

# Galileo's View of Equity Investing

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Galileo Galilei (1564-1642), notable scientist and astronomer of the Medici royal court in 17<sup>th</sup> Century Florence, had a problem. In his time, the prevailing view held that the earth was the center of the universe, with the sun revolving around the earth and the stars occupying fixed places in the night sky. This "geocentric" view of the world was developed by the ancient Greeks, Aristotle and Ptolemy, and held sway since the 4<sup>th</sup> Century, BC. However, Nicolaus Copernicus (1473-1543), a Polish scientist, had offered proofs of an alternative view of the organization of the universe. Copernicus posited that the sun was at the center while the earth and other planets revolved around the sun and the earth rotated on its axis to account for the daily appearance of the sun in its journey from the east to west horizon each day. Copernicus' "heliocentric" theory was further supported by the works of German mathematician Johannes Kepler (1571-1630). Galileo's review of their work, along with his own substantial observations of planetary movement, led him to believe that Copernicus was right.

Galileo's problem was that the Catholic Church, which was the prevailing authority over Italy and much of Europe at the time, had based a significant amount of theological doctrine on the notion that man is at the center of the universe. Copernicus' theories didn't fit with this view. In 1616, a formal Inquisition into the Copernican theories rendered the judgment that these theories were false and that anyone who believed otherwise was violating the laws of the Church. It is no surprise that Church authorities were unwilling to alter a belief system that had been the consensus view throughout the entire existence of Christianity. In the day, heretics were commonly burned at the stake, thus Galileo's dilemma.

For many years, Galileo avoided direct, public discourse of the geocentric vs. heliocentric theories. However, in 1626, he published an extensive work entitled "Dialogue" which expounded on several of his scientific works, observations and theories. In the book, he offered strong arguments in support of the sun as center of the universe. While he did not directly pronounce this to be the correct theory, his intent was obvious. The Pope called him to Rome, where he was tried and found guilty of heresy in the Inquisition Court and excommunicated. He escaped death by recanting his arguments, but he was sentenced to house arrest until his death in 1642. For over 100 years after his death, major universities in Europe continued to teach the geocentric system. In 1992, 350 years after his death, Pope John Paul II lifted Galileo's excommunication.

Galileo's story is illustrative of how a commonly held belief can become so ingrained in the public conscience that it can survive long after contrary evidence arises. Entrenched belief systems are not easily altered. People whose careers and status are based on these beliefs will vigorously defend the false belief systems, even in the presence of contrary evidence. Self interest clouds the enlightened view!

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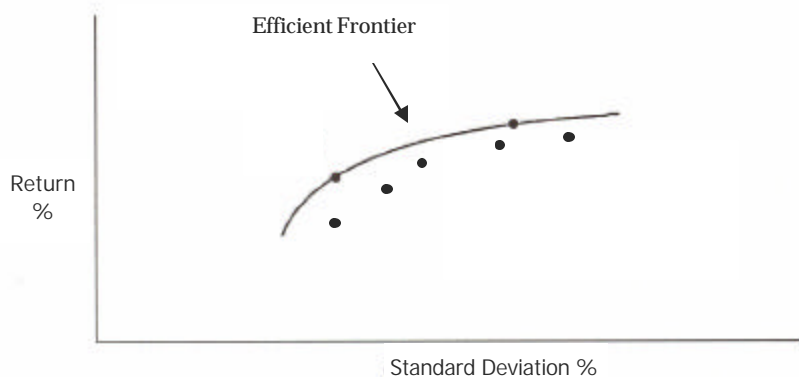
## Investment Belief Systems

One of the central beliefs of the investment realm is that “returns and risks are positively correlated.” This means that an investment category which offers high returns over time will also have higher risk associated with its returns. Risk is classically defined as the volatility (ups and downs) of returns in a short period as compared to the long term average return.<sup>1</sup> The precise statistical measure of risk is usually the annualized standard deviation of monthly or quarterly returns. What investors really want to know about risk is this: “If I invest in this asset, with an expected return in mind, what are the chances that my actual return in the next one year (or longer) is significantly less than expected?” The higher the standard deviation of a category, the greater your chances of such a negative outcome.

