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THE JOURNAL OF BUSINESS VALUATION

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LETTER FROM THE EDITOR

This edition of *The Journal of Business Valuation* features papers presented at the 2008 Biennial Conference of The Canadian Institute of Chartered Business Valuators held in Quebec City and also one of the winning research papers from the CICBV's Ian R. Campbell 2008 Research Competition.

The topics included in this edition are at the forefront of the North American valuation profession both in theory and in practice. Readers are reminded that the papers contained in *The Journal of Business Valuation* are not the opinions of our association but rather of the authors who submitted papers for this journal.

Commencing with this edition, *The Journal of Business Valuation* is featuring a significantly improved, more attractive format that we trust you will appreciate. Moreover, *The Journal of Business Valuation* will feature an array of content, including presentations from National and Regional Conferences of the CICBV, relevant articles and research papers that have won awards from the Institute. As a result of the increased amount of articles, *The Journal of Business Valuation* will now be issued more frequently, appearing twice yearly.

I would like to thank all of the authors who have submitted papers to our journal and also the volunteers and staff who made this edition possible.

Drew Dorweiler, MBA, CPA•ABV, CBV (EEE), ASA, CFE, CBA
Chair, Editorial Committee

CONTENTS

| | |
|---|-----|
| <i>Letter from the Editor</i> | iii |
| INTERNATIONAL FINANCIAL REPORTING STANDARDS | |
| Ian Hague Accounting Standards Board, Toronto | 1 |
| SIZE PREMIA IN THE CANADIAN EQUITY MARKET | |
| Klemens Wilhelm, CPA Deloitte & Touche LLP, Toronto | 7 |
| CLARITY THROUGH DATA – THE PRACTICALITY OF FORENSIC DATA MINING FOR VALUATORS | |
| Louie Velocci, CA, CISA, CISSP, GCFA KPMG Forensic Inc., Halifax David Stewart, ACMA(UK), CFE Deloitte & Touche LLP, Toronto | 21 |
| EXAMINATIONS AND TESTIMONY OF AN EXPERT AT TRIAL | |
| Stacie R. Glazman, LL.B., LL.M., CBV Toronto Nicole Tellier Toronto | 35 |
| FINANCE THEORY AND LOSS QUANTIFICATION REALITY – ESTABLISHING A DISCOUNT RATE IN A LITIGATION CONTEXT | |
| Farley Cohen, MBA, CA•IFA, CIRP, CBV, ASA Navigant Consulting, Toronto Prem Lobo, CA, CBV, CPA Navigant Consulting, Toronto | 63 |

1

INTERNATIONAL FINANCIAL REPORTING STANDARDS

by Ian Hague
Accounting Standards Board, Toronto

In February 2008, the Canadian Accounting Standards Board announced that Canadian accounting standards would be moved to International Financial Reporting Standards (“IFRS”) for Canadian publicly accountable enterprises. Come 2011, the basis on which financial statements are prepared will be significantly changed in accordance with the move from Canadian standards to IFRS.

This is perhaps the biggest change in financial reporting that has occurred in many years. For some companies, the face of the balance sheets and income statements will be changed; the standards and some of the things that need to be done to prepare those statements will be changed. A challenge will be presented for those who use these financial statements, as the information on the statements will look unfamiliar. The statements will contain better information going forward, but because the presentation is different, it will take a while to become familiar with some of that information and use it.

At the same time, the change will enhance the position of our publicly accountable enterprises in the international markets. It will put us on a level playing field with the rest of the world. Opportunities will also be created for business valuers (and valuers in general) to support some aspects of the change.

First I will outline *what* is changing, and also *when* exactly this change will occur. I will mention some of the opportunities and the challenges of the changeover, and also describe the resources that are available as aids in adjusting to these new standards.

The first thing that needs to be understood is to whom does this change apply? Press releases have mentioned that it applies to publicly accountable enterprises, so this is not a change for *all* financial reporting of *all* Canadian enterprises. By “publicly accountable enterprise” we mean any company that is listed (or is in the process of listing) on Canada’s capital markets, and any enterprise that holds assets in a fiduciary capacity for others. So essentially, this includes any financial institution: banks, insurance companies, securities brokers, dealers, credit unions and the like. These institutions are all going to move to IFRS.

The change will also apply to some public sector entities that are essentially similar to private sector entities; government business enterprises being the main group that we refer to in that regard.

Private enterprises are not required to change. However they may choose to move to IFRS, and it is quite likely that some private enterprises will move in that direction — particularly those enterprises that raise capital in foreign markets; or those that are subsidiaries or closely linked to other international organizations, or whose parent companies are also using IFRS. And maybe other private enterprises will simply consider that moving to IFRS is an improvement in financial reporting for them, and change their reporting methods accordingly. There will be no restriction on any organization choosing to make IFRS the basis for its financial reporting.

Many smaller private enterprises probably won't make the move, as I will address later. But for now I will focus on IFRS for public and larger private enterprises.

When is the change going to occur? In simple terms, 2011. A company with a calendar year-end will, in 2011, produce its financial statements in accordance with IFRS, instead of in accordance with Canadian Generally Accepted Accounting Principles ("GAAP"). But effectively the change is happening sooner than that. There is a large amount of preparation that has to be done for the change. When a company reports in 2011 using IFRS, it will be required to report comparative figures for 2010, also in accordance with IFRS. It will therefore be necessary to prepare IFRS financial information for 2010, and for 2011.

One of the key stages in preparing for this change will be the preparation of an opening balance sheet on January 1, 2010 (assuming a calendar year reporting period), by corporations as they move towards IFRS for the financial reporting period. So much of the new information that will be gathered, new inputs that will be required, and perhaps some of the opportunities for us as valuers are going to help in the preparation of information for those opening balance sheets in 2010.

For one year, 2010, information will be available on both bases. Corporations will prepare their 2010 financial information under Canadian GAAP, and they will also, when they publish their 2011 information, have the comparative figures under IFRS. So there will be one year of comparative information available on both bases. By 2011, however, the Canadian GAAP information will fall away. The challenge is that there may be some discontinuities in information as the changeover takes place.

The move is justified, overall, by the significant benefits in moving to the same basis that much of the rest of the world is using for its financial reporting. For quite some time, IFRS have been under development with the view to reporting a single set of globally accepted financial reporting standards that are the same ones used from Australia to Zimbabwe and all points in between.

The standards have received significant regulatory backing from securities regulatory organizations, and the big impetus for the international move was the move by the European Union to using IFRS in 2005. In 2005, 8000 European companies moved to using IFRS for the basis of their financial reporting. Since that time, more and more countries have come on board. Today, there are over a hundred countries around the world using IFRS, and nearly all of the major players are now on their way to this move, such as Brazil, Russia, India, China; the big countries are all moving that way. Japan also is moving that way. And just recently — here's the big jewel in the crown for the convergence of international standards — announcements have been made in the U.S., that the U.S. Securities and Exchange Commission ("SEC") has indicated the significant possibility that they will also abandon U.S. GAAP and move to IFRS. This move is likely to be made in 2014-16, shortly after Canada's move. This means that the U.S. has in fact been looking to Canada rather a lot to understand how the practicalities of the move might be negotiated. But it seems likely that, come 2014 or thereabouts, we will also have the U.S. in the fold, in terms of using the same basis of accounting standards that Canada will adopt in 2011.

The IFRS themselves are, in general terms, similar to Canadian GAAP standards. They are principle-based, which means that they do not go into minute detail concerning how they should be applied. They go a certain degree into such details, but also leave a fair amount of judgment to be applied (some guidance is included in regard to judgments about valuations). The IFRS are unlike U.S. GAAP, which tends to go into much greater detail.

They are developed by the International Accounting Standards Board ("IASB"), an organization based in London, England, which has an extensive process for the development of the standards, and has significant involvement from all of the jurisdictions around the world; Canada is well represented in the international structure, and exerts an influence in the development of those standards that is greater than her size in the world's capital markets would suggest. Obviously, this influence is limited; Canada has no veto rights, for example.

In making this move, Canada is giving up some authority to the international body. All of the international body's proposals are developed with extensive input from participants in the system: from preparers of financial

statements; users of financial statements; and, where appropriate, from those who are experts in areas that the financial statements are dealing with. I will later return to this point in the context of business valuations.

Having moved to these standards, Canadian entities will be given better access to foreign markets. We will no longer be questioned by Wall Street lawyers (or otherwise) who might find the Canadian GAAP to be obscure. Such lawyers have been known to ask why they should not apply some kind of discount to their valuation on the shares they are examining, since they don't really understand the GAAP of the company they are evaluating. Those questions will disappear if Canada has the same GAAP. This translates into lower cost of capital. And for large corporations, that could mean a significant reduction in cost of capital.

At the same time, Canadian companies can stay with standards that are of a similar style and a similar principle to the standards that they currently have, rather than (as seemed at one point to be the case) regressing more and more into the U.S. model, and importing some rather complex standards, that in some cases did not work as well as they may have done.

So there are obvious and significant benefits to the change to IFRS, but there will be a big impact on the system to get there, affecting anyone who is in any way involved with financial reporting.

IFRS provide more ability to revalue assets in financial reporting. Recent reports in the press have suggested that IFRS are "full of fair value requirements." This is a somewhat extreme view. There are not many more *requirements* for valuation in IFRS than in Canadian standards, but there are many more opportunities, and there are opportunities of which some corporations will probably want to take advantage. Globally, we see that corporations have taken advantage of the opportunity to value more of their property, more of their capital assets and in some cases to value some of their intangible assets on the books — these are things that were not permitted under previous GAAP financial reporting, and things that are not permitted today in Canada. The real estate industry in Canada has expressed the view that the opportunity to carry their real estate assets on their books at valuation, rather than at their historical costs, is an attractive proposition to them.

We will see different impairment tests under IFRS. Today, under Canadian GAAP, we tend not to impair assets until the situation becomes particularly dire. We tend to assess the situation and decide that if there's some chance of the value of the asset coming back, it is not to be written down. Only when it appears that the valuation is becoming "other than temporary" will the asset be written down. IFRS are different in that regard. They require that the write-down be taken much earlier. They require that the carrying value of assets on a company's books be examined.

If the discounted cash flows of the future return that are received from these assets are less than the amount on the books, they will need to be written down. It will no longer be acceptable to speculate that the market will come back, and choose not to write the figures down. If the market does come back, then it should be written back up again. We will see more movements in values of items on the balance sheet. There are two consequences of this. A user of financial statements will see more volatility in the financial reporting numbers as assets get written down and up again, and to me this seems to be the right result, because it reflects the underlying economic circumstances in which the valuations have changed. The other consequence is that people are going to need some help in some of these areas, as impairment situations occur with the valuations. Assets must be written down to fair value, so there will be some need for some help in determining what those values are.

Some different assets will also start to appear on the balance sheet. Under IFRS there are a number of things that will come onto the balance sheet, that are typically off the balance sheet today; come 2011 we can expect to see even more things coming onto the balance sheet. IFRS provide much less favourable treatment to derecognition transactions, particularly for securitization transactions. It is much harder to get assets off the balance sheet through securitizations under IFRS; the assets tend to stay on the balance sheet much longer. This method might not be palatable to some corporations, but makes assets more visible, and ensures that the correct information is on the balance sheet.

Lease accounting is another area where more lease assets on the balance sheets of corporations can be expected, as the change to IFRS approaches. The chairman of the IASB, Sir David Tweedie, is fond of saying that one of his objectives by the time he retires in 2011 is to fly on an airplane that's actually on a company's balance sheet. Looking at an airline's balance sheet today, one of the things one would expect to see — airplanes — is not there, because they are all structured as leases that are off balance sheet. Some of those things are likely to come back on balance sheets as we go forward. As more of these things come on balance sheets, there will be questions as to how they are measured, and how they are valued in order to be put on the balance sheet.

Another area where change is likely (and this change will in fact occur before we move to IFRS) is in business combination accounting. The IASB and the U.S. Financial Accounting Standards Board have issued new standards concerning how we account for business combinations, which we are in the process of putting into Canadian GAAP before we move to IFRS. One of the aspects of those new standards is the requirement for more fair value in business combination transactions. That is, with far fewer exceptions than today, enterprises will have to determine and account for and record on the books the fair value of the assets acquired in a business combination transaction. So this is a place where more fair value is coming in sooner rather than later. Those standards are likely to be coming into place in Canada in 2010 rather than 2011.

Therefore, these changes create some opportunities for valuers. There will be opportunities for assistance with some of the valuations that need to be done on an ongoing basis. There is also going to be a one-time opportunity on the first-time adoption of IFRS. One of the things that IFRS allows a company to do when it first adopts IFRS is a one-time valuation of many of its assets, so it can get them up to an up-to-date value on its balance sheets. So regardless of whether it accounts for them on a fair-value basis in the future, it has the opportunity to do a valuation in that opening balance sheet on January 1, 2010, to get them to a more recent up-to-date value. From the European experience, and other jurisdictions, we have seen that companies have taken advantage of that to put some of those assets on their balance sheet at more realistic values. When this is the case, the companies have needed help in determining what those values that go on their balance sheet should be.

With more valuations in financial statements, there will probably be more challenges around some of those values when companies get into difficulties, and litigation arises. There might also be an increased need for litigation support and expert advice, supporting (or otherwise) some of the valuations that appear in financial statements.

Another factor to bear in mind is that the IASB itself is beginning to put more valuation guidance into its standards. In some cases, that valuation guidance may differ from valuation guidance that is used when doing valuations for purposes other than financial reporting. When preparing a valuation for financial reporting purposes, it is necessary to be familiar with some of that guidance, to make sure that the guidance being followed is in accordance with GAAP. There is work under way to ensure that the conclusions of some of those valuations are converging. One of the big objectives of common international financial reporting standards is to have common international habits. If there are widely different valuations underlying some of the areas where valuation is required in financial reporting, that convergence will not be achieved.

A recent report on the website of the International Valuation Standards Committee looked at some of the experiences of valuations in Europe of investment properties, when Europe first moved to IFRS. The report concluded that ten different bases of valuations standards had been used as the underlying basis to value investment properties around the world. In terms of accounting standards, then, there is some convergence in terms of investment properties being measured at values on the balance sheet; but if there are ten different bases of valuations being used, there is not yet hope of getting within the narrower bounds desired for financial reporting purposes. Bodies such as the International Valuation Standards Committee are starting to work closely with the IASB on developing valuation guidance.

The Canadian Institute of Chartered Business Valuators ("CICBV") is a member of the International Valuation Standards Committee, and this is an area where the Canadian valuation profession can have involvement and influence in the area of international standards. Canada can have input into the kind of proposals developed

for the valuations. A process similar to the IASB's process is under development, whereby proposed valuation guidance is exposed, issued for comment, and developed in a suitable and fittingly international manner. There should be some Canadian input into that process, and the CICBV is working very hard to have representation in that group, an aspiration which will require some of its members to pay attention to the proposals, provide input and check how the developed proposals compare with financial habits and behaviour in Canada.

Some of the challenges to come will involve not the preparing of financial statements. Those using financial statements in valuations will notice these changes in bases of accounting. Balance sheets will contain different information, and unfamiliar measures. There will possibly also be a discontinuity of information as we head towards the changeover date, leaving some lack of comparability over periods of time as the information is read for valuation purposes.

The other side of this situation is that more disclosures will be seen. On average, IFRS result in longer financial statements and more information in the notes to the financial statements. Even where valuation information is not included on the statements themselves, it is often in the notes. For example, for investment property, even if an entity has chosen to carry on using a cost-basis for its financial statements, it is required to provide disclosures of the value of that property in the notes to the financial statements. So it is likely that from the disclosure perspective there will be a benefit as well as a challenge. The challenge may be finding the information through what are going to become more extensive notes for financial statements.

There are a number of resources available to help with understanding the change to IFRS. One such resource is the IASB's own website (www.iasb.org). There is a growing body of information on the Accounting Standards Board's website (www.acsbcanada.org) that provides details of the board's plans, together with a couple of comparisons between Canada and IFRS GAAP. One comparison is at a relatively high level, which is a good familiarization document to get a sense of where things are changing, and a more detailed one delves into the details of the standards and looks at the differences.

The major accounting firms also have a wealth of information on their websites. They, from an international perspective, have gone through this before with European, Australian and other companies. On these firms' international websites, there are all sorts of information available, such as newsletters and model financial statements. Some of these sites even include free training material. And the International Valuations Standards Committee is another source that may be of some interest and use.

The Canadian Institute of Chartered Accountants is running courses to help people get up to speed — these courses go into different levels of depth to suit different levels of interest. They offer web-based learning either at a high level or a more basic level, from a one-day overview of the differences, to a four-day in-depth course, which investigates some of the more complex aspects of the standards.

As mentioned earlier, private companies are set apart, in that most of this move is going to be for public companies and those smaller companies that choose to move. For private companies it is proposed that standards remain closer to existing Canadian GAAP. IFRS are not being adopted for private companies; but 10 or 12 major areas of accounting for private companies are being looked at, and changes in those areas may also occur.

Those changes are somewhat behind the IFRS move in their development. They are starting to become available through the Accounting Standards Board website. Some of the changes are going to be in key areas, such as accounting for financial instruments and accounting for business combinations. So it is likely that there will be some change in private company financial reporting; what exactly that change will be is less clear. It is possible that while trends develop in IFRS, when there are changes that improve the quality of accounting overall, they will get pushed down into private company accounting. There are many changes happening in GAAP at the moment in response to the current credit environment. These include enhanced disclosures about liquidity risks, fair value measurement and off-balance sheet reporting. There is no reason why those kinds of changes shouldn't be pushed down to the GAAPs for private companies as well, as these kinds of companies are equally exposed to difficult conditions.

So the changes in private company financial reporting will be slighter, but not insignificant.

In conclusion, there are big changes happening in IFRS, the biggest changes in fact for many years. These changes create some challenges, but they certainly create some opportunities. They create opportunities for companies to move onto the same basis of reporting as global markets, and will create opportunities for companies to make choices in terms of accounting policies, but will also create the need for help in the valuation side of things. This will create the opportunity for extra work and extra assignments. The effects of these changes will be vast, and it is advisable to be aware of, and prepared for, these effects.

2

SIZE PREMIA IN THE CANADIAN EQUITY MARKET

by Klemens Wilhelm, CPA¹
Deloitte & Touche LLP, Toronto

1. INTRODUCTION

1.1 Background

One of the most remarkable discoveries of empirical capital market research is that of a relationship between firm size and equity return. Many studies have shown that risk-adjusted equity returns of public firms are higher for small firms than for large firms. This phenomenon is known as the “small firm effect.”²

Some tests also find that smaller firms consistently generate returns that are above their expected returns predicted by the Capital Asset Pricing Model (“CAPM”).³ This suggests that the CAPM should be modified to account for firm size, which is referred to as the “size premium.” The CAPM is a commonly used and accepted model used by valuation professionals to calculate the opportunity cost of capital or required cost of capital.

1.2 Research Question

Size premia have been extensively investigated in the U.S. and in many other developed markets. *The Risk Premium Report* by Duff & Phelps LLC and the *SBBI Yearbook* by Morningstar, Inc. are published annually and contain empirical size premia studies for the U.S. market that are commonly used in the valuation community.⁴

To the author’s knowledge, the only similar empirical study of the “small firm effect” in the Canadian equity marketplace was conducted by Elfakhani and Wei (2003) which examined the phenomenon over the period 1975 to 1994. However, Elfakhani and Wei do not examine “size premia” per se.

1 Klemens Wilhelm, CPA is a Senior Associate in the M&A Transaction Services Group at Deloitte & Touche LLP in Toronto. The author would like to thank Richard Taylor and Richard Ginsberg for their constructive feedback and valuable suggestions.

2 Banz (1981) and Reinganum (1981) have been the first to describe the phenomenon of the small firm effect.

3 CAPM in this paper refers to the conventional CAPM formula which assumes that the expected return on equity is equal to the risk-free return plus beta multiplied by the equity risk premium.

4 Most empirical studies including Morningstar (2008) use market value of equity as a measure of size. Duff & Phelps (2008) uses eight different measures of size (market value of equity, book value of equity, 5-year average net income, market value of invested capital, total assets, 5-year average EBITDA, revenue and number of employees). Note that the *Risk Premium Report* by Duff & Phelps has been published as the Standard & Poor’s Corporate Value Consulting Risk Premium Report for Reports titled 2002 to 2004 and as the PricewaterhouseCoopers and Price Waterhouse Risk Premium Reports for years prior to 2002.

This research paper will investigate and discuss the existence of Canadian size premia based on an empirical model using historical data of Canadian equities from 1993 to 2007.⁵ In addition, this paper includes a comparison to the U.S. results published by Morningstar.

2. EMPIRICAL STUDY

2.1 Basis of Data

(a) *Equity Sample*

The empirical study includes all Canadian equities listed on the Toronto Stock Exchange (“TSX”) as at December 31, 2007, for which data was available. The study is based on equity data of the entire sample from January 1, 1993, to December 31, 2007.

Equities listed at any time during the time period studied are included. Equities delisted during the period are excluded. See section 3.5 for a discussion of limitations resulting from these exclusions.

TSX-listed income trust units are included. However, the empirical study is also performed excluding income trust units to isolate any bias that might be driven by some of the unique characteristics of these securities and the changes to the income trust marketplace in Canada over this period. For details see section 3.4.

The table in Figure 1 sets out the number of equities included in the study.

Figure 1 Number of Equities Included in Sample 1993-2007

| Year | Equities excl. Income Trusts | Income Trusts | Total Equities |
|-------------|-------------------------------------|----------------------|-----------------------|
| 2007 | 911 | 349 | 1,260 |
| 2006 | 832 | 294 | 1,126 |
| 2005 | 762 | 226 | 988 |
| 2004 | 696 | 170 | 866 |
| 2003 | 652 | 111 | 763 |
| 2002 | 595 | 82 | 677 |
| 2001 | 522 | 67 | 589 |
| 2000 | 443 | 62 | 505 |
| 1999 | 415 | 53 | 468 |
| 1998 | 375 | 36 | 411 |
| 1997 | 319 | 26 | 345 |
| 1996 | 234 | 16 | 250 |
| 1995 | 213 | 12 | 225 |
| 1994 | 195 | 8 | 203 |
| 1993 | 175 | 4 | 179 |

The number of equities in the 1990s appears to be low. This is likely due to data availability and exclusion of delisted equities.

⁵ This paper does not discuss size premia for private firms.

(b) Types and Sources of Data

The market value of equity (“MVE”) is used as a measure of size. Data is obtained from data provider “Capital IQ” and includes year-end figures from 1992 to 2007. Share price data is obtained from data provider “Capital IQ” and includes monthly share prices adjusted for dividends and stock splits from December 1992 to December 2007. Returns based on dividend adjusted share prices reflect the total return representing a return from capital appreciation and a return from dividend distributions.

The 3-month Canadian Treasury Bill is used as the money market rate. Data is obtained from Bank of Canada on a monthly basis from January 1993 to December 2007.

The monthly government bond yield with average maturity over 10 years is used as the risk-free rate. Data is obtained from “Bank of Canada” on an annual basis from 1993 to 2007.

2.2 Methodology

Below is a step-by-step description of the study’s methodology.

(a) Calculation of Actual Size Portfolio Returns

First, monthly equity returns are calculated based on month-end share prices. A monthly return for a particular equity is determined by dividing the current month-end price by the previous month-end price and subtracting one.

Second, ten size portfolios are created by ranking all equities by market value of equity and splitting the ranked equities into ten equally populated portfolios (referred to as “size deciles” in this paper).⁶ Size deciles are rebalanced annually.

Third, monthly equity returns are multiplied by their respective size decile weights. Size decile weights are calculated by dividing the market value of a single equity by the market value of equity for the entire size decile.

Fourth, actual annual size decile returns are calculated by compounding the monthly size decile returns.

(b) Calculation of Size Decile Betas

First, monthly market benchmark returns are calculated based on the total weighted average monthly equity returns of all equities included in the sample.

Second, monthly excess market benchmark returns are calculated by subtracting the monthly money market rates from monthly market benchmark returns.

Third, monthly excess size decile returns are calculated by subtracting monthly money market rates from monthly size decile returns.

Fourth, monthly excess size decile returns are regressed against monthly excess market benchmark returns over the entire time period studied to determine beta for each size decile.

⁶ Note that equities are ranked by market value of equity as at previous year-end to create size deciles for the current year. If deciles would be ranked by market value of equity at current year-end, equities with decreasing share prices during the current year would tend to be part of smaller size decile as a decreasing share price reduces market value of equity. This would bias downward returns of smaller size deciles.

(c) Calculation of Expected Annual Size Decile Returns Using CAPM

First, the risk free rate is determined by calculating the arithmetic average of the long-term government bond yield over the entire time period studied.

Second, annual market benchmark returns are calculated by compounding the monthly market benchmark returns.

Third, the equity risk premium is calculated by subtracting the average risk-free rate as determined above from arithmetic average annual market benchmark over the time period studied.

Fourth, expected size decile returns in the context of the CAPM are calculated using the risk-free rate plus the respective size decile betas multiplied by the equity risk premium.

(d) Calculation of Size Premia

Size premia are calculated by computing the difference between the actual size decile returns and the expected size decile returns as defined by the CAPM.

3. RESULTS

3.1 Composition of Size Deciles

Figure 2 sets out the size of each decile, the largest firm and its MVE for each size decile as at December 2007.

**Figure 2 Largest Firm by Decile and Size of Decile
December 31, 2007**

| Decile | Recent Decile MVE (in C\$ thousands) | Recent Percentage of Total MVE | MVE of Largest Firm (in C\$ thousands) | Firm Name |
|------------------|---|---|---|--|
| 1 (Largest) | 1,255,773,901 | 81.5% | 71,008,421 | Royal Bank of Canada |
| 2 | 137,809,286 | 8.9% | 1,769,738 | West Fraser Timber Co. Ltd. |
| 3 | 60,909,727 | 4.0% | 676,777 | Heritage Oil Corp. |
| 4 | 32,097,282 | 2.1% | 331,412 | SCITI Trust |
| 5 | 20,517,162 | 1.3% | 199,232 | Descartes Systems Group Inc. |
| 6 | 13,772,645 | 0.9% | 132,921 | Amica Mature Lifestyles Inc. |
| 7 | 9,168,088 | 0.6% | 87,989 | World Energy Solutions, Inc. |
| 8 | 6,124,897 | 0.4% | 59,408 | Swiss Water Decaffeinated Coffee Income |
| 9 | 3,639,187 | 0.2% | 36,958 | TORR Canada Inc |
| 10 (Smallest) | 1,523,080 | 0.1% | 20,210 | Northwater Top 75 Income Trusts |
| Mid-Cap(3-5) | 113,524,171 | 7.4% | 676,777 | Heritage Oil Corp. |
| Low-Cap(6-8) | 29,065,630 | 1.9% | 132,921 | Amica Mature Lifestyles Inc. |
| Micro-Cap(9-10) | 5,162,267 | 0.3% | 36,958 | TORR Canada Inc |
| Total MVE | 1,541,335,255 | 100.0% | | |

This table indicates that large firms account for the majority of the market value of the Canadian equity market. As at December 31, 2007, the largest size decile represents 81.5% of the total MVE of the entire equity sample.

