also know that there will never be just one right value to a company.

So, in the final analysis, does the professional market maker have any special insight or competitive edge over the business appraiser when it comes to establishing the worth of a company? Clearly the variability of values provided by the market makers in this survey demonstrates that they do not.

See referenced tables/charts on following pages . . .

TABLE 1

Annual Revenue (in millions)	Firms Responding		Number of Firms With M&A Department	Percentage Total Firms Responding
	Number	Percentage		
< \$10	27	33.3%	11	40.7%
10-20	11	13.6	3	27.3
20-40	6	7.4	2	33.3
40-80	8	9.9	3	37.5
80 >	29	35.8	21	72.4
	81	100.0%	40(1)	49.4%

(1) Two firms responding that they had M&A departments did not list their firm size.

TABLE 2

Minimum Value	- Mean	\$ 12,300,000
	Standard Deviation	4,500,000
Most Likely Value	- Mean	14,700,000
	Standard Deviation	4,800,000
Maximum Value	- Mean	17,100,000
	Standard Deviation	6,000,000

TABLE 3

Ranking of individual methods when selected as either the first, second, or third method of choice.

Ranking	All 74 Respondents	21 Firms With Values
1	P/E 74.3%	P/E 76.2%
2	DCF 64.9%	DCF 52.4%
3	MV/BV 33.8%	MV/BV 28.6%
4	DFE 27.0%	Other 28.6%
5	Liquidation Value 25.7%	DFE 23.8%
6	Book Value 25.7%	Liquidation Value 9.5%
7	Avg. Premium/Book Value 17.6%	Book Value 9.5%
8	Other 12.2%	Avg. Premium/Book Value 4.8%
9	Payback 12.2%	Replacement Value 4.8%
10	Replacement Value 8.1%	

Note: Some firms selected two or more choices as being of equal importance and not all choices were ranked; thus, percentages will not sum to 100%.

CHART 1

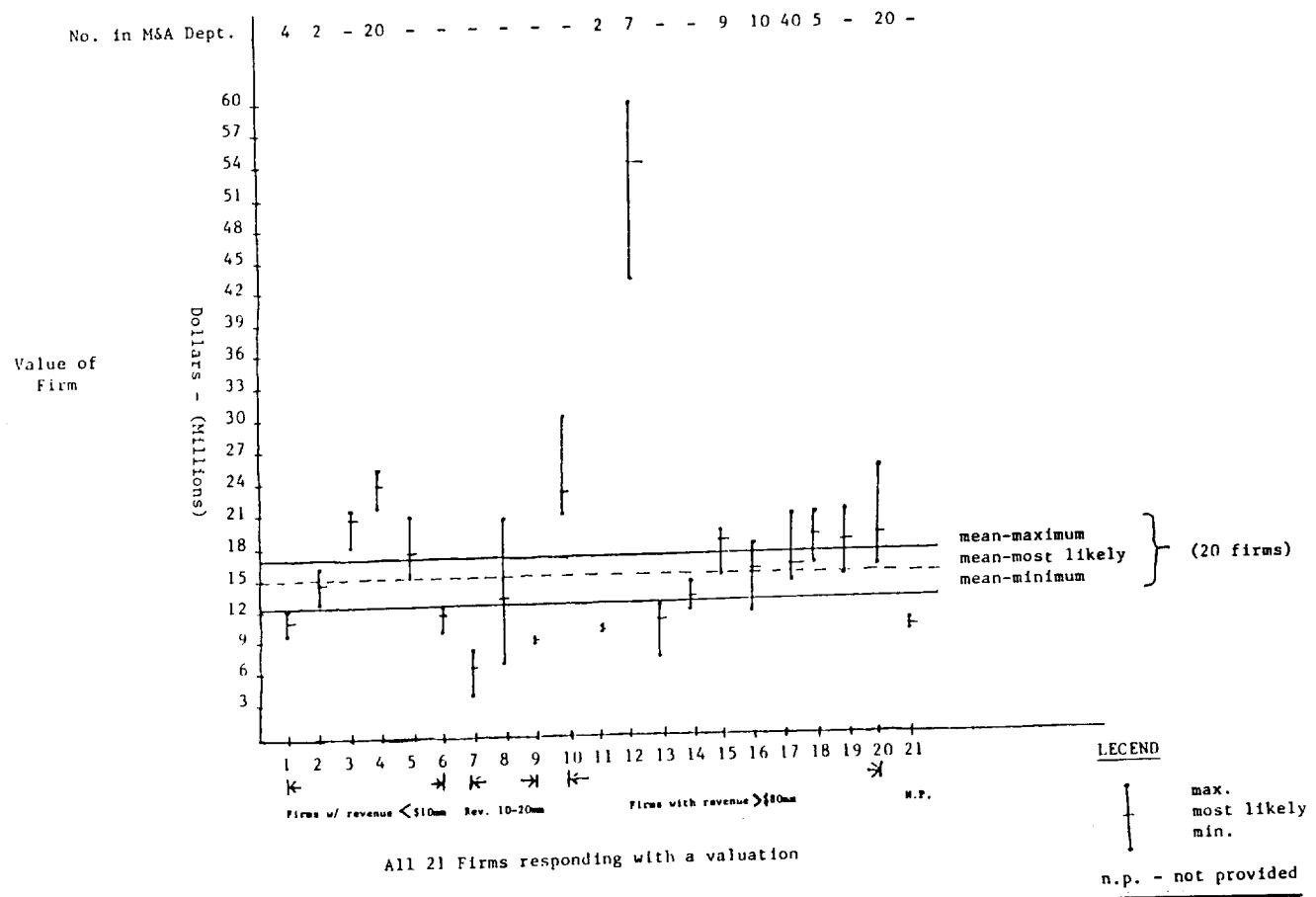


CHART 2

Alternative valuation method used	DFE	21.4%	24.4%	15.8%	---
	MV/BV	19%	26.8%	---	23.1%
	DCF	40.5%	---	57.9%	76.9%
	P/E	---	41.5%	42.1%	69.2%
		P/E (42 FIRMS)	DCF (41 FIRMS)	MV/BV (19 FIRMS)	DFE (13 FIRMS)

Primary or secondary valuation method used

Example: Of the 19 firms choosing MV/BV as one of the top two methods used in valuing companies, 57.9% selected DCF as an alternative primary or second method.

Note: Some firms selected two or more choices as being of equal importance, and not all choices were ranked, thus percentages will not sum to 100%

The Effect of Trading Activity on Beta

by DANIEL L. LARSON

Given the well-accepted premise that smaller companies generally are riskier than larger ones, betas should, in the aggregate, be inversely related to company size. However, beta values provided by several prominent publishers indicate that, below certain market capitalization levels, betas decrease as size declines. This correlation, which has no theoretical basis, indicates that these beta values may not accurately reflect true systematic risk. This possibility has significant ramifications for appraisers who use betas from these publishers because applying incorrect betas can lead to serious errors in estimating the cost of capital using the Capital Asset Pricing Model (CAPM).

An Examination of the Data

The reasons that smaller companies are riskier than larger firms have been discussed for years in appraisal and corporate finance literature (for example, see Zukin¹), and smaller companies, therefore, should have higher betas to reflect their greater systematic risks. We have noted in our practice, however, that smaller companies frequently have substantially lower betas than similar larger ones. This phenomenon is illustrated in Figure 1. For a large universe of NYSE stocks, betas begin declining in the fourth market capitalization decile instead of continuing to increase as market capitalization declines. The same general pattern is observed for the ASE and NASDAQ stocks that were analyzed.

Additional analysis of these data indicates that stock trading activity has a significant effect on beta values. Figure 2 shows the same data as Figure 1 but ranked by share turnover instead of by market capitalization. We define share turnover (T) for a given stock in our sample as:

$$T = \text{Number of shares traded in last 12 months} / \text{Total shares outstanding}$$

T is one measure of liquidity of a given stock. The higher the value of T, the higher the probability that a block of stock could be promptly bought or sold at the prevailing market price. A low value of T indicates low trading volume and possible difficulty in conducting a stock transaction of significant size without substantially impacting market price.

T theoretically should not affect beta because liquidity is not an element of systematic risk. Note however from Figure 2 that the median beta for each decile declines as share turnover declines. This relationship was statistically verified by regression analysis which yielded the following equations.

NYSE Stocks:	Beta = 0.82 + 0.28T	$r^2 = 0.17$	t statistic = 15.5
ASE Stocks:	Beta = 0.77 + 0.19T	$r^2 = 0.06$	t statistic = 4.6
NASDAQ Stocks:	Beta = 0.74 + 0.15T	$r^2 = 0.13$	t statistic = 13.9

As shown, all three of the equations have positive coefficients indicating that beta increases as T increases. Also, two of the three equations have significant r^2 values. The r^2 value of 0.17 for the NYSE stocks indicates that share turnover explains 17% of the variance in NYSE betas, and the r^2 value of 0.13 for the NASDAQ stocks indicate that T explains 13% of the NASDAQ betas. These percentages are large enough to indicate that substantial bias to the beta values is introduced by trading activity².

Infrequent Trading is a Source of Bias

The impact of trading activity on betas has been discussed in academic journals for a number of years. In 1966, Fisher³ pointed out that infrequent trading introduces serious biases into the calculation of betas which, in turn, leads to errors in the computation of risk-adjusted returns. The problem appears to be caused by "non-synchronous trading," a situation where infrequent trading of an individual stock caused stale prices and lack of correlation with the general market. For these stocks, the price recorded for regression purposes at the end of a period may represent the outcome of a transaction that actually occurred earlier in the period.

A method for correcting for infrequent trading, developed by Dimson⁴ in the late seventies, estimates betas by calculating a multiple regression of the equally-weighted return on contemporaneous, leading, and lagged S&P 500 returns and then summing the slope coefficients. Subsequent research, such as by Roll⁵ and Loeb⁶, indicated that the Dimson method yields betas that more accurately reflect the true systematic risk of companies whose stocks trade infrequently. To our knowledge, none of the major publishers use the Dimson method so their betas, especially for infrequently traded stocks, probably are substantially biased from the non-synchronous trading effect.

Other factors that could lead to bias include the methods used to calculate betas and small market capitalization values for some companies. The betas in our analysis were calculated using month-end prices over a 60-month period, and studies have shown that using monthly data leads to greater bias than using data from longer periods⁷. Also, share turnover in smaller market capitalization companies generally is lower than for larger companies because liquidity considerations preclude institutional investors from purchasing many small stocks. Without institutional investors as buyers, demand for the shares of smaller stocks is reduced, trading activity is lowered, and infrequent trading bias is introduced into beta values.

An Industry Example

The problem of biased betas can be quite serious, particularly when working with a smaller number of stocks within a specific industry. Consider as an example the 20 supermarket chain stocks shown in Figure 3.

When ranked by Share Turnover and divided into quartiles, these data again show declining betas as share turnover decreases. This is the same pattern that was observed for the NYSE, ASE, and NASDAQ stocks shown previously. The median beta for the highest share turnover quartiles (1.17) is 80% greater than the median beta for the lowest share turnover quartile (0.65) even though the companies in the highest share turnover quartile generally are larger and therefore less risky. Regressing these data yielded a strong statistical relationship between beta and share turnover as indicated by the following equation.

$$\text{Supermarket Sample: Beta} = 0.61 + 0.94T \quad r^2 = 0.57 \quad t \text{ statistic} = 4.85$$

The major influence of share turnover on beta presents a serious problem for the appraiser. One would prefer to select guideline companies that have similar characteristics, including size, to the company being valued, but if the stocks of the comparatives are not actively traded, incorrect measures of systematic risk could result. For example, if the supermarket chains in the lowest share turnover quartile had been selected as the comparative group, the derived median beta (0.65) would have been substantially different than if the chains in the highest share turnover quartile had been selected (median beta of 1.17). This choice could have resulted in a serious underestimation of systematic risk and significant error in the application of the CAPM⁸.

Conclusion

The conclusions that we believe can be drawn from the above analysis are as follows:

1. Betas provided by the major publishers or calculated by the appraiser may be substantially biased by trading activity and may therefore be unsuitable for analysis purposes.
2. In selecting guideline companies for use in estimating beta for the company being valued, share turnover and betas for all stocks within the relevant industry should be analyzed. The beta values for the smaller market capitalization companies and those with low values of T should be compared with the largest and most liquid companies, and if the betas of the smaller companies are lower than the large company betas, the trading effect most likely is present. In this event, the betas for the larger companies with high share turnover probably are a more appropriate measure of systematic risk for the company being valued than the betas of the smaller companies.
3. The primary publishers of beta values should be encouraged to develop techniques, such as the Dimson method, to correct for the trading effect.

Because trading patterns constantly change, it probably is not possible to develop a fixed set of rules relating to share turnover to assist in the selection of guideline companies. The statistical relationship derived from our analysis as presented herein probably will change over time. Therefore, as always seems to be the case, the appraiser must make decisions on guideline companies on a case by case basis using the facts and circumstances that are relevant to the specific valuation analysis being undertaken, and the appraiser should be well aware that not all betas are necessarily good betas.

Endnotes

1. Zukin, J., Financial Valuation: Businesses and Business Interests, 1992 Update, Chapter 12A, Warren Gorham Lamont, 1992.
2. We also regressed beta against market capitalization and against dollar trading volume but these analyses did not yield any statistically significant relationships between beta and these other variables.
3. Fisher, L., "Some New Stock-Market Indexes," Journal of Business, January 1966 (Supplement).
4. Dimson, E., "Risk Management When Shares are Subject to Infrequent Trading," Journal of Financial Economics, June 1979.
5. Roll, R., "A Possible Explanation of the Small Firm Effect," The Journal of Finance, September 1981.
6. Loeb, T., "Is There a Gift from Small-Stock Investing?", Financial Analysts Journal, January-February 1991.
7. Roll, R., p. cit.
8. We also regressed unleveraged beta against share turnover to determine the effect of adjusting for leverage. The analysis yielded a linear equation with a positive coefficient (t statistic = 3.1) and an r^2 of 0.56.

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Figure 1
Relationship Between Betas and Market Capitalization

NYSE Stocks (1)			ASE Stocks (2)			NASDAQ Stocks (3)		
Market Cap.	Median Market Cap. (\$MM)	Beta	Market Cap.	Median Market Cap. (\$MM)	Beta	Market Cap.	Median Market Cap. (\$MM)	Beta
Decile			Decile			Decile		
1	13,151	1.04	1	699	0.97	1	1,033	1.08
2	4,884	1.09	2	197	0.83	2	346	1.06
3	2,703	1.00	3	108	0.95	3	186	1.02
4	1,558	0.99	4	75	0.94	4	116	1.07
5	996	1.02	5	50	0.72	5	72	1.02
6	669	0.87	6	37	0.78	6	46	0.93
7	408	0.74	7	28	0.91	7	29	0.79
8	258	0.72	8	20	0.76	8	17	0.74
9	145	0.68	9	14	0.73	9	9	0.74
10	58	0.59	10	7	0.71	10	4	0.61

Notes:

- (1) 1,196 NYSE stocks with P/Es between 0 and 50x.
- (2) 373 ASE stocks with P/Es between 0 and 50x.
- (3) 1,660 NASDAQ stocks with P/Es between 0 and 50x.

Figure 2
Relationship Between Betas and Share Turnover

NYSE Stocks (1)			ASE Stocks (2)			NASDAQ Stocks (3)		
Share Turnover	Median Share Turnover (%)	Beta	Share Turnover	Median Share Turnover (%)	Beta	Share Turnover	Median Share Turnover (%)	Beta
Decile			Decile			Decile		
1	148	1.32	1	126	1.08	1	342	1.26
2	97	1.20	2	77	0.99	2	206	1.22
3	74	1.12	3	45	0.99	3	150	1.16
4	62	1.06	4	32	0.75	4	115	0.95
5	53	1.01	5	26	0.90	5	83	1.02
6	45	0.94	6	22	0.83	6	62	0.82
7	36	0.94	7	17	0.76	7	46	0.79
8	29	0.86	8	14	0.85	8	30	0.75
9	21	0.76	9	9	0.65	9	17	0.64
10	8	0.72	10	2	0.54	10	6	0.60

Notes:

- (1) 1,196 NYSE stocks with P/Es between 0 and 50x.
- (2) 373 ASE stocks with P/Es between 0 and 50x.
- (3) 1,660 NASDAQ stocks with P/Es between 0 and 50x.

Figure 3
Selected Supermarket Chains
Ranked by Share Turnover

Company Name	Market Cap. (\$MM)	Share Turnover (T)	Beta	Quartile Median	
				Share Turnover	Beta
Quality Food Centers	657	67.3 %	1.05		
Great Atlantic & Pac Tea	970	66.5 %	1.17		
Smiths Food & Drug - B	1,026	65.8 %	1.32	65.8 %	1.17
Vons Companies	968	59.9 %	1.06		
American Stores Co	2,884	57.7 %	1.31		
Eagle Food Centers	72	46.6 %	1.48		
Albertson's Inc	6,082	42.0 %	0.89		
Food Lion Inc - A	2,563	38.0 %	1.01	38.0 %	0.91
Giant Food Inc - A	1,059	35.0 %	0.91		
Delchamps Inc	149	31.6 %	0.83		
Schultz Sav O Stores	42	28.8 %	0.67		
Marsh Supermarkets - A	109	27.4 %	0.95		
Riser Foods - A	56	25.6 %	0.99	25.6 %	0.91
Ingles Markets Inc - A	98	24.5 %	0.64		
Hannaford Brothers	832	23.2 %	0.91		
Ruddick Corp	372	19.5 %	0.58		
Winn-Dixie Stores	5,159	15.6 %	0.97		
Seaway Food Town	25	9.5 %	0.63	9.5 %	0.65
Village Super Market - A	19	7.9 %	0.65		
Weis Markets	1,128	7.6 %	0.76		

Improved Estimation of Equity Risk Premiums

by CHRISTIAN L. BENDIXEN, ASA

A presentation by Wayne Ferson and Dennis Locke, ASA, of the University of Washington (UW) at the June 1993 ASA International Conference in Seattle aroused my interest in investigating the equity risk premiums that we appraisers use in our capital asset pricing model (CAPM). The UW analysis showed that while there may be better risk coefficients than beta, the more critical input into CAPM, and the input that has the potential for causing greater errors, is the equity risk premium. Therefore, I have analyzed the fluctuations in equity risk premiums over extended periods of time and developed a model to estimate those premiums across a spectrum of different rate-of-return environments.

The UW Analysis

The UW analysis presented at the ASA Conference estimated the sources of errors in the estimation of the cost of capital using CAPM. Very briefly, the authors developed a latent variable model similar to CAPM in which they replaced the beta coefficient with generalized method of moments (GMM) estimates called C-coefficients. Their preliminary findings revealed that the estimates of the cost of capital could indeed be improved by replacing beta with C. However, this change had only a small impact on the estimation errors. A larger impact on the cost of capital estimation was attributed to forecasts of the equity risk premium. Therefore, the authors concluded that "to reduce errors in required return estimates, [one should] focus on better market risk premium estimates."

CAPM

To quickly review and standardize the terminology for purposes of discussion, I provide a short summary of CAPM. The model is based on efficient market theory and modern portfolio theory, which postulate that the expected return on a security is a function of a risk-free rate of return and a premium above that return to compensate the investor for the risks assumed. This relationship is represented mathematically as follows:

$$R_i = R_f + B_i (R_m - R_f) + e$$

where,

R _i	=	expected rate of return for security i
R _f	=	risk-free rate of return
B _i	=	beta coefficient of covariance
R _m	=	average return for a market portfolio of securities
(R _m - R _f)	=	risk premium for a market portfolio
e	=	unexplained variance

Thus, the cost of capital or the rate of return that investors require to induce them to invest in a particular risky security (i) can be determined using CAPM by simply estimating two general returns (R_f and R_m) and a specific beta coefficient (B_i).

Current Practice

The interest rate for three-month U.S. Treasury Bills (T-bills) is sometimes used as a surrogate for the risk-free rate of return (R_f). Since T-bills are issued by the federal government, their risk of

default is almost nil, and their extremely short maturity assures that the loss of principal from interest rate fluctuations will also be very small.

[Editor's Note: In ASA's Principles of Valuation courses, we suggest that the risk-free rate should be represented by either long-term Treasury Bonds or a combination of the Treasury Bill rate plus the appropriate horizon premium. The reason for this suggestion is the belief that the maturity of the risk-free surrogate should match as closely as possible the maturity of the investment under appraisal. When valuing equity in closely-held companies, most analysts believe that the investment horizon is quite long.]

The equity risk premium ($R_m - R_f$) is often based on historical figures for rates of return provided by Ibbotson Associates of Chicago. For instance, Shannon Pratt, in his appraisal textbook *Valuing a Business*, quotes a 1987 Ibbotson equity premium of 8.3% in his section on rate of return derivation. Each year Ibbotson publishes an annual update called *Stocks, Bonds, Bills and Inflation* (SBBI), which contains data on returns going back to 1926. In the 1993 edition of SBBI, the market risk premium through 1992 is estimated to be 8.6%. The market risk premium is based on the differences between the average annual risk-free returns (as measured by T-bill rates) and the average annual stock market returns (mainly as measured by the Standard & Poor's 500 Index) going back 65 years to 1926.

