
VALUE WIZARD INSIGHTER - May 2000

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In this issue:

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1. Investment Ideas

There is a new page at the Value Wizard website for investing ideas. The address is www.numeraire.com/value_wizard/ideas.htm, and it can be accessed from the Value Wizard main page. You are invited to join in the discussion at the new Value Wizard Stock Talk online discussion forum.

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2. World Stock Exchanges

You can now access the suite of models with a main page that has a broader international perspective. The address of the new portal is www.numeraire.com/exchanges/ and is announced here only, for the benefit of readers of this newsletter, at least until the directory of world exchanges is completed. So be sure to bookmark this new page if you want to use it.

Our goal is to enable any investor anywhere in the world at any time to access our free, online, interactive, valuation and related models -- preferably in his or her local language and currency, with example calculations using a local widely-held stock on a local stock exchange, and with automatic local stock price retrieval.

These models may guide investors to reasonable stock valuations, serve as an antidote to "irrational exuberance", and help stabilize capital markets worldwide — while minimizing the unavoidable conflicts of interest with academia, the finance industry, and deadline journalism.

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3. Pricing Effects

Sometimes people are interested in predicting short-term stock prices as opposed to estimating long-term values. For this purpose, they use pricing models instead of valuation models. Anomalies in financial asset pricing represent mispricing. Theoretically, in an efficient stock market, anomalies are not supposed to occur because an investor could make money by arbitraging the difference in average risk-adjusted return. A pricing effect that is logically independent of return is a genuine anomaly. A pricing effect that is not logically independent of return is a fallacy.

For example, most researchers, financial journalists, investment managers, and investors appear to believe that small-cap stocks on average earn larger risk-adjusted returns because these stocks as a group on average over time usually are anomolously priced in the conventional capital asset pricing model (i.e., the coefficient of the size variable is statistically significantly different from zero at conventional levels of probability). This is referred to as the size effect where size is measured by market capitalization, or number of shares outstanding multiplied by share price.

Another pricing effect is the value-ratio effect, where the value ratio is measured by the book-to-market value ratio. The simplistic value ratio is commonly used as an indicator of certain styles of investing. Thus, companies whose stocks rank high in book-to-market value are labeled value stocks, and companies whose stocks rank low in book-to-market value are labeled growth stocks. [See the Value and Growth Investment Styles page at www.numeraire.com/styles.htm.]

It is possible on occasion to beat the market by investing in small-cap stocks only, and also to beat large-cap stocks. For comparison purposes, the market is represented by some representative proxy such as the S&P 500 Index or the Wilshire 5000 Index. Likewise, it is possible on occasion to beat the market by investing in stocks whose ticker symbols begin only with a letter in the first half of the alphabet, *A* to *M*, and also to beat stocks whose ticker symbols begin with a letter in the second half of the alphabet, *N* to *Z*. Such transient performance comparisons are not the main point. What is important is that there is no reason to expect stocks in any particular market-cap size category to outperform stocks in other market-cap size categories or to outperform the market on any occasion

As a thought experiment, lets look at price anomalies by way of an analogy. The analogy is meant to simplify the analysis for presentation, but does not distort our conclusions.

First, imagine that we list all common stocks in a given universe of stocks in alphabetical order by their ticker symbols, and group each stock into its corresponding portfolio labeled by one of the alphabet characters For example, Agilent Technologies Inc., ticker symbol A, goes into the *A* portfolio; Barnes Group Inc., ticker symbol B, goes into the *B* portfolio; Citigroup Inc., ticker symbol C, goes into the *C* portfolio, ... , and Venator Group Inc., ticker symbol Z, goes into the *Z* portfolio. The number of stocks in each such lexical portfolio may vary widely.

Lexical: A B C D E F G H I J K L M N O P Q R S T U V W Y Z

Next, imagine that we list all these common stocks in order of magnitude of their total return during some historical holding period. The beginning and ending times necessarily must be chosen arbitrarily, and makes a critical difference in performance results. The holding period is often a number of calendar years. In our experiment, we use stock returns for the latest calendar year. Total return is share price appreciation (capital gain) plus cash dividends per share. Then we group the stocks into 26 nearly equal-sized portfolios, and label them from *A* to *Z,* from highest to lowest return. The number of whole stocks in each return portfolio will be equal or vary by one. Assuming 6,500 stocks in our universe (NYSE, Amex, and NASDAQ), there would be exactly 250 stocks in each portfolio.