Morningstar (2008) groups deciles into three size categories: mid-cap equities are defined as the aggregate of decile 3 to 5; low-cap equities include equities in deciles 6 to 8, while micro-cap equities include equities in deciles 9 to 10.

Based on the study's decile breakpoints as at December 31, 2007, firms within the mid-cap category have MVE between \$132,921,000 and \$676,777,000. Low-cap equities include firms with MVE between \$36,958,000 and \$132,921,000 and micro-cap equities include firms with MVE up to \$36,958,000.

3.2 Summary Statistics

Based on the foregoing methodology, the table in Figure 3 summarizes the arithmetic mean return, beta, R-square and standard deviation by size decile over 1993 to 2007.

Figure 3 Summary Statistics for Decile Portfolios of the TSX 1993-2007

| Decile | Arithmetic Mean Return | Beta | R-Square [1] | Standard Deviation [2] |
|-----------------|------------------------|------|--------------|------------------------|
| 1 (Largest) | 11.47% | 1.02 | 0.97 | 13.1% |
| 2 | 10.90% | 0.89 | 0.76 | 14.6% |
| 3 | 11.90% | 0.85 | 0.69 | 15.3% |
| 4 | 12.42% | 0.84 | 0.65 | 16.1% |
| 5 | 12.92% | 0.89 | 0.55 | 20.1% |
| 6 | 14.67% | 0.80 | 0.47 | 21.3% |
| 7 | 14.28% | 0.94 | 0.47 | 24.8% |
| 8 | 16.69% | 1.11 | 0.49 | 28.0% |
| 9 | 18.96% | 0.91 | 0.37 | 30.7% |
| 10 (Smallest) | 22.78% | 1.22 | 0.21 | 45.7% |
| Mid-Cap(3-5) | 12.41% | 0.86 | 0.63 | 17.2% |
| Low-Cap(6-8) | 15.21% | 0.95 | 0.48 | 24.7% |
| Micro-Cap(9-10) | 20.87% | 1.06 | 0.29 | 38.2% |

Note 1: R-square is calculated by correlation of monthly excess size decile returns and monthly excess market benchmark returns.

Note 2: Monthly standard deviation is based on monthly size decile returns. Results are multiplied by the square root of 12 to determine annual standard deviation.

(a) Arithmetic Mean Return

As can be seen from Figure 3, non-risk-adjusted returns are inversely related to size: returns tend to increase as one moves from the largest decile to the smallest.

This trend is fairly consistent with the exception of decile 2 and 7. Returns of decile 2 are below returns of the larger size decile 1. The same applies to decile 7 where returns are lower than decile 6 returns.

(b) Beta

The CAPM model gives a prediction of the relationship that should be observed between the risk of an equity and its expected return. The CAPM is based on the assumption that investors are only compensated for the degree of systematic risk for which they are exposed. Systematic risk is measured by beta, or the volatility of the equity's returns in excess of returns available from risk-free investments relative to the volatility of the market benchmark's excess returns (Bodie, Kane and Marcus 2002).

Systematic risk is also called market risk as it results from general market and economic conditions, such as change in interest rates or weakening of the economy, and affects many or all investments. Unsystematic risk arises from firm-specific risk and is not rewarded by the CAPM as, in theory, it can be mitigated by holding a highly diversified portfolio (Damodaran 2002).

The results above indicate that there is no consistent relationship between beta and size. Accordingly, beta does not seem to account for the inverse relationship between size and return.

However, when grouping the smallest eight size deciles into three size categories (mid-cap, low-cap and micro-cap) beta appears to be inversely related to size.

It has been argued that betas for smaller, less frequently traded stocks are mismeasured. Morningstar (2008) uses different beta estimations such as the sum beta technique and measuring beta based on annual returns. These techniques decrease size premia but do not eliminate them.

(c) R-Square

R-square measures the extent to which the movements of the returns for a size decile are explained by movements of the returns of the market benchmark. In other words, R-square is a measure of the explanatory power of beta and indicates the size of the systematic risk component. R-square of 0.97 for size decile 1 indicates that 97% of total risk is systematic while 3% is unsystematic. Note that R-square is a measure of the components of risks rather than a measure of the risk amount.

Low explanatory power of beta found in empirical tests has led to the development of a number of suggested corrections to the CAPM and alternative models for cost of equity estimation. Pratt, Reilly and Schweih (2000) state that the implication would seem to be that the market does not ignore unsystematic risk and demands extra return for accepting it.

The results illustrate that R-square consistently decreases with decreasing firm size. This indicates that smaller firms tend to have higher unsystematic risk components and beta has low explanatory power to predict returns for smaller firms.

(d) Standard Deviation

Standard deviation measures price volatility which represents the extent to which investors are exposed to unsystematic risk. Based on the CAPM this risk can be eliminated by diversification and the market does not compensate an investor for accepting exposure to unsystematic risk.

Based on the study's results, standard deviation of returns increases as one moves from large size deciles to smaller size deciles. This indicates that investors may be compensated for taking on this additional risk by higher returns generated by small firms.

3.3 Size Premia

The table in Figure 4 sets out the actual return in excess of the estimated return as predicted by the CAPM by size decile over 1993 to 2007.

Figure 4 Long-term Returns in Excess of CAPM Estimation for Size Deciles of the TSX 1993-2007

| Decile | Beta | Arithmetic Mean Return | Realized Return in Excess of Riskless Rate | Estimated Return in Excess of Riskless Rate | Size Premia (Return in Excess of CAPM) |
|-------------------------|------|------------------------|--|---|--|
| 1 (Largest) | 1.02 | 11.47% | 5.38% | 6.54% | -1.16% |
| 2 | 0.89 | 10.90% | 4.82% | 5.71% | -0.89% |
| 3 | 0.85 | 11.90% | 5.81% | 5.43% | 0.38% |
| 4 | 0.84 | 12.42% | 6.33% | 5.38% | 0.96% |
| 5 | 0.89 | 12.92% | 6.83% | 5.72% | 1.11% |
| 6 | 0.80 | 14.67% | 8.58% | 5.12% | 3.46% |
| 7 | 0.94 | 14.28% | 8.19% | 6.03% | 2.16% |
| 8 | 1.11 | 16.69% | 10.60% | 7.11% | 3.49% |
| 9 | 0.91 | 18.96% | 12.87% | 5.82% | 7.05% |
| 10 (Smallest) | 1.22 | 22.78% | 16.69% | 7.79% | 8.90% |
| Mid-Cap(3-5) | 0.86 | 12.41% | 6.32% | 5.51% | 0.82% |
| Low-Cap(6-8) | 0.95 | 15.21% | 9.13% | 6.09% | 3.04% |
| Micro-Cap(9-10) | 1.06 | 20.87% | 14.78% | 6.81% | 7.97% |
| Riskless Rate | | 6.09% | | | |
| Equity return [1] | | 12.50% | | | |
| Equity risk premium [2] | | 6.41% | | | |

Note 1: Equity return is based on the weighted average monthly equity returns of all equities included in the sample.

Note 2: Equity risk premium is calculated as equity return minus the riskless rate

Size premia is defined as observed returns of firms (specifically small firms) in excess of returns predicted by the CAPM. Consistent size premia across size deciles suggests that the conventional CAPM should be modified.

The results as set out in Figure 4 indicate that there is a fairly clear inverse relationship between realized returns in excess of CAPM and size deciles with the exception of size decile 7. This indicates that there appears to be size premia in the Canadian equity market based on the methodology and data used in this study.

Size premia of size decile 1 and size decile 2 is negative 1.16% and negative 0.89%, respectively, implying that the expected return per CAPM is above the actual return. It appears that actual returns of the largest two size deciles were below the average market return over the last 14 years.

3.4 Size Premia Excluding Income Trusts

The results discussed in section 3.3 are based on a sample including income trusts listed on the TSX. The significance of income trusts to the Canadian capital markets is illustrated by the fact that they represent 12.1% of total MVE of the equity sample as at December 31, 2007.

Income trusts have debt-like characteristics, have historically benefited from differential tax treatment in Canada, and arguably benefited from public-market dynamics/exuberance until October 2006. In order to test any potential impact on the results, income trusts have been excluded from the size premia calculation as set out in the table in Figure 5.

Figure 5 Long-term Returns in Excess of CAPM Estimation for Size Deciles of the TSX (excluding Income Trusts) 1993-2007

| Decile | Beta | Arithmetic Mean Return | Realized Return in Excess of Riskless Rate | Estimated Return in Excess of Riskless Rate | Size Premia (Return in Excess of CAPM) |
|-------------------------|------|------------------------|--|---|--|
| 1 (Largest) | 1.00 | 10.82% | 4.74% | 5.93% | -1.19% |
| 2 | 0.91 | 10.16% | 4.07% | 5.39% | -1.32% |
| 3 | 0.94 | 11.17% | 5.09% | 5.55% | -0.47% |
| 4 | 0.91 | 12.37% | 6.28% | 5.37% | 0.92% |
| 5 | 0.87 | 12.92% | 6.84% | 5.13% | 1.70% |
| 6 | 0.91 | 14.31% | 8.22% | 5.40% | 2.82% |
| 7 | 1.04 | 14.81% | 8.72% | 6.17% | 2.56% |
| 8 | 1.03 | 15.70% | 9.61% | 6.10% | 3.51% |
| 9 | 1.03 | 18.28% | 12.19% | 6.08% | 6.11% |
| 10 (Smallest) | 1.23 | 20.68% | 14.59% | 7.27% | 7.32% |
| Mid-Cap(3-5) | 0.90 | 12.16% | 6.07% | 5.35% | 0.72% |
| Low-Cap(6-8) | 0.99 | 14.94% | 8.85% | 5.89% | 2.96% |
| Micro-Cap(9-10) | 1.13 | 19.48% | 13.39% | 6.67% | 6.72% |
| Riskless Rate | | 6.09% | | | |
| Equity return [1] | | 12.01% | | | |
| Equity risk premium [2] | | 5.92% | | | |

Note 1: Equity return is based on the weighted average monthly equity returns of all equities included in the sample.

Note 2: Equity risk premium is calculated as equity return minus the riskless rate

The results illustrate that fairly consistent size premia are still evident when excluding income trusts. Overall results do not change significantly.

However, actual returns and size premia decrease when income trusts are excluded. Income trusts may have had higher returns than equities listed on the TSX. This hypothesis is consistent with an empirical study by Cleary and MacKinnon (2007) who found that income trusts exhibited very strong performance from 1995 to 2004, with risk-adjusted performance outperforming equities in Canada over that period.

3.5 Limitations

(a) Illiquid Shares

The breakpoints of smaller size deciles as illustrated in section 3.1 indicate that those deciles include very small firms whose shares may be illiquid. These shares are often not followed to the same degree as larger capitalized

stocks especially by institutional investors, and the market for small firm equities may be illiquid due to low trading activity.

Therefore illiquid shares may not reflect all available information, and their quoted prices may not adjust to market fluctuations on a timely basis in comparison to more marketable stocks. Roll (1981) argues that price changes of infrequently traded shares tend to occur at discrete intervals. As a result, their market risk as measured by beta is understated as returns of infrequently traded shares are less correlated to market returns. An empirical test by Roll shows that this bias lead to an overstatement of size premia. This may also apply to this study.

The study by Roll raised the question whether size premia exists after controlling for liquidity. Amihud and Mendelson (1986) hypothesize that investors demand compensation for lack of liquidity and that size premia are a proxy for an illiquidity premium. Their empirical test reveals that the small firm effect is negligible after controlling for liquidity, measured by the bid-ask spread. Reinganum (1982) finds the illiquidity bias insufficient to explain the full magnitude of the small firm effect.

(b) Data

The study covers 14 years of historical data which is substantially less compared to other empirical size premia studies. Morningstar (2008) and Duff and Phelps (2008) cover 82 years and 44 years of historical data respectively. Long-term equity studies are generally considered to be more representative.

Events that have occurred during the last 14 years that have significantly impacted the Canadian equity market may have distorted the study's results.

During the time period examined numerous firms within the mining sector have been floated on the TSX and have experienced a significant rise in share price. A majority of those firms tend to be small in size and may have distorted results. In addition, the bursting of the dot-com bubble may have also biased results in comparison to US-based studies, as well as the indirect impact of Enron and income trusts on the Canadian equity marketplace.

Morningstar (2008) notes that size premia are cyclical in nature. It is not unusual for size premia to follow several years of consistently positive values with several years of consistently negative values.

(c) Delisted Firms

The study does not include equities that have been delisted. Omitting delisted equities may create a potential bias as delisted equities may be concentrated in small firms and generally experience negative returns towards delisting. This has been offered as a partial explanation of size premia.

Elfakhani and Wei (2003) study the effect of excluding delisted equities on the small firm effect using data for the Canadian equity market during the 1975-1994 period. They find that the difference is weak at best.

Shumway (1997) found that the database used by Morningstar and Duff & Phelps omits delisted returns for a large number of firms. However, Duff & Phelps (2008) take into account the Shumway evidence and size premia results in the Duff & Phelps risk premia study are not greatly affected.

4. COMPARISON TO U.S. SIZE PREMIA STUDY BY MORNINGSTAR

4.1 Methodology

The main difference in methodology between this study and the U.S. size premia study by Morningstar is that Morningstar rebalances size deciles on a quarterly basis whereas size deciles are rebalanced annually in this study.

Furthermore, the Morningstar study includes delisted equities (some delisted returns for a large number of firms are omitted based on Shumway, see above) while this study omits all delisted equities.

Also, the equity risk premium by Morningstar is based on the total return of the New York stock Exchange (NYSE) size deciles 1 to 2 whereas the equity risk premium in this empirical study is based on the equity returns of the entire sample (all equities listed in the TSX for which data was available).

Note that information on the Morningstar methodology is based on a brief methodology description published in the *SBBI 2008 Yearbook* by Morningstar. There may be other differences of which the author is not aware.

4.2 Market

(a) Size

The U.S. equity market is significantly larger in size than the Canadian equity market. As a result, size decile breakpoints and sample size between the two studies differ significantly.

The Morningstar study includes 4,242 equities⁷ as at September 30, 2007, while this empirical study only includes 911 equities (excluding income trusts) as at December 31, 2007.

The table in Figure 6 sets out the most recent size decile breakpoints of the Morningstar study and this study.

Figure 6 Comparison Between Canada and U.S. Study MVE of Largest Company by Decile

| Decile | MVE of Largest Company — CANADA (in C\$ thousands) [1] | MVE of Largest Company — US (in US\$ thousands) [2] | MVE of Largest Company — Canada as a % of US |
|---------------|--|---|--|
| 1 (Largest) | 71,008,421 | 472,518,672 | 15.0% |
| 2 | 1,769,738 | 20,234,526 | 8.7% |
| 3 | 676,777 | 9,206,713 | 7.4% |
| 4 | 331,412 | 5,012,577 | 6.6% |
| 5 | 199,232 | 3,422,743 | 5.8% |
| 6 | 132,921 | 2,411,794 | 5.5% |
| 7 | 87,989 | 1,633,320 | 5.4% |
| 8 | 59,408 | 1,128,765 | 5.3% |
| 9 | 36,958 | 723,258 | 5.1% |
| 10 (Smallest) | 20,210 | 363,479 | 5.6% |

Note 1: MVE as at December 31, 2007

Note 2: MVE as at September 30, 2007

This table illustrates that the U.S. equity market is substantially larger than the Canadian equity market. A firm with a market value of equity of \$1.8 billion would be in size decile 1 in Canada but would be included in size decile 6 in the U.S.

⁷ Morningstar excludes closed-end mutual funds, preferred stocks, real estate investment trusts, foreign stocks, American depository receipts, unit investment trusts and Americus trusts.

(b) Industry

It has been argued that size premia are only relevant for specific industries. The industry mix of the Canadian equity market may be significantly different compared to the U.S. equity market. For instance, the Canadian equity market is dominated by large firms in the financial services and resource sectors whereas the U.S. equity market is dominated by large industrial firms. Therefore results may not be comparable.

Morningstar attempts to test whether size premia are industry specific and find evidence that smaller firms have generally outperformed larger firms across industries. However, due to limited data, Morningstar does not test whether size premia are industry specific.

4.3 Results

Figure 7 compares beta and size premia by size decile of the Canadian study with results of the U.S. study by Morningstar.

Figure 7 Comparison Between Canada and U.S. Study by Decile—Size Premia and Beta

| Decile | US Study (1926 -2007) | | Canadian Study (1993 -2007) [1] | | Variance | |
|---------------------|-----------------------|--------------|---------------------------------|--------------|----------|--------------|
| | Beta | Size Premium | Beta | Size premium | Beta | Size Premium |
| 1 (Largest) | 0.90 | -0.16% | 1.00 | -1.18% | 0.10 | -1.02% |
| 2 | 1.11 | 0.90% | 0.91 | -1.31% | -0.20 | -2.21% |
| 3 | 1.17 | 1.07% | 0.94 | -0.46% | -0.23 | -1.53% |
| 4 | 1.20 | 1.23% | 0.91 | 0.92% | -0.29 | -0.31% |
| 5 | 1.23 | 1.82% | 0.87 | 1.71% | -0.36 | -0.11% |
| 6 | 1.25 | 1.96% | 0.91 | 2.83% | -0.34 | 0.87% |
| 7 | 1.32 | 1.88% | 1.04 | 2.57% | -0.28 | 0.69% |
| 8 | 1.38 | 2.60% | 1.03 | 3.52% | -0.35 | 0.92% |
| 9 | 1.43 | 3.00% | 1.03 | 6.12% | -0.40 | 3.12% |
| 10 (Smallest) | 1.49 | 6.33% | 1.23 | 7.34% | -0.26 | 1.01% |
| Riskless Rate | 5.21% | | 6.09% | | 0.88% | |
| Equity return | 11.56% | | 12.01% | | 0.45% | |
| Equity risk premium | 6.35% | | 5.92% | | -0.43% | |

Note 1: Results as presented exclude income funds.

Note that results of the two studies lack comparability. For details see Section 4.4 below.

(a) Beta

Results of the U.S. study illustrate a clear inverse relationship between beta and firm size.

Therefore beta and the CAPM do take into account the risk of smaller equities to a certain extent. Results of the Canadian study show a less clear inverse relationship between beta and firm size. Beta does not appear to account for the small firm risk. In addition, low R-squares especially in smaller size deciles as found in section 3.2 above indicate that the power of beta to explain expected returns is low.

(b) Size Premia

The Morningstar study would suggest using size premia for firms in size deciles 2 and 3 whereas no size premia (or a negative size premia) would be applied for the same deciles based on Canadian results.

Size premia of smaller size deciles appear to be higher based on Canadian results when compared to the U.S. results. This is likely due to the fact that Canadian size deciles include significantly smaller firms compared to U.S. size deciles.

The table in Figure 8 compares size premia by size group between the U.S. and Canada; however, for the purposes of this comparison, results are based on results covering historical data from 1993 to 2007 for both the U.S. and Canada.

**Figure 8 Size Premia
1993-2007**

| Size Group | US Study [1] | Canadian Study [2] | Variance |
|-------------------|-------------------------|-------------------------------|-----------------|
| Mid-Cap(3-5) | 0.4% | 0.7% | 0.3% |
| Low-Cap(6-8) | 1.3% | 3.0% | 1.7% |
| Micro-Cap(9-10) | 3.9% | 6.7% | 2.8% |

Note 1: Beta and equity risk premium estimated using Standard and Poor's 500 index.

Note 2: Beta and equity risk premium estimated using equity returns of all equities included in the sample (all equities listed on TSX where data was available).

Canadian size premia approximates U.S. size premia for the mid-cap size group. Low-cap and micro-cap size premia in Canada are significantly above corresponding size premia in the U.S. This is likely due to the fact that Canadian size deciles include significantly smaller firms compared to U.S. size deciles.

4.4 Lack of Comparability

Differences in methodology and market between the two studies as described above represent lack of comparability. The two major differences are the data period covered and the size decile breakpoints.

The empirical study covers 14 years of historical data which is substantially less compared to 82 years covered by the Morningstar study. Morningstar (2008) noted that size premia are cyclical in nature. It is not unusual for size premia to follow several years of consistently positive values with several years of consistently negative values.

As noted above size decile breakpoint of the two studies differ significantly. For instance, a firm with a market value of equity of \$1.8 billion would be in size decile 1 in Canada but would be included in size decile 6 in the U.S.

The CAPM is adjusted for size premia based on firm size. Accordingly the cost of equity of a firm with a current MVE of \$1.8 billion should be adjusted by a size premium of 1.96% based on results by Morningstar. Based on Canadian results the firm would be categorized in decile 1 and the cost of equity would have to be reduced by the size premium of (1.18%).

4.5 Directions for Further Research

Further research should be conducted to mitigate the lack of comparability between the Morningstar study and the Canadian study. The following represent suggested directions.

First, the Morningstar size decile breakpoints should be used to assign firms traded on the TSX to the Morningstar breakpoints.

Second, the data period of 14 years should be extended if possible to mitigate the fact that size premia are cyclical and to increase comparability.

Third, size decile should be rebalanced quarterly rather than annually.

Fourth, delisted equities should be included as omitting delisted equities may create a potential size premia bias.

Fifth, equities with infrequent trading activity should be excluded as the inclusion of illiquid shares may distort results and overstate size premia.

Sixth, size premia should be tested whether they only exist in certain industries.

5. CONCLUSION

The empirical study on the Canadian equity market demonstrates the existence of size premia based on data from 1993 to 2007. Results also indicate that beta, the CAPM's risk measure, was a weak measure to explain expected returns for smaller firms as smaller firms have a high unsystematic risk component.

The inclusion of equities with illiquid shares, the exclusion of delisted firms and the fact that only 14 years of historical data are covered represent inherent limitations of the study.

Size premia found in the study are not comparable to U.S. size premia found in the Morningstar study primarily due to the fact that size decile breakpoints used to create size decile differ significantly. As discussed above, further research should be conducted to mitigate the lack of comparability.

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3

CLARITY THROUGH DATA – THE PRACTICALITY OF FORENSIC DATA MINING FOR VALUATORS

*by Louie Velocci, CA, CISA, CISSP, GCFA
KPMG Forensic Inc., Halifax*

*David Stewart, ACMA(UK), CFE
Deloitte & Touche LLP, Toronto*

1. INTRODUCTION

Chartered Business Valuators engaged to determine the value of a business, assess damages or provide evidence in on-going disputes face two main decisions:

1. What is the appropriate valuation approach and supporting methodology to use?
2. What is the appropriate evidence that will be used to support the valuation conclusions and assumptions?

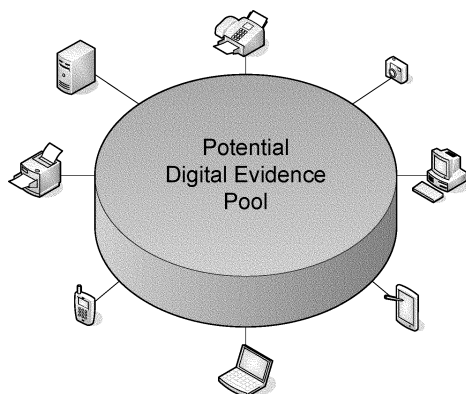
Chartered Business Valuators, accredited appraisers and experts in your field (Valuators) can easily handle number one. However, the second decision is more complex as the source for relevant evidence to support the calculations and assumptions continues to change, and the individuals providing the information may have undisclosed motivations. The complexity is further fuelled by a finance industry that continues to develop more complex structured offerings, the increasing complexity of businesses, and advanced degree of computerization.

As a forensic auditor, specialized in computer forensics, this challenge excites me because it allows me to marry my past experience to the world of business valuations. In this paper I will examine the changing nature of the evidence we, as professionals, may encounter, some techniques for preserving and assessing this evidence, and introduce some high level data analytical techniques that could be useful to Valuators. Finally, I will examine some leading research on spreadsheet validation and the impact on each professional who relies heavily on the use of spreadsheets in their analysis.

I will illustrate the use of computer forensics and data analytics in the context of modern day scenarios such as revenue stream analysis, loan portfolio analysis and business model validations, using, where possible, hypothetical examples based on my forensic experiences.

The Federal Judicial Center for Electronic Discovery, presented at the National Workshop for U.S. Magistrate Judges in 2002, indicated that most organizations had approximately 97 percent or more of their corporate knowledge in an electronic format. More recently, the IDC research group approximated that 281 exabytes of digital information was created worldwide in 2007, the equivalent of 281 billion gigabytes.

Figure 1 The Changing Landscape of Evidence



As Valuators, this means that in addition to the traditional paper copies of documents that we have piled in the corners of our offices, we have a larger and potentially more problematic pool of evidence that could be relevant and of probative value to any work that a Valuator is engaged to undertake.

Digital evidence refers to any electronically stored information on any type of computer or telecom device. Practically, the most likely form of electronic evidence that a Valuator will use is a combination of email, word processed documents and spreadsheets. However, digital evidence differs from traditional evidence (e.g., a hard-copy contract); in that electronic files contain some or all of the elements discussed below that should also be considered prior to you placing reliance on it.

- Metadata/hidden data—embedded information used by the computer system to track changes, route information between systems and store/create/modify dates. This is particularly important when the evidence is embedded within an email message that is forwarded to you.
- Databases and spreadsheets—large collections of similar evidence stored in a logical manner often with advanced search, data manipulation and calculated fields. These sources can be easily manipulated as outlined in example 1 at heading 3.1, and can have hidden errors that are hard to identify.
- System data—records of the use of IT resources such as log-in times, specific applications used and evidence of data being copied to another device (e.g., USB drive). This information may be useful in a damage quantification scenario as it can help establish who knew or took specific information, when they had it and if it was shared. The use of this type of evidence will require the use of a computer forensic specialist as part of your team.
- “Deleted” data—information deleted by a user from the main operating system that is still available for retrieval by forensic professionals using advanced tools and techniques. This information may be useful in damage or loss quantification scenarios but will require the use of a computer forensic specialist as part of your team. This can be costly analysis to perform.
- “Slack” or residual data—a type of “packing” material used by the computer to write files to a hard drive (e.g., temporary “save” files created when working on a document), which can be helpful if changes to evidence are identified. This information can stay on the hard drive indefinitely and is retrievable by trained computer forensic professionals depending on the timing of their involvement in an engagement.

The important thing for a Valuator to understand is that the electronic files they view on-screen may have other hidden information that is available for their use with some additional effort.

2. RULES OF ELECTRONIC EVIDENCE

Consistent with the normal evidentiary tests, electronic evidence must be of probative value to the matter at hand, in an original format which is free from manipulation and handled in an appropriate manner during the preservation, collection and analysis stages (most commonly referred to as chain of custody). This appears to be the largest area of potential risk for both clients and the Valuator, in that they often may not spend sufficient time or effort required to understand potential evidence sources, as it relates to the legal proceedings.