Cyclical Volatility

Over those 65 years, stock market returns and the resulting equity risk premiums have been extremely volatile. As shown in Exhibit A, the annual stock market returns have swung wildly between plus or minus 50% per year, switching from positive to negative returns about every third year. While the average rate of return from 1926 to 1992 was 12.4%, the standard deviation was 20.5%.

These volatile stock market returns (R_m) also generated erratic changes in the annual equity risk premiums ($R_m - R_f$). Exhibit B shows the annual risk premiums calculated from Ibbotson and a ten-year moving average. For many years the calculated risk premium was negative. Overall, the risk premium from 1926 to 1992 averaged 8.6%. However, given the great volatility, applying that average premium in any particular year may not provide meaningful estimates. For example, adding the 65-year average risk premium to T-bill rates for 1983 and 1984 yields a required market return of 19.6%, but adding the same 65-year average premium to the 3% T-bill rates of today results in an estimated market return of only 11.6%.

Secular Change

In addition to the difficulties posed by cyclical swings in stock market returns, the 65-year-old average premium also suffers from fundamental changes in the market return data. These changes are due to major secular changes in the economic environment and sociopolitical institutions that have occurred slowly over the past seven decades. Thus, Exhibit A shows how the volatility of stock market returns has gradually declined over time. A substantial drop in standard deviations occurred during World War II. The ten-year moving standard deviations fell from a peak of nearly 35% in the 1930s to a trough of under 15% in the late 1940s. Since World War II, the standard deviations over ten-year periods have not exceeded 20%, and during this period the standard deviations have declined three times to under 15%: once in the late 1940s to early 1950s, again in the early 1970s, and then again in the late 1980s and early 1990s. For the last six years, the moving standard deviation has hovered just above 10%. Thus, the risk of holding equities (as measured by volatility) has declined substantially.

These secular changes in the stock market are further demonstrated by dividing the 1926 to 1992 database into three time periods spanning approximately 20 years each:

1926–1945	Period I: the earliest 20 years, including the Crash of 1929, the Great Depression, and World War II
1946–1965	Period II: the middle 20 years from the end of World War II to the escalation of the Vietnam War
1966–1992	Period III: the latest 27 years including the Vietnam War, two oil shocks, and the Crash of 1987.

In Exhibit C, the average returns for the three time periods are compared to the averages from the entire period of 1926 to 1992. The rates of return have changed dramatically over the years. Returns for fixed income investments, such as T-bills and long-term government bonds, have been much higher in Period III. Returns for the largest stocks traded on the exchanges were highest in Period II, right after World War II, and returns on small capitalization (cap) stocks were highest in the volatile Period I. These differences have caused fundamental changes in the measurable equity risk premiums.

Exhibit D graphically demonstrates the significant changes between the three time periods. The combined risk premium (i.e., the large stock premium and the small cap premium added together) declined from 19.5% in Period I to 13.5% in Period II, and then to only 10.0% in the latest period.

Both the magnitude of the equity risk premium and the components of the risk premium have changed over time. In Period I, risk-free rates were low, and the average premiums for large stock and small cap equities were about the same at 9.9% and 9.6%, respectively. Then, in Period II, the risk premium for large stocks ballooned to an average of about 13% and the premium for small cap stocks declined to a negligible amount. Finally, in Period III, both the average risk-free rate and the small cap premium increased dramatically, but the equity premium for large stocks was squeezed down to 4.4%.

Given the cyclical volatility of stock returns and the secular changes in risk profiles for securities discussed above, it is clearly not relevant to use an average risk premium covering 65 years. Therefore, I set out to develop a simple risk premium model that could be applied in different rate-of-return situations.

Statistical Analysis

Using data from Ibbotson, I ran statistical regression analyses on equity risk premiums as a function of interest rates. I used ordinary least square estimators of various bivariate linear models that regressed equity risk premiums against both T-bill rates and long-term government bond returns for the entire period since 1926 and for each of the three periods identified above. Not surprisingly, the regression results were only statistically significant for the two periods after World War II. Period I, from 1926 to 1945, was too volatile compared with the other two periods; so I concentrated my analysis on Periods II and III.

Future expected returns are difficult to predict, so from a conceptual viewpoint, I assumed that future expectations would be based on the past rate-of-return experience of recent years. Also, from a pragmatic viewpoint, since the annual returns and premiums fluctuated wildly, it was necessary to base the regression analyses on moving averages over a number of years. The many negative returns and negative risk premiums for particular years (see Exhibits A and B) were not representative of the expected returns of investors over the long term. I tested various moving averages to eliminate the negative risk premiums. Three-year averaging removed most of the negative risk premiums, since the stock market returns have switched from positive to negative about every third year. Five-year averaging was the shortest period that removed all of the negative returns (except -0.8% in 1974). Therefore, regressions were run using both three-year and five-year moving

averages of the market risk premiums, and both single-period and three-year averages of the T-bill rates.

I also ran regression analyses over different post-World War II time periods. The most meaningful results were obtained by splitting the time period in the mid-1970s. This separated the period of high inflation and high interest rates in the late 1970s from the lower interest-rate environment of the 1950s and 1960s.

The statistical results of the bivariate regressions using both T-bill rates and long-term government bond returns were encouraging. The R-squared coefficients of determination were 40% for the whole post-World War II period, and the t-statistics for the individual exogenous variables were also significant (see Exhibit E). These regression results are relatively high, especially in light of the great variance in stock market returns. Other analyses of CAPM have explained about one-third of the variance, that is, the R-squareds were about 33%.

I next attempted a simplified univariate model using T-bill rates as the sole independent variable. The explanatory power (as measured by R-squared) did not suffer much and the significance of the input variable (as measured by t-statistics) was still meaningful. The linear equations resulting from these univariate regressions of T-bills on equity premiums are also shown in Exhibit E, along with their respective R-squareds and t-statistics.

The results of applying these regression equations are shown in Exhibit F, which relates the average estimates of equity risk premiums to risk-free rates (R_f) of 2% up to 8%. As expected, there is an inverse relationship between returns and risk premiums, that is, the higher the risk-free rate of return, the lower the equity risk premium. This relationship follows mathematically and conceptually since the risk premium is simply $R_m - R_f$. Thus, the larger R_f , the smaller the difference, as long as R_m is held constant.

Surprisingly, the average returns on the stock market (R_m) remained quite constant. As interest rates (R_f) rose, the required returns (R_m) did not increase at the same rate. Thus, changes in T-bill interest rates had a nearly one-to-one relationship with changes in the equity risk premium ($R_m - R_f$).

This relationship has remained fairly stable since the end of World War II, as shown by the consistent regression results in Exhibit F for both the most recent period (1976–1992) and the whole post-World War II period. These results suggest that, given the institutional structure since World War II, the equity risk premium ($R_m - R_f$) in CAPM needs to be adjusted slightly for the risk-free rate of return (R_f). The regression results in Exhibit F have been averaged and rounded to provide the general guidelines shown below:

T-bill rate	2%	3%	4%	5%	6%	7%	8%
Risk premium	12%	11%	10%	9%	8%	7%	6%

The table provides a handy means of adjusting risk premiums for different risk-free rates of return in the relevant range of 5% plus or minus 3%. For example, if T-bill rates are about 4%, then one would expect the equity risk premium to be about 10%.

Conclusions

Historically, rates of return have been erratic from year to year. Also, fundamental changes in our economic institutions have altered the relationships between risk and return, especially since World War II. In light of this cyclical volatility and these secular transitions, an average risk premium calculated over 65 years is not applicable to any particular year.

Therefore, I have derived some equations, based upon statistical regression analysis, to adjust the risk premiums for fluctuations in rates of return. The results confirm an inverse relationship of

about one to one between risk-free rates of return and equity risk premiums. The results of the analyses have been rounded and summarized in the simplified table presented above.

It must be emphasized that these results are general rules, and they will not apply to every particular situation. Also, these adjustments of rates of returns are for financial securities, not for tangible assets or projects.

It is interesting to note that the regression equations generated risk premiums that resulted in stock market returns (R_m) of about 14% (i.e., the T-bill rate plus the equity premium sum to 14% in the relevant range). Can we infer from this result that expected returns are based on a long-term view of realizing a 14% return regardless of the short-term fluctuations in interest rates? Does this result imply that Americans are longer term investors rather than myopic speculators as portrayed in the popular press?

Not necessarily. To remove negative risk premiums from the input variables, we had to perform the regression analyses on three- and five-year moving averages. The use of these averages may have smoothed the results toward more stable, long-term returns.

Final Word

The reader should view this analysis not as the last word on adjusting equity risk premiums, but rather as an important first step in tackling the problem of using better estimates of the premiums. I hope and expect that others will expand on this study with improved data and analyses. Nevertheless, we appraisers can now better apply CAPM in estimating the cost of capital and therefore can improve on our discounted cash flow valuations. Clearly, the 65-year average premium derived from data going back to 1926 is not applicable in most rate-of-return environments. The simplified table presented in this paper makes adjusting for those interest rate changes an easy task.

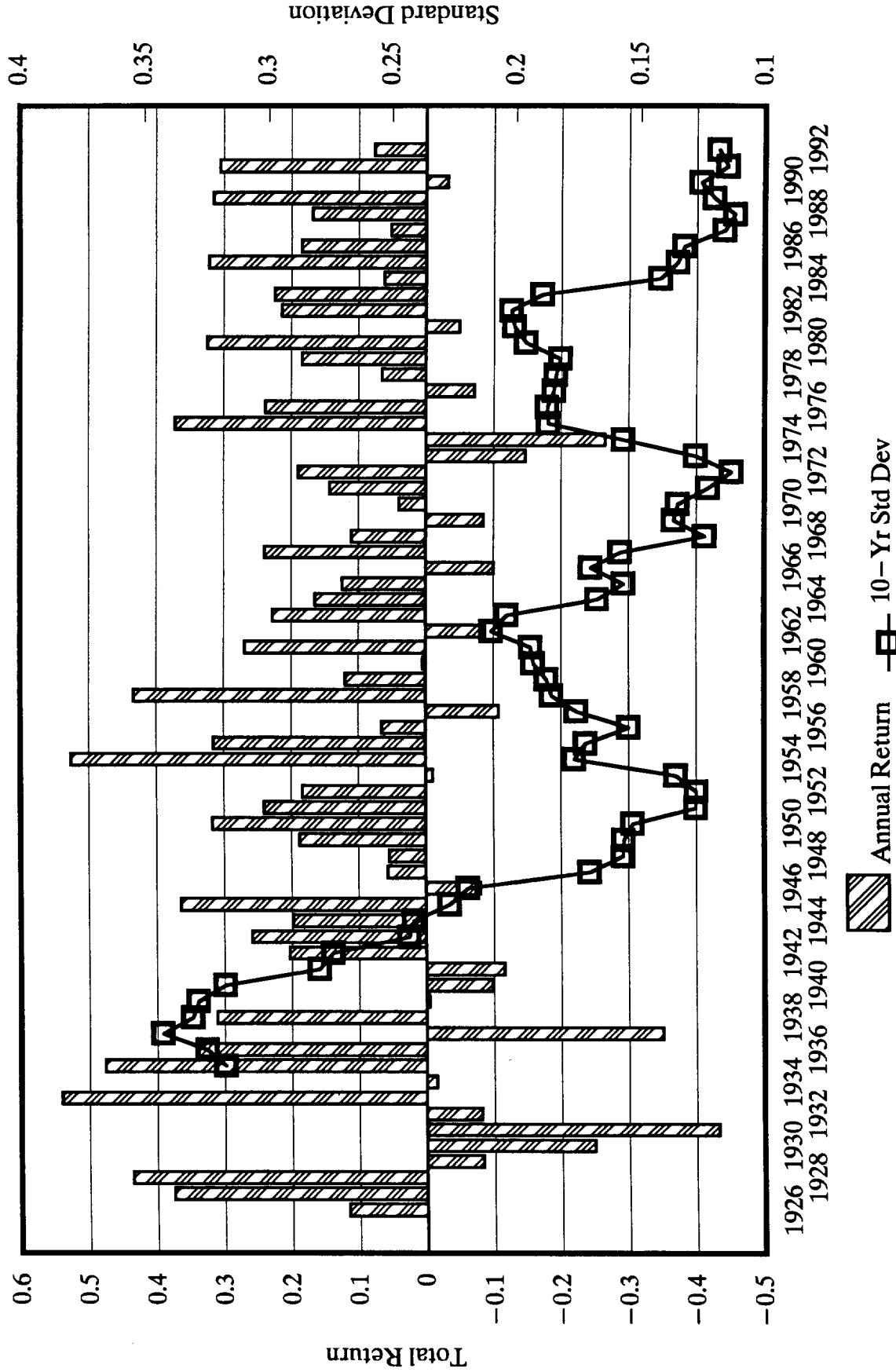
Endnotes

1. Ferson, Wayne E., and Dennis H. Locke, "Cost of Capital Estimation Without CAPM: Analysis of Sources of Error," paper presented at the ASA International Conference, Seattle, Wash., June 28-30, 1993.
2. Ibid., p. 18.
3. Pratt, Shannon P., *Valuing A Business: The Analysis and Appraisal of Closely Held Companies*, 2d ed. Homewood, Ill.: Business One Irwin, 1989.
4. *Stocks, Bonds, Bills and Inflation: 1993 Yearbook*, Chicago: Ibbotson Associates, 1993.

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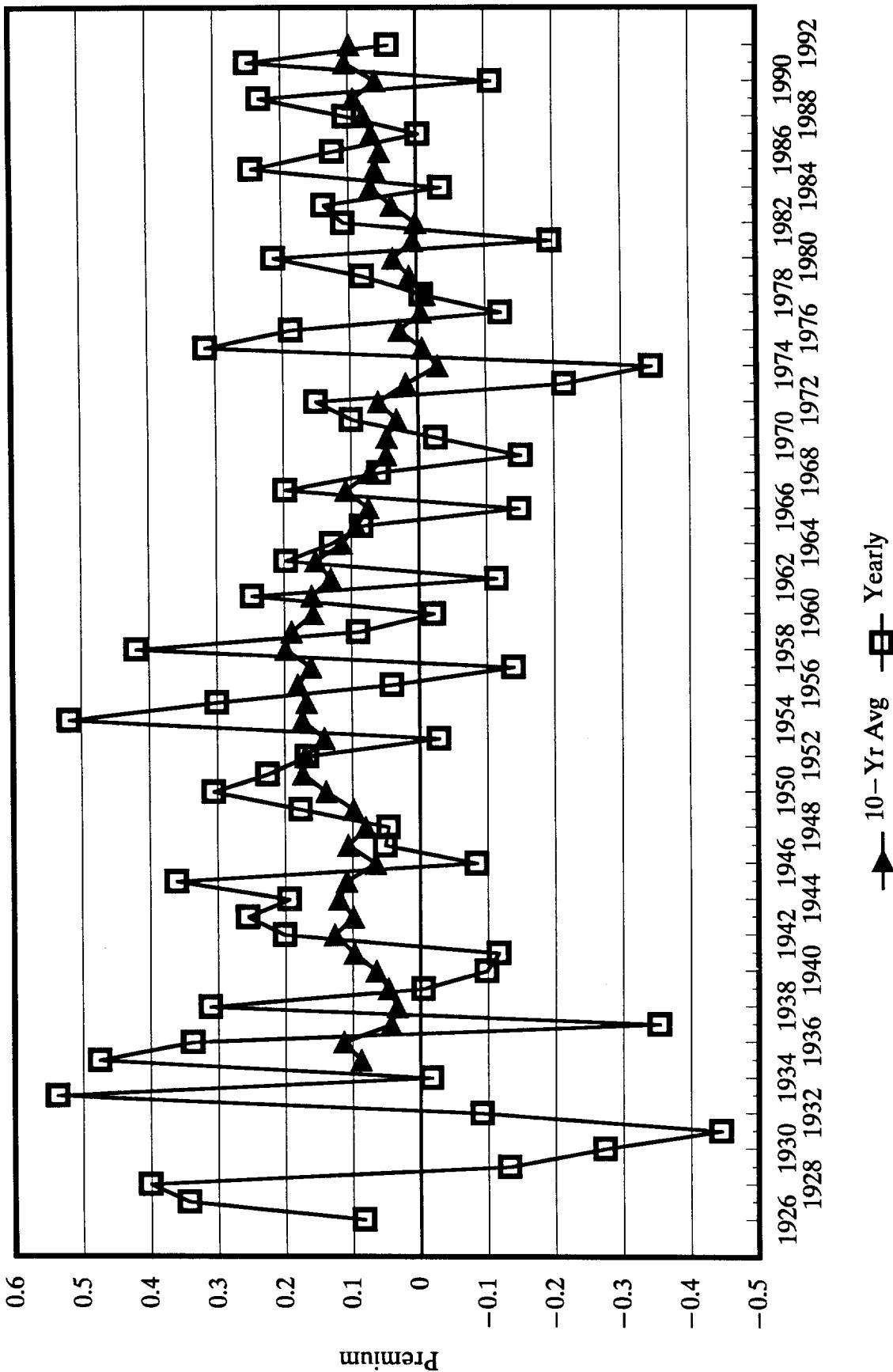
Mr. Bendixen received an MBA in Finance and a BA in Economics from Brigham Young University. Mr. Bendixen previously worked as a Manager of Financial Valuation for Arthur Young, now Ernst & Young. He has served as the Treasurer and twice as a Vice President for ASA's San Francisco chapter.