There is considerable evidence that this rational relationship between risk and return exists for distinct asset types. For example, a review of historical data shows that 90-day Treasury bills have lower risk and lower returns than 30-year Treasury bonds. Bonds have less return and less risk than equities. Most other asset class category comparisons line up in the same way. Every text book on finance and investment has a graphical representation of this return and risk relationship that looks something like **Figure 1**, where the return and risk show positive correlation.

**Figure 1**

### **Efficient Frontier – Investment Categories plotted on the risk and return scales**



The problem arises when we attempt to apply the “higher return = higher risk” belief system within the equity asset class. Modern equity investment discussions focus on the attributes of the so-called “style boxes” – subsets of equities divided by capitalization and style characteristics. In the conventional view, any subset category that has higher than market returns should also have higher than market standard deviation (risk). Also, any category with systematically lower returns should have lower risk. While the majority of market participants hold this view, historical data doesn’t support it.

**Table 1** shows the return and risk attributes of the Russell Company Style/Capitalization Indexes since their 12/31/85 inception. Russell uses a combination of price to book valuation and expected future earnings growth to separate stocks into their respective style indexes. These indexes are the most widely used in the investment industry.

**Table 1**

Russell Index Return &amp; Risk Data 12/31/85 to 6/30/05

<b>Index</b>	<b>Annualized Return (%)</b>	<b>Standard Deviation (%)</b>
Mid Cap Value	13.95	14.90
Small Cap Value	12.81	16.17
Large Cap Value	12.77	14.37
Mid Cap Growth	11.75	21.70
Large Cap Growth	10.53	18.23
Small Cap Growth	7.13	23.72
Russell 3000	11.74	15.46

*Source: Russell/Mellon Analytical Services*

For a longer term view, **Table 2a** shows the risk and return attributes of the subcategory data as found in the Ibbotson Associates' "Stocks, Bonds, Bills and Inflation 2005 Yearbook"<sup>2</sup>. The SBBI database is highly regarded for accuracy and completeness within the professional and academic worlds. They employed the Center for Research in Securities Prices (CRSP) to recreate the subcategory indexes back to 1968, with the style separateness based on price to book values.

**Table 2a**Total Returns and Standard Deviation of Value and Growth  
Summary Statistics of Annual Returns from 1969 to 2004

<b>Series</b>	<b>Geometric Mean (%) Return</b>	<b>Standard Deviation (%)</b>
IA Large-cap Growth Stocks	9.3	20.3
IA Large-cap Value Stocks	11.0	16.8
IA Mid-cap Growth Stocks	9.8	22.0
IA Mid-cap Value Stocks	14.0	19.3
IA Small-cap Growth Stocks	9.3	24.8
IA Small-cap Value Stocks	15.4	21.6
IA All Growth Stocks	9.3	19.9
IA All Value Stocks	11.6	16.9

*Source: Ibbotson Associates - Stocks, Bonds, Bills & Inflation 2005 Yearbook*

**Table 2b** ranks the style categories based on the return per unit of risk over the periods. Mid Cap Value has been the best category for risk adjusted returns, followed closely by Small Cap Value.

**Table 2b**

Ibbotson Associates Sub Categories Ranked by Return per unit of Risk

<b>Category</b>	<b>1969 to 2004 Return ÷ Risk</b>
Mid Cap Value	0.73
Small Cap Value	0.71
Large Cap Value	0.65
Large Cap Growth	0.46
Mid Cap Growth	0.45
Small Cap Growth	0.38

*Source: Ibbotson Associates - Stocks, Bonds, Bills & Inflation 2005 Yearbook*

While we've offered these two databases, there are several others of merit such as the Fama and French<sup>3</sup> database, Wilshire database, and a variety of more precisely defined studies of growth and value linked returns from researchers such as Lakonishok, Shleifer and Vishny<sup>4</sup> and David Dreman<sup>5</sup>. All deliver the same startling conclusion: over time, value stocks deliver higher returns with lower risk than their growth counterparts. As noted in the SBBI 2005 Yearbook, "Value significantly outperformed growth across the market capitalization spectrum. In addition to outperforming their growth counterparts, value series did so with lower volatility. The traditional risk-return tradeoff does not seem to hold with regard to the split between growth and value. The value series are offering more return and less risk." According to the conventional views, this can't be!