The chain of custody is required to keep a continuous record of the evidence, from the time the evidence is acquired until it is transferred out of the Valuator's control. It is prudent to determine the need for the inclusion of a trained computer forensic professional who is experienced in electronic evidence collection and able to meet the legal expectations for admissibility in a legal setting. This proof requires that appropriate steps be planned and taken, including the following:

- proper documentation of where the evidence was acquired (and how);
- the retention of an MD5hash (akin to a digital fingerprint for each piece of electronic evidence) value of the electronic evidence to help authenticate the evidence in later proceedings;
- maintaining a record of those involved in the collection process as well as who has been responsible for safeguarding the electronic evidence; and
- the measures undertaken to ensure that the electronic evidence was free from manipulation or loss.

Notwithstanding the importance of a comprehensive understanding of the subtleties of various forms of electronic evidence, nor minimizing the requirements set out in the *Evidence Act* for preserving and introducing evidence, it is not the focus of this paper. These two separate areas are part of much larger fields of study. Assuming that the electronic evidence collected is legitimate and admissible for use in your work, let's examine how we can use data analytics to help further assess its impact on your valuation.

3. DATA ANALYTICS VS. DATA MINING

In introducing this section, I have thought it relevant to provide high level definitions and a quick reference matrix that I have used with clients in the past to further illustrate the differences between the two areas of analysis.

Data analytics is the transformation of data to extract useful information and effectively draw conclusions. This can include the use of statistical modelling, selection of representative subsets of data, curve fitting against an expected outcome, etc.

Data mining, in contrast, is the application of data modelling, automated computer routines and advanced data sampling techniques aimed at the identification of unforeseen patterns within the data. Data mining uses more complex computer modelling, database analysis and theoretical modelling which often requires a significant investment in software, computer hardware and specialized data analysis resources.

I have included some examples of each to help further outline the differences between data analytics and data mining in Figure 2.

Figure 2 Data Analytics vs. Data Mining

| | Data Analytics | Data Mining |
|--|-----------------------|--------------------|
| Summarization of data subsets | ✓ | |
| Sorting, aging or other indexing of data | ✓ | |
| Analysis of data against an expected value, i.e., discount rate for early payment | ✓ | |
| Statistical modelling of data against known algorithms, i.e., Benford's Law | ✓ | |
| Determining correlation between car sales and weather conditions | | ✓ |
| Analysis of manual journal entries for anomalies | ✓ | |
| Analysis of past sales information to identify which past customers are likely to purchase additional services | | ✓ |
| Reasonableness testing of key business streams, i.e., revenue, cost of goods sold | ✓ | |
| Analysis of fraudulent activities within Purchasing Department | | ✓ |
| Analysis of multiple types of electronic records, i.e., emails, spreadsheets, documents, databases, etc. | | ✓ |

Perhaps many of the examples of data analytics above are things that you may already do in your normal work. If we look at a couple of the more advanced items, however, you will be able to see that their application could have significant implications to the final value you give to a company.

Through the use of hypothetical examples based on prior experiences with helping organizations better understand their data sources we can examine how the application of data analytical techniques can be beneficial for Valuers. Where possible, I have tried to illustrate the relevance of data analytics in the context of a hypothetical valuation engagement.

3.1 Example 1: Sales Data Analysis — Data Analytics

ACME sells a highly unique perishable product from its manufacturing plants in Ontario, Quebec and Nova Scotia. The product has a shelf life of five days from production and, as such, it is only sold through pre-established food distribution companies in the same provinces. The company provided a spreadsheet in support of its expansion west of Ontario. The sales data is outlined in Figure 3.

Figure 3 Relevant Extracts of ACME Sales by Year

| | 2001 | 2002 | 2003 | 2004 | 2005 |
|--------------------|-------------|-------------|-------------|-------------|-------------|
| Sales | 1,345,685 | 1,425,375 | 1,538,250 | 1,650,250 | 1,973,339 |
| Cost of Goods Sold | 1,265,000 | 1,339,857 | 1,447,270 | 1,550,250 | 1,661,253 |
| Gross Income | 80,685 | 85,518 | 90,980 | 100,000 | 132,086 |

We can all efficiently determine that between 2001 and 2004, sales growth was between approximately 6 and 8 percent per year, and that gross profit was consistently between 6 and 9 percent. Having checked the spreadsheet for obvious errors and having had preliminary discussions with ACME, I noticed that a hidden worksheet existed within the spreadsheet that had the 2005 sales numbers included. This led me to do some basic level data analytics with some potentially surprising results.

Figure 4 ACME Sales Aging

| Prepared by: LVelocci KPMG Forensic | | Project name: CICBV Data Analytics Session | | | | | | | |
|--|------------|--|---------------------|---------------|-------------|-------------|---------------------|---------------|--|
| Input file name: randomdata for CICBV-randomdata 1.IMD | | Period: 2008 | | | | | | | |
| Aging of: SALES | | | | | | | | | |
| On: DATE | | | | | | | | | |
| As of: 2008/06/25 | | | | | | | | | |
| Int (Days) | # Records | % | Debits | % | Credits | % | Net Value | % | |
| 0 | 198 | 49.38 | 939,377.00 | 47.60 | 0.00 | 0.00 | 939,377.00 | 47.60 | |
| 30 | 12 | 2.99 | 71,716.00 | 3.63 | 0.00 | 0.00 | 71,716.00 | 3.63 | |
| 60 | 26 | 6.48 | 112,699.00 | 5.71 | 0.00 | 0.00 | 112,699.00 | 5.71 | |
| 90 | 22 | 5.49 | 102,233.00 | 5.18 | 0.00 | 0.00 | 102,233.00 | 5.18 | |
| 120 | 13 | 3.24 | 65,218.00 | 3.30 | 0.00 | 0.00 | 65,218.00 | 3.30 | |
| 150 | 10 | 2.49 | 53,767.00 | 2.72 | 0.00 | 0.00 | 53,767.00 | 2.72 | |
| 180 | 21 | 5.24 | 115,517.00 | 5.85 | 0.00 | 0.00 | 115,517.00 | 5.85 | |
| 180+ | 99 | 24.69 | 512,812.00 | 25.99 | 0.00 | 0.00 | 512,812.00 | 25.99 | |
| ERR | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Totals: | 401 | 100.00 | 1,973,339.00 | 100.00 | 0.00 | 0.00 | 1,973,339.00 | 100.00 | |

Aging is a simple example of data analytics, yet remains one of the more effective methods when looking at a company's sales and inventory data. In this example, we know that we have a product that has a relatively short lifespan. We can also see that over half of the sales are over 30 days old meaning that at least four inventory turns have occurred since ACME shipped the original product.

Furthermore, it outlines that sales are not consistent in each 30-day cycle so historical patterns may not be an appropriate base for future growth estimates. While not given to you, there was a consistent pattern in ACME's receivables which likely meant that sales growth was achieved through less than optimal credit risk decisions.

In further analyzing the data, I stratified the sales by region, as illustrated in Figure 5.

Upon examination, another pattern emerged, namely, that sales have been recorded for regions with no physical presence.

Through the use of drill-down analysis, we can see other anomalies within the data set that provide a greater understanding of the financial information initially provided. Namely, it appears that the data does not support the processes described by management or their revenue recognition processes are not appropriately capturing the revenue in the correct periods. It also appears that future sales have been recorded in their system which is inconsistent with our understanding of the product or business model, as described by management. We have outlined some of the anomalies in the 2005 sales data in Figure 6.

Figure 5 ACME Sales by Region

| Rec # | REGION | NO OF RECS | SALES SUM |
|-------|--------|------------|-----------|
| 1 | | 1 | 0 |
| 2 | AB | 41 | 193436 |
| 3 | BC | 36 | 182925 |
| 4 | MB | 27 | 127858 |
| 5 | NB | 28 | 130237 |
| 6 | NL | 33 | 161321 |
| 7 | NS | 25 | 91167 |
| 8 | NT | 42 | 203343 |
| 9 | NU | 22 | 103989 |
| 10 | ON | 31 | 182770 |
| 11 | PE | 31 | 162894 |
| 12 | QC | 31 | 161827 |
| 13 | SK | 21 | 97635 |
| 14 | YT | 32 | 173937 |

Figure 6 Sales Drill Down Analysis

| sales | region | date |
|-------|--------|-----------|
| 3717 | SK | 15-Apr-08 |
| 5015 | YT | 18-Jan-08 |
| 563 | NT | 12-May-09 |
| 3760 | NU | 06-Jul-07 |
| 9983 | YT | 03-Mar-08 |
| 7846 | PE | 24-May-08 |
| 7066 | NT | 25-Dec-08 |
| 608 | AB | 30-Sep-08 |
| 9006 | QC | 12-Oct-08 |
| 7429 | NT | 31-May-09 |
| 8643 | NU | 11-Jan-09 |
| 1657 | NU | 10-Nov-08 |
| 5868 | NT | 21-Feb-09 |
| 1635 | NL | 15-May-08 |
| 7574 | NB | 28-Apr-09 |
| 2958 | NB | 05-Jul-08 |
| 1056 | NS | 26-Jun-08 |
| 9202 | SK | 16-Dec-07 |
| 4412 | PE | 06-Nov-08 |
| 2991 | SK | 03-Jul-08 |
| 3317 | NU | 29-Mar-08 |
| 9312 | ON | 24-Jul-07 |
| 9346 | PE | 18-Jul-07 |
| 398 | PE | 28-Nov-08 |
| 2702 | AB | 03-Apr-08 |
| 8790 | ON | 18-Sep-08 |
| 3469 | YT | 16-Feb-09 |
| 8802 | PE | 19-Feb-08 |
| 2556 | QC | 07-Mar-08 |
| 4620 | AB | 02-Jul-08 |
| 8127 | NL | 12-May-08 |
| 1386 | AB | 28-Feb-09 |
| 787 | YT | 10-Jan-08 |

This extract of the original data illustrates some potential anomalies which should be further examined.

Through a simple visualization exercise, it appears that ACME's financial records and underlying data are inconsistent with the actual operations as I understand them.

Sales in provinces for which ACME has no physical or distributor presence.

Dates occurring in the last period, or in future periods yet recorded in the current results.

Having identified data anomalies in the dataset, it is important to determine if the anomalies are the result of system error or human intervention. I next used an advance data analytic technique to plot the sales revenue against Benford's Law to see if the data met the randomness tests.

(a) Benford's Law

In 1938, a physicist name Frank Benford, wrote a paper called "Note on the Frequency of Use of the Different Digits in Natural Numbers," in which he outlined the random distribution of leading numbers in a naturally occurring population of numbers. Basically, naturally occurring datasets will have more small items than big items. For example, there are more towns than cities, more small companies than conglomerates, etc. Any deviation from this naturally occurring pattern results in useful information for data mining in corporate datasets, the smaller the first digit (ranging from one to nine) the more likely it is to be found in a random population of numbers. Most often the plotting of data against a Benford modelling curve is similar to that shown in Figure 7.

This statistical model has been adopted to identify transactions which do not appear abnormal; that is, until an analysis is completed on the entire transaction population. This analysis is often successful in identifying unsupported or manipulated financial transactions. For example, in past engagements this model has helped isolate fraudulent cash transactions, inappropriate manual journal entries and breakdowns in automated business processes.

If we apply Benford's Law to the ACME sales data, we get the graphs in figures 7 and 8 which indicate that the data is not random, and has a higher likelihood of being fictitious or incorrect data.

Based on analyzing the first digit of each sales transaction, it is apparent that the majority of sales transactions are beyond the Upper Bound (Z -Statistic > 1.96). This means that there is only a 5 percent statistical probability that the difference between the sales transaction and its expected distribution is due to chance alone. Additionally, by plotting the first two and three digits of the sales data against Benford's Law we can interpret that the sales data needs further investigation to understand what is driving the distribution patterns (i.e., technical errors or human intervention).

There is a 5 percent statistical probability that the difference between the sales transaction and the expected distribution is due to chance alone, therefore extreme caution needs to be used if a Valuator were to rely upon this data to determine a company's value. This further supports the assumption that there is something abnormal with the data, and calls into question all the integrity of the data that was about to be used to project future operating results.

3.2 Example 2: Receivable Analysis — Data Mining

Often in engagements, we are provided with large volumes of data with limited insight into the nature of the data. For example, in a past engagement we were looking at the values associated with an accounts receivable pool that were part of audited financial statements. No reservation or note disclosures existed in relation to this asset.

We further came to understand that the system used to track accounts receivables was a homegrown system with limited documentation and limited understanding of the data schemas except for the original creator who was no longer available to help us out. We extracted the data in Figure 9 from one of the native flat data files within the system.

Figure 7 ACME Sales Data vs. Benford's Law

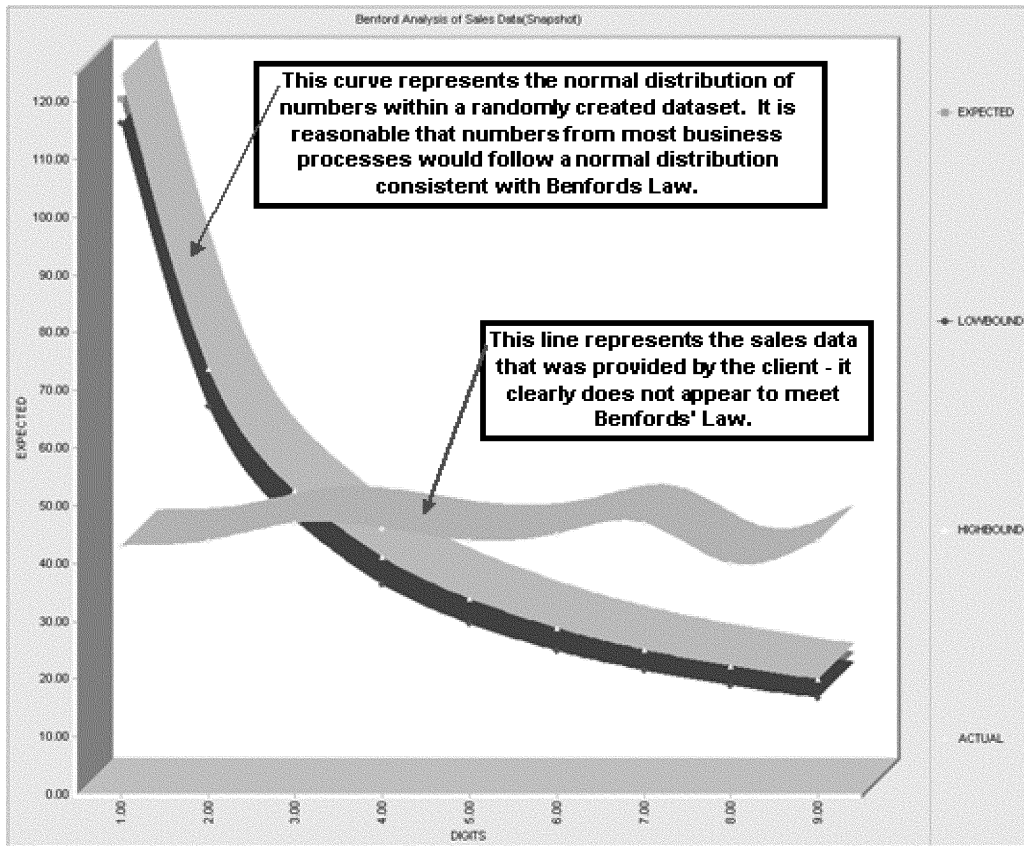


Figure 8 First Two and Three Digit Analysis of ACME Sales Data vs. Benford's Law

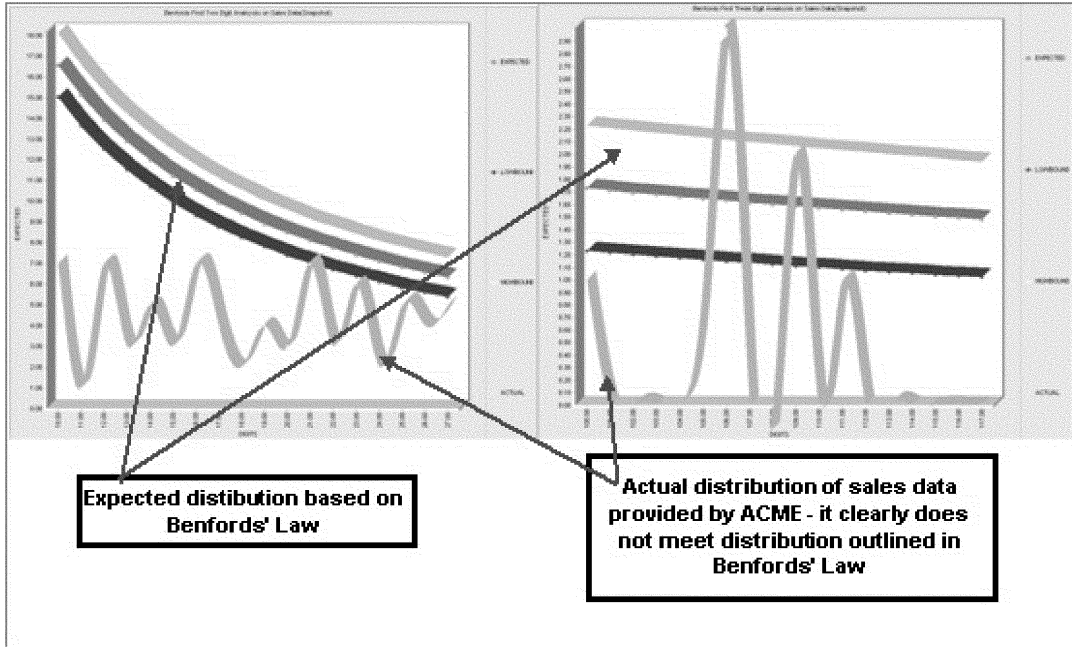


Figure 9 Native Data Files — Data Mining for Date Strings

```

AT001-0a-1~LMCHG1,T50,03:10:00,00000321,31102001,31102002~E4$
AT001-0a-2~LMCHG1,T51,08:56:00,00000761,01102001,27012002~E4$
AT001-0a-3~LMCHG1,T55,02:27:00,00001611,30102001,30102002~E4$
AT001-0a-4~LMCHG1,T50,01:44:00,00002631,30092001,30092004~E4$

```

In this particular case, we knew that the accounts receivable and related allowance for doubtful accounts value would be linked to dates. Furthermore, there was an allegation that the underlying aging of the accounts receivable may have been manipulated to affect change to the value of these assets in their audited financial statements. This would have required the modification of dates or the aging process itself, and is referred to as accounts receivable churning. Not wanting to have to review potentially thousands of lines of programming text to identify the aging routine, I considered sifting the data for any easily identifiable date fields. We used data mining techniques and identified that the 6th and 7th text strings within the record met the conditions of a traditional date field. We further identified a code used by the original programmer to flag records that had been modified within this particular application. Figure 10 outlines the information we were able to better understand after the use of data analytics.

Figure 10 Data Mining Finding Date String Variables

| | |
|---|------|
| AT001-0a-1~LMCHG1,T50,03:10:00,00000321,31102001,31102002 | E4\$ |
| AT001-0a-2~LMCHG1,T51,08:56:00,00000761,01102001,27012002 | E4\$ |
| AT001-0a-3~LMCHG1,T55,02:27:00,00001611,30102001,30102002 | E4\$ |
| AT001-0a-4~LMCHG1,T50,01:44:00,00002631,30092001,30092004 | E4\$ |

Date fields identified using data mining technique to isolate potential date expressions. We also identified E4\$ which initially was thought to be some older language programming metadata - we came to find out it was the nomenclature for all changes in this application. The identification of the code "E4\$" allowed us to parse the rest of the changes with relative ease.

As a result of this, we were able to quantify the quantum, the transaction dates and the impact of changes that had occurred to accounts receivables with a high degree of accuracy. It also allowed us to perform other analysis around the value of the accounts receivables, as recorded in the previously audited financial statements.

By applying our data mining techniques on the entire accounts receivable transaction population we identified approximately 12,000 changes, over a 4-year period, to the accounts receivable outstanding dates which impacted the related aging calculations. We were able to quantify that the value of the account receivables were consistently and artificially overstated. Furthermore we were able to determine that the allowance for doubtful accounts was understated, as the collection dates were pushed into future accounting periods. The financial impact of this analysis determined material errors and misstatements. As a forensic accountant, our systematic process identified the manual override of controls. In the absence of basic data mining techniques, it is often too easy to accept on face value that the data being provided by the client has integrity. As a Valuator, this could be a significant issue if it had not been detected, as working capital, investments and adjustments would be distorted at the valuation date. Future cash flows would also be impacted, through incorrect working capital requirements.

3.3 Example 3: Loss Quantification — Data Analytics & Data Mining

The final example illustrates how a Valuator may use both data analytics and data mining in a loss quantification scenario.

(a) Background

SupplierCo was contracted by ABCo to provide a crew of 30 individuals for the construction project on a cost plus 15 percent basis. Out of the 30 individuals, 4 were to be “management or supervisory” resources which would not be billed to this project, but rather to the developer directly. Over the term of the project, ABCo was billed and paid for some 500 days of SupplierCo crew’s time; however, the original estimate was approximately 350 days. This represented a 30 percent overage, and ABCo felt that they were unjustifiably charged for time that may

not have been appropriate. We were engaged by ABCo to quantify the billings under the terms of the contract with SupplierCo.

(b) Application of Data Mining

SupplierCo was reluctant to provide the billing information. However, given their defense was based on the actual time records, we were able to gain access to the information during the discovery process. We received electronic versions of the following:

- relevant statement of remuneration paid (T4) filings;
- employment insurance (EI) slips;
- master listing of employees; and
- time records of SupplierCo.

Instead of printing each of these records and trying to manually correlate the information, we applied data mining techniques to identify the workers on the ABCo job and link the payroll, EI and time records of each worker to the billings by SupplierCo. We quickly identified that the worker time that should have been billed to the developer had intermittently been charged to ABCo. We also determined that ABCo was being charged for worker days where the time records indicated that the worker was not working on the particular days they were being charged to ABCo.

We were able to take the time records, the T4 and EI slips and, using data analytics and a simple regression model, find out that the mark-up on some of the time was in excess of the amounts outlined in the contract (i.e., cost plus 15 percent).

Using data mining and data analytics, we were able to efficiently link the various data from multiple sources and refine the work that the Valuator had to manually perform. This increased the overall efficiency and presented the data in a clear and succinct manner for use in the final report.

While I can appreciate that the use of advanced data analytics or data mining may not be practical, nor the information as readily available as in a forensic engagement, additional analysis of the underlying data is a practical step to consider in all valuation engagements.

One specific area that Valuators should spend time for additional analysis of data is in the use of spreadsheets for various schedules and financial models.

4. THE VALUATORS AND THE FAMOUS SPREADSHEET

The ubiquitousness of spreadsheets in the accounting, business and valuations fields are both staggering and concerning. Globally, professionals have deployed spreadsheets as the chosen application in modelling, financial analysis, forecasting, etc. Spreadsheets can help with situational analysis, have an intuitive mechanism allowing the development of complex calculations, and can be modified or reused easily.

In 2004, a study found that 95 percent of U.S. firms use spreadsheets for financial reporting,¹ and a separate study by CFO.com of 168 finance executives found that every finance department interviewed relied heavily on the use of spreadsheets in their daily operations. This number would be higher if we talked to Valuators, who often prepare and use financial models, schedules and other spreadsheet-based analysis on a daily basis.

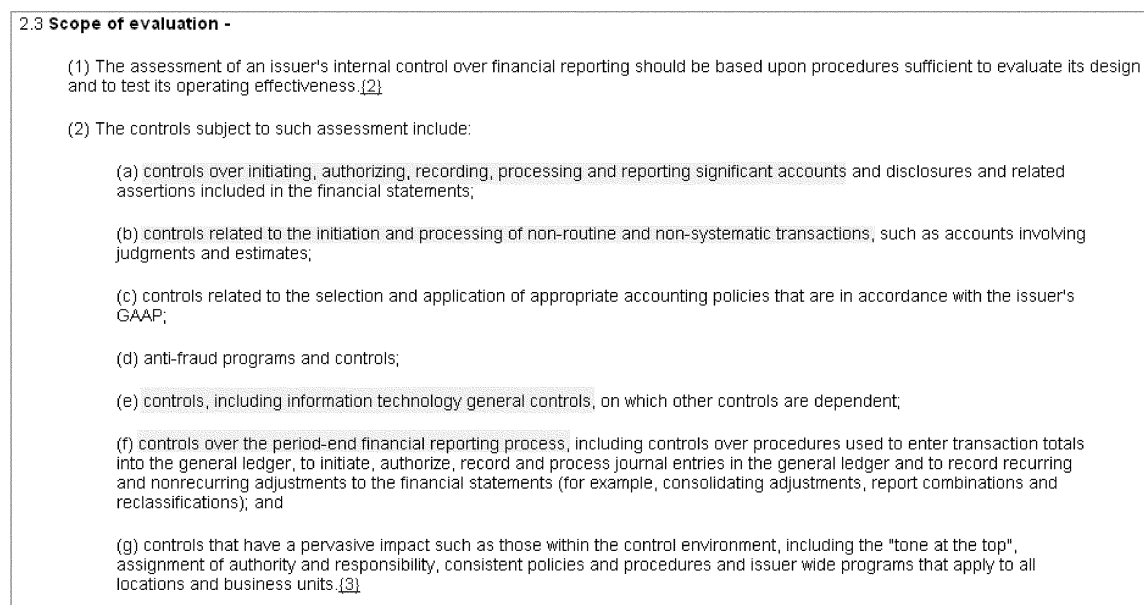
Unfortunately the things that make the use of spreadsheets so popular are also their partial downfall. Linked to the perception that the accuracy of spreadsheets is high, we find many examples where reliance on spreadsheets

¹ www.coda.com

has been linked to material errors. KPMG performed a study and selected random spreadsheets and found that 91 percent had critical errors that could impact financial decisions. Similar results were outlined in detail in Richard Panko's work "Spreadsheets and Sarbanes-Oxley: Regulations, Risks, and Control Frameworks."

The issue of spreadsheet error and related control validations hit mainstream accounting and finance departments with the introduction of regulations around financial controls, Sarbanes-Oxley in the U.S., and Multilateral Instrument (MI) 52-111² in Canada. Each of these regulations looked to the management of publically traded companies to assess and provide comfort over key financial controls that could impact financial reporting. While the emphasis is on management's assertions over controls, I have extracted the scope section from the MI 52-111 (see Figure 11), which I believe is relevant to Valuers who are working with public companies.

Figure 11 Scope of Evaluation – MI 52-111



4.1 What Can be Done to Help with Spreadsheet Validations?

Spreadsheet controls are not significantly different from controls that most organizations have implemented for their general IT controls namely, data classification, logical access, change management and backup and recovery.