Exhibit A: Stock Market Returns 1926–1992



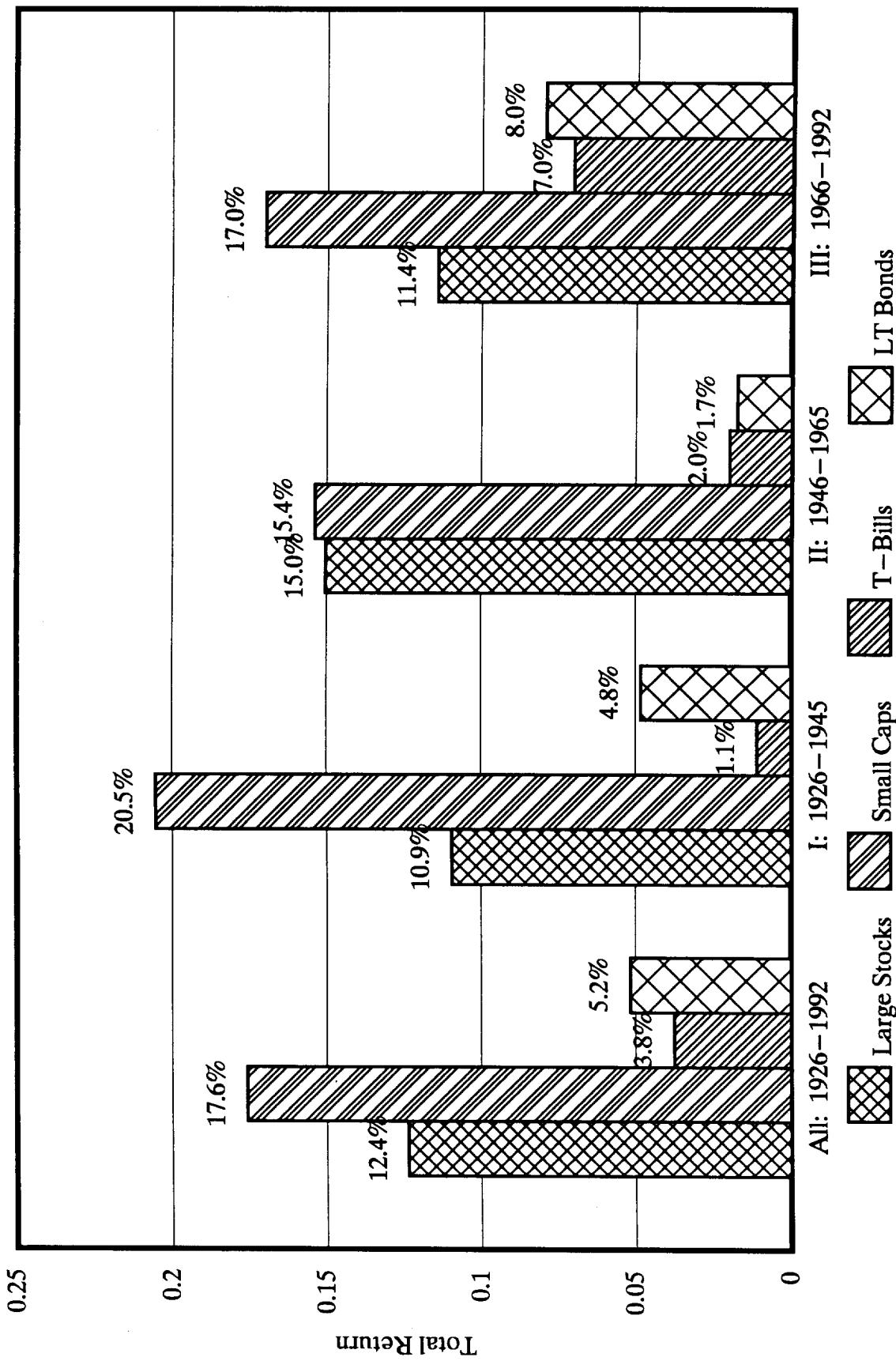
Source: Ibbotson SBBI 1993

Exhibit B: Equity Risk Premiums 1926 - 1992



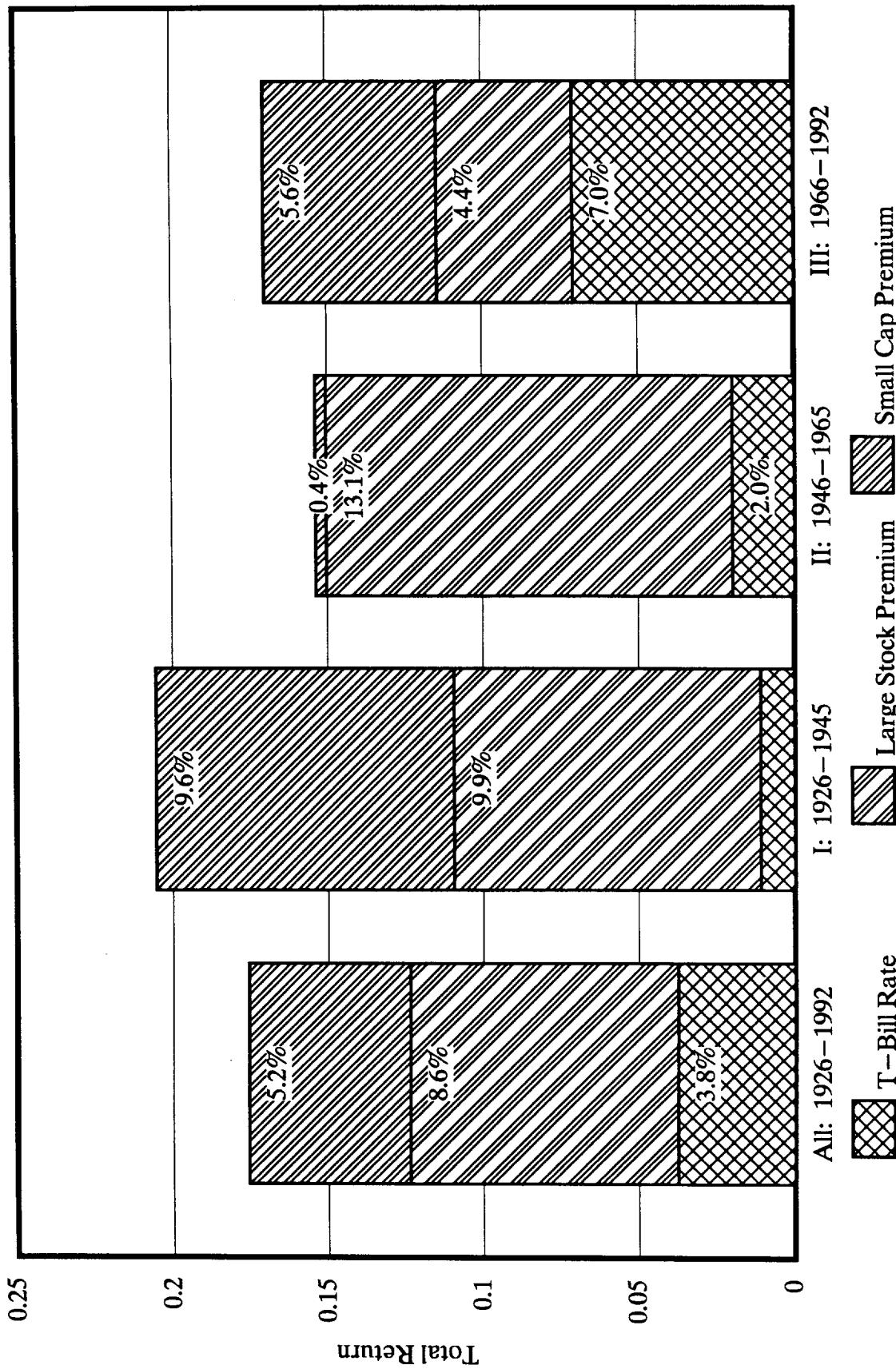
Source: Ibbotson SBBI 1993

Exhibit C: Average Annual Returns 1926 – 1992



Source: Ibbotson SBBI 1993

Exhibit D: Average Annual Premiums 1926 – 1992



Source: Ibbotson SBBI 1993

Exhibit E
Linear Regression Equations
Equity Risk Premiums
Post World War II

R sq.	Regression Coefficients*					
	Coef. a (t)	Coef. b (t)	Coef. c (t)			
<u>Post WWII 1946–1992</u>						
47 years						
Bivariate:						
5-year average	40%	0.150	2.63	−1.79	−5.33	0.424
3-year average	27%	0.144	1.97	−1.58	−4.05	0.343
3-year & current	30%	0.143	1.96	−1.49	−4.34	0.267
Univariate:						
5-year average	40%	0.151	2.56	−1.35	−4.82	
3-year average	22%	0.144	1.92	−1.24	−3.56	
3-year & current	27%	0.150	2.03	−1.35	−4.02	
<u>Recent 1976 – 1992</u>						
17 years						
Bivariate:						
3-year average	30%	0.091	2.39	−0.57	−1.33	0.264
3-year & current	49%	0.084	2.21	−0.58	−1.45	0.340
Univariate:						
3-year average	11%	0.123	2.93	−0.63	−1.34	
3-year & current	33%	0.155	3.60	−1.03	−2.70	

Risk premium = a + b(T-bill) + c*(LT govt. bond) + e

Source: Ibbotson SBBI 1993.

Exhibit F
Stock Market Risk Premiums
At Various Risk-Free Rates of Return
Post World War II

	Regression Coef.*		Premiums at Treasury Bill Rates of:						
	a	b	2%	3%	4%	5%	6%	7%	8%
Post WWII 1946–1992:									
5-year average	0.151	-1.35	12.4%	11.1%	9.7%	8.4%	7.0%	5.7%	4.3%
3-year average	0.144	-1.24	11.9%	10.7%	9.4%	8.2%	7.0%	5.7%	4.5%
3-year & current	0.150	-1.35	12.3%	11.0%	9.6%	8.3%	6.9%	5.6%	4.2%
Average	0.148	-1.31	12.2%	10.9%	9.6%	8.3%	7.0%	5.6%	4.3%
Recent 1976–1992:									
3-year average	0.123	-0.63	11.0%	10.4%	9.8%	9.2%	8.5%	7.9%	7.3%
3-year & current	0.155	-1.03	13.4%	12.4%	11.4%	10.4%	9.3%	8.3%	7.3%
Average	0.139	-0.83	12.2%	11.4%	10.6%	9.8%	8.9%	8.1%	7.3%
Rounded averages	0.14	-1.1	12%	11%	10%	9%	8%	7%	6%

* Risk premium = $a + b^*(T - \text{bill}) + e$

Source: Ibbotson SBBI 1993

The Impact of Management Depth on Valuation

by STEVEN E. BOLTEN, Ph.D., ASA, CBA and YAN WANG

Introduction

It is intuitively obvious and frequently observed, but not heretofore quantified, that the lack of management depth is a risk which can impact firm valuation. We quantified the impact of this risk using the analogous methodology applied in judging the impact of control premiums which observe the change in stock prices before and after the merger or acquisition announcement.

The Data

We examined the "Who's News" columns of the *Wall Street Journal* from August 1, 1996 through November 28, 1996 for announcements of senior management changes above the rank of vice-president. We selected all that had distinct changes in senior persons with clear indications of policy power. We eliminated many internal promotions where little changed in personnel. For example, we excluded announcements where existing management did not change or an additional new position was created with or without a new person added to the senior management team.

We selected 101 observations within our criteria. When the announcement was made after the markets closed we used the opening price of the next trading day.

Methodology

We observed both increases and decreases in stock prices associated with the announcement of change in senior management. The market viewed some changes as favorable and others as unfavorable. We all know that good management can take a bad situation and make it good. Bad management can take a good situation and make it bad. We had to split the increase and decrease responses to avoid the arithmetic distortion of their offsetting effects on the averages. The risk of management disruption is our concern in the smaller, closely held firms, so it is the average decrease we are most interested herein.

We stratified the sample by size based on capitalization below and above \$280 million and, more importantly, on the number of senior management as listed in the Compact Disclosure data base. The latter was stratified as fewer than six; six to ten; eleven to fifteen; and more than fifteen.

We also extracted the reported reason for the management change which we then categorized as: resigned, replaced, moved up internally, succeeded previous CEO (outsider) or health problems.

Results

The results clearly supported the intuitive belief that the departure for whatever reason of a significant key person negatively impacts the firm's valuation (Exhibit 1). On average, the departure of a key management person caused the stock of the smaller, public firms (less than \$280 million capitalization) to fall 8.65%. An average negative 4.83% impact was observed for the larger capitalization firms with presumably greater management depth. Of course, we observed increases in the valuation when a perceived favorable change occurred in senior management, as we would logically anticipate.

The smaller firms, where the impact is potentially greater, had the larger observed average percentage change. Since the private firms typically are structured such that the departure of the key person would be negative, the average decrease is typically more significant for the valuation of closely held firms, except in those rare instances where it can be documented that the departure

of the key person(usually a family member) may be advantageous. We might add that that is hard to document even in the rare case where it may be true.

The impact of the departure of the key person is increasingly greater as the number of persons on the management team decreases. This observed inverse relationship is, of course, what we would anticipate. With fewer than six persons on the management team, as reported in Compact Disclosure, the average decrease in stock value for the public firm was 9.43%. This result was the highest among the smaller public firms, progressively and consistently rising from -2.65% for firms with more than 16 persons on the management team. We could easily conclude from extrapolation that the negative impact would be even higher for firms with still fewer persons on the management team, such as typically observed in closely held firms. We could not specifically measure the extrapolation because there are no data on those size firms. We notice the analogous impact pattern when the key person change is viewed favorably to the firm.¹

We also stratified the sample by the market in which the stock was traded as a proxy for liquidity, but the results were about the same regardless of the exchange or market where the stock was traded. The exception was the few foreign traded stocks which showed much larger reactions to the change in key persons.

We also stratified the sample by reasons for leaving, such as health, including death. The results showed no clear pattern that any particular reason caused a greater or lesser impact on the valuation, except for the few, very sudden departures such as unexpected deaths, which caused an over 10% decrease in the valuation.

Conclusion

We believe the observed results definitively support the generally accepted assumption that the lack of management depth and the potential loss of a key person(s) negatively impacts valuation. This is particularly true in small, closely held firms where the number of persons on the management team may be as few as one. The degree of negative impact increases as the number on the team decreases. We observed it as high as negative 9.43% for public firms with fewer than six persons on the management team before the lack of data made it impossible to extrapolate any further. However, the negative impact of discount should obviously be higher as the number of persons on the team decreases.

Summary

This research attempts to measure the often observed, but never quantified, risk of lack of management depth on valuation. We observe increasingly larger average declines in the stock prices of public firms accompanying significant management changes as the number of persons on the management team decreases. The stock price decline averages about 9.43% for firms with fewer than six on the management team and probably should be extrapolated higher for smaller firms, although public data was not available for testing.

Endnote

1. The implications, for example, would be an increase in the build-up model. If, everything else constant, a 15% discount rate, not otherwise already considering management depth risk, would increase about 10% for a firm with fewer than 6 on the management team to about 16.5%. In the direct application of our results to the net valuation calculation, a 10% discount would be applied.

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Yan Wang is a doctoral candidate at the University of South Florida

EXHIBIT I

SUMMARY				
	Avg. Increase %	Avg. Decrease %	Range	Number of Observations
Small Firm (<280 million)	4.900	-8.65	-27 to 20	27
Large Firm (>=280 million)	2.260	-4.83	-26 to 11	74
By Number of Management				
Less Than 6	8.500	-9.43	-23 to 24	20
Between 6 to 10	2.700	-8	-14 to 23	52
Between 11 and 15	1.180	-3.825	-6 to 14	13
More Than 16	2.342	-2.65	-4 to 19	10
				6 N/A
By Reasons				
Resigned or Step Down	10	-5.67	-6 to 20	39
Replaced or Fired	14.8	-0.69	-0.69 to 15	5
Moved up Internally	8	-5.88	-6.3 to 12	28
Succeed Previous CEO (outsider)	1.25	-5.98	-11 to 7.8	17
Health Problem	2.15	-10.71	-10.7 & 2.15	3
				9 N/A

APPENDIX

The following firms comprised our sample.

Date of Announcement	Company	Date of Announcement	Company	Date of Announcement	Company
8/1/96	Telewest Communications PLC	9-Sep	Micro Warehouse	15-Oct	Diebold Inc.
8/1/96	MobileMedia Corp.	9-Sep	Geerlings & Wade	16-Oct	Quicksilver Inc.
8/1/96	Danielson Holding Corp.	10-Sep	Wellcare	18-Oct	Johnson Worldwide Associates, Inc.
8/2/96	DQE	10-Sep	Giant Food	18-Oct	Weatherford Enterra Inc.
8/5/96	Stratus Computer	11-Sep	Quality Foods	18-Oct	EDAC Technologies Corp.
8/7/96	Rubbermaid	11-Sep	Fort Howard	23-Oct	R.R. Donnelley & Sons, Inc.
8/7/96	Scotts Co.	12-Sep	Orion Capital	23-Oct	Hardinge Inc.
8/8/96	McDermott Int'l.	12-Sep	J. Baker	23-Oct	Consolidated Papers Inc.
8/9/96	ISG Technologies	13-Sep	Ergo Science	24-Oct	Transworld Airlines
8/9/96	Quaker Oats Snapple Division	16-Sep	3DO Corp.	24-Oct	Datametrics Corp.
8/12/96	Amtran Inc.	3-Sep	Bombay Co.	25-Oct	ADVO Inc.
8/13/96	Software Publishing	20-Sep	New York Times Co.	1-Nov.	Vanguard Airlines, Inc.
8/14/96	Converse	18-Sep	Precision Systems Inc.	1-Nov	Intervisual Books, Inc.
8/14/96	National Steel	18-Sep	Federal-Mogul Corp.	5-Nov	Federal Mogul Corp.
8/16/96	Syquest Technology	19-Sep	Eskimo Pie Corp.	5-Nov	Consolidated Health Care Assoc.
8/20/96	Marvel Entertainment	28-Sep	Total Containment Inc.	5-Nov	International Multifoods
8/20/96	Project Software and Development	27-Sep	Ben & Jerry's Homemade Inc.	6-Nov	Long Island Lighting Co.
8/20/96	Mattel	25-Sep	Darling Int'l Inc.	6-Nov	Ventana Medical Systems Inc.
23-Aug	Ann Taylor	30-Sep	Digital Link Corp.	6-Nov	Alliance Gaming Corp.
23-Aug	Richfood Holdings Inc.	30-Sep	X-Rite Inc.	6-Nov	Tektelec
23-Aug	Gibson Greetings	2-Oct	Liz Claiborne Inc.	6-Nov	Seragen Inc.
26-Aug	Rogers Communications	2-Oct	Broderbund Software Inc.	8-Nov	Quest Medical Inc.
26-Aug	Conagna Inc.	6-Oct	Grossman's Inc.	8-Nov	Micrografx Inc.
27-Aug	AST Research	6-Oct	Monterey Pasta Co.	11-Nov	First Central Financial Corp.
27-Aug	Quartetdeck	7-Oct	Tyler Corp.	11-Nov	Lone Star Steakhouse & Saloon Inc.
28-Aug	Novell	8-Oct	Crosscom Corp.	13-Nov	Cylink Corp.
29-Aug	Avid Technology	9-Oct	Bally Total Fitness Holding Corp.	14-Nov	Mustang Software Inc.
3-Sep	Individual Inc.	9-Oct	Porta Systems Corp.	15-Nov	Connecticut Natural Gas Corp.
4-Sep	A.D.A.M. Software	9-Oct	Porta Systems Corp.	18-Nov	Interleaf Inc.
4-Sep	Gaylord Entertainment	9-Oct	Mapinfo Corp.	19-Nov	International Speciality Products Inc.
4-Sep	O'Charley's	14-Oct	H&R Block Inc.	20-Nov	Systems of Excellence Inc.
6-Sep	Summit Technology	14-Oct	Bay Networks Inc.	27-Nov	Micro Warehouse Inc.
6-Sep	J. Ray McDermott SA	15-Oct	Cerplex Group, Inc.	28-Nov	Sun Co.
9-Sep	Edmark	15-Oct	Minimed Inc.		

CAPM and Business Valuation

by James H. Schilt, ASA, CBA, CFA

The Capital Asset Pricing Model (CAPM) stems from Modern Portfolio Theory (MPT) that was developed as a result of a 1952 article published by Professor Harry Markowitz and updated in 1959, and sought to explain the relationship between risk and return in securities portfolios for investors. Markowitz introduced the outlines of a systematic framework for investment management and showed that an investor's portfolio choice can be reduced to balancing the expected return on the portfolio and its variance. Variance or variance of return is a "measure of dispersion about the expected," according to Markowitz. MPT is a risk-premium model that assigns increasingly higher returns to increasing risk. Risk is defined as the covariability of an asset or portfolio returns with the market returns. Portfolio risk is now tied to the interaction of the components.

Before MPT, according to many observers, financial analysts, portfolio managers, and investors looked at each investment opportunity as being unique... well not quite. As far back as the Code of Hammurabi, around 1800 B.C. (Hammurabi being a king in the first dynasty of Babylonia), established the maximum rate of interest that a money lender or investor might charge a borrower on loans of grain, which was repayable in kind, at $33\frac{1}{3}\%$ per annum. On loans of silver, the maximum rate was set at 20%. Not much in the way of diversification, but investors were being compensated for the increased risk.

Based on Markowitz's work, Professor William Sharpe, in the mid-1960s, developed, along with others independently of one another, what has become known as the Capital Asset Pricing Model. Markowitz and Sharpe, along with Professor Morton Miller, shared the Nobel Prize in Economic Sciences in 1960. Sharpe's paper entitled "Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk," was finished in 1962 and published in 1964. The model defines "risk" as the volatility of a security's returns to that of the market.

I believe that herein lies one of the problems in using the CAPM – at least in business appraisals. "Risk" is exposure to possible loss or injury. It is a danger, a hazard, a gamble. If a stock price goes up more or less than the market index in the short term, where is the risk? If the momentum carries the stock down more than the index, where is the risk? Is it that the investor

has a short time horizon and may wish to sell at the very time the market declines? Investors have always known that money in the market is at risk and stocks fluctuate. Even an excellent long-term investment may be a disaster if the holding period is too short. As most privately-owned companies are held for the long pull, shouldn't appraisers have a better definition of risk? Expected returns and risk are the mainstays of a portfolio according to Markowitz. Expected return relates to the expected return of the index, but risk is more complicated. It relates to the risks of the individual components of the portfolio and the correlation.

The CAPM defines risk as the covariability of the security's returns with the market returns. The risk that can be eliminated is called "nonsystematic" or "non-market-related," because it is caused by changes that are specific to the company issuing the security. Risks associated with individual firms can be diversified away. The systematic risk is the risk associated with the market and can not be diversified away. The CAPM designates systematic risk as Beta, which stands for the volatility of an asset or portfolio relative to that of the market. Already we have additional problems. The Beta is based on historical results of asset behavior and may not be predictable of the future. Forecasts of future volatility are hard to make and to validate. Moreover, it is possible that systematic risk or Beta is too limited to define a security's risk. It certainly is when it comes to valuing the privately-owned company as it ignores the specific business risks of the business interest under appraisal.

The CAPM assumes that:

- The investor is risk adverse with an objective to maximize his terminal wealth.
- Investors have diversified portfolios.
- There are no taxes or transaction costs.
- All investors have identical time horizons.
- All investors have identical perceptions regarding the expected returns, volatilities and correlations of available risky investments.

In the real world this is not the case, but appraisers have made many leaps of faith when it comes to the CAPM and its use in business valuation. Another difficulty is that different Betas are reported by different Beta services, and they can vary widely. The length of time over which one calculates a Beta is important as they change significantly as the period changes. To use

a Beta to measure the “risk” in an individual private company, one should use a Beta that arises from the results of a group of publicly-traded stocks that represent firms that are similar to the company under appraisal. Then, for simplicity, you might select the median average Beta of the guideline companies. But how many companies are you going to find with similar product lines, size, operating and financial ratios, depth of management, and diversification? Dr. Rolf Barry in 1981, then with Alliance Capital in London, found that during the 1936-75 period, the average return to stocks of small firms (those with low values of market equity) was substantially higher than the average return to stocks of large firms after adjusting for risk using the CAPM. In 1992, Professors Eugene Fama and Kenneth French found the same thing as regards to size in addition to the ratio of book value of a firm’s common equity to its market value as an explanatory variable. In fact, book-to-market equity appears to be more powerful than size. Fama and French used stock returns for 1963-90. However, it should be pointed out, when they ran their regressions for 1941-65, they found a positive relationship between average return and Beta. As Sharpe said in an interview taken from the *Dow Jones Asset Manager*, May/June 1998, “In the data it’s hard to find a strong, statistical significant relationship between measured betas and average returns of individual stocks in a given market.” We know that amplitude of future stock market movements cannot be forecast by basic regression technique.