### Common Practices

In light of the superior nature of the value category's returns per unit of risk, there are several common behaviors among investors that can only be explained by the power of the conventional belief systems. For example, given the high return profiles of small and mid cap value stocks you would assume that investors with long term horizons would concentrate their equity exposures there. Yet, we find that these are the least used investment categories.

Hewitt Associates, the large 401(k) administrator, shows that 401(k) investors in the Funds that Hewitt administers have put a scant 2.5% of their assets in mid cap and 5.0% in small cap equities as of 6/30/05.<sup>6</sup> **Table 3** shows the Morningstar database tally of all mutual fund dollars invested in the domestic equity style boxes as of 6/30/05. As you can see, investors have chosen Small Cap Value and Mid Cap Value for the smallest amount of assets. Small Cap Growth, the poorest risk adjusted return category over time, gets greater investor participation than the best risk adjusted return category, Mid Cap Value. The historical data obviously has little influence over most investors.

### **Table 3**

Assets Invested in Domestic Equity Mutual Funds  
Allocated to Morningstar Style Boxes – 6/30/05

	<b>\$ in Billions</b>		
	<b>Growth</b>	<b>Core</b>	<b>Value</b>
Large	654.6	954.6	716.4
Mid	182.4	130.8	121.1
Small	134.0	165.5	83.6

Source: Morningstar Principia

The academic community also has a problem with the historical data. The so-called Efficient Market Hypothesis (EMH) holds that all stocks are correctly or "efficiently" priced. That is, each stock has, at all times, a price which fully and correctly reflects the risks of that stock. Sometimes you will hear the EMH stated as "you can't beat the market." This means that you can't estimate a true value for any stock better than the stock market does. It also means that you can't construct a portfolio of stocks with higher returns than the broad market, unless you take greater risk. Yet, the data shows that both Large Cap Value and Mid Cap Value indexes offer higher return and lower

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risk than the broad Russell 3000 Index. The only way the EMH theorists can explain this data is to postulate some “notional risk” that can’t be measured. Some have argued that value stocks have higher risk to bankruptcy (not evident in research on the subject) or that investors are uncomfortable holding value stocks while they enjoy holding growth stocks despite their poor returns.

When Eugene F. Fama (*University of Chicago Graduate School of Business*) and Kenneth R. French (*Tuck School of Business at Dartmouth College*) published their 1992 study “The Cross-Section of Expected Stock Returns”<sup>3</sup> which documented the significant excess performance of value stocks and small cap stocks from 1963 through 1990, leading academics predicted that if the value advantage existed, this widespread publicity would result in a rush of investors seeking to cash in on value stocks. With the inflow of new money, they predicted that the value advantage would be arbitrated away. In fact, value stocks did lag the tech-led bull markets of the late 1990s. However, this was no surprise as value always lags when the markets are driven to madness by excessive speculation. Once the bubble burst, the value advantage returned with a vengeance. When viewed over the 13 years since the Fama and French study, value’s higher return, lower risk profile remains intact. And yet, as we see in **Table 3**, value remains the least favorite category.

Of course, there are modern day Galileos within the academic community such as the previously mentioned professors Josef Lakonishok (*University of Illinois at Urbana-Champaign*), Andrei Shleifer (*Harvard University*) and Robert Vishny (*University of Chicago*). They published several studies on the value effect in the 1990s. Then, they took their work into the real world, starting an investment management firm, LSV Asset Management, which now manages \$35.5 billion. Several others have followed their example.

The investment consulting community has also largely ignored the historical data in their approach to equity asset allocation. Very few use mid cap equities as a dedicated category, despite the superior attributes and typically in direct contradiction to their own portfolio optimization studies. This is yet another example of “cognitive dissonance”, which is the psychologists’ term for “Don’t confuse me with the facts, I know what is right.”

Over the past five years, the value style has trounced growth in all categories. Few consultants that we know of had their clients heavily weighted to small and mid cap value during this period. Since 2002, many have argued against value exposure on the basis that growth is “due for a bounce back.” This will happen someday. In fact, growth stocks were the top performers in 36% of the years in the Ibbotson database, with value on top in 64%. Value wins over time, but not every year. To succeed in “playing the growth bounce”, you have to be right twice—getting in and getting out. Switching between growth and value implies an ability to “time the market swings” in a way that few, if any, have been successful.