(a) Data Classification

Data classification and validation are crucial to ensure that only authorized individuals have access to the information in the spreadsheet. Furthermore the spreadsheet should be vetted to ensure that it does not provide additional information that might be inappropriate. See Example 1 in data analysis section above. Some key areas to examine are discussed below.

- **Authority to access:** A list of authorized individuals should exist and be reviewed on a timely basis to ensure that the information in the spreadsheet is accessed appropriately.

² www.osc.gov.on.ca/Regulation/Rulemaking/Current/Part5/rule_20050204_52-111_ricfr.jsp

- **Version control:** It is important to ensure that the most current and approved version of each spreadsheet is available for use, and changes are clearly articulated through a naming convention that includes relevant information (i.e., version numbers and dates). It is generally accepted that a document briefing that tracks the most current versions of spreadsheets by project/business area is prudent.
- **Documentation:** To facilitate a consistent understanding of the purpose and analysis within the spreadsheet, there should be sufficient documentation (or references to a separate document) outlining the business objective and functions of the spreadsheet(s), and that the author and appropriate approvers are noted.
- **Segregation of duties/roles:** Segregation of duties is not new for most accountants, but for many projects (or on a company basis) there are no clearly defined roles and responsibilities. By formalizing these roles and responsibilities on a per project basis, it is easy for individuals to understand who will be responsible for controlling the spreadsheet development, access issues and who will have final ownership for all changes and testing.

(b) Logical Access

Logical access is the process to ensure that only authorized users have access to the spreadsheet content and, furthermore, that only individuals authorized to make changes to the spreadsheet are able to make changes. Specifically, the ideas below should be examined.

- **Access control:** You should ensure that only appropriate individuals have the right level of access (i.e., full, read only, etc.) to use the spreadsheet. This can include the use of passwords, locked cells and other access controls as required.
- **Security and data integrity:** In the event that the information in the spreadsheets is highly confidential (i.e., contains the new business plan for your client), it is prudent to implement additional logical access restrictions and consider the use of a secured directory or folder to store the spreadsheet. If data integrity is the key consideration, it is possible in most spreadsheets to lock formula cells to prevent logic changes, and force input validation rules (i.e., date fields will only take dates in a specific format).
- **Formula and other logic inspection:** Appropriate levels of review should be done by someone other than the author of the spreadsheet, who has similar or appropriate knowledge of the business, approach being used, or objective of the spreadsheet. This inspection should be formally documented, and be retained as a component of the documentation. As the spreadsheet changes, the original tester should be used to validate the changes and ensure they are appropriate and do not impact other areas.

(c) Change Management

Change management is often the worst risk around the use of spreadsheets. This is the result of a lack of planning on the developer's part, and an undisciplined approach to using and safeguarding the spreadsheet. At a minimum there should be a defined process and ownership for who controls changes to spreadsheets once created and tested.

- **Change restrictions:** All spreadsheets should be locked by the final approver of the spreadsheet after the formula and logic testing. This will prevent rogue changes to the spreadsheet. In the event that changes are needed, then a defined change management process will ensure that the data and spreadsheet integrity are maintained.
- **Data input reconciliation:** Regardless of the source of the data used to populate the spreadsheet, it is prudent to ensure that the data is reconciled to the source system. This should be a first step process. In many of the spreadsheets I use, I leave the control totals in the spreadsheet to ensure that no changes affect the original data.

- **Validation testing:** By building into the spreadsheet predefined validation routines it is possible to ensure that the spreadsheet is working appropriately and the results are consistently interpreted. For example if the condition that weighted average cost of capital (“WACC”) stays above 5 percent is crucial to your model, then you can build in validation routines that will flag changes that would cause your WACC to drop below 5 percent. In a similar manner, ratio analysis and other key metrics can be automatically tracked for validation.

(d) Backup and Recovery

Backup and recovery is typically thought of as an IT thing until it is too late. You should consider the use of the backup and auto archiving features within many of the spreadsheet applications used today. Furthermore, it is prudent to back up your work to a centralized location that is subject to daily or more frequent backups. To the extent possible if you work from that copy, your chance of losing key spreadsheet data will be minimized.

5. CONCLUSION

It has been said that knowledge is power. In today’s world, this power comes in the form of binary “0” and “1”s that can be transformed into additional insight, a succinct analysis or a more comprehensive review of the underlying data. Armed with some additional information around the use of data analytics, the steps that should be in place to safe-guard this data and types of techniques that could be undertaken, Valuers will be able to provide additional insights into their clients’ issues.

Valuers are experts in their field and can easily determine the most appropriate manner of valuing an organization, asset or business model. By introducing data analytics and data mining into their evidence gathering and analysis phases, Valuers are more effectively able to assess the appropriateness of the data underlying their assumptions, and therefore reduce the overall risks to themselves and their clients.

4

EXAMINATIONS AND TESTIMONY OF AN EXPERT AT TRIAL¹

*by Stacie R. Glazman, LL.B., LL.M., CBV*²
Toronto

*Nicole Tellier*³
Toronto

1. INTRODUCTION

Since the mid-1990s, the number of civil litigation matters requiring the assistance of experts has increased dramatically. A team approach to solving disputes, including the encouragement of jointly retained or court appointed experts is more common than in earlier years. Litigants are generally more sophisticated and opinion evidence plays a prominent role in the process, now more than ever.

Throughout this article, we will be canvassing the role of the expert and admissibility of expert evidence, as well as reviewing the trends in recent jurisprudence regarding disclosure of the expert's file and challenges to impartiality. Finally, we will provide practical tools for counsel when working with their experts beginning at the retainer stage and throughout the trial process.

Judges rely on experts to provide opinions on difficult areas in which they have specialized training and knowledge. A review of the jurisprudence does not reveal any significant new precedents or developments, but it did reveal two trends. First, there seems to be an increase in the number of cases where judges admonish experts for departing from their role as impartial witnesses and stepping into that of advocate. Second, there is a general trend toward the relaxation of the litigation privilege rule in favour of ordering disclosure and production of an expert's working papers, although there is no definitive or clear appellate decision articulating a set of principles or test.

2. THE ROLE OF THE EXPERT: DUTIES AND RESPONSIBILITIES OF EXPERT WITNESSES

Experts, like counsel, must approach a case always mindful that a trial may be necessary, even though statistically most cases settle prior to trial. Experts are either retained by a party or are appointed by the court, and they are

1 This paper is an amalgam of previously presented papers by us on this subject. The authors would like to thank our colleagues Ron Foster, Q.C., Calgary, Alberta, and Evelyn Rayson, Toronto, Ontario, who respectively co-authored earlier versions of portions of this paper.

2 Ms. Glazman is both a Barrister and Solicitor and a Chartered Business Valuator. In her capacity as a CBV, she has been qualified as an expert in both Ontario and Alberta.

3 Ms. Tellier is a Barrister and Solicitor, practicing family law in Toronto.

asked to educate and assist the court or party in developing his or her case. The expert's primary role is always to assist the trier of fact, in an independent and impartial manner.

The oft-quoted case regarding the legal obligation of an expert is an English decision called the *Ikarian Reefer*.⁴ In Canada, its principles have been applied in all types of proceedings including civil trials, criminal prosecutions and administrative hearings. Below is a passage from that case:

The duties and responsibilities of expert witnesses in civil cases include the following:

1. Expert evidence presented to the Court should be, and should be seen to be, the independent product of the expert uninfluenced as to form and content by the exigencies of litigation.
2. An expert witness should provide independent assistance to the Court by way of objective unbiased opinion in relation to matters within his expertise. An expert witness in the High Court should never assume the role of an advocate.
3. An expert witness should state the facts or assumptions upon which his opinion is based. He should not omit to consider material facts, which could detract from his concluded opinion.
4. An expert witness should make it clear when a particular question or issue falls outside his expertise.
5. If an expert's opinion is not properly researched because he considers that insufficient data is available, then this must be stated with an indication that the opinion is no more than a provisional one. In cases where an expert witness who has prepared a report could not assert that the report contained the truth, the whole truth and nothing but the truth without some qualification, the qualification should be stated in the report.
6. If, after exchange of reports, an expert witness changes his view on a material matter having read the other side's expert's report or for any other reason, such change of view should be communicated (through legal representatives) to the other side without delay and when appropriate to the Court.
7. Where expert evidence refers to photographs, plans, calculations, analyses, measurements, survey reports or other similar documents, these must be provided to the opposite party at the same time as the exchange of reports.

2.1 CICBV Reports

For the purpose of trial, an expert will be retained to prepare a detailed and comprehensive valuation report, which will mirror many of the principles from *Ikarian Reefer* above. A report will generally not be admissible and expert testimony can not be given at trial unless the report is complete and contains the necessary criteria. The costs to prepare such level of assurance in a report can be prohibitive for many clients. Given that most cases never actually proceed to trial, experts are often asked to prepare "schedules" or "calculations" or "estimate letters" for settlement purposes to assist counsel and the clients.

The CICBV Standard No. 110 sets out the three levels of valuation reports, namely:

1. Comprehensive Valuation Report,
2. Estimate Valuation Report and
3. Calculation Valuation Report.

Per paragraphs 10 to 13.2, 14.1 and 15 of Standard 110, all of these reports require, at a minimum, an introduction, definitions, scope of review, sufficient disclosure and information to allow the reader to understand how the conclusion was arrived at by the valuator, restrictions and conclusions. When preparing an Estimate Valuation or Comprehensive Valuation, additional requirements are noted in paragraphs 13.3, 13.4 and 14.2. At the initial retainer stage, experts should ask counsel or the prospective client as to which type of report is expected and this should be set out in the retainer letter. A copy of Standard No. 110 is attached to this paper at Appendix A.

⁴ *National Justice Compania Naviera SA v. Prudential Assurance Co. Ltd.* ("The *Ikarian Reefer*"), [1993] 2 Lloyd's Rep 68 (Q.B.D.) (Commercial Court).

3. BEFORE THE TRIAL

3.1 Privilege Versus Disclosure

It is important for experts to appreciate how their working papers may be treated in different legal contexts and at various stages in the legal proceeding. “Working papers” include: the expert’s communication with the lawyer; the expert’s communication with the client; the expert’s communication with other experts associated with the case; and notes, records, calculations, and draft reports or draft affidavits including opinions and conclusions.

In the special circumstances of a court-appointed expert, it is suggested that there would be a presumption that all working papers would be available for examination by counsel before trial. The protection or release of working papers is determined by two competing interests, namely the right of a client to confidentiality or privilege in his or her communications with counsel, and the right of the opposing party to learn, as early and completely as possible, the opinion to be given by the expert and its factual underpinnings, through a process of disclosure.

Simply put, solicitor-client privilege arises where legal advice of any kind is sought. In this context, all communications between the lawyer and client are protected from disclosure.⁵ Solicitor-client privilege may be claimed in relation to third party communications where the third party is considered an agent of the client. Generally it will not apply where the third party is retained on instructions from the lawyer, but in *Rice v. Lamy*, the New Brunswick Court of Appeal found the adjuster was the client’s agent, despite having received instructions from the lawyer, as the documents were prepared to assist the lawyer.⁶

Litigation privilege extends to documents created for the dominant purpose of litigation. The nature of the two privileges has been described as follows: “Solicitor-client privilege exists any time a client seeks legal advice from his solicitor whether or not litigation is involved. Litigation privilege, on the other hand, applies only in the context of litigation itself.”⁷ As discussed later in this article, in most Canadian jurisdictions, a party has a right to a pre-trial discovery process at which the lawyer will ask questions of the opposing party, but has no pre-trial examination or discovery of the expert.

Where an expert is examined, counsel will ask about the “findings, opinions and conclusions” of the expert. This obviously encompasses a broad range of information that may be contained in raw data, field notes, records, calculations, correspondence and documents used or created by the expert; and any documents containing this information are potentially producible. While the language of the relevant discovery rules is plain, it is by no means clear what exactly constitutes “finding, opinions and conclusions.” Regrettably, the case law does not yield any cohesive rules. For example, in Ontario the law on the key question of whether a draft report must be produced is inconsistent.⁸

The purpose for which the expert has been retained will, in large part, determine the scope of the disclosure requirements. The working papers of an expert who is retained for the sole purpose of preparing for trial and who will not be called upon to testify at trial will generally be protected by litigation privilege. If the expert’s retainer is limited to assisting in the negotiations and he or she attends negotiation conferences or mediation sessions, any communications or opinions expressed in that context will be privileged or “without prejudice” under the rule that all communications in furtherance of settlement are protected from disclosure to the trier of fact. Counsel

5 See *Solosky v. Canada*, [1980] 1 S.C.R. 821 and for the leading Ontario case, see *General Accident Assurance Company v. Chursz* (1999), 45 O.R. (3d) 321 (C.A.).

6 *Rice v. Lamy* (2000), 190 D.L.R. (4th) 486 (N.B.C.A.).

7 R.J. Sharpe, “Claiming Privilege in the Discovery Process” (1984) L.S.U.C. Special Lectures 163.

8 S.R. Morrison “Drafts of Experts’ Reports: An Analysis” (2000) 50 C.L.R. (2d) 76; With respect to expert’s notes and documents, see *Allen v. Oulaben* (1992), 10 O.R. (3d) 613 (Gen. Div.), *Browne (Litigation Guardian of) v. Lavery* (2002), 58 O.R. (3d) 49 (Sup. Ct.) and *Piché v. Lecours Lumbers Co.* (1993), 13 O.R. (3d) (Gen. Div.); *Flemming v. Laura Secord Inc.*, [2001] O.J. No 2116 (S.C. J.), *St. Elizabeth Home Society v. Hamilton (City)*, [2004] O.J. No. 1418 (SCJ); *Arbesman v. Meighen Demers*, [2003] O.J. No. 2075 (S.C.J.).

often send expert findings that will not be relied on at trial as a component of an offer to settle, thus confirming the privilege.

However, if the expert witness testifies the prevailing view is that all privilege is waived and the entire information available to the expert from all sources, including instructions from the client or counsel, is available for a cross-examination.⁹ In one case, the Newfoundland Court of Appeal ordered the production of the opposing party's expert's report even though it was not intended for trial simply because its factual basis was relevant.¹⁰

In a more recent case, counsel sought the production of drafts of an expert's report in the course of examinations prior to trial.¹¹ In concluding that the draft report constituted findings and therefore were subject to production under the Ontario rule, Nordheimer J. stated:

With respect, I do not agree with the conclusion reached [in *Kelly*¹²]. In my view, draft reports represent, at the very least, preliminary findings, opinions and conclusions of the expert and therefore fall within the scope of the rule. Such an interpretation of the rule would appear to accord with the general principle that the Rules of Civil Procedure are to be 'liberally construed' — see rule 1.04(1). It also seems to be for the reasons expressed by Ferguson J. in *Browne*,¹³ that a party ought to be able to explore with an expert whether he or she changed her views from draft to draft, and, if so, why. It is all part of testing the expert's conclusions. It is also important that this material be produced in advance of the trial so that the trial is not interrupted while such material is reviewed.

In the Ontario decision of *Piché v. Lecours Lumber*,¹⁴ counsel for the plaintiff sought production of an expert witness' entire file *after* the expert began providing testimony. In his reasons, Loukidelis J. outlined four guiding principles:

1. Principles of waiver relating to a privilege claim for documents in an expert's file cannot be said to have been waived simply by calling that witness to give evidence;
2. The privilege can be waived in respect of those facts or premises in the expert's file which have been used to base the expert's opinion and which came to the expert's knowledge from documents supplied to that expert;
3. Whether there is a privilege or not can be ascertained by one of two ways. As in [*Ocean Falls v. Worthington (Canada)*]¹⁵, the judge can examine the documents or materials for which the privilege is claimed. Another way is for counsel, through cross-examination of the expert, to determine whether all or part of the file is privileged; and
4. As a general rule, if facts are supplied that are not found in other evidence, or if certain assumptions are asked to be made in the instructing documents, privilege claimed for those facts or assumptions should be considered waived.

In keeping with the *Piché* principles, communications from counsel to an expert will be producible only if they contain facts or premises that form the basis for the expert's opinion. Similarly, a draft report would not be producible except possibly where counsel made notations on facts or premises and supplied the draft back to the expert, and then those were in turn used again to form the basis of the expert's opinion. The *Piché* principles do not seem to go so far as to require the production of draft reports generally.

9 For a comprehensive paper on this topic outlining various approaches across different provinces, see "Recent Developments Affecting Experts on the Issues of Independence, Draft Reports and Working Papers" as prepared by John Chapman of Miller Thomson LLP and Peter Steger of Navigant Consulting, Inc., Toronto, Ontario in 2007.

10 *Morissey v. Morissey*, [2000] N.J. No. 362. (Nfld. C.A.).

11 *Aviaco International Leasing Inc. v. Boeing Canada Inc.*, [2002] O.J. No. 3799 (Sup. Ct.) (QL).

12 *Kelly v. Kelly*, (1990) 42 C.P.C. (2d) 181 (Ont. Unif. Fam. Ct.).

13 *Browne*, *supra* note 8. In Nova Scotia, the Court adopted the *Browne* reasoning and ordered that not only the draft report be produced, but also required production of all information and materials provided to the expert including "discussions with the party, counsel for a party or with a third party." See *Flinn v. McFarland*, [2002] NSSC 272.

14 *Piché v. Lecours Lumber*, *supra* note 8.

15 *Ocean Falls v. Worthington (Canada)* (1985), 69 B.C.L.R. 124 (S.C.).

Although the case law varies and there is no clear appellate authority setting out the specific test for production of the expert's file, courts appear to loosen litigation privilege in favour of production. This is not surprising, given that we practice in a legal culture that values early settlement, with minimal use of scarce judicial resources. In this context, counsel and their experts must function on the presumption that all or part of the production of the entire expert's file could be ordered.

As a result, some counsel have developed strategies to specifically limit the exposure. One strategy is simply to limit the information provided to the expert, which is problematic. The expert must be provided with sufficient information to come to an informed, objective opinion. If counsel withholds information from an expert that he or she does not wish to be disclosed for fear that it would be damaging to the case, that information might subsequently come to light. Upon cross-examination the absence of that information as a factor in the conclusions reached by the expert might seriously compromise the credibility of the entire report. Moreover, an expert who is properly fulfilling his or her obligations may well be required to disclose the fact in his or her report that he or she received limited information. Another strategy is to restrict written communications and instructions, especially ones involving strategic or tactical discussions. Keep in mind that if a communication falls within the scope of "findings, opinions or conclusions," it will be subject to disclosure, whether it be oral or written.

It is worthwhile to discuss the question of litigation privilege and the fulfillment of disclosure requests with your expert in advance, reminding the expert of his or her duty to remain neutral. Some experts have developed their own practices and routinely shred draft reports; others do not. In this electronic age, who believes that draft reports have been shredded and do not exist on a hard drive or server somewhere? Given all of the professional negligence issues, it defies belief that draft reports (with comments by clients and counsel) are not retained somewhere. Depending on the nature of the case and anticipated opposition, you may wish to adopt a different strategy.

3.2 Examinations, Discovery and Questioning

In most Canadian jurisdictions, a party has a right to a pre-trial discovery process at which his or her lawyer will question the opposing party. Two significant divergent theories embedded in the rules emerged in preparation of this paper. There are seemingly restrictive pre-trial examination rules which are inconsistent with the principle of streamlining trials and testing whether the experts can agree on some issues prior to trial.

Some counsel tell us that cross-examining the expert before trial loses the strategic impact of a scintillating cross-examination of a poorly prepared expert witness in front of the trier of fact. Great drama if it works. The other strategy is to know fully what you are facing with the expert, concede in advance the points that appear solid and explore the possibility of settlement. At the very least, early examination can focus counsel and the trier of fact on the points that the experts disagree on and shorten the trial.

The rules vary from province to province regarding pre-trial discovery process of the expert. Firstly, as set out in the chart in Figure 1, there is a dramatic difference in each of the provincial rules dealing with the timing and delivery of an expert report in family law cases before trial. We polled our colleagues from across the country to provide us with the statutory references in the charts, and the excerpts from various provincial statutes attached at Appendix B. The authors of this paper suggest that readers should confer with counsel in their respective jurisdictions regarding same.

The relevant timelines from each provincial statute are set out in Figure 1.

Figure 1 Provincial Timelines

| PROVINCE | DELIVERY OF EXPERT REPORT |
|----------------------|---|
| Alberta | 120 days prior to trial; responding report required 60 days prior to trial |
| British Columbia | 60 days prior to trial |
| Manitoba | At last pre-trial conference before trial |
| Newfoundland | At least 10 days before trial |
| New Brunswick | No later than the motions day at which trial is set |
| Nova Scotia | Within 30 days of filing notice of trial |
| Ontario | 14 days before trial; Note that all non-family law cases are 90 days prior to trial |
| Prince Edward Island | 30 days from filing notice for trial |
| Quebec | Must be in Court record prior to hearing; If motion to vary, at least 10 days before hearing |
| Saskatchewan | 10 days before the pre-trial |

It is our view that provincial reform is necessary to ensure that adequate time is permitted for the timely delivery of expert reports, responding reports and reply reports where appropriate. We understand that the timelines for delivery of expert reports is under active consideration by various provincial committees across the country.

As well, there is a dramatic difference in the provincial rules dealing with the rights to examine experts prior to trial as outlined in Figure 2. The relevant excerpts from each provincial statute are attached in Appendix B to this paper.

Figure 2 Provincial Rules

| PROVINCE | RIGHT TO EXAMINE PRIOR TO TRIAL | RULE |
|------------------|---|-------------------|
| Alberta | Allows for the cross-examination of Court appointed experts with leave either before trial or at trial; Alternatively a demand can be served to have the expert attend at trial for cross-examination | Rule 218(6) |
| | In very long trials the case management justice may allow examination of experts on leave with prescribed conditions | Rule 218.8(1) |
| British Columbia | Severely restricts the rights to examine expert witnesses before trial | Rule 40(a) and 28 |

| PROVINCE | RIGHT TO EXAMINE PRIOR TO TRIAL | RULE |
|----------------------|---|-----------------------------|
| Manitoba | Allows the Court discretion to direct the examination of experts after their report is filed with leave of the Court but under limited circumstances | Rule 36.01(2) |
| Newfoundland | Discovery and disclosure rules should be liberally applied but courts have restricted examination of an expert who had litigation privilege | Rule 30.01 |
| New Brunswick | Allows discovery of an expert unless the expert has litigation privilege and will not testify at the trial Note: Rule 52.02 seems more restrictive | Rule 32.06 (3) |
| Nova Scotia | Allows broad discovery of an expert Note: It appears that the scope of discovery is wider in Nova Scotia than any other Canadian jurisdiction | Rule 31.08(2) |
| Ontario | Where an expert is examined, counsel will ask about the “findings, opinions and conclusions” of the expert | Rule 31.06 |
| Prince Edward Island | Does not include a specific right to examine experts before trial and the general discovery and disclosure rules does not mention experts | 53.03 |
| Quebec | Leave is required to examine expert or parties can agree | 398(3) C.C.P. 404 C.C.P. |
| Saskatchewan | There is no right to examine experts before trial. The rule allowing examination of non-parties specifically prohibits its application to experts. Note: it appears that the courts will allow productions of the expert’s file notes before examination in chief and cross examination at trial | Rule 222(A) |

4. AT TRIAL

4.1 Test for Admissibility

When being retained at the beginning of your case, always consider whether you will meet the necessary criteria to be admitted as an expert. The client may be significantly prejudiced if you are hired, you prepare a report and then can not testify at trial. Before the expert is permitted to testify at trial, he or she must be qualified as an expert in that particular field. This requires the expert to meet the well-known test as set out by the Supreme Court of Canada in *R. v. Mohan*.¹⁶ There are four factors governing the admissibility of expert evidence.

¹⁶ *R. v. Mohan*, [1994] 2 S.C.R. 9.

1. The evidence must be relevant
2. The evidence must be necessary to assist the trier of fact
3. There must be the absence of any exclusionary rule which would prevent the testimony
4. The expert must be properly qualified

4.2 Challenges at the Qualifying Stage

(a) *Testifying Outside of their Area of Expertise*

Courts are asked to receive evidence from experts who are offered to provide an opinion in a particular area. Once the threshold issue of admissibility has been determined, the question of expertise must be addressed. The Supreme Court of Canada has found that “Evidence outside the expertise of the witness must be disregarded.”¹⁷ Even if the expert is qualified to give evidence in a particular case, upon examination of the qualifications, he or she may not be qualified to give opinion evidence on all areas in issue. For example, a business valuator may be retained to value a shareholder’s interest in a holding corporation which owns commercial rental property. Although the expert may have the requisite training as a Chartered Business Valuator, and may have testified in this area previously, it would not be appropriate for the expert to provide an opinion on the value of the company without an appraisal or opinion of the commercial property. The valuator’s conclusions on that issue may be of limited value to the trier of fact.

(b) *Experts with a History of Personal Relationship with the Client*

If the proposed expert has a prior or existing connection to the client, be wary of their evidence in expert form. In the 2006 decision of *Poirier v. Poirier*¹⁸ the valuation of the husband’s shares in one of his companies was in issue. Both parties retained experts. The husband did not retain a business valuator; rather, he relied on the testimony of the company accountant. The experts differed in their respective opinions on the appropriate rates of return and other areas. The husband’s expert found the value to be \$750,000 and the wife’s expert found the value to be between \$2.2 million and \$2.3 million.

Mr. Justice Charbonneau found that the husband’s expert was in a “very difficult conflict of interest position” and rejected the valuation of the husband’s expert as being “unreliable and clearly biased.” Per paragraph 12 of the decision, His Honour states “I have very little faith in the conclusions reached by D&T concerning the value of Carrière & Poirier. I find that D&T is in a very difficulty conflict of interest position. The respondent is a good client of the accounting firm.”

There were other problems with the findings by that particular expert as discussed later in this paper. However, this case squarely gives rise to the question of whether retaining the company accountant to provide a valuation opinion itself is a conflict and will automatically lead to a trier of fact qualifying or rejecting the evidence. Clients often prefer to retain their personal accountant or the company accountant as expert for many reasons that may have nothing to do with the personal relationship or an expectation that the findings will be in their favour. It is efficient and less costly for the person who is familiar with the company and the books and records to prepare an expert report. The client may be more willing to disclose documents and provide information to his or her accountant, and simply feel more comfortable with the process.

The accountant can certainly assist by gathering and providing backup data and documents, attending at examinations or settlement discussions to facilitate disclosure, and preparing income tax calculations. However,

17 *R. v. Marquard*, [1993] 4 S.C.R. 223 (S.C.C.).

18 *Poirier v. Poirier* (2005), 19 R.F.L. (6th) 197 (Ont. S.C.J.).

if the client's regular or ongoing accountant prepares an expert report or provides a valuation opinion, the report may be inadmissible and the testimony may be rejected. As clearly outlined in *Poirier*, there is an inherent lack of independence due to the existing relationship between the accountant and the company or client.