In a January 2004 draft of a working paper entitled “The Capital Asset Principal Model: Theory and Evidence,” Fama and French state that “in the late 1970s, research begins to uncover variables like size, various price ratios, and momentum that add to the explanation of average returns provided by Beta. The problems are serious enough to invalidate most applications of the CAPM.”

Many authors in the field of business valuation provide excellent explanations of the working of the CAPM. (See References.) Jay Fishman does a particularly good job in bringing together the build-up method and the CAPM method along with the use of guideline companies for business appraisers in Section 503 in the 2003 Edition of *Guide to Business Valuation*. Other author/appraisers in the cautious group regarding use of the CAPM would include Ian Campbell and George Hawkins.

It is my belief, however, that there still remains a large leap of faith between the use of Beta in the management of security portfolios and the appraisal of closely-held business interests in spite of several au-

thoritative authors who warn about its use. Could it be the problem with the Emperor’s new clothes that such a large group of appraisers don’t see it?¹ In a recently published informative article in *The Valuation Examiner*, Michael Elmaleh states that “If the risk/return model cannot accurately predict the price movement of publicly traded equities, where the ability to measure risk and future income is relatively good, why would you expect the model to yield accurate predictions about the price of closely held equities, where the ability to measure risk and future income is generally much worse?”

My own research on the subject has been published in *Business Valuation Review* (September 1991, December 1994, March 2000 and December 2003). The data was taken from *Value Line Investment Survey* going back to 1986 and showed changes in Beta and safety ratings at three to five year intervals. For the original article, I randomly selected ten industries and took the first seven stocks that were reviewed by *Value Line*. From the original 70, there remained 31 in the final *Survey* due primarily to companies having been acquired or lowered investment interest.

Value Line uses the term “Safety” rather than “Risk.” Safety incorporates the finances of each company in addition to volatility which means a better look at “risk” of a business enterprise than just the volatility of a security’s return in the CAPM model. The data disclosed that most of the stocks under examination failed to show any change in risk as defined by *Value Line*, while the Beta changed in almost every case. This should not be a surprise since the Beta coefficient is a measure of the “variance of return” and not a quality rating.

As suggested by Diana Harrington in her book on MPT and CAPM, “The definition of risk as relative volatility of returns has some disadvantages, however. First, forecasts of future volatility are difficult to make and to verify. Second, it is possible that systematic risk or beta is too limited a definition of a security’s risk.”

In addition to the use of a Beta, many appraisers will apply an additional discount rate to cover company-specific business risks as they realize that ownership of a privately-held business has much greater risk than a portfolio investment. The question remains as to why use a Beta at all in the valuation of a single, privately-owned long term equity investment? Beta does not say anything about the business entity. It is simply a mere computation using historical data of market and stock prices! Apparently, too many business appraisers live in a world where fantasy has more status than reality.

Readers should take heart. Even without the CAPM, there are some wise men who know about investing besides the sage of Omaha. Will Rogers, for example, wrote some good advice:

Don't gamble; take all your savings and buy some good stock, and hold it till it goes up, then sell it. If it don't go up, don't buy it.

Endnote

1. *The Emperor's New Clothes* comes from a fable by Hans Christian Andersen. In it, a foolish Emperor is convinced he has bought an enchanted wardrobe of lightweight garments from two con men, that are invisible to him, but are seen by his subjects as elegant royal costumes, heavily brocaded with gold and silver threads. None of the sycophants around the Emperor dared tell him the truth. One day, as the Emperor was out in public displaying his finery, a child among the spectators, too young to know how to lie, cried out for all to hear, "Look. He's naked. That guy in the crown is naked."

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Addendum

After submitting the foregoing paper for publication, I received the March/April 2004 issue of the *Financial Analyst Journal* (published by the Association for Investment Management and Research), which included some comments on valuation that should be of interest. The article in question entitled "Value at Risk and Expected Stock Returns," by Professors Bali and Cakici states the following:

The primary implication of the capital asset pricing model (CAPM) of Sharpe (1964), Lintner (1965), and Black (1972) is that a positive linear relationship exists between expected returns on securities and their market betas and thus variables other than beta should not capture the cross-sectional variation in expected returns. Over the past two decades, many researchers have found that idiosyncratic factors, such as stock size, book value of equity to market value of equity (BE /ME), and the earnings-to-price ratio have significant explanatory power for average stock returns but that beta has little or no explanatory power at the individual-stock level.

It should be remembered that the CAPM was designed for application, among other uses, by financial analysts in constructing a portfolio of stocks. When the instructors of core users begin to abandon the method it is a bad sign. Where does this leave the business appraiser who uses the model?

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The Residual Income Method of Business Valuation

by Ronald S. Longhofer, JD, CFA, CFE

I. Introduction

Although quite well known in academic circles and among CFA candidates and charterholders,¹ little has been written about the Residual Income Method (RIM) of business valuation in the business appraisal literature.² Certainly, the RIM has not gained widespread application in the business valuation community, despite its many advantages. The RIM is a method of valuation within the income approach. The primary features distinguishing the RIM from the more familiar discounted cash flow (DCF) method are (1) that it is based on accrual accounting net income rather than net cash flows, and (2) that it relies upon accounting book value as the anchor of value. It is often claimed, under the banner of “cash is king,” that cash flow is a better measure of value than accounting net income due to management’s ability to manipulate the latter. However, the RIM in fact yields exactly the same value, as does the DCF method when applied with the same valuation assumptions. This article illustrates the basic features of the RIM, and compares the results of applying it to those yielded by the DCF method.

II. The Residual Income Method

The RIM employs concepts similar to economic value added (EVA) analysis,³ in that it measures value added in terms of earnings in excess of the required rate of return on capital employed. Starting with the value of its existing capital, a firm adds value only to the extent that its returns exceed its cost of capital. Thus, under the RIM, the value of equity (V_e) is calculated using the following general formula:

$$V_e = BV_0 + \sum [RI_t / (1 + k_e)] \quad (1)$$

Where:

BV_0 = Beginning book value of equity;

k_e = Cost of equity capital; and

RI_t = Residual Income at time t, defined as:

$$NI_t - (k_e * BV_{t-1}) \quad (2)$$

Where:

NI_t = Accrual accounting net income at time t; and

BV_{t-1} = Book value of equity at time t-1.

As with the DCF method, the RIM may be applied either to capitalize a single period’s return (both where it is assumed that future period returns will be stable, and where such returns are expected to grow at a stable rate in perpetuity), or to discount projected returns over

multiple discrete periods followed by a capitalized terminal value. It can also be used either to value equity directly, or to value equity indirectly by first valuing the entire enterprise on a “debt free” basis and then subtracting the market value of debt.

A. Direct Equity Valuation Using Single-Period Capitalization

For a single-period capitalization, formula (1) above reduces to beginning book value plus either a perpetuity or a growing perpetuity, depending on whether future residual income is expected to be stable or to grow at a stable rate.

1. Future Returns Expected to be Stable

In the simplest case where future residual income is expected to be stable, the formula becomes:

$$V_e = BV_0 + RI_1 / k_e \quad (3)$$

Where:

RI_1 = Residual income at the end of period one, defined as:

$$NI_1 - (k_e * BV_0) \quad (4)$$

Where:

NI_1 = Accrual accounting net income at the end of period one; and

BV_0 = Beginning book value.

To illustrate the application of the RIM in this situation, assume that ABC Company has the following simplified balance sheet, where year 0 represents the valuation date, and year 1 represents the projected balance sheet one year hence:

Year	0	1	Growth Rate
Current Assets	30	30	0%
Fixed Assets	80	80	0%
Total Assets	110	110	0%
Current Liabilities	20	20	0%
Long-term Debt	40	40	0%
Equity	50	50	0%
Liabilities + Equity	110	110	0%

Since no growth is anticipated, the balance sheet is in a steady state. Under this scenario, there will be no change in working capital requirements, and capital expenditures will be necessary only to replace existing fixed assets, i.e., at a level equal to depreciation.

Now, assume further that ABC Company is expected to have the following simplified income statement for year 1, assuming a cost of debt of 5% and an effective tax rate of 40%.

	Year	1
Earnings before interest and taxes (EBIT)		20.00
Interest		(2.00)
Earnings before taxes (EBT)		18.00
Taxes		(7.20)
NI		10.80

Assuming a cost of equity capital of 15%, we are now ready to value the equity of ABC Company under the RIM by applying formula (3) above:

$$V_e = BV_0 + RI_1/k_e = 50 + [10.80 - (0.15 * 50)]/0.15 = \mathbf{72}.$$

Comparing the results of the RIM with the single-period capitalization of cash flows method, we use the traditional definition of net cash flow to equity (NCF_e):⁴

$$NCF_e = NI + \text{Depreciation} - \text{Capital Expenditures} - \text{Increase in working capital} + \text{Increase in long-term debt} \quad (5)$$

In this steady state scenario, as stated above, capital expenditures are equal to depreciation, and these factors cancel out. Further, no increase in working capital or long-term debt is needed. Therefore, in this simple example, $NCF_e = NI$. Using the no-growth single-period capitalization method to calculate the value of equity, we arrive at the same value as we did under the RIM:

$$V_e = NCF_e / k_e = 10.80/0.15 = \mathbf{72}.$$

It should be further noted that, under the no-growth assumptions of this example, all net income is paid out in dividends (there being no need to retain earnings as there is no growth to fund). Using the accounting convention of the “clean surplus relationship:”

$$BV_1 = BV_0 + NI_1 - Div_1 \quad (6)$$

Solving for Div_1 ,

$$Div_1 = BV_0 + NI_1 - BV_1. \quad (7)$$

As $BV_1 = BV_0$ in our example, it follows that $Div_1 = NI_1$. Accordingly, we can also value ABC Company using the dividend discount model (DDM) and get the same result. The DDM formula is as follows:

$$V_e = Div_1 / k_e \quad (8)$$

Setting dividends equal to net income, we arrive at the same value:

$$V_e = Div_1 / k_e = 10.80/0.15 = \mathbf{72}.$$

2. Future Returns Expected to Grow

Now assume the same facts as above, except that future returns are expected to grow at a rate of 4% in perpetuity. We now modify formula (3) above as follows:

$$V_e = BV_0 + RI_1/(k_e - g) \quad (9)$$

With a 4% growth rate, the above balance sheet is changed to look like this:

	Year	0	1	Growth Rate
Current Assets		30	31.2	4%
Fixed Assets		80	83.2	4%
Total Assets		110	114.4	4%
Current Liabilities		20	20.8	4%
Long-term Debt		40	41.6	4%
Equity		50	52	4%
Liabilities + Equity		110	114.4	4%

Note that the capital structure has remained constant with the 4% growth funded by a combination of retained earnings and increased long-term debt.

Assuming the same year 1 income and other parameters, the year 1 income statement is again as follows (the difference being that it is now expected to grow at 4% in the future):

	Year	1
Earnings before interest and taxes (EBIT)		20.00
Interest		(2.00)
Earnings before taxes (EBT)		18.00
Taxes		(7.20)
NI		10.80

Under these assumptions, the RIM yields the following value for the equity of ABC Company:

$$V_e = BV_0 + RI_1/(k_e - g) = 50 + [10.80 - (0.15 * 50)]/(0.15 - 0.04) = \mathbf{80}.$$

For comparison, let us now compute the equity value by capitalizing net cash flows to equity. From the above balance sheet, we can determine that in year 1, capital expenditures have exceeded depreciation by 3.2, working capital has grown by 0.4, while long-term debt has grown by 1.6. Under these circumstances, using formula (5) above:

$$NCF_e = 10.80 - 3.2 - 0.4 + 1.6 = 8.8.$$

Using the Gordon Growth Model for a growing perpetuity, we again arrive at the same value as we did under the RIM:

$$V_e = NCF_e / (k_e - g) = 8.80 / (0.15 - 0.04) = 80.$$

The same result is obtained using the Dividend Discount Model (DDM). Using formula (7) above, dividends in year 1 are computed, using the clean surplus relationship, as follows:

$$Div_1 = BV_0 + NI_1 - BV_1 = 50 + 10.80 - 52 = 8.80.$$

We therefore calculate the DDM value of equity as follows:

$$V_e = Div_1 / (k_e - g) = 8.80 / (0.15 - 0.04) = 80.$$

It is thus apparent that equity can be valued directly using the RIM, the capitalization of cash flows method, or the dividend discount model, all with the same results under the same assumptions.

B. Indirect Equity Valuation Using Single-Period Capitalization

As noted above, the RIM can also be used to value equity indirectly, by first determining the enterprise value of the firm, and then deducting the market value of debt. This can be done using single-period capitalization, both where future returns are expected to be stable, and where they are expected to grow at a constant rate.

As with the DCF method, the RIM requires different metrics to value the total enterprise on a “debt free” basis, but the basic formula is the same. The anchor of value is the book value of operating assets rather than the book value of equity, and residual income is measured by operating income rather than net income. Instead of the cost of equity, the weighted average cost of capital (WACC) is used. Thus, the basic formula becomes:

$$V_f = OA_0 + \sum [RI_t / (1 + WACC)]^t \quad (10)$$

Where:

V_f = Value of firm;

OA_0 = Book value of beginning operating assets;

WACC = Weighted average cost of capital; and

RI_t = Residual Income at time t, defined as:

$$RI_t = WACC * OA_{t-1} \quad (11)$$

Where:

OI_t = Operating income at time t; and

OA_{t-1} = Book value of operating assets at time t-1.

Operating assets (OA) are defined to be distinct from financial assets. For purposes of RIM valuation, $OA = Total\ assets - Current\ liabilities$. Operating income (OI) is defined to eliminate the after-tax effect of interest expense (thus “debt free”). Therefore, $OI = EBIT * (1-t)$, where EBIT is earnings before interest and taxes,

and t is the effective tax rate. Equivalently, $OI = NI + I * (1-t)$, where I is interest expense.

1. Future Returns Expected to be Stable

With these definitions in mind, where future residual income is expected to be stable, the formula becomes:

$$V_f = OA_0 + RI_1 / WACC \quad (12)$$

Where:

RI_1 = Residual income at the end of period one, defined as:

$$RI_1 = (WACC * OA_0) \quad (13)$$

Where:

OI_1 = Operating income at the end of period one; and OA_0 = Book value of beginning operating assets.

The enterprise value (V_f) is then reduced by the value of debt to calculate the value of equity.

To illustrate the use of the RIM to calculate the enterprise value of the firm where future returns are expected to be stable, consider the same balance for ABC Company as was used above, with the addition of an entry for operating assets (OA):

Year	0	1	Growth Rate
Current Assets	30	30	0%
Fixed Assets	80	80	0%
Total Assets	110	110	0%
Current Liabilities	20	20	0%
Long-term Debt	40	40	0%
Equity	50	50	0%
Liabilities + Equity	110	110	0%
Operating Assets	90	90	0%

Under this steady state scenario, as before, there will be no change in working capital requirements, and capital expenditures will be necessary only to replace existing fixed assets, i.e., at a level equal to depreciation.

Assume further the same year 1 income statement, expanded to show the computation of operating income (OI):

EBIT	20
OI	12
I * (1-t)	1.2
NI	10.8
Div	8.8

Assuming the same cost of debt (5%) and the same cost of equity (15%) as above, the WACC that equates the indirect and direct values is approximately 10.743%. The RIM value is calculated as follows:

$$V_f = OA_0 + RI_1/WACC = 90 + [12 - (0.10743 * 90)]/0.10743 = 112 \text{ (rounded).}$$

Debt of 40 is then subtracted to get an equity value of **72**.

Comparing the indirect calculation of equity value using the RIM with the single-period capitalization of cash flows method, we use the traditional definition of net cash flow to invested capital (NCF_f):

$$NCF_f = NI + \text{Depreciation} - \text{Capital Expenditures} - \text{Increase in working capital} + I * (1-t) \quad (14)$$

In this steady state scenario, as stated above, capital expenditures are equal to depreciation, and these factors cancel out. Further, no increase in working capital is needed. Therefore, in this simple example, $NCF_f = NI + I * (1-t) = 10.80 + 1.2 = 12$. Using the no-growth single-period capitalization method to calculate the value of equity indirectly, we arrive at the same value as we did under the RIM:

$$V_f = NCF_f / WACC = 12/0.10743 = 112 \text{ (rounded).}$$

Subtracting debt of 40, produces the same equity value as reached using the RIM, i.e., **72**.

2. Future Returns Expected to Grow

Now assume the same facts as above, except that, as under the direct procedure, future returns are expected to grow at a rate of 4% in perpetuity. We now modify formula (12) above as follows:

$$V_f = OA_0 + RI_1/(WACC - g) \quad (15)$$

With a 4% growth rate, the above balance sheet is modified as follows:

Year	0	1	Growth Rate
Current Assets	30	31.2	4%
Fixed Assets	80	83.2	4%
Total Assets	110	114.4	4%
Current Liabilities	20	20.8	4%
Long-term Debt	40	41.6	4%
Equity	50	52	4%
Liabilities + Equity	110	114.4	4%
Operating Assets	90	93.6	4%

Note that the capital structure has again remained constant with the 4% growth funded by a combination of retained earnings and increased long-term debt.

Assuming the same year 1 income and other parameters, the year 1 income statement is again as follows (the difference being that it is now expected to grow at 4% in the future):

EBIT	20
OI	12
I * (1-t)	1.2
NI	10.8
Div	8.8

The WACC that equates the direct and indirect equity values is approximately 10.908%. Under these assumptions, the RIM yields the following enterprise value for ABC Company:

$$V_f = OA_0 + RI_1/(WACC - g) = 90 + [12 - (0.10908 * 90)]/0.06908 = 122 \text{ (rounded).}$$

Subtracting debt of 40, the equity value is **82**.

The parallel calculation using free cash flow to the firm yields the same result. As before, in year 1 capital expenditure exceeded depreciation by 3.2, while working capital grew by 0.4. After-tax interest expense was 1.2. Using formula (14) above:

$$NCF_f = 10.80 - 3.2 - 0.4 + 1.2 = 8.40.$$

Using the Gordon Growth Model for a growing perpetuity, we again arrive at the same value as we did under the RIM:

$$V_f = NCF_f / (WACC - g) = 8.40/(0.06908) = 122 \text{ (rounded).}$$

Subtracting debt of 40 again results in an equity value of **82**.

It can be seen from the above that the same equity values are obtained under both the RIM and the DCF methods, when capitalizing single periods under assumptions of either stable or constantly growing returns. This is true whether equity is valued directly or indirectly.

C. Multiple-Period DCF Compared to Residual Income Method

The above-described equivalence between the DCF method and the RIM also obtains for valuations using multiple discrete periods followed by a terminal capitalized value. A detailed illustration is contained in Exhibit A, representing a hypothetical start-up business. Note that once again the same equity values are obtained under the same assumptions, regardless whether equity is valued directly or indirectly.

III. Advantages of the Residual Income Method

While the same valuation results are obtained, the RIM has a number of advantages over valuation using cash flows. First, it requires the analyst to focus on the true drivers of value, which are the amount of capital invested, and the return on that investment. As with

EVA, the RIM defines increases in value as returns in excess of the required rate. Note in Exhibit A that, despite high earnings growth rates, the RIM shows negative residual income in the early years of the start-up enterprise, while the cash flow methods show positive cash flows. The company is actually destroying value until it starts to stabilize in year 5. It is impossible to tell from cash flow analysis alone whether a company is earning positive economic returns on its investment.

Second, the RIM takes advantage of accrual accounting, which matches value added with value surrendered, and recognizes value that may be added before cash flows are received. Unlike cash flow analysis, the RIM treats investments as assets rather than as lost value, and anchors value on the equity already recognized in the balance sheet.

Third, the RIM places far less weight on the terminal value, i.e., the distant earnings that are the most difficult to project. In Exhibit A, for example, under the DCF method (direct equity procedure), the terminal value accounts for 2,239 out of the total value of 3,392. In contrast, under the RIM, the terminal value accounts for only 746, with the bulk of value coming from the book value of equity, for which no projections are required.

IV. Conclusion

The RIM is worthy of consideration either as a primary valuation method, or as a check on valuations performed using the single-period capitalization or multiple-period DCF methods. It is widely recognized in the academic literature, and is taught to countless students in business schools, as well as to CFA candidates, both in the U.S. and abroad. It yields the same values under the same assumptions as the DCF method, but directs the analyst's attention to the true sources of value, i.e., existing investment and return on that investment exceeding the cost of capital.

Endnotes

1. See, e.g., Lundholm, R. and Sloan, R., *Equity Valuation and Analysis with eVal* (McGraw-Hill 2004), Ch. 10; Penman, S., *Financial Statement Analysis and Security Valuation* (McGraw-Hill, 2d ed. 2004), Ch. 5; Palepu, K., Healy, P., and Bernard, V., *Business Analysis and Valuation* (South-Western 2000), Ch. 11; Feltham, J. and Ohlson, J., "Valuation and Clean

Surplus Accounting for Operating and Financing Activities," *Contemporary Accounting Research* 11 (1995): pp. 689-731; Stowe, J., Robinson, T., Pinto, J., and McLeavey, D., *Analysis of Equity Investments: Valuation* (AIMR 2002), Ch. 5.