Return: Low A B C D E F G H I J K L M N O P Q R S T U V W Y Z High

Finally, imagine that we list all these common stocks in order of magnitude of some effect such as their size as measured by market capitalization at some common date and time, say the market close on the last trading day of the historical holding period. Then we group this universe of stocks into 26 nearly equal-sized portfolios without dividing any stock into two parts. The number of whole stocks in each size portfolio will be equal or vary by one. Since size is reported by some academicians to be inversely related to total return, we inverse the ranking from descending to ascending order, and then label each size category *A* to *Z*, from smallest to largest.

Size: High A B C D E F G H I J K L M N O P Q R S T U V W Y Z Low

We now have grouped the same universe of common stocks into different sets of 26 portfolios labeled *A* to *Z*. We assign each portfolio to a bead on a string of 26 beads. We use the following two rules about the colors and the shapes of beads for each string.

Rule One -- Bead Shape: If the portfolios in a set are grouped on an effect that is mathematically *independent* on return, then we assign all the beads on the string a unique shape other than the sphere. As a special case, if the effect is both *independent and also random*, then we assign the cube shape, like a die in a pair of dice. All dependent effects are represented by the sphere shape, the same as return, and are both mathematically and logically circular with return.

Rule Two -- Bead Color: If the portfolios in a set are grouped on an effect that is mathematically *independent* of return, then we assign all the beads on the string a unique color other than white. As a special case, if the effect is both *independent and also random*, then we assign the color black. All dependent effects are represented by the color white, the same as return.

	Order of Beads on the String	Shape of Bead	Color of Bead	String Type: Explanatory
1.	return	sphere	white	[explained]
2.	lexical	cube	**black**	random
3.a.	inverse size	ellipsoid	"**red**"	fallacy
b.	inverse size	ellipsoid	white	fallacy
4.a.	value-ratio	ellipsoid	"**blue**"	fallacy
b.	value-ratio	ellipsoid	white	fallacy
5.	R&D expense	tetrahedron	**green**	anomaly

Please observe that all strings of beads are in alphabetical order from *A* to *Z*, but only the lexical string of beads is also in actual lexical order from *A* to *Z*. If a string of beads is masquerading as an independent effect with a unique non-white color, we refer to its shape as an ellipsoid, a modified sphere. All the beads on the same string are the same color and the same shape. The string order to be explained is return. A random effect has no explanatory power. The explanatory string orders are those of size, value-ratio, R&D, or other non-random effect, and they may be either fallacies or genuine anomalies.

If an effect is assigned the color white, then regardless of its shape, it is not independent and thus not scientifically interesting. Black effects are totally independent because they are random. If an effect is neither white nor black, then it is independent and thus interesting and potentially economically important. White effects explain everything because they are circular, and thus meaningless. Black effects are just the opposite — they explain nothing. Effects of any color other than white or black offer partial explanations.

We can compare two strings of beads by measuring their coefficient of correlation, where positive 1 is perfect positive correlation, negative 1 is perfect negative or inverse correlation, and zero is absolutely no correlation between two sequences of numbers. Each bead on a string is represented by the average value of the variable of interest for the stocks assigned to the portfolio represented by that bead. It is important to remember that mere correlation is not necessarily causation. But causality between two variables is accompanied by high absolute value of correlation.

When we compare the lexical string with the return string, would we expect to see a high correlation between the averages of the contents of the portfolios with the same bead labels *A* to *Z*? No, because the lexical string order is logically independent of return string order. In addition, the lexical string order is effectively random in its association of stock returns with portfolios -- it is mathematically equivalent to a blindfolded dart-throwing monkey.

Random: A B C D E F G H I J K L M N O P Q R S T U V W Y Z

When we compare the inverse size string with the return string, would we expect to see a high correlation between the averages of the contents of the portfolios with the same bead labels *A* to *Z*? Yes, because size is a mathematical transform of return, i.e., size is included in the definition of return. In our experiment, this transform is equivalent to changing the shape of each white bead from a sphere to an ellipsoid and calling its color red. Therefore, the change in color of the return string from white to red is a meaningless distraction because it does not change the order of the beads on the string which is what is critical. The change in color from white to red merely gives the appearance of meaningful difference and serves as a camouflage. The red beads are a red herring. What is important to observe is the transformation of shape which rarely is acknowledged explicitly. Mathematical transforms add no new information.