In addition to the prior relationship, there are other problems with using an accountant as expert. A business valuator can cross-check and objectively test the findings and usefulness of the annual corporate financial statements as prepared by the accounting firm. An accountant does not have the specialized training of a Chartered Business Valuator and the reliability of conclusions regarding value are questionable. Further, many accountants do not have the familiarity with specific components of provincial property division or income analysis necessary to render such an opinion.

For example, we have seen accountants prepare reports with a conclusion as to the value of privately held shares in a business in family law matters, without taking into account the corresponding consideration of notional disposition costs.¹⁹ Similarly, accountants may render reports on the quantification of damages in a personal injury matter without taking into account discount rates or interest rates as prescribed by provincial statute.

The history of a personal relationship with the client as a downfall to expert testimony extends beyond financial experts. In the case of *De Zen v. De Zen*²⁰ the husband's ability to work due to a back injury was in issue. He had undergone surgery, and his treating physician was asked to prepare an expert report for trial. The physician was highly qualified in his field. McWatt, J. commented on the expert's testimony and the personal relationship between the patient and his family and the physician at paragraph 32:

I have grave reservations caused by Dr. Fazl's apparent partisanship and lack of veracity. Apart from his demeanour as a witness which involved moments of evasiveness and omission, Dr. Fazl appears to have a connection to Mr. De Zen's father and Royal Plastics which puts his objectivity in real doubt.

When he was asked about his personal relationship with the family, including dinner with the husband's father and a trip paid for by the husband's company, his responses were inadequate, particularly as to why these factors were not mentioned in his report. With respect to the expert physician, Her Honour concluded at paragraph 36, "I find his evidence untrustworthy as a result of these testimonial indices and place no weight on his opinion."

(c) Experts with a History of Personal Relationship with Counsel

This is a delicate area. Given the small and interrelated communities that family lawyers practice in, all counsel generally have some prior experience with experts in other cases. Counsel should only raise this in clear cases where there is objective evidence of a relationship that would lead an objectively reasonable person to conclude that the independence of the expert is jeopardized by his or her close relationship with counsel.

The factors that might be considered in determining whether there may be a conflict include:

- Does a certain lawyer repeatedly steer a majority of his or her files to specific and select few experts?
- Does the lawyer meet with the client and expert to deliver instructions, discuss the overall strategy of the case and ask for draft reports before final publication, which appear to affect the result of the conclusion provided?
- Do these experts and counsel have a social or personal relationship including vacations, and regular outings such as golf and dinners?
- Has this expert ever testified on the opposing side to the counsel in question?

¹⁹ *Sengmueller v. Sengmueller* (1999), 2 R.F.L. (4th) 232 (Ont. C.A.).

²⁰ *De Zen v. De Zen*, 2001 CarswellOnt 2702 (Ont. S.C.J.).

Overall, there is a very high standard of true independent thinking that the experts must adopt and counsel must respect, regardless of whether the expert is retained separately by each party, jointly appointed, or court appointed.

(d) Court-Appointed Experts

Most jurisdictions encourage court-appointed or jointly retained experts in litigation proceedings. This may occur for a number of reasons, including a substantial costs savings to the litigants. For example, in a commercial dispute, the parties may agree on an expert to quantify the damages, and therefore only the issue of liability would be in dispute. The independent joint expert is allowed full access to the parties and their documents and should be able to streamline the information gathering and reporting. Prior to such appointments, counsel should have input on the process. This may include what feedback, if any, the expert should give to the parties and at what stage of completion of the report.

It appears that a court-appointed expert must report only to the court. If he or she encounters difficulties or resistance, it is suggested that the expert must:

- apply directly to the court for advice and directions; or
- write joint letters to counsel outlining the impasse and ask them to solve it and request counsel to launch a further court application to clarify the issues and allow the expert to proceed.

There are innumerable ways a recreational litigant can effectively sabotage even well intentioned court orders, and counsel must consider whether a court-appointed or joint expert may be appropriate for a particular case.

4.3 Challenges During Testimony

Even after the expert is qualified and is clearly testifying within his or her expertise, there may still be challenges made to the substantive findings. Some of the common examples are set out below.

(a) Testimony Based on Hearsay

Often it is necessary for an expert to rely on hearsay evidence as background material when forming his or her opinion. The reliability of the facts upon which the opinion is based is then the underlying foundation for the weight given to an expert report. In *R. v. Lavallee*,²¹ Justice Sopinka stated, “Where an expert’s opinion is based in part upon suspect information and in part upon either admitted facts or facts sought to be proved, the matter is purely one of weight.” He further stated that, “An expert opinion that is based entirely on unproven hearsay must, if anything, be inadmissible by reason of irrelevance, since the facts underlying the expert opinion are the only connection between the opinion and the case.”

Financial information is by its nature hearsay. Yet, certain financial records are admissible because they are included as exceptions to the hearsay rule. Admissibility of those records is only one step to the testimony being accepted. The reliability and weight to be placed on those records is fundamental to the usefulness of the expert’s opinion.

In *The Children’s Aid Society of Cape Breton-Victoria and ND and RM*,²² the Court stated, “Where, however, the information upon which an expert forms his or her opinion comes from the mouth of a party to the litigation, or from any other source that is inherently suspect, a Court ought to require independent proof of that information.” By way of example, the expert should be cautioned not to rely solely upon schedules prepared by the

21 *R. v. Lavallee* (1990), 55 C.C.C (3d) 97 (S.C.C.),

22 *The Children’s Aid Society of Cape Breton-Victoria and ND and RM*, 2003 CarswellNS 227 (N.S. S.C.).

company bookkeeper for example, without ensuring that the information upon which the schedule was prepared is reliable. To the extent that the bookkeeper has relied on the spouse's characterization, for example, of expenses being "personal" or "business" without any mechanisms to cross-check same could be a problem.

Justice Wilson, in *R. v. Abbey*²³ attempted to set out a series of principles concerning the admissibility and weight of an expert report, and gave as one principle: "Before any weight can be given to an expert's opinion, the facts upon which the opinion is based must be found to exist." It may therefore be necessary to call multiple experts, to ensure that all factual bases that are being relied upon by the expert have been independently established. Conversely, when assessing evidence that has been adduced by the opposite party, careful consideration must be given as to whether or not the facts upon which the expert is giving testimony have been established by the evidence. In a family law business valuation context, as noted elsewhere in this paper, it may be necessary to call more than one expert.

(b) Testimony Inconsistent with Expert Report

Recently, the Alberta Court of Appeal commented negatively in *McPhail v. Karazik*²⁴ on the trial justice's acceptance of the evidence of the expert where he had changed his theory during his evidence at trial, and which differed from the findings in his written expert report.

While testifying, an expert can explain matters touched on in the report, but may not testify about matters that are a new theory or position not mentioned in the report and would not have been anticipated from reading the report.

In *Carbon v. Young*,²⁵ a decision of the Alberta Queen's Bench, the Court conducted a *voir dire* to deal with the issue of the scope of the expert's report. The Court concluded that the concern about the expert testifying outside the scope of his report could be dealt with during his evidence. The difficulty with that approach is that the opposite side will not have an opportunity to challenge the new theory on its merits, will not have the opportunity to review same with their own expert, and will essentially be faced with "trial by ambush," which is typically discouraged in most areas of litigation.

In *Auto Worker's Village (St. Catharines) Ltd. v. Blaney, McMurtry, Stapells, Freidman*²⁶ the court at trial refused to permit the plaintiff's expert witness to express an opinion on a matter not referred to in his report. However, the court granted the plaintiff leave to serve a supplementary report. This presumably meant that the plaintiff would then have an opportunity to put forward a new theory and the defendant would be permitted to review the new theory and cross-examine the plaintiff's expert on it, therefore obviating any prejudice to the defendant. Of course, the time delay is addressed on the issue of costs.

(c) Independence, Impartiality and Expert Bias

The importance of an expert's impartiality and independence cannot be over-emphasized. For instance, the CICBV Code of Ethics and Practice Guidelines and CA*IFA guidelines specifically outline the need for independence and objectivity which must be present in both the expert's written work product, as well as in the expert's unbiased oral opinion evidence.²⁷ It is open to the court to conclude an expert is impartial. This may occur where the expert has an argumentative or adversarial stance during testimony, where the expert seems to

23 *R. v. Abbey*, [1982] 2 S.C.R. 24.

24 *McPhail v. Karazik*, [2006] A.J. No. 982 (Alta. C.A.).

25 *Carbon v. Young*, 2004 CarswellAlta 137 (Alta. Q.B.).

26 *Auto Worker's Village (St. Catharines) Ltd. v. Blaney, McMurtry, Stapells, Freidman* (1997), 14 C.P.C. (4th) 152 (Ont. Gen. Div.).

27 See also *Bank of Montreal v. Citak*, [2001] O.J. No. 1096; *Rudberg v. Ishaky*, [2000] O.J. No. 376 (S.C.J.); *Jacobson v. Sveen*, [2000] A.J. No. 365 (Q.B.); *Fellowes, McNeil v. Kansa General International Insurance Co.* (1998), 40 O.R. (3d) 456 (Gen. Div.); and *R. v. Marquard*, [1993] 4 S.C.R. 233.

assume the role of advocating the case of the party who retained him or her, or where the expert holds fast to an opinion in the face of obvious conflicting evidence. Counsel may challenge an expert's partiality in cross-examination by referring to the expert's expressed views in other cases or publications.

The jurisprudence reveals two different approaches to concerns about impartiality and independence. One line of authority is that evidence of a partial witness is inadmissible since by definition, a partial expert cannot be considered an expert. The prevailing view is that partiality affects the assessment of the expert's credibility and goes to the weight to be given the evidence, rather than to admissibility.

A handful of recent family law cases, for example, have involved challenges to objectivity and neutrality. In *DeBora v. DeBor*,²⁸ both counsel "leveled charges" that the other side's valuator was acting as an advocate for the party by whom he had been retained. Backhouse J. concluded the husband's valuator fell short of the independence required of an expert witness. Her main criticism was his failure to account for obvious relevant factors, including the CCRA's reassessment of the husband's company and an Inland Revenue audit.

The quote below at paragraph 348 from Justice Backhouse's reasons serves as an important reminder that in keeping with *Ikarian Reefer*, an expert has a positive duty to detail the limits of the information provided to him or her at arriving at the opinion. Likewise, if upon receipt of the other's opinion, he or she changes his or her view, there is a duty to advise. The failure to either consider relevant information, or mention such limitations, might well be fatal:

[The valuator's] conclusions on a number of significant matters were shown to be inaccurate and misleading because he was not in receipt of all of the relevant information — for example, the LIOL financial statements and Mr. Reich's working papers. Why [the valuator] was not provided with a copy of LIOL's financial statements when he prepared his income analysis report and why, if he asked for them, he did not disclose that his conclusion did not have the benefit of these financial statements, are questions for which no satisfactory answer appears. Suffice it to say, on this record of deliberate falsehoods by the husband and his partner, Mr. Drutz, the failure to produce relevant records in a timely fashion or at all and the failure by [the valuator] to access all the relevant information before submitting his reports to the court, I have approached the evidence on behalf of the husband, including [the valuator's], with extreme caution.

In *Kenning v. Kenning*,²⁹ the so-called expert was found to be a knowledgeable farmer with helpful information about farming generally and the parties' particular farming operation. Initially he was qualified as an expert, but subsequently disqualified on the basis that he was friends with both of the parties.

In *Ristimaki v. Cooper*,³⁰ a solicitor's negligence case, Stinson J. found one of the four legal experts who gave opinion evidence at trial frequently slipped out of the role of an expert and into the role of an advocate for the defendant. An example was his failure to respond directly to hypothetical questions put to him on cross-examination. The doubts from the Court about this witness' lack of neutrality and objectivity led to its reluctance to rely on his opinions.

In the *Poirier* case referred to earlier in this paper,³¹ the relationship between the husband and his expert was problematic at the outset. Also, the draft report of the husband's valuator concluded a different value which changed after discussions with the husband. These issues led to a conclusion of the expert's lack of independence.

Similarly, in a recent Manitoba case of *Schreyer v. Schreyer*,³² an expert was retained to appraise livestock of a farmer. The expert was qualified to render the opinion, and was found to be honest in his testimony. He relied on information provided by the wife, who was his housekeeper, and did not engage in any independent verification.

28 *DeBora v. DeBora*, [2004] O.J. No. 4826.

29 *Kenning v. Kenning*, [1995] M.J. No. 180.

30 *Ristimaki v. Cooper*, [2004] O.J. No. 2699. For the more recent decision from the Ontario Court of Appeal, see 2006 CarswellOnt 2373.

31 *Supra*, note 18.

32 *Schreyer v. Schreyer*, 2006 CarswellMan 282 (Man. Master).

At paragraph 80, the Master C.W. Sharp found the testimony to be “seriously flawed and cannot be called either ‘objective’ or ‘expert’. In the final analysis, it is of very little or any value to this court.”

In the recent case of *LeVan v. LeVan*,³³ the Court had to weigh the evidence of two valuation reports, which were agreed to be marked as exhibits at trial. In assessing the testimony of the experts, Her Honour preferred the wife’s valuator over the husband’s valuator. At paragraph 239, the court found that the wife’s valuator was a “senior and respected business valuator who did a comprehensive valuation report, the highest level of report. She gave her evidence the way an independent expert witness ought to — fairly, independently and objectively. At no time did she act as an advocate. She withstood a vigorous cross-examination and was not shaken in any aspect of her testimony.” Her Honour criticized the husband’s valuator as he produced only a limited critique of the other expert’s report, disagreeing with one aspect. In addition to the scope of his assignment being limited, the court noted “He was very defensive on cross-examination.”

This case acts as a reminder to counsel that in preparing for trial, the importance of demeanour, and properly answering questions on cross-examination should be emphasized to even the most seasoned and well-qualified experts.

In all of these cases, the presiding judges either disregarded the expert’s testimony or gave little weight to it. However, experienced counsel will raise these allegations carefully and only in extreme situations. If the allegation is raised and the court finds that there was no bias, the finding could backfire, by making the one who raised the allegation look like he or she just did not like the expert’s findings and is looking for an excuse to disregard same. This will lead to a negative result for the client and the cost consequences that may follow.

(d) Other Challenges

All experts should be interviewed to confirm that they are in good standing with their professional governing body. Counsel need to be especially alert to any outstanding complaints or investigations of their experts. Lack of compliance with standards set by the expert’s governing body is a common ground to challenge the expert. Counsel may also inquire or cross-examine on previous evidence tendered by the expert or reports in similar areas, and whether or not the court has accepted or rejected their evidence previously.

The entire area of comparing previous drafts of reports is a minefield for expert’s credibility and counsel ingenuity. To put this concept into perspective, imagine if a justice could be challenged on their final judgment by comparing the final decision with previously discarded drafts.

You should also discuss with the expert the possibility of relying on authoritative literature by adoption. As part of an expert’s opinion, he or she is permitted to adopt authoritative texts or articles and, in so doing, the authority itself is admitted into evidence. Sometimes, on cross-examination, counsel may seek to impeach your expert by reference to a text, which contradicts what he or she has said. If your expert witness refuses to accept the text as authoritative, the cross-examiner cannot ask any further questions based on the text. Counsel may still be able to enter into the relevant portions of the text through his or her own expert witness, provided that expert accepts the text as authoritative. It is also important that the expert explains the relevance of the text to a point or theory in issue. By simply attaching them and saying they are authoritative will not make them admissible.³⁴

In the case of financial experts, consider the wisdom of providing very specific factual assumptions that would lead to a more precise number, or providing a range of factual assumptions, which would lead to a range of values, leaving more scope for negotiation and interpretation. A common and simple example is the date of retirement in a personal injury matter. Many experts approach this issue by preparing the damage calculation at several dates, including the earliest possible date upon which the plaintiff could retire. The question of the appropriate retirement date is left open for discussion or, if necessary, adjudication. Alternatively, counsel may

³³ *LeVan v. LeVan*, 2006 CarswellOnt 5393. See also the Ontario Court of Appeal decision at 2008 ONCA 388.

³⁴ *Kutz v. Popwell*, [1994] B.C.J. No. 33.

instruct you that it was always the client's intention to work until the age of 65 and to produce only the calculation corresponding to that date. This assumption must be stated in the report. It would then be up to opposing counsel to argue for a different date of retirement, and produce the other expert's report at his or her own expense.

5. CLOSING COMMENTS

To some degree the role of the expert in the litigation process is not static. It may be defined by specific case precedents and legislative reforms dealing with expert testimony or informed by broader trends within our legal culture. But the core duty to be independent and impartial will always be demanded to ensure that the integrity of our adjudicative processes is maintained.

APPENDIX A

The Canadian Institute of Chartered Business Valuators

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|-------------------------|
| Standard No. 110 |
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Valuation Reports

Report Disclosure Standards and Recommendations

- 1 Chartered Business Valuators may be retained as independent experts to provide a conclusion as to the value of shares, assets or an interest in a business. In these circumstances, reports arising from such engagements are termed “Valuation Reports”.
- 2 A Valuation Report is defined as “**any written communication on letterhead and/or where the author(s) is identified, containing a conclusion as to the value of shares, assets or an interest in a business, prepared by a Valuator acting independently and that is not clearly marked as being in draft form.**”
- 3 In practice, there are three types of Valuation Reports. These Reports are not only distinguished by the Valuator’s scope of review and the amount of disclosure provided, but also by the level of assurance being provided in the conclusion, with a Comprehensive Valuation Report providing the highest assurance and the Calculation Valuation Report providing the lowest. The three types of Valuation Reports are generally described as follows:
 - 4 **Comprehensive Valuation Report** — a Comprehensive Valuation Report contains a conclusion as to the value of shares, assets or an interest in a business that is based on a comprehensive review and analysis of the business, its industry and all other relevant factors, adequately corroborated and generally set out in a detailed Valuation Report.
 - 5 **Estimate Valuation Report** — an Estimate Valuation Report contains a conclusion as to the value of shares, assets or an interest in a business that is based on limited review, analysis and corroboration of relevant information, and generally set out in a less detailed Valuation Report.
 - 6 **Calculation Valuation Report** — a Calculation Valuation Report contains a conclusion as to the value of shares, assets or an interest in a business that is based on minimal review and analysis and little or no corroboration of relevant information, and generally set out in a brief Valuation Report.
- 7 The type of Valuation Report required is a matter to be discussed and agreed on by the Valuator and the client, and then reflected in the terms of engagement. In arriving at this agreement, the Valuator and client should consider the purpose for which the Valuation Report is being prepared, the availability of information on which to base a conclusion, and the client’s need for assurance. The Valuator should also consider whether the type of Valuation Report will be credible for the purpose intended, and ensure that any conclusion expressed will not be misleading to a reader and is not dependant on any assumptions known by the Valuator to be false.
- 8 A summary of any type of Valuation Report shall be exempt from the following standards and/or recommendations provided that the summary clearly refers to the original Valuation Report.

9 At a minimum, all Valuation Reports shall contain the following information, which is set out herein in bold characters. To the extent requirements differ for the three types of Valuation Reports, the different requirements are specifically noted. “Recommendations” are not mandatory, but encouraged. “Explanatory comments” provide additional guidance in applying the specific provisions of the Standard.

10 Report Introduction

10.1 The Valuation Report shall have an introduction that includes the following information:

- A. **To whom the Valuation Report is being provided;** (*Explanatory comment:* if not readily apparent from the addressee, the name of the party who engaged the Valuator should be disclosed)
- B. **A description of the shares, assets or interest in a business being valued;**
- C. **The effective date of the valuation (the valuation date);**
- D. **The date of the Valuation Report;** (*Explanatory comment:* the Valuation Report should be dated at the time when pertinent information was last obtained and analyzed, including information obtained from discussions with management or other parties)
- E. **The purpose for which the Valuation Report is being prepared;** (*Explanatory comment:* the Valuator may want to emphasize that the Valuation Report is addressed to specific readers in specific circumstances, having specific needs and/or knowledge)
- F. **The name of the firm responsible for preparing the Valuation Report, as well as the name of the Valuator when the Valuation Report is prepared for litigation purposes;** (*Explanatory comment:* this information may be disclosed elsewhere in the Valuation Report, such as in the letterhead and/or on the signature page)
- G. **The type of Valuation Report being provided (i.e. Comprehensive, Estimate or Calculation Valuation Report);**
- H. **A statement that the Valuation Report was prepared by the Valuator acting independently and objectively;** (*Explanatory comment:* in circumstances where a firm is responsible for preparing the Valuation Report, this statement is in respect of the independence and objectivity of the person(s) who prepared the Valuation Report and any assistants)
- I. **A statement that the Valuator’s compensation is not contingent on an action or event resulting from the use of the Valuation Report;** and
- J. **A statement that the Valuation Report has been prepared in conformity with the Practice Standards of The Canadian Institute of Chartered Business Valuators.**

11 Report Definitions

11.1 **The Valuation Report shall contain definitions for the terms of value used, such as “fair market value”, “market value”, “fair value”, or “adjusted net asset value”.** (*Recommendation:* unless self-evident, other terms and phrases having a technical meaning should be defined or explained in the Valuation Report, including such terms as “special purchaser”, “notional valuation”, “minority discount”, or “control premium”)

11.2 **With respect to the definition of fair market value, the Valuation Report should indicate the extent to which special purchasers were considered and the reasons why.** (*Recommendation:* the discussion may include the steps taken to investigate the existence of special purchasers, the problems of quantifying the amount of net economic value-added, and the degree to which special purchasers have influenced the conclusion)

12 Report Scope of Review

- 12.1 **The Valuation Report shall contain a scope of review that clearly identifies the specific information on which the Valuator relied to arrive at a conclusion.** (*Explanatory comment:* such information might consist of the documents reviewed, the individuals interviewed, the facilities visited, other expert reports relied on, such as Valuation Reports, management consulting studies, and appraisals, and management representations obtained with respect to the information provided)
- 12.2 It is expected that the scope of review will be more comprehensive for a Comprehensive Valuation Report and progressively less comprehensive for an Estimate Valuation Report and a Calculation Valuation Report. It is a matter of professional judgement as to the amount of review appropriate for the type of Valuation Report being provided.
- 12.3 **For Estimate and Calculation Valuation Reports, the Valuator shall disclose that the scope of review is inherently limited by the nature of the Valuation Report being provided, and that the conclusion expressed may have been different had a Comprehensive Valuation Report been provided.**
- 12.4 **Where the conclusion is qualified by a scope limitation, regardless of the type of Valuation Report being provided, the limitation shall be explained, setting out the reasons for the limitation.** (*Explanatory comment:* to the extent that the scope of review has been significantly restricted, or information provided is substantially incomplete, the Valuator must determine if an unqualified conclusion can be provided)

13 Report Disclosure

- 13.1 **The Valuation Report shall provide sufficient information to allow the reader to understand how the Valuator arrived at the conclusion expressed.** (*Explanatory comment:* the amount of information included and the manner of disclosure is a matter of professional judgment, based on the scope of review, the purpose for which the Valuation Report is intended, and the type of Valuation Report being provided)
- 13.2 **At a minimum, all Valuation Reports (i.e. Comprehensive, Estimate and Calculation Valuation Reports) shall include the following information:**
- A. **The basis of valuation, as well as the approach and methods used,** explaining the rationale for using the going concern or liquidation basis and the reasons for selecting a particular valuation approach (income, cost or market); (*Recommendation:* the basic mechanics of the valuation methodologies used should be outlined, and appropriate definitions should be provided as necessary) (*Explanatory comment:* the amount of explanation and disclosure would be minimal for a Calculation Valuation Report, and progressively more for an Estimate and Comprehensive Valuation Report) and
 - B. **A statement of the key assumptions made in arriving at the valuation conclusion.**
- 13.3 **In addition to the minimum information required for all Valuation Reports as noted in 13.2, Comprehensive and Estimate Valuation Reports shall also include the following information:**
- A. **A description of the valuation calculations,** explaining how the significant components of the valuation calculations were developed, the rationale for each component and the matters considered;
 - B. **Where relevant to the valuation assignment, a full description of the classes of shares and rights attached thereto, where interests other than common shares have to be valued either directly or as part of the overall valuation;** (*Recommendation:* the details of any shareholder agreements, voting trust agreements, or other contractual obligations affecting the shareholders should be provided)
 - C. **A summary of relevant financial information;** (*Explanatory comment:* this would comprise the most

current balance sheet, as well as historic income/cash-flow statement information leading up to the valuation date)

- D. **A description of the business being valued, sufficient for the reader to understand the valuation basis and approach adopted, as well as the various earnings/cash flow risk factors present;** (*Explanatory comment:* this would include a narrative description of the business activities, a brief history and a discussion of factors influencing value) and
- E. **A reference to trading volumes and price ranges, in the case of publicly traded securities.**

13.4 **In addition to 13.2 and 13.3, a Comprehensive Valuation Report shall include:**

- A. **A description of the economic context and industry outlook bearing on the shares, assets or interest in a business being valued,** taking into account the past and foreseeable future, as well as conditions at the valuation date.

14 Report Restrictions and Qualifications

14.1 **All Valuation Reports shall disclose any restrictions that affect the Valuator's conclusion, as noted below:**

- A. **A statement restricting the use of the Valuation Report by the persons for whom the Report was prepared and only for the stated purpose;**
- B. **A statement denying responsibility for losses resulting from any unauthorized or improper use of the Valuation Report; and**
- C. **A statement giving the Valuator the right to make revisions and/or to further support the conclusion under specified circumstances, such as when facts existing at the valuation date become apparent to the Valuator after the Valuation Report is issued.**

14.2 **Comprehensive and Estimate Valuation Reports shall disclose any qualifications that affect the Valuator's conclusion.** (*Recommendation:* Valuators should consider including qualifications in Calculation Valuation Reports as well)

15 Conclusion

15.1 **The Valuation Report shall contain a conclusion as to the value of the shares, assets, or interest in a business being valued.** (*Recommendation:* the conclusion should include a reference to the type of Valuation Report being provided, the Valuator's scope of review, key assumptions relied upon, and any restrictions and/or qualifications in the Valuation Report)

June 6, 2007

APPENDIX B

ALBERTA

Court expert

218(1) The court, on its own motion or upon the application of any party in any case where independent technical evidence would appear to be required (including the evidence of an independent medical practitioner) may appoint an independent expert (herein called “the court expert”).

(2) The court expert shall, if possible, be a person agreed between the parties and failing agreement shall be nominated by the court.

(3) The question or the instructions submitted to or given to the court expert, failing agreement between the parties, shall be settled by the court.

(4) The report of the court expert shall be in writing, verified by affidavit, and shall be admitted as evidence at the trial and given such weight as the court thinks fit.

(5) Copies of the report shall be forwarded by the clerk to the parties or their solicitors.

(6) Any party may, within 14 days after the receipt of a copy of the report or within such other time as the court directs, apply for leave to examine the court expert on his report and the court, on the application shall

(a) order the cross-examination of the court expert prior to the trial; or

(b) order the cross-examination of the court expert at the trial,

or both.