2. The only such article the author has been able to locate is Gore, R., Cooper, J. and Allen, M., "Accounting-Based Valuation: The Residual Income Model," *Valuation Strategies*, November/December 2001, pp. 20-33.
3. See Stewart, G.B., *The Quest for Value* (HarperBusiness 1991).
4. See, e.g., Pratt, S., *Valuing a Business* (McGraw-Hill 4th ed. 2000), p. 158.
5. Since the WACC requires the market value of equity to determine the relative weights of debt and equity, and the market value of equity is what we are attempting to calculate, we encounter a circularity problem if we want to reach the same value of equity indirectly that was reached under the direct procedure. The solution is to use the value of equity calculated under the direct procedure for purposes of determining the weight of equity under the indirect procedure. Other capital structure assumptions may of course be used, and the valuation results will be consistent with those assumptions, but not necessarily the same as the direct equity value. This is true for both the RIM and DCF methods to exactly the same extent.
6. Pratt, p. 158.
7. While it is true that book values may be distorted due to either "creative accounting" by management or the particular requirements of GAAP accounting (e.g., the carrying of fixed assets at original cost less depreciation, or the immediate expensing of R&D and advertising), the RIM corrects automatically for such distortions. If book value is too high, residual income will be correspondingly lower, and vice versa. See Penman, pp. 161-162; Lundholm & Sloan, pp. 186-187; Palepu, Healy & Bernard, pp. 12-18 to 12-20.

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EXHIBIT A

Reconciliation of DCF Method with Residual Earnings Method

End of Period	0	1	2	3	4	5	6	7	Terminal 8
Income Statement									
Revenue		2466.5	2760.0	3726.0	4657.5	5356.1	5891.7	6186.3	6495.6
Cost of Goods Sold	65%	(1603.2)	(1794.0)	(2421.9)	(3027.3)	(3481.4)	(3829.6)	(4021.1)	(4222.1)
Depreciation	30%	(720.0)	(737.1)	(788.7)	(818.3)	(836.7)	(849.3)	(891.7)	(936.3)
EBIT		143.3	228.9	515.4	811.8	1037.9	1212.8	1273.5	1337.1
Interest		(19.5)	(11.3)	(11.4)	(11.6)	(12.1)	(12.6)	(13.2)	(13.9)
EBT		123.8	217.6	504.0	800.2	1025.8	1200.2	1260.2	1323.2
Income Tax		(49.5)	(87.0)	(201.6)	(320.1)	(410.3)	(480.1)	(504.1)	(529.3)
Net Income		74.3	130.6	302.4	480.1	615.5	720.1	756.1	793.9
Balance Sheet									
Cash	1,200	826.1	778.0	601.6	549.1	590.7	694.2	728.9	765.4
Accounts Receivable		246.6	276.0	372.6	465.7	535.6	589.2	618.6	649.6
Inventory	390	144.3	161.5	218.0	272.5	313.3	344.7	361.9	380.0
PP&E	2,000	2400.0	2457.1	2629.1	2727.7	2789.1	2830.9	2972.5	3121.1
Total Assets	3,590	3617.0	3672.5	3821.2	4015.1	4228.7	4459.0	4681.9	4916.0
Accounts Payable		173.1	193.8	261.6	327.0	376.0	413.6	434.3	456.0
Long-Term Debt	390	225.3	227.6	232.9	241.3	252.0	264.7	277.9	291.8
Retained Earnings		18.6	51.2	126.8	246.8	400.7	580.7	769.8	968.2
Book Value of Equity	3,200	3218.6	3251.2	3326.8	3446.8	3600.7	3780.7	3969.8	4168.2
Liabilities + Equity		3617.0	3672.5	3821.2	4015.1	4228.7	4459.0	4681.9	4916.0
Cash Flow Statement									
Net Income		74.3	130.6	302.4	480.1	615.5	720.1	756.1	793.9
+ Depreciation		720.0	737.1	788.7	818.3	836.7	849.3	891.7	936.3
- Δ Non-Cash Current Assets		(0.9)	(46.5)	(153.1)	(147.6)	(110.7)	(84.9)	(46.7)	(49.0)
+ Δ Current Liabilities		173.1	20.6	67.8	65.4	49.0	37.6	20.7	21.7
Cash from Operations		966.5	841.8	1005.8	1216.2	1390.5	1522.1	1621.9	1703.0
- Capex		(1120.0)	(794.3)	(960.7)	(916.9)	(898.1)	(891.1)	(1033.3)	(1084.9)
- Dividends Paid		(55.7)	(97.9)	(226.8)	(360.1)	(461.6)	(540.1)	(567.1)	(595.5)
+ Δ LTDA		(164.7)	2.3	5.3	8.4	10.8	12.6	13.2	13.9
Δ Cash		(373.9)	(48.1)	(176.4)	(52.4)	41.6	103.5	34.7	36.4
DCF Method (Direct Equity Procedure)									
NCFe = NI + Dep - Capex -									
Δ WAC + Δ LTDA		56	98	227	360	462	540	567	595
DCF		48	74	149	206	230	233	213	
Sum of DCF	1,154								
Terminal Value	2,239								
Equity Value	3,392								
Residual Income Method (Direct Equity Procedure)									
Residual Income = NI(t) -									
Ke*Equity _(t-1)		(406)	(352)	(185)	(19)	98	180	189	198
Discounted Residual Income		(353)	(266)	(122)	(11)	49	78	71	
BV₀ + Sum of RI	2,646								
Terminal Value	746								
Equity Value	3,392								
DCF Valuation (Debt Free Procedure)									
NCF _t = NI + I ^t (1-t) - Capex									
+ Dep - Δ WAC		232	102	228	359	458	535	562	590
DCF		203	78	153	209	234	239	219	
Sum of DCF	1,335								
Terminal Value	2,447								
Enterprise Value	3,782								
Less: LTD		(390)							
Equity Value	3,392								
Residual Income Valuation (Debt Free Procedure)									
Residual Income = UI _(t) -									
WACC*OA _(t-1)		(431)	(359)	(192)	(25)	92	173	182	191
Discounted RI		(377)	(274)	(128)	(15)	47	77	71	
OA₀ + Sum of RI	2,991								
Terminal Value	791								
Enterprise Value	3,782								
Less: LTD		(390)							
Equity Value	3,392								

Model Assumptions:

Cost of Debt (Kd)	5%
Cost of Equity (Ke)	15%
Weight of Debt (Wd)	5%
Weight of Equity (We)	95%
WACC	14%
Tax Rate (t)	40%
Long-term Growth Rate (g)	5%
Dividend Payout	75%

Growth in the Constant Growth Model

by James R. Morris, PhD

Abstract

This article discusses the conditions that justify the use of the constant growth model. The constant growth model is very sensitive to the assumptions regarding the firm's operating ratios, capital structure, and dividend policy. If the constant growth model is used and these factors are not coordinated and consistent, the valuation estimate using the equity method will not agree with the valuation estimate obtained with the invested capital method. On the other hand, if all the factors are coordinated, or "in sync," these two methods will generate identical values when the constant growth model is used. Data presented at the end of the article suggests that only a small proportion of companies have growth rates that would make them good candidates to be valued using the constant growth model.

Introduction

Growth is part of almost every discussion of value, and in appraising the value of a firm, the growth forecast is one of the most pivotal inputs. The importance of growth is evident in the constant growth model that is used in many firm valuations. The constant growth model is

$$\text{Value}_0 = \text{Cash Flow}_1 / (k - g) \quad (1)$$

where k is the discount rate, and g is the growth rate of the cash flow expected to prevail over the perpetual life of the firm. When faced with the task of valuing a growing firm, many appraisers probably resort to the use of the constant growth model shown in (1). They use this either directly, as the value at the valuation date, or indirectly, in conjunction with a period-by-period valuation using the constant growth model for the value at the horizon. The point is that many valuations frequently rely on using the constant growth model at some stage of the valuation.

In constant growth formula (1), the growth rate's importance is equal to the discount rate. A one percentage point increase in growth has the same impact on value as a one percentage point decrease in the discount rate. Yet, despite the obvious importance of growth in estimating value, little effort is devoted to estimating, or even understanding growth. We have 40 years of highly technical research that has been devoted to improving our estimates of the discount rate, k . But we have relatively little guidance for estimating or even understanding the growth rate. Given the importance of growth in the valuation process, more effort needs to be devoted to enhancing our understanding and ability to

forecast growth. The purpose of this article is to add a little to this understanding. In Part 1, we discuss the conditions necessary to have consistent values from the invested capital and equity valuation methods when we use the constant growth model. In Part 2 we briefly summarize growth data so we have a better idea of what growth rates companies have experienced and what rates are applicable to the constant growth model.

Part 1. Constant Growth in the Valuation of Invested Capital and Equity

The constant growth model can be used for either the equity method or the invested capital method of valuation. The cash flows, discount rates, and growth rates must match the method. For the equity approach with constant growth, the cash flow is the cash flow to equity, denoted as CFE, and the discount rate is the equity investor's required return, k_E . With the invested capital method, the cash flow is the cash flow to invested capital, denoted as CFIC, and the discount rate is the weighted average cost of capital, k_{WACC} . Of course, the perpetual growth in the formula is the annual growth in the respective cash flows, denoted by g_{CFE} , and g_{CFIC} . When all the inputs are correctly defined and are "in sync," we should get values that are the same whichever method we use. That is, using the notation we have introduced, we should obtain the same estimate of equity value from both methods:

Equity method:

$$\text{Equity value}_0 = \text{CFE}_1 / (k_E - g_{CFE}) \quad (2)$$

Invested capital method:

$$\text{Equity value}_0 = [\text{CFIC}_1 / (k_{WACC} - g_{CFIC})] - \text{debt}_0 \quad (3)$$

The difficulty we might encounter is that we may not get the same values with the two methods. We seem to have done all the computations right, used the right formulas, yet end up with two different values. We aren't quite sure why we get two different values, but if they aren't too far apart, we pick one and proceed—chalking up the difference to rounding error. But the problem is probably not rounding error. The problem is that the constant growth model is very sensitive to the inputs, and all the inputs must be precisely "in sync" to get consistent estimates from the two methods.

For the constant growth model to yield consistent values, all the assumptions and forecasts about the firm have to be "in sync." The crucial assumptions and

factors where the mistakes are most likely to occur include the following:

1. The growth rate must be sustainable forever, and, of course, must be less than the discount rate.¹
2. Cash flow to equity and cash flow to invested capital must be consistent.
3. Interest rates and costs of capital are expected to be the same every period forever.
4. Assumptions used to calculate cost of equity must be consistent with the assumptions used to calculate the weighted average cost of capital.
5. The firm's operating ratios (profit margins, asset turnover, etc.) are stable.
6. The capital structure is stable, with the proportional mix of debt and equity, in market value terms, being the same every period, forever.
7. The capital structure, dividend policy, and the growth rates must be consistent.

A critical reader can be excused for saying “Of course, it’s obvious that everything needs to be consistent.” However, I suspect that a few valuations occasionally fail to show the level of consistency necessary for the models to work correctly and yield consistent results.

To see how errors might occur, let’s consider the following example. Exhibit 1 shows financial statements for the Mythic Corporation. The balance sheet applies to

time $t = 0$, and the income statements and cash flows are forecasts for year 1 that ends at $t = 1$. Assume that sales, CFIC, and CFE are all forecasted to grow at 7% annually forever. The operating ratios such as profit margin and asset turnover are expected to be stable. Note that all of the equity cash flow is paid out as a dividend, and the dividend payout ratio is 80% ($1,231.2/1,539.0$). Assume that the capital asset pricing model applies, and that the Hamada adjustment of beta is appropriate based on market value leverage ratios. The risk free interest rate is $k_F = 4\%$, the market risk premium is $(k_M - k_F) = 5\%$, and Mythic’s equity would have a beta of 1.0 if it had no debt.

Using this data, we calculate the value of equity using the equity method assuming constant growth. Then we calculate the value of equity using the invested capital approach. Hopefully, we will get the same equity value using both methods. Because the correct application of either method requires that the capital structure weights in our cost of capital calculations be based on market values, and the market values are the things we are estimating, the problem is circular, and will require some iterations.

For the equity method, we start the iterative process using book value capital ratios, and iterate until we converge on the value of equity where the capital ratios and the computed equity value agree. At each iteration, the value of equity is calculated as

Exhibit 1

Mythic Corporation		
Balance Sheet		Time 0
Current Assets	2,500.0	
Net Fixed Assets	7,500.0	
Total Assets	10,000.0	
Current Liabilities	1,000.0	
Debt	3,000.0	
Equity	6,000.0	
Liabilities & Equity	10,000.0	

Income Statement		Period 1
Sales	10,700.0	
Operating Costs	6,955.0	
EBITDA	3,745.0	
Depreciation	1,000.0	
EBIT	2,745.0	
Interest	180.0	
Earnings Before Tax	2,565.0	
Income Tax	1,026.0	
Net Income	1,539.0	
Dividends	1,231.2	

Cash Flow to Invested Capital		
EBITDA		3,745.0
Depreciation		1,000.0
EBIT		2,745.0
Tax (EBIT * T)		1,098.0
Operating Cash Flow (EBIT(1-T)+Depr)		2,647.0
NWC Investment		105.0
Capital Investment + Depr		1,525.0
Cash Flow to Invested Capital (CFIC)		1,017.0

Equity Cash Flow		
Net Income		1,539.0
Depreciation		1,000.0
Cash Flow from Earnings		2,539.0
NWC Investment		105.0
Capital Investment + Depr		1,525.0
Debt Issued		322.2
Cash Flow to Equity (CFE)		1,231.2

Exhibit 2
Equity Method. Iterations to Converge on Equity Value. Dividend Payout at 80%

Row	Iteration	1	2	3	4	5	6
1	Equity Value Assumed	\$6,000.0	\$35,180.4	\$54,586.4	\$56,879.9	\$57,055.1	\$57,068.0
2	Debt/Equity	50.00%	8.53%	5.50%	5.27%	5.26%	5.26%
3	Beta - Leveraged	1.300	1.051	1.033	1.032	1.032	1.032
4	k_E	10.500%	9.256%	9.165%	9.158%	9.158%	9.158%
5	Derived Equity Value	35,180.4	54,586.4	56,879.9	57,055.1	57,068.0	57,069.0

$$\text{Equity value}_0 = 1,231.2/(k_E - 0.07),$$

where k_E changes as we adjust the market value based debt to equity as input for beta. Exhibit 2 shows the results of this iterative process. After six iterations, the estimated value of equity converges to \$57,069.² Note that this converged value is 62% greater than the \$35,180.4 that we get using book value weights in iteration 1.

Next, we use the same iterative process to estimate value of invested capital and the value of equity. Exhibit 3 shows the equity value converge to \$51,450.8, which differs by 37% from the \$81,751.3 we got in iteration 1 using book values. But more important for our present discussion is that this converged value using the invested capital method disagrees with the converged value we got with the equity method. With the equity method, we got equity value of \$57,069, and with the invested capital method we got \$51,450.8—a difference of about 10%.

The difference between the results from the two methods is not due to improper calculations or rounding error. The difference is due to the fact that our forecast assumptions are inconsistent with the requirements of a constant growth model. The constant growth model is a very picky mistress. If you don't live by her rules, she will give you inconsistent results.

Where did we go astray in this case? Which rules did we break? Luckily, we managed not to break all of them. But unluckily, we broke some that are hardest to detect. We violated assumptions 6 and 7 in the list above. Growth, capital structure, and dividend policy are all interrelated, so they have to be consistent. These are the

items that are hardest to keep consistent, or to even be aware that they are inconsistent.

In this example, we projected 7% growth in cash flow to both invested capital and equity, we assumed the capital structure would be 33.3% debt (in book value terms³) every period forever, and we assumed that we had an 80% dividend payout ratio. In addition, it is assumed that there is a constant, stable relation between assets and sales so that assets need to grow at the same rate as sales. In this case, we assumed that the turnover of total assets ($\text{sales}_0/\text{total assets}_0$) must be 1.0 every period. These seemingly reasonable forecasts and assumptions are inconsistent. For this firm's sales to grow at 7% requires that assets increase at the same rate. This, in turn, requires investment and financing. To maintain a stable mix of debt and equity requires that new debt and new equity be added in a fixed, constant proportion each period. Some, or all, of the equity financing must come from retained earnings. This implies that the dividend policy must be tailored to the growth rate and the proportional debt-equity mix. In the constant growth context, growth, capital structure, and dividend policy have to work together. If one is not consistent with the others, the constant growth model yields inconsistent results and is inappropriate to the situation.

This example was set up with the book value capital structure assumed to be 33.3% debt, with all the other operating ratios for the firm stable over time. If we hold the growth rate constant, the 80% dividend payout will not leave sufficient retained earnings to keep the capital structure stable. At this growth rate, the firm will have to issue proportionally too much debt, and the proportion of debt will continually increase. In this case, the debt to

Exhibit 3
Invested Capital Method. Iterations to Converge on Equity Value

Row	Iteration	1	2	3	4	5	6	7	8
1	Equity Value Assumed	6,000.0	81,751.3	50,106.6	51,548.5	51,443.8	51,451.2	51,450.7	51,450.8
2	Debt/Equity	50.00%	3.67%	5.99%	5.82%	5.83%	5.83%	5.83%	5.83%
3	Debt/Invested Capital	33.33%	3.54%	5.65%	5.50%	5.51%	5.51%	5.51%	5.51%
4	Beta - Leveraged	1.300	1.022	1.036	1.035	1.035	1.035	1.035	1.035
5	k_E	10.500%	9.110%	9.180%	9.175%	9.175%	9.175%	9.175%	9.175%
6	WACC	8.200%	8.915%	8.864%	8.868%	8.868%	8.868%	8.868%	8.868%
7	Value of Invested Capital	84,751.3	53,106.6	54,548.5	54,443.8	54,451.2	54,450.7	54,450.8	54,450.8
8	Derived Equity Value	81,751.3	50,106.6	51,548.5	51,443.8	51,451.2	51,450.7	51,450.8	51,450.8

total capital (book values) will increase from 33.3% at $t = 0$ to 38.5% by year 5, and continue to increase after that. This doesn't seem like much, but it violates a basic assumption for the using WACC in the constant growth model, and is enough to lead to the inconsistent value estimates noted above.

Dividend payout

To have everything work "in sync," what has to give? What can we adjust so the model is valid? We can adjust any or all of the items: growth rate, capital structure, or dividend payout. Let's consider dividend payout. To keep everything in balance, meet our financing needs, and maintain a stable debt-equity mix, the payout would have to be 72.7% of earnings. Higher payout would provide insufficient equity, lower payout would provide too much equity. Either way, the debt-equity mix would change. The payout of 72.7% leaves just enough retained earnings to keep the debt-to-total capital ratio at 33.3%—forever. You might ask why couldn't we have a higher payout and issue new shares to maintain the equity financing? The answer is that issuing new equity simply offsets the higher payout. In the absence of transaction costs, paying out \$3 per share and issuing \$1 of new equity is the same as paying a dividend of \$2 and not issuing any new shares. In terms of payout or retention ratios, it is the net payout that matters—particularly in the perpetuity context of the constant growth model.

How do we know that 72.7% dividend payout will work? Two reasons: first, we will try it out; and second, a little algebraic manipulation can prove the case. Let's look at the Mythic example. Keep all other factors the same, but change the dividend payout to 72.7%. With net income in period 1 of \$1,539, the dividend will be \$1,118.9 ($72.7\% \times 1,539$) and the value of equity with the equity method will be calculated as

$$\text{Equity value}_0 = 1,118.9 / (k_E - 0.07).$$

The cash flow to invested capital is unchanged, so the value of equity with the invested capital method will be calculated as

$$\text{Equity value}_0 = [1,017 / (k_{WACC} - .07)] - 3,000,$$

where the debt at $t = 0$ is \$3,000. The data for the invested capital approach is not affected by the payout ratio so long as the capital structure and other factors are also unchanged. Consequently, the value of invested capital method will provide the same correct value as in Exhibit 3, \$51,450.8. To get the value of equity, we have to iterate as we did in Exhibit 2. Without showing all the steps, the value of equity with the equity method will be as shown in Exhibit 4, where the values now agree between both methods—the value of equity is \$51,450.8.

Exhibit 4

Equity Method. Iterations to Converge on Equity Value.
Dividend Payout at 72.7%

Row	Iteration	1 *****	8
1	Equity Value Assumed	\$6,000.00	\$51,450.7
2	Debt/Equity	50.00%	5.83%
3	Beta - Leveraged	1.300	1.035
4	k_E	10.500%	9.175%
5	Derived Equity Value	31,970.2	51,450.8

You might ask "why use the equity method if the invested capital method worked correctly in the first place?" The answer is that you can use either method, but all the factors have to agree. If the dividend payout really was 80%, with all other elements unchanged, the invested capital method in Exhibit 3 would not be correct. The reason is that with a payout of 80%, the capital structure would not be stable at 7% growth. The validity of the invested capital value in Exhibit 3 depends on the stable capital structure.