The same argument for the size effect applies to the value-ratio effect, which also is a mathematical transformation of return. Since the value-ratio is not independent of return, its color is white and its shape is an ellipsoid, even though some may call its color blue.

Value-Ratio: Low A B C D E F G H I J K L M N O P Q R S T U V W Y Z High

In the case of a mathematically independent effect such as a company's annual research and development expenditures (R&D), there is a non-white color, say green, and a non-spherical shape, say a tetrahedron. The number of whole stocks in each return portfolio will be equal or vary by one. Assuming 10% of the 6,500 stocks in our universe (NYSE, Amex, and NASDAQ) have meaningful annual R&D expenditures or 650 R&D stocks, there would be exactly 25 stocks in each portfolio.

R&D Expense: Low A B C D E F G H I J K L M N O P Q R S T U V W Y Z High

Is sum, it is not surprising that any white-color effect is highly correlated with the white-color return. All white-color effects have the same order. The main point is that it makes as much or as little sense to buy stocks that are in a particular size category or fit a particular investing style as to buy stocks that begin with a certain ticker symbol character.

I hope this analogy has not been too abstract and thus more confusing than if I spoke directly in terms of capital asset pricing models and their anomalies. I'm sure serious researchers and econometricians are shaking their heads at the looseness of this presentation, but the intent is to make this material accessible to a broader audience.

The size of stocks, investment style, and similar non-independent effects give academicians something to research and publish, journalists something to meet deadlines with, and gurus and pundits something to appear expert about. It would not seem professional to have an article headline in *The Wall Street Journal* stating "*R* Stocks Dive and *U* Stocks Rise in Active Trading", but effectively this can be seen in almost every issue, along with commentary about divergence between size categories (*R*'s, *U*'s, and other characters) and the rotation of market leadership between the investment styles (*R*'s, *U*'s, and other characters), including appropriate language such as

"some analysts say", "may occur", and other qualifying words. But hey, it sells newspapers, advances academic careers, and gives unheeding investors something to believe in and follow.

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4. Research Findings

Sometimes scholarly research produces unexpected results that have a large wide-ranging impact. One such finding occurred in my study of capital market pricing, in contrast with private market valuation. As you know, price is not value. In this study, it was found that the size of a joint-stock company, as measured by its stock market capitalization, is not an independent factor that determines stock returns because it is logically circular in financial asset pricing models. Nevertheless, the generalized "size effect" and its corollary, the small-cap or small-firm effect, live on.

It is desirable to make these research findings as widely available possible and as soon as possible. Since discovery, this and other original research findings have been placed by me in the public domain, but only in a doctoral dissertation dated May 1996 and in electronic documents published online since then. To ensure greater accessibility by interested persons, the major findings are being summarized in papers submitted to the top academic journals in related disciplines.

Six working papers have been written about the findings of my original research in financial economics in the area of capital markets. Three of these papers are closely related. Their short titles are Critique, Static R&D Effect, and Dynamic R&D Effect. The Critique paper logically precedes the other two papers and should be read first. All three have been submitted to academic journals for publication, and all three have their abstracts published online at www.ssrn.com/fen/ [www.numeraire.com/abstracts.htm]. All three have so far successfully sustained the challenges of facts and arguments by anonymous reviewers and the selected editors of the respective journals, yet the exposition of none of the three papers meets the standards of these scholarly journals.

Recently, on 6 March 2000, a professor of finance kindly recommended to me a book on writing economics and referred me to a professional copy editor. Both were a tremendous benefit. The first paper, titled "Critique of Asset Pricing Circularity", was revised and submitted to another journal. Although the latest revised manuscript will not be made available online to the public until it is accepted for publication by a journal, the progress of the papers is logged here for the record.

1995 June 13: The Critique paper is first submitted to an academic journal for publication, the *Review of Financial Studies*. My rebuttal dated **October 1995** to the two referee's reports dated **26 September 1995,** agrees that the exposition needs improvement, and shows that the referee's other points are either irrelevant, insignificant, or wrong.