Rule 218.1 — Notice to adduce expert evidence

(1) A party intending to adduce expert evidence at a trial shall, not less than 120 days before the day the trial commences or such other time as may be ordered by the Court, serve on the other parties to the action

(a) a statement of the substance of the evidence, signed by the expert, including the expert’s opinion, the expert’s name and qualifications, and a statement from counsel setting out the proposed area of expertise for which qualification as an expert will be sought, and

(b) a copy of the expert’s report, signed by the expert, on which the party intends to rely.

(2) The party serving the expert’s report may, at the same time, also serve notice of intention to have the report entered as evidence without the necessity of calling the expert as a witness.

(3) The expert’s report shall be entered as evidence at the trial unless, within 60 days after service of the notice under subrule (2) or such further time as the Court allows, the other party serves a statement

(a) setting out those parts of the report which that party will not agree may be entered as evidence in writing in this way, and

(b) giving reasons why that party cannot agree.

(4) Agreeing to have the expert’s report entered as evidence without calling the expert as a witness is not, by itself, an admission of the truth or correctness of the evidence submitted.

Expert's Document

218.6(1) At a time as may be directed by the case management judge, each party shall deliver to the other party or parties a document known as an "Experts Document".

(2) The Experts Document shall

- (a) be signed by the proposed expert, and
- (b) contain the following information with respect to each expert proposed to be called by the party submitting the document:
 - (i) the name and qualifications of the proposed expert;
 - (ii) the proposed expert's area of expertise;
 - (iii) any report prepared by the proposed expert on which any party proposes to rely at trial;
 - (iv) where a report referred to in subclause (iii) has not been prepared, a detailed statement of the evidence proposed to be given.

(3) Within 60 days after having been served with an Experts Document, a party shall deliver to the party who served the Experts Document a document known as a "Reply to Expert's Document".

(4) The reply to Experts Document must contain the following:

- (a) a statement as to whether or not the qualifications of the proposed expert are accepted;
- (b) if the qualifications of the proposed expert are not accepted, the reasons for non-acceptance;
- (c) a statement as to whether or not the party disagrees with any of the evidence intended to be given by the proposed expert;
- (d) if the party disagrees with any of the evidence intended to be given by the proposed expert, the reasons as to the disagreement.

Demand for expert's attendance

218.11(1) A party who agrees to have the report entered in evidence may, at the same time as responding to the notice of intention, serve a demand that the expert be in attendance at the trial for cross-examination.

(2) The expert shall not give oral evidence at the trial unless

- (a) a demand has been served, or
- (b) the Court gives leave.

(3) The party who required the attendance of the expert for cross-examination shall pay the costs of the expert's attendance unless the Court considers that the cross-examination was of assistance and makes a different order about the payment of those costs.

(4) If the party proposing to enter the expert's report receives a demand to produce the expert for cross-examination, the party proposing to enter the report may examine the expert, so long as the examination is not in respect of matters substantially outside the matters covered by the report, and need not rely only on the expert's written report.

BRITISH COLUMBIA

Rule 40A of the British Columbia Supreme Court Rules, which sets out the terms under which expert reports and/or testimony are given at trial, contains no provision for the pre-trial examination of a witness.

However, Rule 28, which provides a method under which one may apply to the Court for an order for the pre-trial examination of a witness, says the following:

28(1) Where a person, not a party to an action, may have material evidence relating to a matter in question in the action, the Court may order that the person be examined on oath on the matters in question in the action and may, either before or after the examination, order that the examining party pay reasonable solicitors' costs of the person relating to the application and the examination.

(2) An expert retained or specially employed by another party in anticipation of litigation or preparation for trial may not be examined under this rule unless the party seeking the examination is unable to obtain facts and opinions on the same subject by other means.

MANITOBA

RULE 36 — TAKING EVIDENCE BEFORE TRIAL

WHERE AVAILABLE — By consent or by order

36.01(1) A party who intends to introduce the evidence of a person at trial may, with leave of the court or the consent of the parties, examine the person on oath or affirmation before trial for the purpose of having the person's testimony available to be tendered as evidence at the trial.

Discretion of court

36.01(2) In exercising its discretion to order an examination under subrule (1), the court shall take into account,

- (a) the convenience of the person whom the party seeks to examine;
- (b) the possibility that the person will be unavailable to testify at the trial by reason of death, infirmity or sickness;
- (c) the possibility that the person will be beyond the jurisdiction of the court at the time of the trial;
- (d) the expense of bringing the person to the trial;
- (e) whether the witness ought to give evidence in person at the trial; and
- (f) any other relevant consideration.

Expert witness

36.01(3) Before moving for leave to examine an expert witness under subrule (1), the moving party shall serve on every other party the report of the expert witness referred to in subrule 53.03(1) (calling expert witness at trial) unless the court orders otherwise.

PROCEDURE

Rule 34 applies

36.02(1) Subject to subrule (2), Rule 34 applies to the examination of a witness under rule 36.01, unless the court orders otherwise.

Exception

36.02(2) A witness examined under rule 36.01 may be examined, cross-examined and re-examined in the same manner as a witness at trial.

EXAMINATIONS OUTSIDE MANITOBA

36.03 Where an order is made under rule 36.01 for the examination of a witness outside Manitoba, the order shall, if the moving party requests it, provide for the issuing of a commission and letter of request under subrules 34.07(2) and (3) for the taking of the evidence of the witness and, on consent of the parties, any other witness in the same jurisdiction, and the order shall be in Form 34E .

BEFORE A JUDGE

36.04 An examination under this rule may be held before a judge.

USE AT TRIAL

Witness available at trial

36.05(1) Any party may use at the trial the transcript and a videotape or other recording of an examination under this rule as the evidence of the witness, but, where the witness is available to give evidence at the trial, the transcript, videotape or other recording shall not be used as the evidence of the witness unless the court orders or the parties agree otherwise.

36.05(2) Use of evidence taken under rule 36.01 or 36.03 is subject to any ruling by the trial judge respecting admissibility.

May be filed

36.05(3) The transcript and a videotape or other recording may be filed with the court at the trial and need not be read or played at the trial unless a party or the trial judge requires it.

NEWFOUNDLAND AND LABRADOR

The Rules

It should be noted that experts are not specifically mentioned in rule 30.01(1), which generally defines “persons who may be examined” during discovery. However, specific guidelines regarding the treatment of expert witnesses are detailed in rule 46.07. The relevant rules state,

Persons who may be examined

30.01.(1) At any time before trial, any person, who is within or without the jurisdiction, may be orally examined on oath or affirmation by any party regarding any matter, not privileged, that is relevant to the subject matter of the proceeding.

(2) Where it is unnecessary, improper or vexatious, the Court may limit the number of persons to be examined and set aside the appointment for the examination of any person.

(3) The costs of examining more than one person, other than a party, shall, unless the Court otherwise orders, be borne by the party examining.

Expert witness; evidence of and report

46.07. Unless an opposite party has, at least ten days before the commencement of a trial, been given a report of an expert witness who is expected to give evidence on a trial, the evidence shall not be admissible without the approval of the court, which may be granted on such terms as are just.

NEW BRUNSWICK

32.06 Scope of Examination

(3) A party may obtain discovery of any findings, opinions and conclusions of an expert engaged or consulted by or on behalf of the party being examined or his solicitor and relating to an issue in the actions; but the party being examined need not disclose such information nor the name and address of the expert where

- (a) the only findings, opinions and conclusions of the expert relevant to an issue in the actions were made or formed by him in preparation for contemplated or pending litigation and for not other purpose, and
- (b) the party being examined undertakes that he will not call the expert as a witness at the trial

Expert Witness

52.01 Condition Precedent to Calling Expert Witness at Trial

(1) Where a party intends to call an expert witness at trial, he shall serve on every other party a copy of the expert's signed report which shall contain, or be accompanied by, a statement containing the expert's name and address and qualifications and the substance of his proposed testimony. Service shall be made as soon as practicable and no later than the Motions Day at which the trial date is fixed.

(2) Where a party intends to call an expert witness at trial but cannot obtain from him a report, or where, because of the nature of the proposed evidence, the expert is not required by the party to submit a written report, the party may comply with paragraph (1) by serving on every other party a report signed by the party or his solicitor which sets out the name and address and qualifications of the expert and the substance of the evidence he is expected to give.

(3) A party who has not complied with this subrule shall not call and expert evidence without leave of the court.

(4) Where a report has been served under paragraph (1) or paragraph (2), on motion the court may order that any records, documents or other materials on which the report is based be produced for inspection and copying.

(5) On consent of all parties, the court may receive in evidence at the trial a report served under paragraph (1) without requiring the expert to attend and give oral evidence.

52.02 Examination of Expert Witness Before Trial

(1) Where it is impractical or inconvenient for an expert witness to attend the trial, the party intending to call the witness may, with leave of the court or the consent of all parties, examine that witness before the trial for the purpose of having his evidence available for use at trial.

(2) Before applying under paragraph (1) to the court for leave, the applicant shall comply with Rules 52.01(1) or 52.01(2).

(3) Where possible, an examination under paragraph (1) shall be conducted before the trial judge.

(4) Unless ordered otherwise or provided by this rule, the procedure prescribed by Rule 33 shall apply to the examination of a witness under this rule.

(5) On the examination of a witness under this rule, he may be examined, cross-examined and reexamined in the same manner as a witness at trial.

(6) An order for, or consent to, the examination of a witness under this rule may provide that the examination be recorded by videotape or other similar means either in addition to or substitutions for a typewritten transcript.

(7) Where the evidence on an examination under paragraph (1) has been transcribed, the party whose witness has been examined shall serve very party who attended or was represented on the examination, with a copy of the transcript, free of charge unless ordered otherwise.

(8) A transcript, videotape, or any other recording of evidence taken under this Rule may, as far as it is admissible, be tendered in evidence at the trial by a party to the action, and such parties shall be responsible for providing the equipment required to tender such evidence if it is not otherwise available in the courtroom.

(9) Where the evidence of an expert witness has been taken under this subrule, he shall not be called to give evidence at the trial, except with leave of the trial judge or unless the trial judge requires his attendance at the trial.

52.03 Medical Expert

(1) Where, under Rule 52.01 (1) a party has served a report of an expert who is a medical practitioner as defined in Rule 36.01 the report may, with leave of the court, be admitted into evidence without proof of signature, or qualifications or the medical practitioner and without his attendance at trial.

(2) When an opposite party, within 10 days after service of a report of a medical practitioner under Rule 52.01 (1), serves notice in writing requiring the attendance of the medical practitioner at trial, the report shall not be received in evidence unless the medical practitioner is called as a witness.

(3) Where a medical practitioner is required to attend and give oral evidence at or before trial and the court is of the opinion that his evidence could have been introduced as effectively by way of a medical report, the court may order the party who required the attendance of the medical practitioner to pay the costs of his attendance.

NOVA SCOTIA

Expert witnesses: Evidence of and report

31.08.(1) Unless a copy of a report containing the full opinion of an expert, including the essential facts on which the opinion is based, a summary of his qualifications and a summary of the grounds for each opinion expressed, has been

- (a) served on each opposite party and filed with the court by the party filing the notice of trial at the time the notice is filed, and
- (b) served on each opposite party by the person receiving the notice within thirty (30) days of the filing of notice of trial,

the evidence of the expert shall not be admissible on the trial without leave of the court.

(2) Where an opposite party wishes to conduct discovery examination of an expert, the opposite party shall pay the expert a reasonable fee for his attendance at the examination. If the fee is not paid in advance, the opposite party shall have no right to discover the expert. Unless otherwise ordered, if the opposite party is awarded costs following the trial, that party shall be entitled to recover as a disbursement the amount paid to the expert for his attendance at discovery.

(3) If the report of an expert does not comply with the requirements of rule 31.08(1), a judge may on the application of an opposite party make an order requiring the party providing the report to comply with the rule 31.08(1) and if such an order is granted, the applicant shall have costs in any event.

(4) Where a copy of the report has been filed and delivered as provided in rule 31.08(1), the expert shall be required to attend at the trial unless the person receiving the report gives notice that he does not require the attendance of the expert at the trial.

(5) Where no notice as provided in rule 31.08(4) has been given and the court is of the opinion that any evidence obtained from the expert at trial does not materially add to the information in the report served under rule 31.08(1), the court may order the party failing to dispense with the attendance of the expert at the trial to pay, as costs, such sum as the court considers just.

ONTARIO

20(4) Other Cases — Consent or Order

In a case other than a child protection case, a party is entitled to obtain information from another party about any issue in the case,

- (a) with the other party's consent; or
- (b) by an order under subrule (5).

20(5) Order for Questioning or Disclosure

The court may, on motion, order that a person (whether a party or not) be questioned by a party or disclose information by affidavit or by another method about any issue in the case, if the following conditions are met:

1. It would be unfair to the party who wants the questioning or disclosure to carry on with the case without it.
2. The information is not easily available by any other method.
3. The questioning or disclosure will not cause unacceptable delay or undue expense.

PRINCE EDWARD ISLAND

Expert Witness

53.03(1) Unless a copy of a report containing the full opinion of an expert, including the essential facts on which the opinion is based, a summary of his qualifications and a summary of the grounds for each opinion expressed, has been

- (a) served on each opposite party within thirty days of the filing of the notice of trial and
- (b) filed with the court within thirty days of the filing of the notice of trial,

the evidence of the expert shall not be admissible on the trial without leave of the judge.

(2) Where a copy of the report has been served and filed as provided in subrule 53.03 (1), the expert shall be required to attend at the trial unless the person receiving the report gives notice that he does not require the attendance of the expert at the trial.

QUEBEC

Code of Civil Procedure, R.S.Q., c. C-25

BOOK II — Introduction of Actions and Applications, Appearance and Case Management

Title V — Proof and Hearing

CHAPTER I — Trial before the Court

SECTION V — Examination of Witnesses

294. Except where otherwise provided, in any contested case the witnesses are examined in open court, the opposite party being present or duly notified.

Any party may demand that the witnesses testify outside each other's presence.

[1965 (1st sess.), c. 80, a. 294]

CHAPTER III — Special Proceedings Relating to Production of Documents

SECTION II — Examination on Discovery, Medical Examination and Production of Documents

§ 1 — Examination on Discovery

398. After defence filed, any party may, after two days notice to the attorneys of the other parties, summon to be examined before the judge or clerk upon all facts relating to the issues between the parties or to give communication and allow copy to be made of any document relating to the issue:

- (1) any other party, or his representative, agent or employee;
- (2) any person mentioned in paragraphs 2 and 3 of article 397;
- (3) with the permission of the court and on such conditions as it may determine, any other person.

The defendant cannot, however, without permission of the judge or, in the case referred to in subparagraph 3 of the first paragraph, the court, examine under this article any person whom he has already examined under article 397.

[1965 (1st sess.), c. 80, a. 398; 1983, c. 28, s. 13; 1984, c. 26, s. 14; 1992, c. 57, s. 420; 1999, c. 40, s. 56; 2002, c. 7, s. 77]

Title V — Proof and Hearing

CHAPTER III — Special Proceedings Relating to Production of Evidence

SECTION III — Examination of Witnesses Out of Court

404. At any stage of the case, the parties may agree, or the court, if it sees fit to do so, may permit that a witness he heard out of court, provided that all the parties are present or duly summoned.

Depositions must in that case be made by way of affidavits sufficiently detailed to establish all the facts necessary to support the conclusions sought or be taken down by stenography or in handwriting before a person authorized

to administer oaths and be filed in the record to have the same force and effect as if they had been taken at the hearing.

Notwithstanding the foregoing, the court cannot maintain an application for the annulment of a marriage or a civil union nor, where the defendant has filed a defence, an application for separation from bed and board or divorce or for the dissolution of a civil union unless the evidence of the plaintiff has been given before the court.

[1965 (1st sess.), c. 80, a. 404; 1968, c. 84, s. 4; 1982, c. 17, s. 16; 1986, c. 85, s. 2; 1988, c. 17, s. 3; 2002, c. 6, ss 99]

SASKATCHEWAN

There is no Saskatchewan right to examine expert witnesses prior to trial. To the best of our knowledge, there has not been any case where there has been a pre-trial examination of an expert witness in a family case.

There is the ability to examine non-parties through third party discovery rules. The Rule specifically prohibits its use for the purpose of examining experts:

222A(1) The court may grant leave, on such terms respecting costs and other matters as are just, to examine for discovery any person who may have information relevant to a material issue in the action, other than an expert engaged by or on behalf of a party in preparation for contemplated or pending litigation.

5

FINANCE THEORY AND LOSS QUANTIFICATION REALITY — ESTABLISHING A DISCOUNT RATE IN A LITIGATION CONTEXT

*by Farley Cohen, MBA, CA•IFA, CIRP, CBV, ASA
Navigant Consulting, Toronto*

*Prem Lobo, CA, CBV, CPA
Navigant Consulting, Toronto*

All truths are easy to understand once they are discovered; the point is to discover them. — Galileo Galilei

In many loss quantification engagements, business valuers are required to quantify the difference between the cash flows that an injured party (a “plaintiff”) may have realized “but for” the alleged wrongful actions of another party (a “defendant”), and the “actual” cash flows that the plaintiff did realize. The difference between the “but for” and “actual” cash flows represents the quantum of business or economic loss (hereinafter, “loss”).¹ Often, part of the loss in question may relate to future periods, and business valuers need to estimate the expected future loss using available facts, and making reasonable assumptions where necessary.

In such cases, the future loss usually needs to be “present valued” to a current assessment date in order to determine the lump sum amount of money that, if awarded to a plaintiff today, will compensate the plaintiff for estimated future loss (i.e., the amount of money that will place the plaintiff in the same position as if the alleged wrongful actions, and resulting future loss, had not occurred or as if a contract had been completed). In order to present value future loss, business valuers need to determine and use a *discount rate*. Simply stated, a discount rate is a rate of return that is applied to a stream of estimated future cash flows to adjust those cash flows for the time value of money and risk and, thereby, arrive at a present value.

The concept of a discount rate is, at first blush, seemingly straightforward. Indeed, discount rates have been a significant element of corporate finance and business valuation theory for many years, and have been discussed extensively in research papers and textbooks. Therefore, it is not surprising that, often, the approach to determining and applying a discount rate in loss quantification contexts is to use a corporate finance or business valuation approach. That is, the frequent approach is to determine a discount rate by choosing a corporate finance and valuation methodology (such as the weighted average cost of capital) and applying this discount rate in a financial model that would otherwise be used in a typical business valuation engagement.

However, using just *any* corporate finance or business valuation approach to determine and apply a discount rate in a loss quantification context without adequate consideration of whether such an approach makes sense in the *specific* circumstances at hand may lead to misleading results. The fact is loss quantification contexts have

¹ In this paper, we will use the term “loss” to refer to the various loss quantification contexts that business valuers might be engaged in, including the quantification of business loss, the quantification of personal income loss, the quantification of loss due to professional negligence and so on.

unique characteristics and nuances which set them *distinctly* apart from business valuation contexts. The *generic* use of a particular corporate finance or business valuation approach to determine and apply a discount rate in a loss quantification context may not always be appropriate.

Business valuers need to be intimately aware of the following:

1. on a *first principles basis*, what a discount rate is supposed to represent, both in a business valuation context and in a loss quantification context;
2. the various alternative methodologies to establish a discount rate in a loss quantification context, and the relative strengths and weaknesses of each alternative; and
3. the fundamental issues that need to be considered when utilizing and applying discount rates in calculations to arrive at a quantification of loss (for example, considering the correct pre- or after-tax estimated future cash flows with the corresponding pre- or after-tax discount rate).

This paper is therefore divided into three sections. Section 1 discusses the theory of loss quantification, discount rates and the time value of money. Section 2 discusses alternative methodologies to determine an appropriate discount rate in a loss quantification context. Section 3 discusses issues to be aware of when applying discount rates to calculate a loss.

1. THE THEORY OF LOSS QUANTIFICATION, DISCOUNT RATES AND THE TIME VALUE OF MONEY

1.1 The Purpose of Loss Quantification

In order to fully understand discount rates, it is helpful to briefly discuss the purpose behind the quantification of loss.

The ultimate objective of loss quantification is to determine the cash flows that a plaintiff business or individual would have earned “but for” the alleged wrongful actions of a defendant or if a contract had been completed, and compare these to the actual cash flows that the plaintiff did or is expected to generate. The difference between the two represents the quantum of business loss. The loss quantification is usually prepared at a particular (current) assessment date.

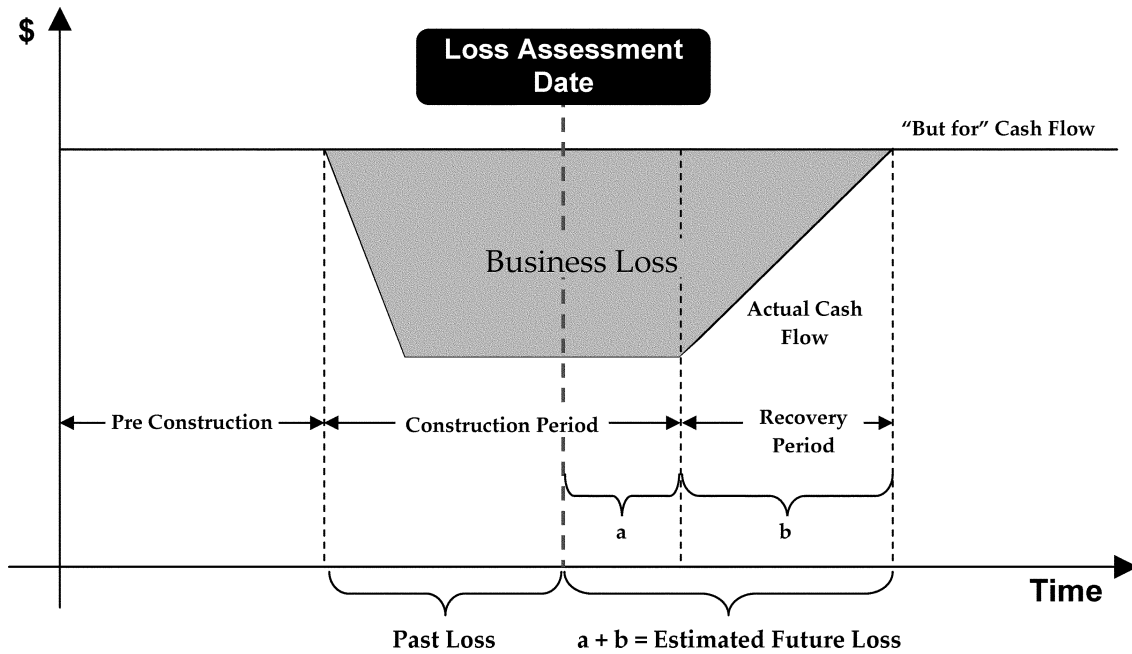
Relative to the current assessment date, loss may have occurred in prior periods (i.e., a “past loss”) and may be expected to continue into future periods (i.e., a “future loss”), either for a finite period of time or, sometimes, indefinitely into the future.

Figure 1 presents a simplified illustration of past and future business loss. Assume that the plaintiff, Company A, has been operating for a number of years. At a particular point in time, a local government authority began road construction activities near the location of Company A. The road construction activities resulted in lost sales as a result of road closures, road diversions and so on. It is expected that road construction will continue for a period of time, and, when completed, the company’s cash flows will return to pre-construction levels.

From Figure 1, it can be seen that Company A has experienced a *past loss* from the start of construction until the loss assessment date. The loss assessment is, as indicated, right in the middle of the construction period. Company A is also expected to experience a *future loss* during the remainder of the construction period and in the period following construction, before cash flows have recovered to their pre-construction levels (the recovery period).

If quantifying the future loss at the indicated assessment date, a business valuator has to determine, using a discount rate, the present value of the estimated future construction period and recovery period loss amounts (marked as “a” and “b”).

Figure 1 Past and Future Business Loss



Note that in quantifying past loss, unlike in business valuation contexts, *hindsight* is permissible. Discount rates are not required in past loss situations. However, past losses might attract prejudgment interest or might otherwise need to be adjusted to the loss assessment date.

1.2 What Is a Discount Rate

A discount rate is a rate of return that is applied to a stream of estimated future cash flows (or, specifically, “foregone” future cash flows, in the case of a quantification of loss) to adjust those cash flows for the time value of money and thereby arrive at their present value.

The theory underlying present value is that a dollar to be earned or to be received in the future is worth less than a dollar earned or received today. For example, if \$100 can be received today and invested in a substantially risk free investment (say a Government of Canada Treasury Bill) at 3% per year, that \$100 would be expected to grow to \$103 one year hence. The 3% represents the time value of money (i.e., by definition it excludes any risk). If the same \$100 were to be received *one year hence* and if such payment were to be substantially guaranteed (i.e., there would be no substantial risk of non-payment), the *present value* of that \$100 today would be only \$97.09 (i.e., $\$100 / [1+3\%]$). Said another way, the equivalent of a “risk free” \$100 to be received one year hence is \$97.09 received today and invested in a *similar* risk free manner at 3%.

Now, suppose \$100 could be received one year hence, but there was additional risk associated with earning the \$100 (i.e., the \$100 is not guaranteed), but could end up being lower. This additional risk (over and above the time value of money) reduces the present value of the expected \$100 today. Assuming money could be invested today in an investment of *similar* risk for an expected rate of return of 8%, the present value of the \$100 today is therefore \$92.59. Said another way, the equivalent of a “risky” \$100 to be received one year hence is \$92.59 received today and invested in an investment of *similar* risk at 8%.

The formula for the determination of the discounted present value “PV” (in dollars) of an amount “FV” (in dollars) due in year “T” (in years) where the expected risk adjusted rate of return is R (in %) is as follows:

$$PV = FV / [1 + R]^T$$

Similarly, the future value of an amount “FV” (in dollars) in year “T” (in years) where the expected risk adjusted rate of return is R (in %) is as follows:

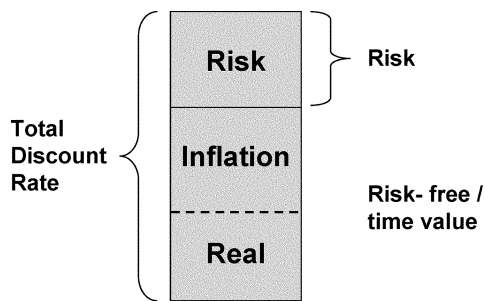
$$FV = PV \times [1 + R]^T$$

A key point from the above two examples is that a discount rate comprises two basic components:

1. a rate of return reflecting the time value of money (real and inflation), and
2. a premium for risk (i.e., the risk associated with whether the future cash flows will transpire as estimated or forecasted).

See Figure 2 for a demonstration.

Figure 2 Discount Rate



Another key point is that to arrive at an appropriate discount rate, one has to consider the expected rates of return from alternative similar risk investments. However, identifying what is a *similar* risk investment (and then determining its return) requires a considerable amount of analysis and professional judgment.

