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**Guest Article**

**Comparing the Butler-Pinkerton Model to Traditional Methods Under Four *Daubert* Criteria**

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Over the last two years, the authors have developed a new, empirical technique for quantifying company-specific risk (CSR). The Butler Pinkerton Model (BPM) quantifies company-specific risk premiums (CSRPs) for publicly-traded benchmarks using the following formula:

CSRPs = (Total Beta – Beta)\*Equity Risk Premium – Size Premium; where  
Total Beta = Standard deviation of stock/standard deviation of market, which is also equal to:  
Total Beta = Beta/R, where R is the correlation coefficient between the stock and the market.

Appraisers can use these benchmarks in determining the appropriate CSRPs when valuing private companies.

**Comparing CSR models under *Daubert***

The U.S. Supreme Court’s decision in *Daubert v. Merrell Dow Pharmaceuticals* (1993) set the current standard for admission of expert testimony pursuant to Rule 702 of the Federal Rules of Evidence. *Daubert* established four criteria to assess the relevance and reliability of an expert’s “scientific, technical, or other specialized knowledge.” In particular:

The inquiry envisioned by Rule 702 is, we emphasize, a flexible one. Its overarching subject is the scientific validity—and thus the evidentiary relevance and reliability—of the principles that underlie a proposed submission. The focus, of course, must be solely on the principles and methodology, not on the conclusions they generate.

By applying the *Daubert* criteria (quoted in italics, below), this article compares the BPM to the established, traditional, factor-based CSR models—also known as the plus/minus procedure, the numeric procedure, and the listing procedure. Historically, appraisers who have relied on these “factor-models” have not necessarily determined company-specific risk incorrectly. (In fact, before developing the BPM, we also used the traditional models.) We just believe the BPM is a better method—and after reading this application of the *Daubert* requirements to all the methods, we hope you do, too.

Look-back Period (years)	CSRPs when stocks adjusted for dividends		CSRPs when stocks not-adjusted for dividends	
	XOM	GE	XOM	GE
5	3.90%	3.07%	3.90%	3.08%

4	4.23%	3.06%	4.23%	3.08%
3	4.11%	2.87%	4.11%	2.91%
Assumptions: Risk-free rate = 5.0%, <b>S&amp;P 500 = market proxy</b> , size premium = -0.36%, <b>Equity risk premium = 5.0%</b> , 5-year look-back period: 9/16/02 – 9/10/2007; 4-year look-back period: 9/15/03 - 9/10/07, and 3-year look-back period: 9/13/04 – 9/10/07.				
Look-back	CRSPs when stocks adjusted for dividends		CRSPs when stocks not-adjusted for dividends	
Period (years)	XOM	GE	XOM	GE
5	5.39%	4.20%	5.39%	4.23%
4	5.85%	4.19%	5.85%	4.23%
3	5.69%	3.93%	5.69%	3.99%
Assumptions: Risk-free rate = 5.0%, <b>S&amp;P 500 = market proxy</b> , size premium = -0.36% and <b>Equity risk premium = 7.1%</b>				
Look-back	CRSPs when stocks adjusted for dividends		CRSPs when stocks not-adjusted for dividends	
Period (years)	XOM	GE	XOM	GE
5	3.37%	3.46%	3.36%	3.49%
4	3.46%	3.39%	3.45%	3.44%
3	3.26%	3.17%	3.25%	3.23%
Assumptions: Risk-free rate = 5.0%, <b>NYSE Composite = market proxy</b> , size premium = -0.36% and <b>Equity risk premium = 5.0%</b>				

### Daubert Factor #1: Testing

*"[A] key question...in determining whether a theory or technique is scientific knowledge that can assist the trier of fact will be whether it can be (and has been) tested."*

*Butler-Pinkerton Model.* The BPM has helped move the determination of company-specific risk from subjective qualification to objective quantification, from "all art" to "part art/primarily science." The technique can, and has, been tested.

For example, one can run the model using different assumptions regarding the market proxy, the equity risk premium (ERP), the size premium, and historical look-back period (including frequency measurement of beta) to check the sensitivity of the conclusions for benchmark CSRs. Results (or tests) for both Exxon Mobil (XOM) and General Electric (GE) with different assumptions (in bold) are shown above.