Where does the payout of 72.7% come from, and why does it work? As noted above, the stable payout can be derived with a little algebraic manipulation⁴ that yields the following formula in terms of the retention ratio:

$$\text{Retention ratio} = \left[\frac{\text{equity}_0}{\text{total assets}_0} \right] \left[\frac{\text{total assets}_0}{\text{sales}_0} \right] \times \left[\frac{g_S}{(1 + g_S)} \right] / \text{net profit margin} \quad (4)$$

$$\begin{aligned} \text{Retention ratio} &= \left[\frac{6,000}{10,000} \right] \left[\frac{10,000}{10,000} \right] \\ &\quad \times \left[\frac{0.07}{(1.07)} \right] / 0.144 = 0.273 \end{aligned}$$

$$\text{Payout ratio} = 1 - 0.273 = 0.727$$

In this formula, the ratios are in terms of book values on the same date. For example, $\text{total assets}_0/\text{sales}_0 = 10,000/10,000$ refers to assets and sales both at the end of period 0, in contrast to sales shown in Exhibit 1 of \$10,700 that are at the end of period 1, after the 7% growth in sales has occurred. The derivation of this formula assumes that the structure of the firm (asset turnover, net profit margin, and capital ratios) is stable in the long run, and calculates the retention ratio necessary to maintain a constant debt ratio and equity-to-total asset ratio. For a given structure and growth rate, the payout ratio is unique. While this is not the only dividend policy the firm can use, it is the only dividend policy that will support 7% sales growth and a stable capital structure. To support faster growth, with the same margin, debt ratio, and asset turnover, the

payout would have to be reduced, and vice versa for slower growth. The point is, if you use a constant growth model, you must have a stable situation. That requires that the firm structure (asset turnover, profit margin, capital ratios, and dividend payout) be stable and consistent over time.

Investment

Investment is another of the items that must be ‘in sync’ for the constant growth model to be valid. Investment in new assets enters into the constant growth model in two ways. First, assets must grow to provide the base for increased sales and cash flows. Second, the calculation of cash flows available to invested capital and equity must take account of the funds spent for the asset investment.

In our Mythic Corporation example, the cash flow calculations in Exhibit 1 summarized the firm’s investment, which is based on the following detail:

Net working capital:	
Increase in current assets	\$175
Less: Increase in spontaneous current liabilities	<u>70</u>
Investment in net working capital	\$105
Capital investment:	
Replacement of depreciated assets	\$1,000
Net new capital expenditures	<u>525</u>
Gross capital investment	<u>\$1,525</u>
Total gross investment	\$1,630

The \$1,630 is the gross investment in the sense that it includes \$1,000 for “replacement of depreciated assets” that is included as part of the expenditure to offset the inclusion of depreciation as part of the operating cash flow. On a net basis, the total amount spent on net working capital and fixed assets was \$630.

These investments are the amounts necessary to keep the firm growing and “in sync.” In this case, it is assumed that, in the long run, the firm will maintain a constant ratio of total assets to sales, and some of its liabilities will increase spontaneously as sales increase. With these relationships stable over time, the net investment is calculated as

Net investment_t

$$= \left\{ \left[\frac{\text{total assets}}{\text{sales}} \right] - \left[\frac{\text{spontaneous current liabilities}}{\text{sales}} \right] \right\} \times (\text{sales}_{t-1})g_s$$

For Mythic in period 1 this would be

$$\begin{aligned} \text{Net investment}_1 &= \left\{ \left[\frac{10,000}{10,000} \right] - \left[\frac{1,000}{10,000} \right] \right\} \\ &\quad \times (10,000) 0.07 = \$630, \end{aligned}$$

where period 0 sales were \$10,000, and the sales growth rate is 7%.

The point of this example is that this investment is necessary for sales to grow at 7%, and cash flows to invested capital and to equity both must take account of the investment. In the context of the constant growth model, whatever long run growth rate is assumed, the investment expenditures in the cash flow calculations must be consistent with the growth, and vice versa.

Sustainable growth

Whereas the firm structure and policies must be ‘in sync’ with the growth rate, it follows that the growth rate must also be consistent with the structure and policies. The long run growth rate that is consistent with structure and policies is the sustainable growth rate.

Formula (4) for the retention ratio may look slightly familiar because it is closely related to the sustainable growth formula developed by Higgins,⁵ which is

$$g^* = \frac{\left\{ (\text{net profit margin})(\text{retention ratio}) \left[\frac{\text{total assets}_0}{\text{equity}_0} \right] \right\}}{\left[\frac{\text{total assets}_0}{\text{sales}_0} \right] - \left\{ (\text{net profit margin})(\text{retention ratio}) \left[\frac{\text{total assets}_0}{\text{equity}_0} \right] \right\}}, \quad (5)$$

where these ratios are in terms of book values. For Mythic Corporation this is

$$\begin{aligned} g^* &= \frac{(0.144)(0.273) \left[\frac{10,000}{6,000} \right]}{\left[\frac{10,000}{10,000} \right] - \left\{ (0.144)(0.273) \left[\frac{10,000}{6,000} \right] \right\}} \\ &= 0.07 \end{aligned}$$

Higgins’ sustainable growth represents the highest rate of sales growth that a firm can support and still have its operating ratios, capital structure, and dividend payout stable. In this scheme, all new equity financing comes from retained earnings, and debt financing is constrained so the debt-to-equity ratio is constant over time. This does not mean the firm could not grow at a different rate—it could grow at a faster or slower rate. But to support a different sales growth rate, something has to give. If, over time, the asset-to-sales ratio, cost structure, profit margin, and dividend payout ratio are stable, more rapid growth will require the firm to finance

Exhibit 5
Growth Rates for Selected Aggregate U.S. Data*

	Population	GDP	Real GDP	Inflation GDP Deflator	Inflation CPI	Corporate Profits	Dividends
1	Average Annual Growth Rate, 1930 - 2004	1.18%	6.77%	3.55%	3.06%	3.36%	7.13% 8.05%
2	Standard Deviation of Annual Growth, 1930 - 2004	0.35%	7.30%	5.17%	3.74%	4.39%	4.14% 5.89%
3	Compound Average Growth, 1930 - 2004	1.18%	6.51%	3.42%	2.99%	3.26%	7.11% 7.84%
4	Average Annual Growth by Decades						
5	1930 - 1939	0.73%	-0.24%	1.32%	-1.93%	-2.05%	n/a n/a
6	1940 - 1949	1.31%	11.66%	5.97%	5.45%	5.56%	n/a n/a
7	1950 - 1959	1.73%	6.68%	4.15%	2.42%	2.12%	7.30% 5.98%
8	1960 - 1969	1.36%	6.89%	4.44%	2.35%	2.53%	7.46% 6.79%
9	1970 - 1979	1.05%	10.06%	3.26%	6.61%	7.55%	9.99% 9.21%
10	1980 - 1989	0.95%	7.93%	3.07%	4.75%	5.26%	7.77% 10.75%
11	1990 - 1999	1.22%	5.39%	3.11%	2.22%	2.95%	5.69% 8.04%
12	2000 - 2004	1.03%	4.84%	2.59%	2.20%	2.49%	4.05% 8.06%

*From U.S. Bureau of Economic Analysis, www.bea.doc.gov/bea/, and the Federal Reserve Bank of St. Louis, <http://research.stlouisfed.org/fred2/>

the asset growth with debt in such a way that the debt ratios will increase.

When we use the constant growth model (1), we are assuming that the cash flow will grow at rate g forever. This rate cannot be chosen arbitrarily. It must be a rate that is attainable, can be sustained in the long run, and is consistent with the firm's operating characteristics and financial policies. Higgins's sustainable growth fits these criteria perfectly. A growth rate that differs substantially from this sustainable rate should be used only with careful justification. One should be able to explain how the firm can grow at a given rate that is consistent with a stable debt-equity mix, with sufficient stability in other characteristics that the growth can continue forever at the same average rate.

Note the term "average rate" in the previous paragraph. In spite of the sensitivity of the constant growth model, it is not necessary that the growth rate actually be the same every period in the future. It is permissible for the actual growth rate to fluctuate from period to period. However, it is necessary for the actual growth to be distributed evenly around an expected or mean growth rate that is the g used in the formula. That is, the long run growth, g , in the constant growth model should be an "unbiased" estimate of the mean rate of future growth, and actual growth in each period should be as likely to be above g as below. If there is a systematic pattern to growth—increasing, decreasing, or following a systematic cycle, then the firm has not reached the point of stability where we are justified in using the constant growth model.

Part 2. Growth Experience

What about the prescription to use the growth rate of the economy as the long run growth rate? Or perhaps the

inflation rate plus population growth? These rates might turn out to be correct, but there is nothing automatic about them. The use of these systemwide rates for a particular firm also needs some justification other than just saying everyone uses these rates. One would really need to explain why these rates apply to the specific industry and firm, and when the firm is expected to reach the point where it just keeps pace with the economy. As a first step, it may be helpful to be reminded of growth rates actually experienced in the past.

Exhibit 5 presents data summarizing economy-wide growth rates for the United States from 1930 through 2004. The average annual growth rates in row 1 are arithmetic averages of the annual rates over the period indicated, and the standard deviations also are based on annual observations. The compound average growth in row 3 is the geometric mean based on the beginning and ending years of the series.

Various prescriptions for long run growth of a firm's cash flows have been suggested based on various broad economic trends. At the low end would be growth in population plus inflation. If we base the forecast on past annual averages, this would be $1.18\% + 3.36\% = 4.54\%$ (using CPI). Note that both population growth and inflation have trended down since their earlier peaks. At the upper end of average aggregate growth would be GDP, or real GDP plus inflation. These would be 6.77% and 6.61%, respectively. Still higher would be the growth in aggregate profits or dividends, which were 7.13% and 8.05%, respectively. Because corporate profits and dividends are aggregated data, they reflect the growth in the business sector, including growth in the number of firms, so one should be cautious in applying those growth figures to a single firm.

Exhibit 6
 Distribution of Selected Growth Rates from Table 1 of Chan, Karceski, and Lakonishok

	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile
Sales growth	0.1%	5.5%	10.2%	13.8%	18%
EBITDA growth	-2.3%	4.1%	9.5%	14.1%	19.4%
Income per share growth	-3.1%	3.9%	9.7%	14.7%	20.4%

While these figures help give us some perspective about growth rates, the range of values we get using the different versions should cause us to be careful. Arbitrary choice of one or the other historical growth rates would lead to wide variations in the estimated value of a particular firm.

The growth experience of individual firms gives us another basis for comparison and projection for future growth in our valuations. We can turn to other studies' of growth. One of the more thorough, recent studies of growth was that by Chan, Karceski, and Lakonishok⁶ (noted as CKL). CKL examined growth for a sample consisting of all firms with data in the Compustat database for the period from 1951 to 1997. On average there were about 2,900 firms in the sample, but with the growth in the number of companies in the database, there were as few as 359 in the first year, and about 6,800 in the last year. They calculated average annual growth for each company over 1-, 5-, and 10-year periods, and summarized the results by showing growth data averaged over all firms in the sample. The variables considered were sales per share, operating income before depreciation (EBITDA) per share, and net income available to common before extraordinary items (per share). Exhibit 6 summarizes selected results from CKL's Table 1. These growth rates are the averages annual rates across all firms in the sample for all possible 10 year holding periods.

The most representative number is the median (50th percentile), which shows sales per share growing at about 10.2% per year, and income per share at about 9.7%. As CKL point out, these figures tend to have an upward bias because of survivorship, the exclusion of firms when the income numbers were negative, and their method of tracking the number of shares that assumes dividends were reinvested. CKL summarize their results by noting that "Our median estimate of the growth rate of operating performance corresponds closely to the growth rate of gross domestic product over the sample period." "After deducting the dividend yield...as well as inflation, the growth in real income before extraordinary items is roughly 3.5% per year. This is consistent with the historical growth rate in real gross domestic product. . ." (p. 649)

While these data provide some perspective on growth rates, we should be cautious in interpreting it. A given firm might jump randomly from the 10th percentile to the 90th, or possibly even settle for a substantial period at the 25th percentile. With that possibility in mind, CKL examined the data for evidence of persistence in growth rates. They performed several tests to determine whether firms with above median growth rates in one period tended to stay in the upper half of the distribution in subsequent periods. They found that "While there is persistence in sales growth, there is no evidence of persistence in terms of growth in the bottom line as reflected by [EBITDA] and [net income]. Instead, the number of firms delivering sustained high growth in profits is not much different from what is expected by chance."..."This finding is what would be expected from economic theory: Competitive pressures ultimately dissipate excess earnings, so profitability growth reverts to a normal rate." (663)⁷

CKL's search for growth persistence focused on high growth. They did not look at the lower end of the spectrum to find whether firms with slower growth fit the mold of the constant growth model with long lasting but steady growth. To gain additional perspective on firms with slower growth that might fit the requirements for constant growth, I examined growth for firms listed on the Compustat Research Insight database with data for the 19-year period, 1986–2004. The base sample⁸ consisted of 3,920 companies. Average annual growth over the sample period was calculated for each company for sales, EBITDA, income before extraordinary items, net income, earnings per share (EPS), total dividends, and dividends per share.⁹

Exhibit 7 shows, for each variable, the growth rates at selected percentiles of the growth data sorted in ascending order from the lowest to highest average annual growth rate. For example, with average annual sales growth calculated for each of 3,919 companies, the data were sorted from lowest to highest. Ten percent of the companies had average sales growth of 2.27% or less, and 25% of the companies had average sales growth of 6.41% or less. The 50th percentile, or median, is the best measure of central tendency: 50% of the companies had sales growth of 13.7% or less. Note that the median

Exhibit 7
Distribution of Growth Rates at Selected Percentiles

Growth variable	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile	Number of companies in the sample*
Sales	2.27%	6.41%	13.7%	26.4%	49.2%	3,919
EBITDA	-38.9%	3.32%	14.8%	37.7%	90.3%	3,920
Income before extra. items	-304.1%	-56.1%	10.53%	49.21%	157.1%	3,917
Net income	-317.2%	-71.3%	7.24%	47.9%	158.3%	3,918
Earnings per share	-268.9%	-62.5%	7.52%	38.7%	121.5%	3,705
Dividend	-33.6%	-0.98%	8.18%	25.9%	97.7%	1,960
Dividend per share	-37.5%	-2.07%	7.64%	23.5%	87.8%	1,741

* For each growth variable, the number of companies in the sample is different because companies were eliminated when data were missing for that particular variable.

growth of net income, EPS, total dividends, and dividend per share all are in the 7% to 8% range, which fits with our conception of growth rates that potentially fit in a constant growth model.

The distribution of growth rates in Exhibit 7 does not show us how many companies experienced growth at rates that would reasonably fit into a constant growth model. Exhibit 8 is intended to give us some of that information. Based on the idea that growth over an infinite horizon should be positive, but less than the long run growth rate of the economy, we would expect that constant growth would have to be between 0% and about 7% or 8%. Certainly, we would not expect a firm to experience growth in excess of 10% over an infinite horizon. Exhibit 8 shows the percentage of companies in the sample that exhibited average annual growth in selected intervals between 0% and 10%. For example, of the 3,919 companies for which average annual sales growth was calculated, 3.55% (139 companies) had average annual sales growth between 0% and 2%; 6.23% of the companies had average annual sales growth between 2% and 4%. The next to last column is the cumulative proportion of companies that had average

annual sales growth between 0% and 10%. When we consider growth of the income variables (income before extraordinary items, net income, or earnings per share), only about 8% to 9% of the companies experienced average growth between 0% and 10% per year.

About 28% of the companies in the dividend sample exhibited average annual dividend growth in the 0% to 10% range. This proportion appears to be large relative to the earnings growth figures. However, half of the base sample of companies were eliminated because of missing data or because they paid no dividends. The companies for which dividend data was available tend to be the more stable companies, so a larger proportion of these companies have dividend growth rates that would be in the constant growth range.

These data tend to support the inference that there is a relatively small number of companies that fit the requirements of a constant growth valuation model. Many of the companies that happened to experience growth rates in the constant growth range would not be expected to stay in that category in the long run. They may speedup or slow down, or disappear. Because of that, the proportion of companies that actually fit the constant growth model

Exhibit 8
Percentage of Companies with Growth within the Interval Indicated

Growth variable	Growth rate interval, %					Cumulative %	Number of companies in sample
	0%–2%	2%–4%	4%–6%	6%–8%	8%–10%		
Sales	3.55	6.23	7.81	8.78	7.55	33.92	3,919
EBITDA	2.63	4.01	4.69	4.44	5.28	21.05	3,920
Income before extra items	1.17	1.48	1.91	2.3	1.79	8.65	3,917
NI	1.3	2.3	1.05	1.63	1.97	8.25	3,918
Earnings per share	1.57	1.38	1.86	2.38	2.0	9.19	3,705
Dividend	3.32	5.92	6.58	6.73	5.31	27.86	1,960
Dividend per share	5.57	6.03	5.97	6.32	4.31	28.2	1,741

is probably considerably smaller than is represented by Exhibit 8.

None of these data will tell the appraiser what growth rate to use for a particular company. Hopefully, it will give an idea of the range of rates that is plausible, and also hopefully, it will provide a caution against using the constant growth model in a situation in which it does not apply.

Conclusion

The objective of this article has been to provide the reader with a little better understanding of how and when the constant growth model can be validly used. The section on the constant growth model shows that we can use it with either the equity method or the invested capital method. Either method will provide valid estimates of value only if all the assumptions and forecasts are consistent. The assumptions that must be consistent include the firm's operating ratios, particularly asset turnover and profit margins, capital structure, dividend payout, and, of course, the growth rate. These factors need to be "in sync" so that the expected growth is the same each period, forever. This does not require that the actual growth must turn out to be the same every period, but it does require that the expected growth is an unbiased estimate of actual future growth. In this context, unbiased means that growth in any period is equally likely to be above or below the mean. Stable long run growth is more likely for a firm with stable operating ratios. However, this does not really require that every ratio be the same every year. Rather, it requires that the operating ratios average out over time so the result is growth that is, on the average, smooth, stable, and with an unbiased mean.

It is well known that the constant growth model requires that growth be less than the discount rate, and that growth should not exceed the growth of the company's economic environment. As a reminder of what long run growth rates are plausible, we briefly reviewed past growth for U.S. economic aggregates. The economy has experienced average annual growth of about 6% or 7%. This suggests that the constant growth model would normally apply to companies whose long run growth is expected to be in the range of 0% to about 7% per year. Growth rates over the last 19 years were calculated for a large sample of companies. What we found was that only a small proportion of companies had average growth rates in a range appropriate for a constant growth model. This suggests that only a minority of companies would have long run growth in a range that would be appropriate for the constant growth model. Our cautionary conclusion is that the constant growth model should be applied with great care only to those situations where it fits the facts and forecasts.

Endnotes

1. The constant growth model is based on expected values so the growth rate can vary period-to-period. However, the expected (mean) growth rate must be the same every year.
2. If our model is not too complex, we can bypass the manual iteration process that is shown in Exhibit 2 by using Excel's iterative calculation method in Tools>Options>Iteration.
3. The assumption that the book value capital weights do not change over time is consistent with market value weights also being constant over time. The reason is that in the stable world of the growth model, the market-to-book ratios will also be constant over time.
4. To derive expression (4) we use the following definitions and assumptions.

In each period, t , the following operating ratios of the firm are assumed to be constant.

$P = \text{net income}_t / \text{sales}_t$, the net profit margin in period t ;

$R = \text{retained earnings}_t / \text{net income}_t$, the earnings retention ratio;

$L = \text{debt}_t / \text{equity}_t$, the debt-to-equity ratio, in book value terms;

$A = \text{total assets}_t / \text{sales}_t$, the asset intensity ratio, the inverse of turnover of total assets. To support sales, the firm's assets must maintain a constant proportion, A , to sales, which implies that assets must grow at the same rate as sales.

$A(\text{sales}_1 - \text{sales}_0) = A \cdot \text{sales}_0 \cdot g$ is total investment in period 1, where g = growth in sales = $(\text{sales}_1 - \text{sales}_0) / \text{sales}_0$.

Equity financing is provided entirely by retained earnings, which in period 1 is

$\text{Retained earnings}_1 = RP \cdot \text{sales}_1$.

Debt financing provides the remainder of the required financing for total investment. To maintain the debt-equity ratio at a constant level over time, the new debt in period 1 will be

$\text{Debt financing}_1 = L \cdot \text{equity financing}_1 = LRP \cdot \text{sales}_1$
Equality of investment and financing requires:

Total investment = equity financing + debt financing

$A \cdot \text{sales}_0 \cdot g = (RP \cdot \text{sales}_1) + (LRP \cdot \text{sales}_1)$
 $= (RP \cdot \text{sales}_1)(1 + L)$

$A \cdot \text{Sales}_0 \cdot g = \text{sales}_0(1 + g)[RP(1 + L)]$.

Assume g , P , and L are held constant, and solve for retention ratio, R , we have:

$R = (g/1+g)[A/P(1+L)]$.

Noting that $1 + L = 1 + (\text{debt/equity}) = (\text{debt} + \text{equity})/\text{equity} = \text{total assets/equity}$, so that $[1/1 + L] = \text{equity}/\text{total assets}$, we have

$R = (g/1 + g)[A(1/1 + L)/P]$

$$= (g/1 + g)[A(\text{equity/total assets})]/P$$

Retention ratio = $(g/1 + g)(\text{total assets/sales})(\text{equity/total assets})/\text{net profit margin}$.