1.3 Components of a Discount Rate

The overall discount rate should ultimately include a risk-free rate of return reflecting the time value of money and a premium for risk as to whether a future stream of cash flows will transpire as estimated. Delving into these components in more depth, a discount rate should conceptually reflect the five elements discussed below.

1. An appropriate risk-free “base” rate of return. Rates of return on government-issued securities such as bonds or treasury bills are generally used as a proxy for a risk-free return. The term/maturity of such securities should also try to match the time horizon of the estimated future cash flow (or foregone future cash flow).
2. External, macro-level risks that might prevent a future stream of cash flows from being realized as expected. Such risks might include (among others) the impact of:
 - macro-economic variables such as interest rates, commodity prices and the cost of raw materials;
 - changes in technology;

- changes in government policies, rules and regulations, including changes in environmental regulations;
 - changes in the competitive environment;
 - demographic trends;
 - changes in customer demand; and
 - the stage of development of the industry.
3. Internal risks that might prevent a future stream of cash flows from being realized as expected. Such risks might include (among others) the impact of:
- the quality, experience, dedication and qualifications of *management* in terms of overseeing smooth operations and responding quickly to unplanned events;
 - the quality, experience, dedication and qualifications of *staff* in terms of ensuring smooth operations and responding quickly to unplanned events;
 - the existence and effectiveness of policies and procedures to ensure smooth operations and contingency plans in the case of unplanned events;
 - the existence of ongoing training programs for management and staff;
 - the financial status and possible risk of financial distress and the availability of contingency financing;
 - dependence on key parties (employees, suppliers, customers) and legal agreements relating thereto; and
 - a company's stage of development.

The risk-free rate, the premium for external risks and the premium for internal risks are all examined in more depth when discussing the risk adjusted build-up approach to setting a discount rate later in this paper.

4. There may need to be “parity” between the pre- or after-tax discount rate used in calculating present value and the appropriate pre- or after-tax estimated future cash flows. This will be discussed in more depth subsequently in this paper.
5. The discount rate should exclude or include an inflation component if the estimated future cash flows in question exclude or include inflation, respectively.

2. ALTERNATIVE METHODOLOGIES TO DETERMINE A DISCOUNT RATE IN A LITIGATION CONTEXT

Business valuers have a number of alternatives available to them when determining a discount rate for loss quantification purposes; these alternatives all stem from corporate finance and business valuation theory. However, finance “theory” needs to be adapted to specific loss quantification contexts to reflect the “particulars” of each specific loss quantification context, and some alternatives may be more relevant than others for the specific loss quantification context at hand.

Some of the more common bases used to determine a discount rate are as follows:

- risk-free approach,
- risk adjusted build-up approach,
- weighted average cost of capital,

- rate of return on equity,
- interest rate on debt,
- internal rate of return,
- rate of return on a comparable investment of similar risk,
- prescribed rate of return (such as the interest rate that has to be paid on overdue or unpaid amounts as specified in the terms of a contract) and
- legislated rate of return (such as the pre- or post-judgment interest rate specified by the *Courts of Justice Act* or rates set out in various Rules of Civil Procedure such as Rule 53.09 in the Ontario Rules of Civil Procedure).

Each of these is discussed below.

2.1 The Risk-Free Approach

One option for determining a discount rate is to use a “risk-free” rate of return, such as the rate of return on government bonds or treasury bills. The risk-free rate of return basically captures the time value of money (real return and inflation) and does not consider any risk associated with whether an estimated future cash flow amount will transpire as forecasted. As such, using a risk-free rate of return as a discount rate is appropriate only in those loss quantification contexts where there is virtual *certainty* with respect to realizing the estimated future cash flows.

In most loss quantification contexts, however, there is likely to be some degree of uncertainty with respect to realizing estimated future cash flows as projected. Internal or external factors could cause estimated future cash flows to deviate up or down. Therefore, the use of a risk-free approach is usually limited to very specific contexts.

When using a risk-free approach (or even when using a risk-free rate of return as part of the overall discount rate as per the other methods discussed below), business valuers need to select the rate of return on a “risk-free” security with a term/maturity that matches as best as possible the time horizon of the stream of estimated future cash flow that is being present valued. So, if the estimated foregone cash flow in a loss quantification model spans a two-year period and if a risk-free approach is applicable, the rate of return on a two-year government security would likely be the most applicable risk-free rate of return to use for the discount rate.

Another option would be to use a different risk-free rate of return (i.e., discount rate) for each year, pairing the maturity of the risk-free security being used with the number of years into the future a particular cash flow amount is expected to occur. For example, where Year 0 represents the current date, Year 1 cash flows would be present valued using the interest rate on a one-year government security, while Year 2 cash flows would be present valued using the interest rate on a two-year government security and so on for Years 3 and beyond.

2.2 The Risk-Adjusted Build-Up Approach

(a) Theory

The risk-adjusted build-up approach starts with a risk-free rate of return, and then adds premium(s) for external and internal risks to arrive at an overall discount rate. The actual risk premiums are based on professional judgment, taking into account the various external and internal risks that could potentially impact a plaintiff’s ability to earn a forecasted stream of future cash flow (see Figure 3).

Figure 3 Risk-Adjusted Build-Up Approach

$$\begin{array}{c} \text{Risk free rate of return} \\ + \text{Premium for external risks} \\ +/- \text{Premium for internal risks} \\ = \text{Discount Rate} \end{array}$$

(b) Risk-Free Rate of Return

The determination of a risk-free rate of return is the same as discussed with respect to the risk-free approach (i.e., the risk-free rate of return uses the return on a substantially risk-free security with a term that best matches the term of the future cash flows being present valued).

(c) Premium for External Risks

External risks represent changes in the external environment that might prevent a particular future stream of cash flows from being realized as projected (results could be better or worse), including (among others) those discussed below.

(i) Macro-Economic Variables

Interest rates, commodity prices, GDP growth and the cost of raw materials are just some macro-economic variables. For example, if a company has extensive short term borrowings at variable interest rates, and its claim for foregone future cash flows includes an estimate for interest expenses, then any change in future interest rates will have a material impact on the future cash flows that will actually be realized. Therefore, the greater the expected variability of short-term interest rates, the greater the level of risk associated with the realization of future cash flows and the higher the required rate of return and discount rate.

(ii) Changes in Technology

Changes in technology can make some production techniques or business processes obsolete quickly, thereby increasing the risk associated with the realization of future cash flows. For example, assume a claim of future loss arises from the allegation that a company was unfairly put out of business due to the wrongful actions of a competitor. The calculation of future loss captures the future cash flows that the plaintiff company would have earned if it had remained in business. Assume that the plaintiff company is committed to using technology that is mature at the loss assessment date but new technologies are expected in the future which the plaintiff company cannot readily utilize. This might make the plaintiff company's existing technology obsolete, and increases the level of risk associated with the realization of the plaintiff's future cash flows.

(iii) Changes in Government Policies

Governments always change rules and regulations, including environmental regulations. All businesses are impacted by government rules and regulations, some more than others. Changes in government rules and regulations could impact the ability of a business to realize expected future cash flows. For example, the possibility of more stringent government policies in the future with respect to greenhouse gas emissions or stricter environmental compliance regulations could increase future operating costs and decrease expected future cash flows.

(iv) Changes in the Competitive Environment

The number and nature of competitors in a particular industry could change in the future, impacting the ability of a plaintiff to realize forecasted future cash flows.

(v) Demographic Trends

Future changes in demographics such as the size of the overall population, changes in the size of the population in particular age categories or the movement of people into or away from particular geographic regions could impact the ability of a plaintiff to realize forecasted future cash flows.

(vi) Changes in Customer Demand

For example, the decrease in consumer demand for foods which are high in saturated fats and towards more healthy alternatives could impact the ability of a fast food chain that specializes in hamburgers and french fries to realize forecasted future cash flows.

(vi) The Stage of Development of the Industry

An industry that is in development stage, decline stage or is susceptible to rapid change will usually imply higher risk for a particular business, while a mature industry will usually imply lower risk.

(d) *Premium for Internal Risks*

Internal risks represent variables that are internal to a particular business or individual that might prevent a particular future stream of cash flows from being realized. Some of the most prominent are discussed below.

(i) The Experience, Dedication and Qualifications of Management

Generally, the more experienced, dedicated and qualified the management of a business happens to be, the more likely it is that a business will realize forecasted future cash flows and the lower the level of risk attached to those future cash flows.

(ii) The Experience, Dedication and Qualifications of Staff

As with management, generally the more experienced, dedicated and qualified the operational and service staff of a business happens to be, the more likely it is that a business will realize forecasted future cash flows.

(iii) The Existence and Effectiveness of Policies and Procedures

If sufficient and appropriate policies, procedures and guidelines exist at a business, the more likely it is for the business to ensure smooth and uninterrupted operations. In addition, in the case of unplanned circumstances, the more likely it is that the business can respond to such circumstances and return to normal operations in a timely fashion. This increases the likelihood that a business will be able to realize forecasted future cash flows and decreases the risk of those cash flows.

(iv) **Ongoing Training Programs**

Generally if sufficient and appropriate ongoing training and skills development programs exist at a business, the more likely it is that management and employees will be able to ensure smooth ongoing operations or respond to unplanned circumstances in a timely fashion. This increases the likelihood that a business will be able to realize forecasted future cash flows, and decreases the risk of those cash flows.

(v) **The Risk of Financial Distress and Contingency Financing**

If a business has historically incurred losses or is highly leveraged (has a significant amount of debt), does not have short-term financing options in place (such as lines of credit), and/or has insufficient or limited ability to obtain short-term financing then there is a heightened risk that the business could face financial distress due to unplanned circumstances (such as lost opportunities due to cash shortages and insolvency). This increases the risk associated with the realization of forecasted future cash flows.

(vi) **Dependence on Key Parties**

If a business is highly dependent on certain parties such as key employees, significant customers and particular suppliers, any changes in a business' relationship with such parties could have a material adverse impact on the operations and cash flows that the business can generate. Thus, dependence on key parties increases the risk associated with the realization of forecasted future cash flows.

(vii) **Stage of Development**

The risks associated with a company that is a well established, mature player in an industry will usually be less than the risks associated with a new company in its growth or development stage.

(e) ***Comments***

The above is not meant to be an all-encompassing summary of external and internal risks that might be applicable to a particular stream of future cash flow in a loss quantification context, but rather a guideline as to some of the risk factors to consider in each specific loss quantification context.

The risk-adjusted build-up approach has the distinct advantage of being specifically “tailored” for each particular loss quantification situation, and is the approach that conceptually is closest to the “first principles” definition of a discount rate (i.e., a discount rate is the expected rate of return that accounts for both the time value of money and the future uncertainty associated with an estimated stream of future cash flows).

There is no magic formula to determine the premiums for external and internal risks. Business valuers need to exercise professional judgment in order to determine each premium, after having considered the *number* and *nature* of the external and internal risks that could impact the realization of forecasted future cash flows.

It is important that the premium for external and internal risks only captures those risks that are *not* expected to impact both the “*but for*” and *actual* scenarios in exactly the same manner. In other words, risks that would impact the cash flows that a plaintiff would have earned “but for” the actions of another party, *and* which would also impact the actual cash flows that the plaintiff is expected to earn in the future to the *same* degree should *not* be incorporated into the premium for external risks as the two would effectively “net” each other out when calculating the *foregone* cash flows.

To demonstrate, assume that a plaintiff, Company A is suing Company B for breach of contract. The contract had a remaining term of 5 years and was replaced (mitigated) by another contract with a remaining term of 5 years, but with a different (lower) level of revenue and expenses.

A business valuator has arrived at the “but for” cash flows by estimating the future contract revenue that would have been earned less related incremental expenses. The business valuator has also estimated the actual cash flows that the plaintiff is expected to earn from the replacement contract. The difference between the “but for” and actual cash flows represents the estimated future loss. Assume that one of the external risks relevant to the plaintiff is the future price of fuel. The question is, should the risk of a change in the price of fuel be included as part of the external risk premium under the risk-adjusted build-up approach?

If an increase in the price of fuel will increase operating costs and decrease cash flows by the *same* amount under *both* the “but for” and actual scenarios, then there would be no impact on the *loss*, which is the difference between the “but for” and actual cash flows. Therefore, the risk of change in the price of fuel should, *in this specific case*, probably not be factored into the external risk premium. However, if a change in the price of fuel will likely have a *different* impact upon the cash flows in the “but for” and actual scenarios, then this risk *should* probably be factored into the external risk premium. However, generally the “but for” scenario is not identical or the same as the actual with respect to operating expenses and, therefore, the risk of fluctuations in operating expenses should be considered.

As noted, it is also important that the premiums for external and internal risks only include those risks that are relevant for the *specific* loss quantification context at hand. Often, a business may be subject to a wide spectrum of risks. However, only a *limited subset* of those risks may be relevant for loss quantification purposes.

To demonstrate, assume that a plaintiff, Company A is suing Company B for breach of a long-term contract. Under the terms of the contract, Company B agreed to purchase the *entire* output of an electricity generation plant owned and operated by Company A at a predetermined fixed price. The contract had a remaining term of 15 years (“original contract”). Company A was able to replace the breached contract immediately with another contract with a remaining term of 15 years (the “replacement contract”). The replacement contract is similar to the breached contract in every way (i.e., Company A expects to operate its plant in the same manner and at the same cost, and to sell the same output of electricity under the replacement contract as it would have under the breached original contract. The only difference is that, having being negotiated at a later date with different market conditions, the replacement contract has a lower fixed price for the output of Company A’s generation plant. Therefore, in *this* context, the *only* difference between the original contract and the replacement contract is the difference in revenue under each.

In order to quantify the future loss over the remaining 15-year term of the breached original contract, a business valuator will likely take the difference between the respective fixed price revenue amounts under each contract; operating costs are not relevant here because they are expected to be *the same* under the original contract and the replacement contract.

In order to present value the future revenue differential loss, what risks should be considered in the discount rate? Should all the risks that impact the operations of Company A be reflected in the discount rate? Should the risks of operating the specific plant that is the subject of the original contract and the replacement contract be reflected (to the extent that plant risk is different from overall company risk)? Should external and internal risks related to both operating expenses and revenue be reflected? Or should only risks that impact the generation of the lost *revenue* be considered?

Given that the quantification of loss in this context deals with a differential in *revenue*, and given that the “first principles” definition of a discount rate is the rate of return that relates to the time value of money and to the risk that a *future stream of cash flow will be realized as forecasted*, then a business valuator might consider only revenue related risks in setting a discount rate. Risks that impact operating expenses (for instance, the risk that fuel prices will increase or decrease) should not be included in the discount rate as these would overstate the level of risk related specifically to revenue, would result in an unjustifiably higher discount rate and lower loss calculation, which would not place Company A in the same position as if the breach of contract had not occurred.

Although the risk-adjusted build-up approach requires judgment in determining the external and internal risk premiums, the risk premium used in the build-up approach can be “reconciled” to risk premiums implied by other approaches, such as the weighted average cost of capital (“WACC”) or the cost of equity in order to obtain additional comfort that a chosen risk premium is reasonable.

All said, the risk-adjusted build-up approach is an intuitively appealing method to determine a discount rate, but requires the prudent exercise of professional judgment in order to determine the appropriate premiums for risk, and in order to include only those risks that are relevant in a particular loss quantification context.

2.3 The Weighted Average Cost of Capital

(a) Theory

The WACC represents a weighted “blend” of a company’s actual or optimal debt, preferred stock and common stock costs of capital. Investors in a company’s preferred stock and common stock and/or lenders of debt to a company require and expect a minimum rate of return in order to compensate them for the risk associated with their investment. This expected rate of return represents the “cost” to a company of obtaining debt financing and equity investment. As such, the WACC represents a company’s overall cost of capital, and, concurrently, the *minimum* rate of return that the company has to earn on its investments in order to satisfy its lenders and investors.

The WACC is commonly used:

- to value the *entire* capital structure of a company (for instance, when a purchaser is buying a company, paying off all debt and equity holders and refinancing the company in some “optimal” manner that is the purchaser’s choice);
- to value the *equity* of a company (for which purpose the market value of debt would be subtracted from the value of the entire capital structure as determined using the WACC); and
- for capital budgeting decisions, when the proportions of debt and equity that might be used to finance a particular project differ from the overall proportions that are used to finance a company as a whole.²

Many business valuers also use WACC as a method to determine a discount rate in a loss quantification context. The underlying assumption when using this measure for a discount rate is that the risk and expected rate of return associated with an estimate of future cash flow (or foregone cash flow) is reflective of the underlying overall risk and expected rate of return of the overall business. This assumption will be discussed in more detail subsequently.

The determination of WACC is as follows:

$$\text{WACC} = (\text{R.common} \times \text{W.common}) + (\text{R.preferred} \times \text{W.preferred}) + (\text{R.debt}[1-t] \times \text{W.debt})$$

Where:

“R.common” represents the expected rate of return on common share equity (i.e., the cost of common equity capital;

“W.common” represents the weight (i.e. percentage) of common share equity in the capital structure, at market value;

“R.preferred” represents the expected rate of return on preferred share equity (i.e., the cost of preferred equity capital;

² Shannon P. Pratt, *Cost of Capital: Estimation and Applications*, pages 45-53.

“W.preferred” represents the weight (i.e., percentage) of preferred share equity in the capital structure, at market value;

“R.debt” represents the interest rate on debt (i.e., the cost of debt);

“t” represents the tax rate; and

“W.debt” represents the weight (i.e., percentage) of debt in the capital structure, at market value.

There are two basic approaches to determine the rate of return on common share equity in the above formula:

1. the equity build-up approach; and
2. the capital asset pricing model approach (CAPM).

The equity build-up approach is similar to the risk-adjusted build-up approach discussed at heading 2.2. Using the equity build-up approach, the rate of return on equity consists of

1. a “risk free rate” and
2. premiums for risk, including, as applicable,
 - a general equity risk premium,
 - a size premium and
 - a company specific risk premium.

The main difference between the equity build-up approach and the risk-adjusted build-up model discussed at heading 2.2 is that the former focuses on the risk of a *common share equity* investment in a *company* and the resulting rate of return that common share equity investors demand, whereas, the latter focuses *specifically* on the risk and expected rate of return of a particular stream of estimated future cash flow (or foregone future cash flow).

CAPM is essentially a modification of the equity build-up approach. According to CAPM, the rate of return on equity consists of:

- a “risk free rate”;
- beta x the general equity risk premium;
- a size premium; and
- a company specific risk premium.

Beta in the above formula represents a measure of how volatile a particular company’s rate of return happens to be relative to the rate of return of the overall market. If a company’s returns increase or decrease 10% when the market’s returns increase or decrease 10% respectively, the company’s stock has a Beta of 1.0. If a company’s returns increase or decrease 20% when the market’s returns increase or decrease 10%, the company has a beta greater than 1.0. Similarly, if a company’s returns increase or decrease 5% when the market’s returns increase or decrease 10%, the company has a beta less than 1.0.

The calculation of WACC and the determination of its various components is discussed in detail in various finance and valuation textbooks.³ Therefore, we will not discuss this further.

3 Refer, for example to Brealey, Myers and Allen, *Principles of Corporate Finance*, 9/e, (McGraw-Hill Irwin), Chapters 18-20, or Shannon Pratt, *Cost of Capital*, 2/e, (Wiley), Chapter 7.

(b) Comments

The critical point to remember when using WACC to arrive at a discount rate is that the WACC reflects the risk and return associated with a *company as a whole*. In particular, the WACC makes particular assumptions.

The risk associated with a particular estimate of future cash flow is the *same* as the risk associated with the overall entity. *This may or may not be the case*. For example, assume that Company A is suing Company B for alleged unfair solicitation of the investors of Company A's hedge fund division. Company A is a financial institution whose *primary* line of business is taking deposits from customers and making secured loans. Assume that a business valuator has quantified Company A's loss as the foregone future investment returns and fees that Company A would have earned from the investors that Company B allegedly solicited. In this scenario, it is likely that the risks associated with the foregone cash flows from the hedge fund division are different (likely higher) than the risks associated with the overall banking operations of Company A. Therefore, using the overall Company WACC to arrive at a discount rate for Company A's foregone future cash flow will likely understate the discount rate and overstate the present value of Company A's loss.

All of the risks that impact an *overall* entity are relevant and apply to the *specific* estimated future cash flows in a particular loss quantification context. In other words, using the WACC assumes that the risks that impact an overall entity, such as revenue generation risks, operating expense risks, internal and external risks are *all* applicable to a particular loss quantification context. *In reality, only a small subset of those risks might apply*. For example, if a breach of contract claim involves quantifying only a *revenue* differential between a breached contract and a replacement contract (as discussed in a previous example at heading 2.2), then only those risks impacting the generation of revenue should be considered in the discount rate. Using WACC will overstate the number and severity of risks that are being considered in the discount rate and will understate the present value of the calculated loss.

The WACC may only be appropriate in those situations where the cash flow being considered in the loss quantification context *does* have similar risks to the risks of the overall entity that is generating those cash flows.

In addition, in calculating the WACC, for the purposes of determining enterprise value; business valuers may have to refer to rates of return and Betas of comparable public companies. However, for loss quantification contexts, it is the *actual* WACC of the company in question or specific project that is relevant, not comparable company data.

2.4 The Rate of Return on Equity

In addition to the WACC, the rate of return on equity might be used to determine a discount rate. The rate of return on common share equity can be arrived at using the equity build-up model or CAPM, as described at heading 2.3 above.

The rationale for using the rate of return on equity is that the foregone future cash flows that comprise a company's loss will likely ascribe to a company's common shareholders. Debt holders usually receive the first "tranche" of available cash flows, with the residual being left to shareholders.

The rate of return on shareholder equity can be used as a discount rate where a company does not have any debt financing, and the risks associated with the overall company (as reflected by the rate of return on equity) are reflective of the risk and rate of return of an estimated stream of future cash flow. However, where the risks associated with an estimated stream of future cash flow are not the same as the overall risks of the business, the rate of return on equity will not result in a conceptually sound discount rate.

2.5 The Interest Rate on Debt

In some cases the interest rate on a company's debt investments might be used to establish a discount rate for loss quantification purposes. For example, where the estimated future cash flows (or foregone cash flows) have relatively low degrees of risk attached to them or have risk characteristics that are analogous to a debt investment (see the example below), the interest rate on debt might be considered as an option for a discount rate.

For example, assume Company A is suing Company B for a breach of contract in which B reneged on a contract to purchase all of the manufacturing output produced by one of Company A's plants. Company A was able to secure a replacement contract at a lower price but all operating expenses under the replacement contract are expected to be the same as under the breached contract. As the foregone cash flow relates to a revenue differential, all the risks associated with the foregone cash flow should relate to *revenue risks*.

As Company A owns the plant and Company B is, in a manner, renting/leasing the plant from Company A (by virtue of paying for the entire output of the plant over a period of time), the risk associated with the foregone cash flow is akin to the risk of a secured debt or leasing arrangement. Company A (the plaintiff) is akin to a lessor, who owns the leased asset and whose lease contract is "secured" by the right to repossess the leased asset if lease payments are not made. Company B is akin to a lessee, who has a liability/commitment to make lease payments over the lease contract term. Therefore, *one* way to arrive at a discount rate for the foregone revenue between the breached contract and the replacement contract in this specific context might be to use the interest rate on a secured debt or the interest rate inherent in a leasing arrangement for a capital asset.

There may also be other situations where the interest rate on debt is used to establish a discount rate, such as where it can be shown that the lost cash flow would have been used to repay debt in the event there had not been a breach, and as such the discount rate reflects the cost of not repaying as planned. This approach would be applicable only if the debt to be repaid, and the interest rate thereon, reflects risks to the realization of the estimated future cash flow.

Still another situation where the interest rate on debt may be appropriate to use in determining the discount rate is where the project that would have been undertaken continued but for the breach was to be entirely funded by debt. As such, the interest rate charged in respect of that project would reflect the risk assessment attaching to that cash flow (of course consideration must also be given to cross collateralization, guarantees and collateral security).

2.6 The Internal Rate of Return

(a) Theory

The internal rate of return ("IRR") is the discount rate that will make the present value of a particular stream of future cash flows equal the amount of the investment made in order to generate those cash flows in a base year (i.e., the IRR is the discount rate that results in a *net present value* (present value of future cash flows less initial investment) of zero).

The IRR is commonly used for capital budgeting purposes, when a company is deciding whether to enter into a particular investment or a project. The "general rule" is to examine the investment required, determine the future cash flows from the investment or project, and then calculate the IRR that makes the net present value equal zero. If the resulting IRR is *higher* than the company's cost of capital or hurdle rate (i.e., the minimum acceptable rate of return that a company has to earn on its investments in order to satisfy investors), then the company should in theory proceed with the investment.

For example, assume a company has the opportunity to invest \$1,000 today (Year 0) in order to earn \$400 in Year 1, \$300 in Year 2 and \$500 in Year 3, with a recovery of \$300 of the original investment in Year 3. Assume

cash flows will be realized at the end of each year. In this case, by process of iteration or using a spreadsheet program, the IRR is calculated as follows:

$$\text{Net present value} = -\$1,000 + \frac{\$400}{(1+\text{IRR})^1} + \frac{\$300}{(1+\text{IRR})^2} + \frac{\$500}{(1+\text{IRR})^3} + \frac{\$300}{(1+\text{IRR})^3}$$

An IRR of approximately 20.3% results in a net present value of zero. If the company's required rate of return (hurdle rate) on investments is 15%, the investment should be undertaken (based only on these figures).

Some business valuers might use the IRR to calculate a discount rate in loss quantification contexts by taking an estimated future stream of cash flows and determining the discount rate that equates those future cash flows to the initial capital investment laid out to earn those cash flows.

For example, assume Company A was in the business of manufacturing a specialized kind of technology at its one and only manufacturing plant. One of the main reasons why Company A decided to build and operate its plant was a 10-year program of federal tax credits which allowed the plant to remain profitable. However, after two years of operations, the federal government cancelled its tax credit program, forcing Company A to shut down its operations. Company A is suing the government for the cash flows that it would have earned from continued operation of its plant had the government not prematurely cancelled its tax credit program.

A business valuator might compare the estimated future stream of cash flows from the plant with the initial capital investment to construct the plant and thereby calculate the IRR inherent in the venture. The business valuator might then use this as a discount rate for present valuing the future foregone cash flows that comprise Company A's loss claim against the federal government.

(b) Comments

Notwithstanding our discussion above with respect to how to *calculate* an IRR, it is *extremely* important to note that the IRR represents the *actual return* (if using actual results) or *expected return* (if using projected results) to be earned from an investment. However, the IRR does *not* represent the return that *should* be earned from an investment *given its risk*. A company may enter into an investment that generates an IRR of 20%. However, given the *risk* of such an investment, the actual risk adjusted required rate of return from such an investment might, in fact, be 25% or 30%, or, conversely, might be 15%. The IRR of an investment or future stream of cash flows will only coincidentally equal the rate of return that reflects the underlying risk of such cash flows. However, it is the latter that should be used as the discount rate for loss quantification purposes in order to place a plaintiff in the same position as if an alleged harmful act had not occurred.