While the BPM technique relies upon market-derived data, it has subjective elements, as do nearly all established valuation techniques. Selecting the appropriate equity risk premium (ERP) is subjective, for example—but we do not exclude the capital asset pricing model (CAPM) or the build-up approach simply for this reason, and neither do the courts.

*Traditional models.* The traditional factor-models rely on subjective elements, requiring the expert to support and defend each assumption. Moreover, it is impossible to test the expert's listing and assignment of "points" (or some other risk allocation) to CSR factors. There is simply no empirical evidence to test. By contrast, the BPM indicates that risk premiums change over time (see the different look-back periods in the tables above). The traditional factor models, which have no raw data to analyze, cannot calculate the cost of risk over time. Despite their widespread use, which is more a function of necessity and lack of familiarity with the BPM—the traditional factor-models fail to satisfy the testing requirement.

### **Daubert Factor #2: Peer review and publication**

*"Another pertinent consideration is whether the theory or technique has been subjected to peer review and publication....Submission to the scrutiny of the scientific community is a component of 'good science,' in part because it increases the likelihood that substantive flaws in methodology will be detected."*

*Butler-Pinkerton Model.* The use and misuse of the term "peer-reviewed" was the subject of a recent article by Jay Fishman in the *Business Valuation Review* (2006). Notably, the BPM—which was published first in the *Business Valuation Review*—cleared the following peer-review hurdles: 1) an editor supervises the refereeing and publication process; 2) technical reviewers are screened for conflict of interest; 3) reviews are "double blind"; 4) the paper clearly and precisely documents underlying data, which can be replicated; and 5) the material is subject to revision per suggestions from reviewers.

To date, we have published four articles on the BPM (granted, only the first was peer-reviewed).<sup>1</sup> We have presented the technique at numerous professional conferences.<sup>2</sup> At each one, after initial skepticism and in-depth question and answer sessions, most participants appeared to find the technique sound and superior to traditional models.

The BPM is based on theories and calculations developed by Aswath Damodaran, Ph.D. (New York University), specifically his Total Beta concept, introduced in 1999. To date, we have seen no criticism of the technique and have seen other professors defer to it. (Prof. Damodaran has also told us that he likes the BPM.)

We have spent the last year or so carefully listening to and processing the questions and concerns of our peers, which have substantially helped refine the model. So far, no feedback suggests the BPM is inferior to the traditional, subjective models. In fact, Prof. Ashok Abbott (West Virginia) provided this peer-review related to the Total Beta concept:

Use of standard deviation as a measure of the risk of an asset in a stand-alone situation is quite appropriate. Market-based beta is an appropriate measure of risk for an asset held in a diversified portfolio. This is widely accepted and you can cite a number of finance text books on this. *Hopefully your presentation helped individuals to move from subjective measures towards considering objective measures.* (Emphasis added)

We understand that change is difficult and requires time for practitioners to process. Hopefully, this article sheds additional light on the BPM and how appraisers can better use it to defend their work. In due time, we fully expect this technique to become the de-facto standard on CSR.

*Traditional models.* While the traditional factor-models have been published, they are not really subject to peer review. There is no data to review, verify, or validate. Thus, any peer reviews would have to be subjective.

### **Daubert Factor #3: Error rate**

*"...The court ordinarily should consider the known or potential rate of error."*

*Butler-Pinkerton Model.* The BPM has established standards to control application of the technique, particularly in the use of statistical data. For example, if the T-stat obtained in the regression analysis (of stock returns to the market proxy) is less than 80%, then the analyst should seriously consider excluding the benchmark's CSRP. As a reminder, the T-stat indicates how confident the analyst is that the slope of the regression line, also known as the stock's beta, is different than zero.

Also, keep in mind the total cost of equity (TCOE) (as calculated by the equation:  $TCOE = \text{Risk-free rate} + \text{Total Beta} * \text{ERP}$ ) is 100% accurate as far as the required rate of return for the stock as a standalone asset. The BPM allocates the total risk between systematic risk, the size premium, and company-specific risk. If the T-stat is less than 80%, then it's not the TCOE that's subjective but the allocation of the total risk amongst the various components.