5. Higgins, Robert C., "How Much Growth Can a Firm Afford?" *Financial Management* (Fall 1977):7–16. A revised formula for sustainable growth is presented in Robert C. Higgins, *Analysis for Financial Management*, 6th edition (New York: McGraw-Hill, 2001), 119. We use the older formula because the revised version yields consistent results only when the firm is actually growing at the sustainable rate.
6. Chan, Louis, Jason Karceski, and Josef Lakonishok, "The Level and Persistence of Growth Rates," *Journal of Finance* (April 2003):643–684.
7. Other evidence of the lack of persistence of high performance is provided by Fama and French, who find evidence of mean reversion in firms' return on assets. What this means is that when a firm's return on assets deviates above or below its long run mean, there is a tendency for it to revert back toward its mean. Eugene Fama, and Kenneth French, "Forecasting Profitability and Earnings," *Journal of Business* (April 2000):161–175.
8. Companies included in the sample were from the Standard & Poor's Research Insight (Compustat) database, annual data from 1985 to 2004. The sample

excluded financial companies (SIC 6000 to 6999). To be included in the base sample, a company had to have at least 5 years of sales data and sales over \$1 million in year 2000. In addition, companies were eliminated from the sample if average sales growth exceeded 1,000%. Growth was calculated only from a positive base. That is, growth was not calculated if the earnings were negative in that year.

9. For each company, growth was calculated for each year for which data were available. The average (mean) and standard deviation of the rate of growth over the sample period were calculated for each company. The number of years of growth included in each company's average varied according to the number of years of data available for each company.

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Regression Analysis in Valuation Engagements

by George B. Hawkins, ASA, CFA

Abstract

Regression analysis can be an important tool, when used correctly during a valuation engagement.

Introduction

“Business valuation is as much as art as it is science.” Sage advice; however, quantitative techniques can and should be used where appropriate in a professional valuation to arrive at more sound, logical, and well-supported conclusions. A case in point is the use of linear regression analysis, a statistical technique that helps discern possible relationships between two or more variables. About now you’re about to tune out on the subject, suffering a bad flashback to that boring college statistics class that covered the math you thought you would never use. Wrong! This simple technique is incredibly valuable in many aspects of business valuation and in the related issues that arise for attorneys where valuation issues come into play. These include

- Identifying the factors driving the pricing paid for public companies in a particular industry and what this says about valuing the private company
- Identifying the factors driving the pricing paid for private companies in a particular industry and what this says about valuing the private company
- In equitable distribution matters in a divorce, identifying how much of the appreciation in value of a company (that is the separate property of one spouse) over time during the marriage was due to passive versus active efforts of the owning spouse, affecting how much of the change in value during the marriage is marital versus separate property for property division.

Regression analysis does not “prove” that there is necessarily a causal relationship between things (i.e., people who eat more Twinkies weigh more), so common sense also has to come into play. Nonetheless, it is a powerful tool with an important place in valuation that already shapes our everyday lives, in everything from testing new pharmaceutical drugs to making public policy decisions.

This article will not make one an expert on regression, although it will provide a basic understanding of the technique, show how to interpret its results in several examples using Microsoft Excel,TM and provide resources to learn more about the subject.

The Basics

Regression attempts to discern relationships between things, called variables. The variable (or thing) to be predicted is the dependent variable (y), called this because its value “depends” on other independent variables (x_1 , x_2 , etc.). To keep it simple, this discussion will focus on using only one independent variable. Let’s take a look at a real-life example to make it clear.

A valuator has been given the assignment of valuing a beer distributor and has obtained data on the prices paid in 11 transactions involving the sale of privately owned beer distributors, including the price paid and financial measures of the companies, such as their annual revenues and earnings (as measured by earnings before interest, taxes, depreciation, and amortization, or EBITDA). The appraiser must decide what measure(s) (the independent variables) such as revenues, EBITDA, profit margin, and the like best predict the value (the dependent variable, y) of the private company. Therefore, using Excel the analyst performs several linear regressions to test the relationship between the prices paid (y) for the beer distributors that were sold and each of the independent variables (the annual revenues, EBITDA, and profit margin of each beer distributor) to discern relationships to the price paid.

Table 1 gives a summary of the data for each acquired company, including the price paid, the price expressed as a multiple of annual EBITDA and revenues, and the annual EBITDA and annual revenue figures of each beer distributor.

The valuator could just simply take the easy way out and take the median multiple as a measure of the central tendency in the price paid, and in many instances that might be the right decision. However, the data in Table 1 show a wide range of multiples, so the appraiser wants to be sure he or she is making the best informed decision. Second, it would be very helpful to know which multiple is a better predictor of what buyers of beer distributorships pay in acquisitions, one based on earnings (EBITDA) or revenues. Insight into this issue will assist in deciding which multiple(s) to use or weight the most in the valuation.

Neither of these questions is easily answered from merely eyeballing the data, so let’s test the relationships using simple linear regression, first “regressing” the price paid (the y , or dependent variable) against EBITDA (the x , or independent variable), and then do the same

Table 1
Prices Paid to Acquire Beer Distributors (\$000s)

Price Paid	Price Paid as Multiple of		Annual Revenues	EBITDA
	EBITDA	Revenues		
\$94,769.0	7.04	1.55	\$13,457.0	\$61,283.0
\$52,000.0	6.98	0.83	\$7,448.0	\$62,444.0
\$48,400.0	8.23	0.79	\$5,884.2	\$61,508.2
\$47,000.0	8.04	0.78	\$5,845.6	\$60,119.3
\$33,740.0	11.68	0.79	\$2,888.1	\$42,705.0
\$33,715.0	7.33	1.05	\$4,600.0	\$32,000.0
\$21,100.0	7.39	0.79	\$2,854.8	\$26,674.2
\$7,500.0	6.89	0.86	\$1,087.9	\$8,704.1
\$3,700.0	27.90	0.63	\$132.6	\$5,901.2
\$2,550.0	3.86	0.81	\$661.0	\$3,144.0
\$1,800.0	10.86	0.57	\$165.7	\$3,138.7
Average	9.66	0.86		
Median	7.39	0.79		

thing with price compared to revenues. Therefore, our formulas are as follows, first based on earnings and then revenues. First, the formula for the relationship between price paid and a selling company's earnings (EBITDA) in transactions is

$$y = a + bx,$$

where y = company value (in \$000s; this is the price we are trying to predict), x = annual EBITDA (in thousands; this is the earnings of the company, i.e., its earnings before interest, taxes, depreciation, and amortization expense), and a = slope intercept. Second, the formula for the relationship between price paid and a selling company's annual revenues in transactions is

$$y = a + bx,$$

where y = company value (in \$000s; this is the price we are trying to predict), x = annual revenues (in thousands), and a = slope intercept.

Regression analysis works by plotting the independent and dependent variable data from the transactions on a graph and then mathematically draws a line through the center of the data, minimizing the squared deviations of the data from the average. The $y = a + bx$ formula then describes this relationship so that it might be applied later to the private company's specific results to estimate its value.

Table 2 shows the data for the price paid for the acquired beer distributors versus their annual earnings (EBITDA) (results in \$000s). Using Excel, a regression analysis of the price paid (y) against the earnings (x) is performed. In Microsoft Excel 2007™ (the location and commands in Excel may differ in earlier versions) this is accomplished using the regression analysis tool found

Table 2
Regression Variables

Price Paid (y)	EBITDA (x)
\$94,769.0	\$13,457.0
\$52,000.0	\$7,448.0
\$48,400.0	\$5,884.2
\$47,000.0	\$5,845.6
\$33,740.0	\$2,888.1
\$33,715.0	\$4,600.0
\$21,100.0	\$2,854.8
\$7,500.0	\$1,087.9
\$3,700.0	\$132.6
\$2,550.0	\$661.0
\$1,800.0	\$165.7

under "Data Analysis" on the "Data" toolbar. If you cannot find "Data Analysis," you will need to follow Excel instructions to install the Data Analysis toolpak that comes with Excel.

Select "Data Analysis" and then the "Regression" tool. Using your input device, click the "Input Y Range" and then highlight the cells where the data for prices paid are located in your spreadsheet. Be sure to begin by highlighting the label and the data, and don't leave a blank in your spreadsheet between the label and the data. Next, do the same for the label and data in the X range for EBITDA. Next, select "Confidence Level" and put 95%, which means that you want to Excel to test that the relationships between the variables are not random with a 95% certainty (see the explanation of this issue below). Also, select labels so that Excel will know that the first entry in the range for each variable is a label, as well as where the regression output should be posted (on the existing spreadsheet, etc.). Click OK, and your regression results will then be produced as shown in Figure 1. A detailed discussion of the meanings of each of the measures under "Regression Statistics" and "ANOVA" (analysis of variance) is the subject of an entire statistics book. However, there are several critical statistics included in Figure 1 that the business appraiser can quickly focus on to draw broad conclusions about the regression.

The R^2 measure is a measure of the percentage of the variation in the y variable that can be explained by changes in the x variable. In Figure 1 the R^2 measure indicates that 97.5% of the variation in the prices paid for the beer distributors can be explained by variations in the earnings as measured by EBITDA, a very strong relationship. In other words, companies that make more sell for more, which makes sense.

However, just because R^2 is high does not prove that the relationship is statistically valid and other than by random chance. The "Significance F" measure tests

SUMMARY OUTPUT					
Regression Statistics					
Multiple R	0.9876305				
R Square	0.975414				
Adjusted R Square	0.9726822				
Standard Error	4714.4764				
Observations	11				
ANOVA					
	df	SS	MS	F	Significance F
Regression	1	7936151449	7936151449	357.0614846	1.49724E-08
Residual	9	200036593.5	22226288.16		
Total	10	8136188043			
	Coefficients	Standard Error	t Stat	P-value	Lower 95%
Intercept	2686.2721	2083.850586	1.28909055	0.22951138	-2027.725423
EBITDA	7.0344411	0.372270047	18.89607061	1.49724E-08	6.192307745
					7.8765744

Figure 1

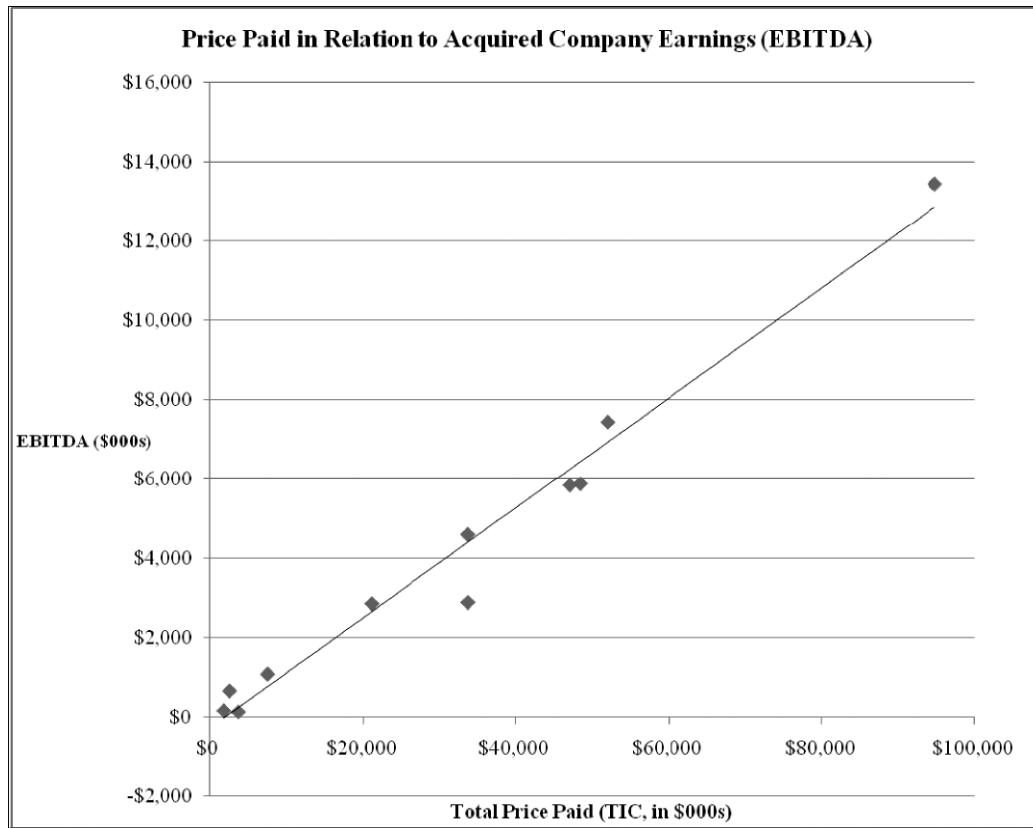


Figure 2

whether or not the relationship is random or where a statistically significant relationship exists. In performing the regression, we selected a 95% confidence level. Therefore, if the Significance *F* statistic computed by

Excel is less than 0.05 (for 5%), then the relationship is statistically significant (had we selected 90%, the Significance *F* would have to be less than 0.10 to be valid). Figure 1 shows that the Significance *F* statistic is actual-

Table 3
Regression Variables

Price Paid (y)	Revenues (x)
\$94,769.0	\$61,283.0
\$52,000.0	\$62,444.0
\$48,400.0	\$61,508.2
\$47,000.0	\$60,119.3
\$33,740.0	\$42,705.0
\$33,715.0	\$32,000.0
\$21,100.0	\$26,674.2
\$7,500.0	\$8,704.1
\$3,700.0	\$5,901.2
\$2,550.0	\$3,144.0
\$1,800.0	\$3,138.7

ly negative to the eighth decimal place, or much less than 0.05; therefore, the relationship is statistically significant. Regardless of how strong the R^2 measure is, had the Significance F statistic been larger than 0.05, then it would not be possible to conclude that changes observed in the prices paid for beer distributors had a statistically significant relationship to earnings.

Therefore, a regression formula for predicting company value based on annual EBITDA (earnings before interest, taxes, depreciation, and amortization expense) would be as follows (rounded). The formula for the relationship between price paid and a selling company's earnings (EBITDA) in transactions is

$$y = a + bx,$$

$$y = 2,686.3 + 7.0x,$$

where y = company value (total value of invested capital, in thousands; this is the price we are trying to predict), x = annual EBITDA (in thousands; this is the earnings of

the company, i.e., its earnings before interest, taxes, depreciation, and amortization expense), and a = slope intercept.

Moving beyond the math, Figure 2 shows a graphical depiction of the relationship between the price paid for the acquired company (as measured by total invested capital, or TIC) versus the acquired company's level of earnings as measured by EBITDA, with the line representing the result that would be predicted by the regression formula.

Next, let's perform a similar regression of prices paid (y) against the annual revenues of the acquired companies. Table 3 shows the data on the price paid for the acquired beer distributors versus their annual revenues (results in \$000s).

Inputting the same data in Excel and running a simple regression provides the results shown in Figure 3. In this instance we can quickly see two things. First, the R^2 measure of 0.726 tells us that 72.6% of the variation in the prices paid for the beer distributors sold can be explained by changes in their level of annual revenues. Although 72.6% is a relatively strong relationship, it is not nearly as powerful a predictor as with earnings (EBITDA), which explained 97.5%. Nonetheless, since the Significance F figure is less than 0.05, we can conclude that the relationship is not random and is statistically significant.

Given these results, the appraiser might then proceed to use the predicted regression formula based on earnings (EBITDA) to value the private company at issue, inserting the private company's measures to arrive at a value estimate as shown in Table 4. As shown, using the regression formula the estimated value for the company is \$16.7 million.

SUMMARY OUTPUT						
Regression Statistics						
Multiple R	0.8523116					
R Square	0.7264351					
Adjusted R Square	0.6873544					
Standard Error	15359.686					
Observations	9					
ANOVA						
	df	SS	MS	F	Significance F	
Regression	1	4385297792	4385297792	18.58807413	0.003517109	
Residual	7	1651439753	235919964.7			
Total	8	6036737544				
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	-2960.5229	10790.56898	-0.274362079	0.791726736	-28476.16403	22555.11816
Revenues (x)	1.0200081	0.236584573	4.311388886	0.003517109	0.46057448	1.579441718

Figure 3

Table 4
Applying Merger and Acquisition Data Regression Formula to Estimate Company 100% Control Value (\$000s)

Multiple Applied (<i>b</i>)*	7.0
Times: Company EBITDA	\$2,000.0
Equals	\$14,000.0
Plus: <i>y</i> Intercept (<i>a</i>)*	\$2,686.3
Equals: Preliminary Total Value of Invested Capital (TIC)	\$16,686.3
Less: Interest-Bearing Debt†	\$0.0
Equals: 100% Control Value of Company Equity	\$16,686.3

* Based on regression obtained from the analysis of prior transaction data. The formula based on EBITDA is as follows: $y = a + bx$, $y = \$2,686.3 + 7.0x$.

† This is a simplistic example, where the price paid from the transaction data was defined as the total price including any interest-bearing debt assumed. Therefore, to arrive at the value of the company's common equity, we have to subtract interest-bearing debt (it had none). Adjustments, if any, to be made in a real valuation will depend upon the nature of the data used.

Caution in Interpreting Results

Several major warnings are in order. First, regressions do not prove causality—a cause and effect relationship. A relationship could have a high R^2 and be shown to be statistically significant. Nonetheless, the result could be utterly meaningless, and there may in fact be no causal relationship between the independent variable and dependent variable. This is why common sense also has to play a role in assessing the results of statistical analysis. In this instance the results make sense: companies that have higher earnings sell for more, and this also fits well with the traditional foundation of valuation theory that the value of a company is based on the present value of its earnings or cash flow.

Second, not all relationships are necessarily linear in nature, so in those instances tools other than regression analysis may be needed. Similarly, regressions are based on an assumption that the sample population data is "normally" distributed, that is, like the bell-shaped curve. When the population is not normally distributed, regression might or might not be appropriate, depending upon the circumstances.

Third, the quality, quantity, and reliability of the underlying data impact the degree to which regression analysis can be used and whether or not it gives reliable results. A practical problem in business valuation is that often one has insufficient data to have a large enough sample to be able to utilize regression analysis effectively.

Finally, although it is appealing to have the simplicity of a math formula to predict value, valuators must not lose sight that other nonquantitative measures and issues may be equally important in impacting value. As a simple example, the valuator finds out that the beer distributorship being valued is about to lose its exclusive right to distribute a national beer brand, the very thing that drove its revenues and earnings in the first place.

Active-Passive Appreciation Uses of Regression

A business appraiser has been engaged to value a distributor of residential wood flooring (Woodco) in a divorce for the husband who owns and runs it and who had owned the shares of the company prior to getting married, therefore being his "separate" property. The appraiser has been given the additional task of determining how much of the change in the value of the company during the marriage (from the time of marriage to the date the parties separated) was due to the active efforts of the husband, versus the amount of the change in value due to passive, external forces. Under relevant state law, even though the shares were the husband's separate property and not subject to division on divorce, the portion of the change in the value during the marriage that is a result of his active efforts is considered marital for purposes of equitable distribution. Hence, the need to isolate the impact of passive, external factors on the change in value, versus those that are active.

There are many potential factors external to Woodco that might impact its performance and its value at different points in time. The valuator's research and analysis has isolated what he believes are three passive forces affecting Woodco's results and its change in value over time:

- Changes in the level of residential housing starts
- Changes in investor-required rates of return for investing in common stocks
- Changes in income tax rates, personal and corporate rate.

Analysis of each of these passive forces will be considered by the valuator, although, for brevity's sake, this article will examine only the effect of housing starts. Since the parties were married on 1 January 1989, and were separated on 31 December 2006, the valuator will examine the relationship between housing starts and Woodco's performance over that time frame.

Housing Starts as a Passive Force

Based on the interview of Woodco officials as well as a review of public company filings with the Securities and Exchange Commission specializing in the sale of

Table 5
Relationship between Woodco Revenues and Residential Housing Starts (1989–2006)

Year	Housing Starts (x)	Revenues (\$000s) (y)
1989	1,146,300	12,100
1990	1,081,400	14,600
1991	1,003,400	14,700
1992	894,900	15,400
1993	840,400	14,500
1994	1,030,100	16,900
1995	1,125,600	21,300
1996	1,198,400	26,800
1997	1,076,300	26,000
1998	1,161,000	30,000
1999	1,133,600	29,500
2000	1,271,400	33,100
2001	1,302,500	45,900
2002	1,230,900	50,400
2003	1,273,200	47,100
2004	1,358,500	63,400
2005	1,499,000	69,100
2006	1,610,500	83,400

various building materials, it appears that the level of single-family residential housing starts is a significant external factor affecting results in a given year. This is a factor over which neither the husband nor other Woodco management has any control and is therefore a passive force. The overall level of residential new home construction is influenced by changes in interest rates, the overall economy, consumer confidence, population growth, the rate of new household formations, and other factors.

Woodco's products are ultimately used by single-family homebuilders in the construction of new residential housing. Therefore, the initial working hypothesis is that it appears reasonable that an analysis might find that Woodco's revenues, earnings and value are significantly influenced by housing trends. Given this working hypothesis, the valuator sets out to test these relationships objectively using regression analysis. In using regression analysis, the goal here is to determine if annual residential housing starts are a statistically significant predictor of (a) Woodco annual revenues and (b) Woodco annual earnings (measured by EBITDA), and if so, the direction and nature of those relationships.

The following sections outline the results of this analysis. The relationship of company annual revenues to housing starts is first examined, followed by the relationship of company profits.