In addition, there are many computation challenges associated with calculating an IRR, including the fact that a stream of future cash flows can result in *multiple* IRRs if cash flows are expected to fluctuate between positive to negative in the future, and difficulties associated with determining the cost of the initial capital investment and determining the future recovery value of the initial capital investment). We mention these here only briefly, as such challenges are discussed in depth in many finance textbooks.⁴

2.7 The Rate of Return on a Comparable Investment of Similar Risk

If sufficient information is available, one way to arrive at a discount rate for a particular stream of estimated future cash flow is to use the rate of return on investments of similar risk. For instance, if a claim for future loss deals with cash flows that have debt-like characteristics (for example where a company has an otherwise stable long-term contract to sell the entire manufacturing output of a plant), then the rate of return on debt instruments

⁴ *Principles of Corporate Finance*, *supra* note 3, Chapter 6.

might be used as a discount rate. As another example, assume that a claim for future loss deals with shares that should have been sold from Party B to the plaintiff, Party A, but which were not sold according to plan. Party A would have earned capital gains and dividend income from such shares. In this context, when present valuing the foregone capital gains and dividends that Party A would have earned, the rate of return on comparable publicly traded shares of similar risk as the ones that are at issue could be referred to in order to establish a discount rate.

The challenge is, of course, *identifying and establishing* an investment of comparable risk and calculating the rate of return for each investment.

2.8 A Prescribed Rate of Return

A prescribed rate of return is a rate of return or rate of interest that is specified in the terms of a contract to apply to overdue or unpaid amounts or that apply by way of a penalty provision if a party involved engages in a wrongful act. Take, for example, a long-term natural gas supply contract in which Company B agreed to purchase natural gas from Company A. The contract terms might specify that if Company B were to breach the contract, it would have to pay a penalty to Company A calculated as 6 months' payment of natural gas, plus interest of 6% on the penalty until the penalty is paid. Or, another contract may specify that interest of prime + 5% would be owing on overdue or delinquent contract payments.

The use of such prescribed rates of return or interest rates is certainly easy and possible to use as long as prescribed rates are mentioned in a contract. However, caution must be exercised in that the prescribed rates of return often have no correlation to the underlying risk of a particular stream of future cash flow, and therefore may not put the party back in the position they would have been but for the breach.

2.9 A Legislated Rate of Return

Another theoretical approach to set a discount rate is to use either the discount rate prescribed in the various Rules of Civil Procedure such as Rule 53.09 in the Ontario Rules of Civil Procedure, or pre- or post-judgment interest rates as set out in provincial statutes. Again, this is easy enough to do. However, these rates most likely have no bearing on the underlying risks associated with a particular stream of cash flow. Therefore, using a legislated rate of return might overstate or understate the actual risk-adjusted discount rate that should apply in a specific loss quantification context.

3. ISSUES TO CONSIDER WHEN APPLYING DISCOUNT RATES IN LOSS QUANTIFICATION CONTEXTS

There are a number of important issues that all business valuers need to be aware of when applying discount rates in loss quantification contexts.

Some of the most frequently encountered issues are as follows:

- whether to use pre- or after-tax discount rates,
- whether to use single versus dual discount rates,
- whether, and to what degree, credit risk should be included a discount rate and
- whether multiple approaches to arriving at discount rates should be utilized to corroborate each other.

3.1 Pre-Tax or After-Tax, Discount Rates and Cash Flows

One commonly encountered issue for business valuers in loss quantification contexts is whether to use pre-tax or after-tax discount rates, and whether such pre- or after-tax discount rates should be applied to pre- or after-tax cash flows.

For *business valuation* purposes, the forecasted future cash flows and discount rates are typically determined on an after-tax basis.⁵ The reason for the use of after-tax cash flows is that, in most cases, companies earn after-tax cash flows, and prospective acquirers of a company analyze their acquisition targets based on expected discretionary after-tax cash flows. Having said that, if future cash flows are expressed in pre-tax dollars, the appropriate after-tax discount rate can be adjusted (“grossed up”) to arrive at a pre-tax discount rate. For example, given an after-tax discount rate of 10%, and given that a company pays tax at 30%, the appropriate pre-tax discount rate would be $10\% / (1-30\%) = 14\%$. This can then be used to discount the pre-tax cash flows and will result in approximately the same value conclusion as if after-tax cash flows were discounted using after-tax discount rates.⁶

However, for *loss quantification* purposes, the pre-tax/after-tax question is somewhat complicated by the fact that the loss is not necessarily equal to a capital or share value and the plaintiff will often have to pay taxes on a damages award as income. The purpose of damages is to place a plaintiff in the same position as if an alleged harmful act had not occurred. If a plaintiff would have otherwise earned after-tax cash flows in the future, the calculated discounted present value of the loss should be expressed as a pre-tax amount. In this way, the plaintiff, after tax is paid on the damages award, will have the same *after-tax* dollars as if the breach had not occurred and the plaintiff had earned the particular stream of after-tax cash flows in the future.

There are two ways to arrive at the present value of future loss on a *pre-tax* basis:

1. apply an *after-tax* discount rate to estimated *pre-tax* future cash flows; or
2. apply an *after-tax* discount rate to estimated *after-tax* future cash flows, and *gross up* the resulting loss calculation to arrive at a *pre-tax* amount.

To demonstrate, assume that a plaintiff, Company A would have earned an estimated future stream of cash flows of \$10,000 per year before tax for 5 years but for the alleged harmful acts of another party. Company A is subject to a 40% tax rate. The appropriate risk-adjusted *after-tax* discount rate for the future stream of cash flow is 10%.

(a) *The “But for” Scenario*

In a “but for” world, if the alleged harmful acts had not occurred, Company A would have earned \$10,000 and paid 40% tax on such amounts. The present value of the *after-tax* cash flows would therefore be \$23,855 as presented in Figure 4.

⁵ Ian Campbell and Howard Johnson, *The Valuation of Business Interests*, pages 302-303.

⁶ *Ibid.*, page 303.

Figure 4 The “But for” Scenario

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|------------------|-----------|-----------|-----------|-----------|
| Pre-tax cash flow | \$ 10,000 | \$ 10,000 | \$ 10,000 | \$ 10,000 | \$ 10,000 |
| Tax rate | 40% | 40% | 40% | 40% | 40% |
| After-tax cash flow | \$ 6,000 | \$ 6,000 | \$ 6,000 | \$ 6,000 | \$ 6,000 |
| After-tax discount rate | 10% | 10% | 10% | 10% | 10% |
| Discount factor (mid year) | 0.953 | 0.867 | 0.788 | 0.716 | 0.651 |
| Present Value at Year 0 | \$ 5,721 | \$ 5,201 | \$ 4,728 | \$ 4,298 | \$ 3,907 |
| Total after-tax present value (i.e., Amount in hand) | \$ 23,855 | | | | |

Therefore, in order to compensate the plaintiff, any calculation of loss should leave the plaintiff with \$23,855 in hand *after tax*.

(b) Applying an After-tax Discount Rate to Estimated Pre-tax Future Cash Flows

If a business valuator were to apply the *after-tax* discount rate of 10% to *pre-tax* cash flows of \$10,000, the resulting present value of the loss would be \$39,758, as set out in Figure 5. If tax at 40% is paid on this loss award, the remaining sum of money, *after tax*, would be \$23,855.

Figure 5 Applying an After-tax Discount Rate to Estimated Pre-tax Future Cash Flows

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|--|------------------|-----------|-----------|-----------|-----------|
| Pre-tax cash flow | \$ 10,000 | \$ 10,000 | \$ 10,000 | \$ 10,000 | \$ 10,000 |
| After-tax discount rate | 10% | 10% | 10% | 10% | 10% |
| Discount factor (mid year) | 0.953 | 0.867 | 0.788 | 0.716 | 0.651 |
| Present Value at Year 0 | \$ 9,535 | \$ 8,668 | \$ 7,880 | \$ 7,164 | \$ 6,512 |
| Total after-tax present value (i.e., Calculated loss) | \$ 39,758 | | | | |
| Tax rate | 40% | | | | |
| Total after-tax (i.e., Amount in hand) | \$ 23,855 | | | | |

Therefore, applying an *after-tax* discount rate to estimated *pre-tax* future cash flows will result in a calculation of loss that will place a plaintiff in the same *after-tax* position as if an alleged harmful act or breach had not occurred.

(c) *Applying an After-tax Discount Rate to Estimated After-tax Future Cash Flows*

If a business valuator were to apply the *after-tax* discount rate of 10% to *after-tax* cash flows of \$6,000 (i.e., \$10,000 less 40%), the resulting present value of the loss would be \$23,855, as Figure 6 demonstrates. *However*, the \$23,855 is not the amount of the loss. The \$23,855 has to be grossed up for taxes, which will result in a calculated loss of \$ 39,758 (i.e., $\$23,855/[1-40\%]$). If tax is paid on this loss award, the remaining sum of money, *after tax*, would be \$23,855.

Figure 6 Applying an After-tax Discount Rate to Estimated After-tax Future Cash Flows

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|--|------------------|-----------|-----------|-----------|-----------|
| Pre-tax cash flow | \$ 10,000 | \$ 10,000 | \$ 10,000 | \$ 10,000 | \$ 10,000 |
| Tax rate | 40% | 40% | 40% | 40% | 40% |
| After-tax cash flow | \$ 6,000 | \$ 6,000 | \$ 6,000 | \$ 6,000 | \$ 6,000 |
| After-tax discount rate | 10% | 10% | 10% | 10% | 10% |
| Discount factor (mid year) | 0.953 | 0.867 | 0.788 | 0.716 | 0.651 |
| Present Value at Year 0 | \$ 5,721 | \$ 5,201 | \$ 4,728 | \$ 4,298 | \$ 3,907 |
| Total after tax present value | \$ 23,855 | | | | |
| Tax rate | 40% | | | | |
| Grossed up amount (i.e., Calculated loss) | \$ 39,758 | | | | |
| Tax on calculated loss | 40% | | | | |
| Total after tax (i.e., Amount in hand) | \$ 23,855 | | | | |

Therefore, applying an *after-tax* discount rate to estimated *after-tax* future cash flows, *and* grossing up the resulting calculated amount for taxes will result in a calculation of loss that will place a plaintiff in approximately the same *after-tax* position as if an alleged harmful act or breach had not occurred.

Note that the above results will usually *not* be obtained if a *pre-tax* discount rate is applied to *pre-tax* cash flows due to the timing and compounding effects of discounting.

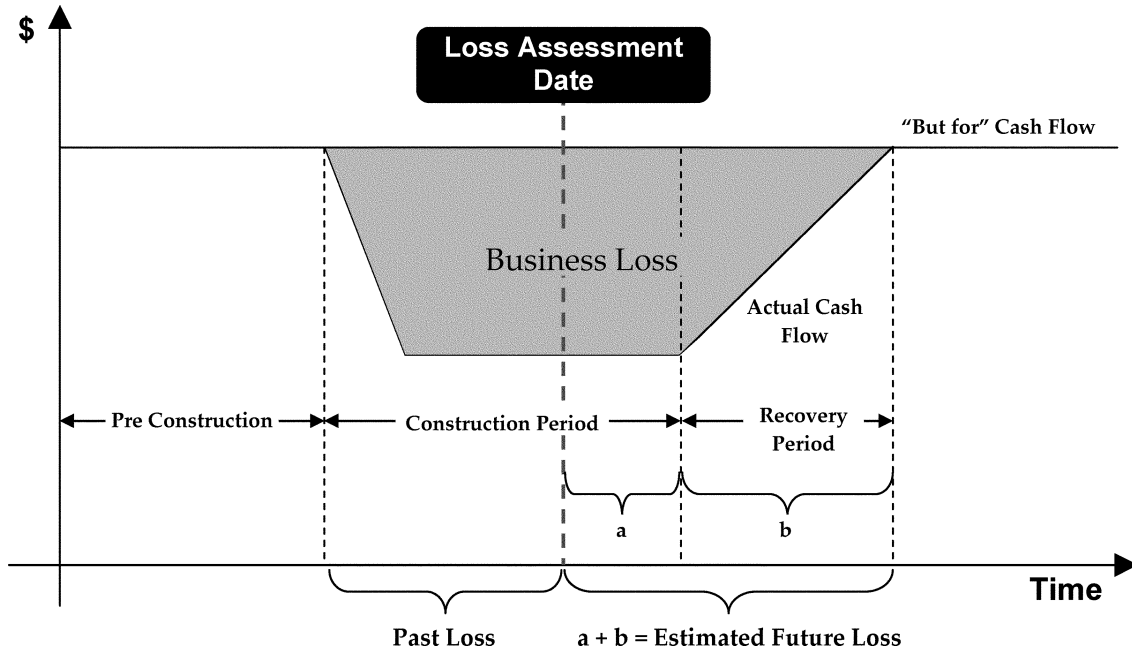
3.2 Single Versus Dual Discount Rates

In preparing calculations of loss, business valutors usually take the *net* difference between “but for” and actual cash flows (i.e., the loss) and apply a *single* discount rate to arrive at the present value of the loss. In theory, an alternative to this could be to use one discount rate to present value the “but for” cash flows, and a different discount rate to present value the actual cash flows. The present value of the loss would then be the difference between the present value of the “but for” and actual cash flows.

Let’s look at Figure 7 (a reproduction of Figure 1 for ease of reference). If a business valuator decides that it is appropriate to use dual discount rates, then the “but for” cash flow would be discounted at a particular discount

rate reflecting its risk, while the “actual” cash flow would be discounted at a particular discount rate reflecting *its* risk.

Figure 7 Past and Future Business Losses

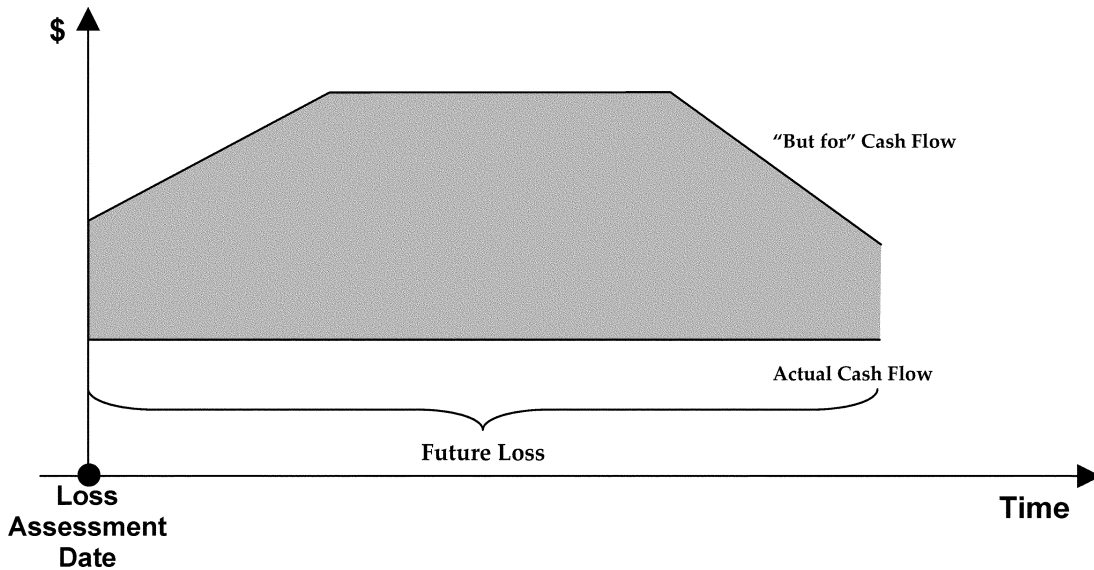


A single discount rate methodology is used more frequently in loss quantification contexts. Part of a discount rate is supposed to capture the risk associated with whether a stream of future cash flows will transpire as estimated. Therefore, the discount rate is supposed to reflect risk associated with the *difference* in cash flow between “but for” and actual (see Figure 7). In most situations, the actual results reflect similar operations, to the “but for” results and normally take place in the same jurisdiction with similar customers. Therefore, it is reasonable to use a single discount rate as the risks are similar.

In theory, a dual discount rate methodology will apply in certain circumstances where the risks associated with the “but for” and actual cash flows are significantly different such that it would be more objective to capture the risk, and determine the discount rate, for the “but for” and actual cash flows separately, rather than attempting to reflect the risk associated with just the foregone cash flows.

For example, assume that the plaintiff, Company A, was prevented from entering into a project to build power plants in the Middle East. Estimated future cash flows from this project represent the “but for” scenario. To mitigate its loss, Company A procured a large contract to perform routine maintenance for power stations in Ontario. Estimated cash flows from this project represent the actual scenario. Refer to Figure 8 for an illustration of the loss in this example.

Figure 8 Dual Discount Rate Methodology



In this specific context, the “but for” cash flow has a significantly higher level of risk than the actual cash flow. The difference in risk might be sufficiently large such that it might make sense to employ dual discount rates for the “but for” and actual cash flows.

3.3 The Inclusion of Credit Risk in a Discount Rate

Another question that arises in loss quantification contexts is whether, and to what degree, credit risk should be factored into a discount rate. The term “credit risk” can refer to different perspectives.

1. The risk that the *customers* of a particular plaintiff company will indeed pay amounts that are owing to the plaintiff company for goods and services purchased is one viewpoint. This can be characterized as a one of the plaintiff company’s *routine operating risks* and we will refer to this as “customer credit risk” herein.
2. Another outlook is the risk that the *plaintiff* company will remain financially viable such that it will continue to provide goods and services to customers and generate future cash flows. We will refer to this as “plaintiff credit risk.”
3. The final perspective is the risk that a *defendant* company will remain financially viable such that it will continue to meet its contractual or other obligations to the plaintiff company. We will refer to this as “defendant credit risk.”

(a) Tort Context

In tort⁷ situations, credit risk should usually be considered in setting a discount rate if the credit risk relates to the likelihood/risk that estimated future cash flows will be realized as forecasted. For example, assume a plaintiff,

⁷ A tort is defined as a civil wrong or injury other than a breach of contract committed against a person, business or property.

Company A, manufactures products using a proprietary technology. Company B is alleged to have unlawfully copied the technology and sold competing products. Company A is suing Company B for its lost profits as a result of alleged unlawful actions of Company B.

In this scenario, a business valuator has determined that Company A's loss is represented by its lost future sales volume and corresponding lost cash flows as a result of the unlawfully copied technology. In setting a discount rate to present value the loss, the credit risk of Company A's *customers* (i.e., customer credit risk) should be included as part of the discount rate as this has a direct bearing on how likely it is that Company A would have been able to make the lost sales and collect amounts owing to it in a "but for" scenario. This represents a "routine" risk of doing business. In addition, the credit risk of *Company A* (i.e., plaintiff credit risk) should also be considered vis-à-vis Company A's ability to remain financially viable in the future and continue to earn estimated future cash flows. The risk of financial viability of *Company B* (i.e., defendant credit risk), however, should have no impact on the discount rate as this does not have any bearing on Company A's ability to realize its estimated foregone cash flows in a "but for" scenario.

(b) Breach of Contract Context

The consideration of credit risk is somewhat more challenging in a breach of contract context.

To demonstrate, assume a plaintiff, Company A, has a long-term contract to supply Company B with electronic components. The contract was signed in 2005 and was set to run until 2015. It is currently 2008, and Company A has just been informed that Company B has terminated the contract. Company A alleges that the termination is unlawful and a breach of the contract and therefore is suing Company B.

Assume also that at the time the contract was signed in 2005, Company B was financially stable with a strong credit rating. At the termination date of 2008, Company B's financial stability has deteriorated significantly and it has a weak credit rating.

Assuming that Company B's contract termination was unlawful, Company A's loss might be represented by the foregone future cash flows that Company A would have earned from selling its electrical components to Company B over the remaining term of the contract. However, in order to present value the future loss:

- should Company B's credit risk (i.e., defendant credit risk) be considered at all, and, if so,
- how should Company B's *increase* in credit risk (i.e., decrease in credit rating) between 2005 and 2008 impact the discount rate, if at all?

With respect to whether defendant credit risk should be considered *at all*, in many situations⁸ it *is* reasonable to consider Company B's credit risk and include this in the discount rate as Company B's financial condition does impact Company A's ability to earn future cash flows under the terms of the long-term contract. Indeed, this was likely a consideration when Company A entered into its contract and may even have been reflected in the pricing terms of the contract.

With respect to whether to consider Company B's lower 2005 versus higher 2008 credit risk, some business valuers might consider Company B's *higher 2008 credit risk* in setting the appropriate discount rate. In other words, the discount rate used would be higher, to reflect the fact that, in a "but for" scenario, there would have been a heightened risk that Company B might not have remained financially viable such that it would have honoured its contract with Company A until completion. The higher discount rate reflects the risk and uncertainty associated with whether Company A would have earned its estimated foregone future cash flows under its contract with Company B.

⁸ An exception might be a situation where the defendant is in bankruptcy or insolvency proceedings, in which case credit risk might not be considered, for the reasons described below.

Other business valuers might consider Company B's lower 2005 credit risk in setting the appropriate discount rate. The rationale for this is that Company A *contracted for* a stream of expected future cash flows at Company B's 2005 credit level. Therefore, reflecting a *higher* 2008 level of credit risk would be unfair because in a "but for" world, Company A would have earned its estimated future cash flows subject to the Company B's 2005 level of credit risk. In other words, Company A is entitled to receive the sums of money it contracted for and this should not be impacted by the deterioration in Company B's credit risk.

There is no definitive answer with respect to whether or not to consider Company B's lower 2005 or higher 2008 level of credit risk in setting the discount rate in the example above. The choice rests with the business valuator's professional judgment, and with the facts of the particular context at hand.

Of course, in the above example Company A's plaintiff credit risk should be considered in setting the discount rate as this *does* have a direct bearing on whether Company A's ability to generate future cash flows in a "but for" scenario.

(c) Breach of Contract Context in an Insolvency

The situation in which there is a breach of contract and the breaching party (defendant) is involved in insolvency proceedings presents an interesting and unique example of whether credit risk (specifically, defendant credit risk) should or should not be included in setting a discount rate.

Let us assume again that a plaintiff, Company A, has a long-term contract to supply Company B with electronic components. The contract was signed in 2005, was set to run until 2015 and was allegedly unlawfully breached by Company B in 2008. The reason for the breach is that Company B has filed for bankruptcy. At the time the contract was signed in 2005, Company B was financially stable with a strong credit rating.

In this situation, Company A's calculation of loss will again be reflected by the foregone future cash flows that Company A would have earned had Company B not breached the contract. What is unique about an insolvency context, however, is that Company A's loss calculation will be used to arrive at a "claim" which will be filed, together with the claims of other secured and unsecured creditors, in Company B's insolvency. The eventual payment of Company A's claim will depend on whether there are sufficient funds available in the insolvency.

In this specific situation, the credit risk of Company B should probably *not* be considered *at all* in setting a discount rate to value Company A's loss and corresponding claim in the insolvency because the defendant credit risk that usually exists in "normal" (i.e., non-insolvency) contexts will be *dealt with through the actual insolvency proceedings that are in effect at the date of loss calculation*. In normal situations, there is a *risk*, in a "but for" world, that Company B *might* become insolvent, and that Company A might not realize its expected cash flows under its contract with Company B. This risk would probably have to be considered in the discount rate. However, now that Company B *has* actually become insolvent, the realization of Company A's claim will be dealt with through the insolvency process, through which Company A's claim may recover 100 cents on the dollar or 0 cents on the dollar depending on the funds available. To include Company B's credit risk in the discount rate would *double count* credit risk and unfairly reduce Company A's claim, as the resulting reduced claim would *then* be further reduced depending on whether there are available funds in the insolvency.

In short, the defendant credit risk that may or may not transpire in a "normal" contract scenario will be *crystallized* by virtue of the insolvency process. Therefore, defendant credit risk should likely not be considered in the discount rate in an insolvency scenario.

3.4 Using Multiple Approaches to Corroborate Discount Rates

It is always wise to cross reference and test calculations of discount rates that were arrived at using one particular approach with the discount rates implied by other approaches. This is especially the case when the choice of

discount rate has a significant impact on the discounted present value of the estimated future loss (which it usually does).

For example, using a risk-adjusted build-up model might indicate an after-tax discount rate of 15%. This is broken down as follows:

| | |
|-------------------------------------|-------------------|
| Risk-free rate of return | 4% |
| + Premium for external risks | 7% |
| + Premium for internal risks | 4% |
| = Discount Rate | <u>15%</u> |

Although the premiums for external and internal risks were arrived at through an analysis of risks and the exercise of professional judgment as described at heading 2.2, these risk premiums could potentially be corroborated by using the rate of return on equity method as outlined below.

1. Determine the rate of return on equity using the build-up or CAPM approach as outlined at heading 2.3. Say that this is 19%.
2. Subtract the risk-free rate of return to arrive at the risk premium implied in the rate of return on equity. Subtracting the risk-free rate of 4% (above) results in an implied risk premium of 15%.
3. Reconcile the implied risk premium from the rate of return on equity (15%) method with the risk premium from the risk-adjusted build-up approach (11%). For example, perhaps the specific risks of the estimated future cash flows in the loss calculation are in fact lower than the overall risks of the plaintiff entity. Hence, a lower risk premium of 11% for the specific cash flows being present valued would be justified. Or, perhaps the 15% risk premium from the rate of return on equity includes revenue and operational risks that are not all relevant when considering the cash flows that are being present valued in the loss calculation.

Alternatively, the expected rate of return on equity for comparable public companies could be determined and the implied risk premiums from these companies could be reconciled to the 11% risk premium from the risk-adjusted build-up approach in the same manner as above.

The above is just one example of using alternate methods to arrive at discount rates in order to corroborate a primary approach and obtain additional comfort that a particular discount rate determined by a business valuator is reasonable.

4. CONCLUSION

This paper opened with a quote from Galileo Galilei:

All truths are easy to understand once they are discovered; the point is to discover them.

Discount rates are similar to the “truths” that Galileo talks about. Discount rates are *easy* to understand, but only when business valuers take the time to discover and appreciate:

1. on a *first principles basis*, what discount rates are supposed to represent,
2. the various alternative methodologies to establish a discount rate in a loss quantification context,
3. the specific facts of the case at hand and
4. the fundamental issues common to many discount rate-setting contexts.

The intent of this paper is not to set out the ultimate “truth” about discount rates, but, rather, to provide business valuers with a sample of what needs to be considered in order to truly understand discount rates and

thereby arrive at discount rates that are conceptually reasonable, internally consistent, and relevant to the particular loss quantification context in which they are being applied.

Ultimately, in setting discount rates, as with all aspects of business valuation and loss quantification, the role of due diligence and prudent professional judgment on the part of business valuers cannot be stressed enough.