1995 July 6: The Static R&D Effect paper is first submitted to an academic journal for publication, the *Journal of Financial Economics*. My rebuttal dated **25 September 1995** to the referee's report dated **15 September 1995**, agrees that the exposition needs improvement, and shows that the referee's other points are either irrelevant, insignificant, or wrong. The referee's report said: "be more persuasive if R&D could be shown to be a significant explanatory factor for equity returns *after* controlling for the firms' book-to-market ratio and size." [italics in original].

1995 August 29: The Dynamic R&D Effect paper is first submitted to an academic journal for publication, the *Journal of Financial Economics*. **:** My rebuttal dated **23 October 1995** to the referee's report dated **16 October 1995**, agrees that the exposition needs improvement, and shows that the referee's other points are either irrelevant, insignificant, or wrong.

1995 July 20: The submittal of the Critique paper to the first journal is acknowledged as received by the *Review of Financial Studies* (RFS), a new journal for both theoretical and empirical research. In a letter to me dated **26**

September 1995, the editor for the paper writes: "While your manuscript contains some interesting ideas, they are not sufficiently developed to warrant publication in the RFS. One of the anonymous referee's concludes: "Unfortunately, the insight itself is not original -- it is contained in a recently published paper by Berk (RFS, Vol. 8, No. 2). The paper develops the point in a different way, so the decision whether this paper should be published rests on whether the difference in approach yields an important enough insight to warrant publication in the *Review*." Another anonymous referee's concludes: "Much of the author's point is made in another paper by Jonathan Berk in the Review of Financial Studies in 1995. Berk argues that the small firm effect is actually a market value effect like the book to market effect. He doesn't find that accounting measures of size predict returns, but market value of equity does." This paper by Berk appeared in Vol. 8 No. 2 Summer issue of RFS, received by me on 25 September 1995 as part of my new subscription to the RFS, and stamped as received at my local university library on 2 June 1995. As it turns out, the conclusion of my paper is diametrically opposite to Berk's paper, which is another example of the "size effect" fallacy. Thus, it appears that I failed to clearly communicate my research findings.

1996 May 25: The doctoral dissertation entitled *Capital Market Efficiency of Firms Financing Research and Development* is published by UMI Dissertation Services (UMI Number 9624265). One member of my dissertation committee openly opposed the inclusion of my original research findings that successfully challenged some of the received academic dogma in financial economics.

1997 February 27: The submittal of the Critique paper to a second journal is acknowledged as received by American Economic Review (AER), a long-established journal for general economic empirical research. The editor for my submitted paper is identified in a letter to me dated **3 March 1997**. In a letter to me dated **20 May 1997**, the editor replies: "The submission is not suitable for the AER. I share the reviewer's assessment, however, that you are writing on an interesting topic. ... One of the specialty finance journals might prove an appropriate outlet for this research."

1997 June 28: I write a letter to Professor Eugene Fama to clarify three points in a cited article co-authored with Kenneth French (JFE 33, 1993, 3-56). One point appears to be a strategic ambiguity. My original letter with Fama's replies hand-written in the margin and initialed by Fama is returned to me by post dated **3 July 1997**.

1997 November 12: Abstract of the Critique working paper is posted online at SSRN FEN.

1997 November 21: A copy of the then-latest draft of the Critique paper dated 31 October 1995 is sent to Bill Schwert, Social Science Electronic Publishing, per request of Marianne Stevens, production editor for Financial Economics Network Working Paper Series for Capital Markets (SSRN FEN WPS Capital Markets). FEN reference number is JFA:C-WPS98-116. For some reason, this paper initially did not receive an FEN reference number as did the next two papers, but my follow-up lead to a number being assigned to it.

1997 November 29: Abstract of the Static R&D Effect working paper is posted online at SSRN FEN. FEN reference number is JFA:C-WPS98-106.

1997 November 29: Abstract of the Dynamic R&D Effect working paper is posted online at SSRN FEN. FEN reference number is JFA:C-WPS98-107.

2000 March 27: After revision, the paper is sent to a professional copy editor. After it is returned on 13 April 2000, another revision is made to improve the exposition.

2000 April 26: The submittal of the Critique paper to a third journal is acknowledged as received on 26 April 2000 as MS#226-00 by the *Journal of Finance* (JF), an established journal with a emphasis on empirical research. The JF policy is to complete their review within 100 days or else return the submittal fee.

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