*Traditional models.* The established standards of the traditional factor-models are not rooted in empirical evidence. Thus, there is no basis on which to calculate an error rate. Generally, the range of possible conclusions for CSR under these models has been -3% to 15%. According to the BPM, however, an absolute negative CSRP is impossible (or, at least, exceedingly unlikely). And why is 15% the maximum? The BPM has calculated CSRPs greater than 15%. In short, the range of possible conclusions is not based on market-derived data and may very well be incorrect.

### **Daubert Factor #4: Acceptance**

*"Finally...widespread acceptance can be an important factor in ruling particular evidence admissible..."*

*Butler-Pinkerton Model.* Based on continued education and application of this new technique—and given its peer-review, its publication, its testing and control for error, the BPM should become the standard on quantifying CSR. While subjectivity remains, nothing makes the BPM inferior to the purely subjective models.

We are actively using the technique in current appraisals, including litigated matters. In presenting the BPM to the courts, we anticipate making the following comparisons to the traditional factor-models:

1. The BPM provides multiple benchmarks for determining a subject company's CSRP. Traditional models provide one benchmark, which may be incorrect and low by assuming a starting point of 0%.

2. The BPM framework is based in empirical support, whereas the traditional models have an artificial and incorrect framework.
3. The BPM uses the same data that analysts use to calculate betas, ERPs and size premiums.

Moreover, the Total Beta concept is an extension of Beta and the CAPM—a Nobel-prize winning theory. The CAPM may only explain 1%, for example, of a stock's price movement in a well-diversified portfolio. By contrast, the Total Beta technique explains 100% of the required stock's return as a standalone asset (subject to assumptions). Those numbers are compelling.

*Traditional models.* Up until now the appraisal community has accepted the traditional factor-models without the benefit of the BPM. We are not asking appraisers to abandon these methods; we are simply recommending that appraisers no longer use them in isolation. The BPM provides an additional framework, based on market-derived data that provide empirical reference points, to analyze the public disclosures of publicly traded benchmarks.

### **Older models, alone, may not be defensible**

Given the introduction of the BPM, appraisers may no longer be comfortable defending a determination of CSR using only a factor-model, especially if an opponent combines insightful analysis with the empirical reference points provided by the BPM. "Judgment and experience" alone may not be enough to survive a *Daubert* challenge in light of the availability, through application of the BPM, of market-derived evidence.

*Introducing the BPM-CSR Calculator.* One of the stumbling blocks to wide acceptance of the BPM is the difficulty in calculating the CSRPs for guideline publicly traded stock. It is a lot easier to use the factor-models without having to calculate Beta, Total Beta, and perform regression analyses, among other procedures. Fortunately, we've launched a new web-based program: the Butler Pinkerton Model—Company-Specific Risk Calculator. This new software, now available through BVRresources, can calculate CSRPs for twelve different benchmarks in a matter of seconds. With the calculations at appraisers' fingertips, there will no longer be any impediment to analyzing the data and making informed, educated determinations of company-specific risk based on empirical evidence.

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1. "Company-Specific Risk – A Different Paradigm: A New Benchmark," *Business Valuation Review* (Spring 2006 – Volume 25, No. 1). This article introduced the Total Beta concept developed by Prof. Damodaran and our refinement which yields the BPM.  
"Quantifying Company-Specific Risk: A New Empirical Framework with Practical Applications," *Business Valuation Update* (Feb. 2007). The article provided a detailed example of how to select a CSR for a privately held company using benchmark CSRPs derived from guideline publicly traded companies. A follow-up article, "Quantifying Company-Specific Risk: The Authors Answer Your Questions," *Business Valuation Update* (May 2007) answered insightful questions we received during our March 8, 2007 teleconference sponsored by Business Valuation Resources.  
"Company-Specific Risk and the Dow 30," *The Value Examiner* (Sept./Oct. 2007). This article showed that the largest companies in the world exhibit CSR and asked the question why appraisers start at a 0% CSR when valuing privately held companies. (Answer: We shouldn't.)

2. In addition to the March 2007 BVR teleconference, we have presented at: the New York State Society of CPAs in May 2007; to a regional accounting firm at their annual business valuation conference in May 2007; to the Institute of Business Appraisers at its 2007 Symposium in June 2007; and to the American Society of

Appraisers at its annual Advanced Business Valuation Conference in October 2007.

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Commentary:  
**None**



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