Relationship of Housing Starts and Company Revenues

Regression analysis results are shown in Table 5 related to the degree to which U.S. residential housing starts in a given year (the independent variable, *x*) help predict Woodco's annual revenues (the dependent variable, *y*). As shown in Table 5, housing starts generally increased materially over the 1989–2006 time frame as did Woodco's annual revenues. The statistics shown in Table 5 enable the analyst to explore if a statistical relationship might exist between the two or whether or not the results are by chance and random.

Using the same procedure as before in Excel, a regression of the data, with *y* (annual revenues) as the dependent variable and *x* (housing starts) as the independent (and here passive) variable, yields the results dis-

SUMMARY OUTPUT							
Regression Statistics							
Multiple R	0.910015553						
R Square	0.828128306						
Adjusted R Square	0.817386325						
Standard Error	9082.811137						
Observations	18						
ANOVA							
	df	SS	MS	F	Significance F		
Regression	1	6359951781	6359951781	77.0926999	1.6248E-07		
Residual	16	1319959330	82497458.16				
Total	17	7679911111					
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%
Intercept	-84303.01836	13656.53815	-6.173088481	1.3381E-05	-113253.5858	-55352.45095	-113253.5858
Housing Starts (x)	0.10037266	0.011431647	8.780244863	1.6248E-07	0.076138651	0.124606669	0.076138651

Figure 4

played in Figure 4, from which several preliminary conclusions can be drawn:

- The relationship between Woodco's annual revenues and housing starts is statistically significant. Because the F statistic is less than 0.05, this indicates there is a statistically significant relationship present. This indicates that there is a 95% confidence that the results seen would not come up randomly by chance—that is, that there is a statistically significant relationship present.
- There is a strong relationship of company revenues to housing starts, with 82.8% of variations in Woodco revenues explained by changes in national homebuilding activity. Given that the regression is valid, the R^2 statistic (called the coefficient of determination) indicates that a significant 82.8% of the variations observed in Woodco's annual revenues can be explained by changes in housing starts, a passive force over which Woodco has no control.
- There is a positive relationship between Woodco earnings and housing starts. The positive nature of the slope coefficient (b) indicates that there is a positive relationship between changes in housing starts and Woodco revenues. This is what might be expected: that is, as housing starts increase, the demand for Woodco's products might increase.
- The relationship between housing starts and Woodco revenues makes common sense. Statistical relationships do not necessarily mean there is a "causal" relationship present. Therefore, is there a valid reason why such a causal relationship would be expected to exist? The relationship is reasonable from a common sense standpoint, as housing starts directly affect the demand for products used to build the houses under construction. Woodco's ability to sell its products depends on houses being built, and so the results make complete sense.
- The formula to predict annual Woodco revenues is based on housing starts. Therefore, a regression formula for predicting Woodco's annual revenues would be as follows (rounded):

$$y = a + bx,$$
$$y = -84,303 + 0.10x,$$

where y = revenues (in \$000s), x = annual housing starts, and a = slope intercept. The valuator performs similar tests with Woodco's annual earnings and finds similar strong relationships.

In summary, the previous regression analysis showed that Woodco's results over time are materially impacted by trends in national housing start activity. Furthermore, this passive force explains a significant percentage of the variation in Woodco's results and does so with a statis-

tical validity within a 95% level of confidence. In addition, companies in the same or similar industries indicate, in their filings with the Securities and Exchange Commission, the importance that housing activity has on their results and the demand for their products. This anecdotal information confirms the assessment by Woodco's management of the importance of housing activity and lends additional support to the credibility of regression analysis of the statistical nature of this relationship. In short, the levels of housing starts in a given year play a major role in influencing Woodco's performance. Because there is a close relationship of revenues and earnings to housing starts and earnings heavily impact the value of a business, this suggests that housing starts are a major passive force shaping Woodco's results and, therefore, value over time.

Caveats

It is clear that U.S. residential construction activity is a powerful and passive force over which management has no control, yet plays an important role in Woodco's revenues and earnings in a given year and, ultimately, in its value. However, it is also true that Woodco cannot run on cruise control. Management must manage a company to achieve its results, compete effectively, develop new products, and otherwise make the right decisions to benefit from national changes in demand. Therefore, despite what statistics show, it may not be reasonable therefore to assume that 82.8% of the variations in the value of the husband's shares can be explained by passive forces and is therefore separate property. The truth must incorporate that there is indeed a strong passive element, but also an important active element, which means the effect may be less than 82.8%. Unfortunately this is where subjective analysis and further inquiry by the valuator must come into play. However, this does not negate the powerful value afforded in this instance by regression analysis.

More Resources on Regression

This has been a vastly simplified discussion of regression analysis. To understand and employ it in actual practice, it is important to understand the technique in detail, issues in its application and interpretation, and the pitfalls in using and interpreting its results. An excellent way to learn more about the topic is to read William Mendenhall and Terry Sincich's *A Second Course in Statistics: Regression Analysis* (Prentice Hall/Pearson, 2003). In addition, a quick Google search will give numerous Internet sites with tutorials on the use and interpretation of regression analysis.

George B. Hawkins, ASA, CFA, is President of Banister Financial, Inc., a Charlotte, North Carolina, business valuation firm and is a member of the ASA Business Valuation Committee and coauthor of the *CCH Business Valuation Guide*. This article is an adaptation of a chapter from the 2007 edition (9th) of the book, provided by permission of CCH.
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Valuation Research Notes

Lawrence M. Levine, ASA

This column provides our readership with an opportunity to read summaries of several of the most up-to-date and innovative valuation research being performed today. Valuation research and empirical studies are being published today in record amounts at many of the world's finest universities as well as by many highly regarded practitioners. The papers we will be covering in this column and future columns have not been disseminated widely but encompass all facets of valuations, including valuation discount analyses, valuation methodologies, nuances of valuing early stage companies through valuations of companies in financial distress, fair value issues, and derivatives. Our intent is to present the substance of the paper, but the *Notes* wording may depart from the authors' original text.

We encourage our readership to forward interesting research and articles to us for future inclusion in this column. Contact the Business Valuation Review office at progers4bvr@cfail.com; mark your emails to the attention of Larry Levine.

THE BIGGEST WARRANT AUCTION IN U.S. HISTORY

Author: Linus Wilson, University of Louisiana at Lafayette, December 20, 2009, <http://ssrn.com/abstract=1521335>

Summary: In an interesting test of the accuracy of using the Black Scholes option pricing model to price long dated warrants, Professor Wilson compared the expected valuation of recently sold long dated JP Morgan Chase (JPM) warrants to their actual sales price.

On December 10, 2009 the auction of JPM warrants raised gross proceeds of \$950.0 million. This paper analyzed the results from the secondary market trading on December 9, 2009 of the Troubled Asset relief Program (TARP) warrants issued by Capital One Financial (COF) to estimate the expected auction price of the TARP warrants.

The COF warrants had an implied volatility discount relative to other historic or implied volatility metrics.

Lawrence M. Levine, ASA with RSM McGladrey, Inc., Chicago, Illinois, is a member of the *Business Valuation Review*'s editorial review board.

This paper translates the percent volatility discounts from traded TARP warrants to estimate the likely implied volatility of long dated TARP warrants.

In exchange for \$25.0 billion JPM sold preferred stock and warrants to purchase 88.4 million shares for a price of \$42.42 to expire October 28, 2008. On June 17, 2009, ten banks including COF and JPM repaid the preferred stock. The other eight banks also repurchased the warrants.

Study Construction: Professor Wilson uses volatilities based upon the COF TARP warrants to estimate the likely implied volatilities of the JPM warrants. Volatility is the most important input in an option pricing model. Five different volatility estimates were obtained. Three were selected for the valuation range of JPM warrants. Two of the three volatilities were adjusted downward based on the ratio of volatility for COF to the implied volatility of COF TARP warrants.

Findings: The COF warrants based on disclosed secondary market trading represented a discount to what the author and other market commentators expected based on the historic and implied volatilities of shorter term publicly traded options. Prior to the December 10th auction, Professor Wilson estimated that the warrants should trade for \$9.75 per warrant.

As shown below, the implied volatility for COF warrants is below that of other COF shorter term options.

The volatilities of the COF options expiring in January 2012 are approximately 41% versus the implied volatility of the COF TARP warrants with almost 9 years remaining of 25%.

The implied volatility of the auction price for the JPM warrants was 23.1% compared to the 31.1% volatility for JPM call options expiring in 2012.

Conclusion: Professor Wilson suggests that it would be appropriate to adjust volatility downward by an amount congruent with the implied volatility based upon data from other long dated warrant transactions. Observable data indicates that investors have much lower volatility estimates for longer term warrants than shorter term warrants. Investors were not willing to pay as much for volatility when they buy the nearly 9 year TARP warrants as they are willing to pay for shorter term exchange traded options with maturities of up to two years. as investors were only willing to acquire long dated TARP warrants at a significant discount to their expected volatility.

Table 1
Implied Volatility of Long-Term Traded Options of Capital One Financial (COF)

Option Contract	Ticker	Option Price at Close	Strike Price	Expiration Date	Closing Price Date	Continuously Compounding Risk-Free Rate	Dividend Yield	Stock Price	Time to Expiration	Implied Volatility
Capital One Warrants	COF-WS	\$12.80	\$42.13	11/14/2018	12/9/2009	3.21%	0.50%	\$38.61	8.9370	24.92%
Capital One's January 2012 \$40 Call Option	YFNAH	\$8.50	\$40.00	1/21/2012	12/9/2009	0.76%	0.52%	\$38.61	2.1178	40.91%
Capital One's January 2012 \$45 Call Option	YFNAI	\$7.15	\$45.00	1/21/2012	12/9/2009	0.76%	0.53%	\$38.61	2.1178	42.10%

PRODUCT MARKET COMPETITION, IPOs, VERSUS ACQUISITIONS, AND THE VALUATION PREMIUM PUZZLE: AN EMPIRICAL ANALYSIS

Authors: Onur Bayar, University of Texas at San Antonio, Thomas J. Chemmanur, Boston College, October 25, 2009, <http://ssrn.com/abstract=1494058>

Summary: Studies have found that valuation multiples are higher for firms exiting via an IPO versus an acquisition. This paper decomposes the factors causing the “IPO valuation premium.”

The ratio of acquisitions to IPOs among private firms has increased significantly. Over the last decade, a private firm was more likely to have been acquired than to go public. According to the National Venture Capital Association there were more exits by venture capital backed firms through acquisitions than by IPOs in each of the last ten years. As an example, in 2008 there were six venture backed IPOs raising a total of \$470 million versus 96 acquisitions with a total value of nearly \$14 billion.

Citations of Prior Research: The determinants of a firm’s choice between IPOs and acquisitions has not been rigorously studied. The authors cite only one firm level empirical study on the choice of IPOs versus acquisitions. This previous study uses firm data on private company acquisitions to identify that firms with greater growth opportunities, greater capital constraints and venture capital backing are more likely to go public rather than be acquired. They also identify that IPO firms have greater valuations and valuation multiples than acquired firms suggesting that there exists a valuation premium for IPOs over acquisitions.

Study Construction: One objective of this paper is to test hypotheses regarding a private firm’s choice between IPOs and acquisitions. A second objective is to understand the IPO valuation premium puzzle (i.e., the finding

that while some firms are able to obtain higher valuations in the IPO market they still choose to be acquired).

The researchers obtained their data from Securities Data Company for IPOs and acquisitions, SEC EDGAR data base, Thomson Research data base, CRSP, and Compustat. Data collected was for the period 1995 through 2004.

The researchers obtain a data set of private firm acquisitions by public companies from 1995 through 2004 and a data set of IPOs for the same period.

The researchers test several hypotheses:

1. Established firms with viable business models against product market competition are more likely to go public rather than be acquired.
2. Are IPOs lower in concentrated industries (i.e., an industry with a dominant player) and infrastructure support from a larger, more established firm is greater.
3. Whether firms competing in industries characterized by greater private benefits or control, firms facing a greater extent of information asymmetry and relatively more capital intensive firms are more likely to choose an IPO over an acquisition.
4. Do venture capital backed firms choose IPOs relative to acquisitions?

Findings: One rationale is that sellers of private firms, regardless of whether they are venture capitalists or entrepreneurs, have private information about the viability of their business. Therefore, the seller can decide if an acquisition can provide greater longer term benefits than an IPO, particularly if the acquiring firm can provide greater infrastructure resources.

One reason why valuations in an acquisition setting are lower than in an IPO is that industry buyers have better information than individual investors. Consequently, the

valuations of an acquisition may be lower than the valuation in an IPO. In addition, one large buyer may have greater negotiating power than a coalition of random investors. Thirdly, after the firm is acquired the sellers lose control whereas in an IPO, insiders can continue to enjoy certain control benefits.

The researchers' significant empirical findings between the choice of an IPO and acquisition are as follows:

1. Firms with higher sales growth and firms that are larger in size are more likely to choose an IPO versus an acquisition.
2. Firms operating in less concentrated industries and in an industry lacking a dominant competitor are more likely to choose an IPO.
3. Firms that are more capital intensive and a firm in which the owner can extract greater private benefits of control are more likely to choose an IPO over an acquisition.
4. Venture backed companies are more likely to choose an IPO over an acquisition.

Another objective of this paper is to study the IPO valuation premium puzzle in which valuation multiples are higher for firms exiting via an IPO versus an acquisition. The researchers suggest two explanations:

1. The quality of firms going public versus those being acquired will be different. It is possible that a firm going public may be of a higher quality than a firm selling via an acquisition.
2. Even when an IPO valuation is higher, it is possible that the long run payoff to the sellers may be higher in an acquisition as sellers in an IPO only sell a fraction of their equity versus the majority of their equity in an outright sale.
3. The researchers find that after controlling for industry and firm specific factors, the IPO valuation premium disappears particularly for values in excess of \$50.0 million.
4. For deal values less than \$50.0 million the median valuation premium for VC backed acquisitions is significantly smaller than the median valuation premium for non-VC backed firms.
5. The IPO valuation premium vanishes for VC backed firms, regardless of size, after accounting for the expected future payoff to sellers from an IPO exit.
6. The long run IPO valuation premium is much smaller than the short run IPO valuation premium.

Conclusion: The researches claim that their empirical study is the first to resolve the IPO valuation premium

puzzle. The researchers find that the IPO valuation premium disappears for larger firms after controlling for industry and company specific factors. Also, while there may be an IPO valuation premium in the short run, the premium degrades over time.

BUSINESS VALUATION, DLOM AND DAUBERT

Author: Robert Comment, The Johns Hopkins–Carey Business School, January 18, 2009, <http://ssrn.com/abstract=1504134>

Summary: Professor Comment claims that discounted cash flow methodologies have the effect of discounting future cash flow substantially due to lack of size. He states that because of the relation between size and liquidity any additional discounting for lack of liquidity would be redundant. In his opinion, the large liquidity discounts that are accepted in practice and by judges violate the Daubert requirement for reliability.

Professor Comment states that: "Among the various types of economic expert opinion that are commonplace, business valuation may be the type that complies least commonly with the requirement for reliability and fealty to the scientific method that the Supreme Court sent down in its decision in *Daubert v. Merrell Dow Pharmaceuticals*. This paper explains why." In this paper, Professor Comment concentrates on "... the most nebulous of the various discounts and premiums: the discount for lack of liquidity thought to be applicable to private (often family-owned) businesses."

Study Construction: Professor Comment obtains 551 fairness opinions issued between July 2007 through June 2009. There were four primary valuation techniques used:

- Comparison of the deal price to the pre-announcement market price (used in all instances);
- Comparable company multiples (used in 91% of the opinions);
- Discounted cash flow (used in 82% of the opinions); and,
- Comparable transaction multiples (used in 80% of the opinions).

Findings: In only 2% (12 out of 551) was a valuation premium or discount applied. Professor Comment noted that there was a high inverse correlation between company size and discount rate; the larger the company the lower the discount rate. He also demonstrates that liquidity is highly correlated with company size. Therefore, he argues that embedded in the discount rate is a large size premium as the analyst preparing the fairness opinion has concluded that smaller companies experience a higher

cost of capital than larger companies. Professor Comment does an analysis in which the implied discount for lack of size, embedded in the higher discount rate, ranges from 21% to 66%. "This finding provides context for the question of whether supplemental discounting by allocation of a large DLOM is redundant to the discounting for lack of size that occurs in the core methodologies."

Conclusion: Professor Comment believes that any DLOM applied in recognition of illiquidity in the market for shares of small companies or in the market for whole small companies would be substantially redundant (although not necessarily equal to 0%) with the ample discounting for lack of size that is embedded within the

valuation methodologies. Professor Comment believes that the most supportive discounts for lack of liquidity are those discounts caused by illiquidity alone as that is the only rationale in which a DLOM can be incremental to the discounting for size. Based upon data including discounts from private placements, thinly traded securities and returns within portfolios based on size and liquidity, Professor Comment concludes that a non-redundant DLOM should be just several percent: "An application of a private company discount of 8% or a discount for lack of marketability of up to 5% is acceptable, but these two discounts are redundant to each other so a choice is required."

From the Chair

Kenneth J. Pia, Jr., CPA, ABV, ASA, MCBA

I am writing this on my first official day as the Chair of ASA's BV Committee (BVC), a group of prestigious leaders of the exciting industry we all work in and a position I do not take lightly. As a group and as an organization, we need to focus our efforts, all of us, on the NextGen of professionals to become members of and eventually lead our profession. That will be a theme of the BVC over the next few years. Summer has also just begun, and I wish everyone a relaxing and enjoyable season.

ASA Awards

Woman Appraiser of the Year Award: The ASA is offering the Woman Appraiser of the Year Award at the Joint ASA 2019 Advanced Business Valuation and International Appraisers Conference in New York, New York. This award recognizes and celebrates the outstanding contribution of women appraisers to the profession.

Rising Stars Award: We encourage you all to honor a younger member of our profession. The Rising Stars Program was designed to encourage and recognize young appraisers (under age 40) who have done exemplary work for ASA, valuation community, and our profession.

Nominations were due by June 30. If you did not nominate someone for this year's award, please make a point to nominate someone next year. Winners will be announced at the August Advanced BV Conference.

Regional Fair Value Conferences

The ASA's outstanding series of regional fair value conferences has been strong in 2019 with the return of the New York conference. Thank you to Bill Johnston, ASA, for taking the lead on bringing back this important event. The schedule for the last conference is:

- San Francisco—Tuesday, November 19, 2019

Kenneth J. Pia, Jr., is a partner and Business Valuation Industry Leader at Marcum LLP, 555 Long Wharf Drive, 8th Floor, New Haven, Connecticut 06510; phone 203-781-9780; ken.pia@marcumllp.com

Offices of KPMG San Francisco

55 Second Street, 11th FloorSan Francisco, CA 94105
Link to conference information: <http://www.appraisers.org/Education/conferences/annual-fair-value-conference>

August Conference

I remember when I first joined ASA almost 30 years ago when we had nearly double (maybe even triple) the number of participants at our annual Advanced Business Valuation Conference than what we have had in the past several years. Our profession is evolving now just as much as it was then, and the content of the conference, being second to none, will keep you at the leading edge of our profession. We should all make a point to attend and to have our partners and staff attend. In fact, it should be a given each year. I am committed to having at least 10 of my partners and staff attend this year's conference. See the link below.

Sir David Tweedie, IVSC Chairman, Comments on the Future of International Valuation Standards

Sir David Tweedie, Chairman, International Valuation Standards Committee (IVSC), will headline as Keynote Speaker at the American Society of Appraisers Joint ASA 2019 Advanced Business Valuation & International Appraisers Conference in New York, New York, on August 25–27, 2019. As a preview for his presentation, Sir David kindly agreed to answer a few questions about International Valuation Standards, including his predictions for significant future changes and how adoption of the standards will impact appraisers in the United States.

Sir David is the former chairman of the International Accounting Standards Board (2001–2011) and the ninetieth member of The Accounting Hall of Fame. He was knighted in 1994 and has received many other honors and awards in recognition of his service to the accounting profession. Sir David became President of The Institute of Chartered Accountants of Scotland, the world's oldest professional accountancy body, in April 2012. He chairs the Royal Household Audit Committee for the Sovereign Grant.

Link to the full article: <http://www.appraisers.org/asa-newsroom/article/2019/06/05/sir-david-tweedie-ivsc>

chairman-comments-on-the-future-of-international-valuation-standards

ASA Taps Johnnie White as New CEO

The ASA announced in March of this year the appointment of Johnnie White, MBA, CAE, CMP, as Chief Executive Officer. White is an association professional with more than twenty-seven years serving in a variety of management and leadership roles. White holds his MBA from University of Maryland University College and his BS in Information Systems Management from the University of Maryland. In addition, White is an adjunct faculty member of Georgetown University where he instructs graduate students in operations and event

management. Please join me in warmly welcoming Johnnie to the ASA.

Link to full announcement of new CEO: <http://www.appraisers.org/asa-newsroom/article/2019/03/18/american-society-of-appraisers-appoints-johnnie-white-as-new-chief-executive-officer>

See You in New York!

The Advanced Business Valuation Conference is being held this year at the Marriott Marquis New York from August 25–27. Our conference chair Jay Fishman, FASA, promises a slate of timely and insightful presentations. More information can be found at <http://www.appraisers.org/Education/conferences/asa-joint-conferences>. If you are there, please make a point to say hello.

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