### Beyond the Data

We are left with two questions about the circumstances surrounding the equity style boxes. First, why does value work so well? Second, why do so many find it hard to incorporate the data in their investment efforts?

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Prior explanations of value stocks performance advantage have typically included a “behavioral” component along with a “regression to the mean” component. Essentially, investors overreact to good news for some companies by driving stock prices too high and bad news for others by driving their prices too low. Eventually, as their respective fortunes change in the future, the higher valued stocks fall back toward the mean (average) and the lower valued stocks rise up toward the average. Recently, a simple yet elegant theory of explanation was offered by Robert Arnott in the 61<sup>st</sup> edition of the *Financial Analysts Journal*. Arnott is the Editor of the FAJ and a highly respected practitioner and theorist in the investment community. His editorial entitled “What Cost ‘Noise’?”<sup>7</sup> presented a statistical analysis of how stock prices are formed which easily and logically explains why value stocks beat growth stocks, why smaller caps beat larger caps and why equal weighted indexes beat capitalization weighted indexes. Arnott’s article has, so far, been largely ignored by the investment profession. I heartily recommend this essay for anyone further interested in the subject.

Why do professionals and investors find it so difficult to accept the data and craft a logical investment program? The explanation is probably grounded in the deeply ingrained behaviors that have evolved through the many thousands of years of human development. The Behavioral Finance field has chronicled many of these behavioral tendencies which might explain the phenomenon. I explored some of these in my 1999 paper entitled “Behavior and Investing”.<sup>8</sup> For greater depth on the subject, I recommend Hersh Shefrin’s excellent book “Beyond Greed and Fear”.<sup>9</sup> As a value practitioner, I am delighted that it appears so difficult for most to get with the program!

So, should your investment effort be based on the persistent trends evidenced in historical data, or do you prefer to adhere to the conventional belief system? If Galileo were alive today, he would certainly allocate his 401(k) account to value equities, with particular emphasis on mid and small caps. He would enjoy long term success in a logical system...and he would not be excommunicated or jailed! **I encourage you to weigh the evidence of historical data and consider the correct path for your own investment endeavors.**

<sup>1</sup> To be precise, it is only a portion of the risk of a stock which is, in theory, related to the expected return of that stock. That is the portion which we call undiversifiable or systematic in nature. Some risk is reduced by diversification, and, as the theory goes, investors don’t get “paid” with extra return to bear this risk, since they can get rid of it merely by holding a portfolio of stocks. A large portfolio of stocks has returns which are substantially less volatile than the returns of a portfolio of only a few stocks, or one stock. In practice, measures of total risk (e.g.: volatility of returns) and undiversifiable risk are highly correlated. Therefore, the main conclusions of this article are correct if we use this more precise definition of risk.

<sup>2</sup> Ibbotson Associates, 2005 Yearbook, “Stocks, Bonds, Bills and Inflation” pp. 149, (Chicago: Ibbotson Associates).

<sup>3</sup> Fama, Eugene F. and French, Kenneth R., June 1992, “The Cross-Section of Expected Stock Returns”, *Journal of Finance*, Vol. 47 no. 2, pp.427-465. Data available at Dr. French’s website: [http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data\\_library.html](http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html)

<sup>4</sup> Lakonishok, Josef, Shleifer, Andrei and Vishny, Robert, December 1994, “Contrarian Investment, Extrapolation, and Risk”, *Journal of Finance*, Vol. 49, no. 5, pp. 1541-1578.

<sup>5</sup> Dreman, David, 1998, *Contrarian Investment Strategies: The Next Generation*, (New York: Simon & Schuster).

<sup>6</sup> [www.hewitt.com/hewitt/services/401k/index.html](http://www.hewitt.com/hewitt/services/401k/index.html)

<sup>7</sup> Arnott, Robert D., March/April 2005, “What Cost ‘Noise’?”, *Financial Analysts Journal*, Vol. 61, no. 2 pp. 10-14. (available at: [www.cfapubs.org](http://www.cfapubs.org))

<sup>8</sup> Jones, Michael E., May 1999, *Behavior and Investing* ([www.clovercap.com/commentary](http://www.clovercap.com/commentary))

<sup>9</sup> Shefrin, Hersh, 2002, *Beyond Greed and Fear – Understanding Behavior Finance and the Psychology of Investing* (Oxford University Press)