



How the Innovation Premium Has Changed Equity Investing

The rationale for the dominance of innovation has parallels to the Value Premium

by Brian Foerster, CFA, Equity Investment Strategist

IN BRIEF

- In the 20 years since the bursting of the tech bubble, globalization and technological advances have altered the asset intensity of successful companies and placed a greater weight on the development of intellectual capital—the well-spring of innovation. Investing in future growth, specifically via capital allocation to successful research and development (R&D), has become a key driver of stock performance.
- This allocation decision can be a risky one. Capital designated for R&D is diverted from traditionally “shareholder friendly” purposes such as servicing current operations, delivering realized earnings, buying back stock, holding cash, or paying dividends.
- Just as investors were rewarded for overweighting the “Value Risk Premium” in periods of high capital intensity, investors have been rewarded for overweighting the “Innovation Premium” in this period of dynamism and technological disruption.

KEY CONCEPTS:

Value Premium — *The excess return to be gained from investing in stocks with the lowest price-to-book ratios.*

This phenomenon was illustrated in an influential study by Eugene Fama and Kenneth French (1993) that assessed stock market returns from 1963 to 1991. Over time, the accepted rationale for the performance dominance of low price-book stocks during that period was that cheap stocks became cheap due to their higher operating risks. Investors who take risk owning these cheap stocks can earn a premium, as the lowest price-book segment of the market, on average, disproved the excessive negativity that drove down their valuations.

Innovation Premium — *The excess return to be gained from investing in companies demonstrating the fastest current—and strongest potential for future—operating growth, as measured by intensity of investment in R&D.*

Innovative companies are the biggest threat to displace mature, entrenched competitors and, we argue, a driving force behind the value premium. But innovative companies have their own risk premium. Investment in uncertain future projects rather than “safer” uses of capital, such as funding current operations or cash

dividends, may cause the stocks of many innovators to appear overly expensive—and to be undervalued relative to their intrinsic value by risk-averse investors.

Paper Outline

This paper reflects a balance of both experiential observations from investing in companies driving innovation over the past two decades, and the integration of new research, both proprietary and third-party, that we believe illustrates the evidence for an innovation premium and the need for investors to balance their asset allocations to reflect changes in the relative importance of corporate innovation and dynamism versus a tangible asset base. In the first paper of this series (“[Why Innovation Stocks Are Crucial in Asset Allocation](#)”), we stated our belief that owning an equity portfolio skewed away from innovation results in equity allocations vulnerable to displacement risks from the accelerating pace of disruption.

This second paper focuses on two rationales for the Innovation Premium (INVP) and key implications for improved asset allocations:

- I. Risk-Based Explanations of INVP: The Risks of R&D Investment and High-Intensity Competition
- II. Behavioral Explanations of INVP: Myopia, Disposition Effect, and the Legacy of “Margin of Safety”
- III. The Relationship Between Innovation and Value: Implications for Investors



I. Risk-Based Explanations of INVP: The Risk and Payoff of R&D Investment and High-Intensity Competition

In a Harvard Business School paper, “Stock Market Swings and the Value of Innovation, 1908-1929”¹, Tom Nichols illustrates how and why the innovation stocks of that era—namely railroads, automobiles, and the electrification of manufacturing and businesses—paved the way for even more powerful innovation in science, manufacturing, and technology in subsequent years. Nichols’ description of the period has strong parallels to the new technologies enabled by groundbreaking innovation today, and how they are enabling inventions across healthcare, industrials, and commerce. He notes that the 1870s-1920s were years of enormous technological progress, characterized by rapid growth in intangible capital.

“Several firms formed during the great merger wave in American business (1897-1904) built up separate research and development laboratories, shifting innovation away from individual inventor-entrepreneurs and towards firms. The centralized R&D lab became a focal point for innovation and was perhaps the most significant organizational change to influence the structure of American business in the early twentieth century. In 1921 General Electric had five labs in four different states. By 1927 AT&T had more than 2,000 research staff working in a 400,000 square feet, 13-story building on West Street in New York (National Research Council, 1927).”

This concept of intangible capital is one of the hallmarks of innovation, yet is reflected as a mundane expense on income statements and a static asset on balance sheets. We parallel this earlier period of rapid growth in intellectual capital to the 1990s, with the technological advances in the personal computer, the Internet, rapidly-developed networks, e-commerce, and cloud computing. In these high-innovation areas, investment in intellectual capital was pregnant with massive future growth rates; however, widespread monetization from these processing gains and intellectual leaps was still years away. The leveraged market froth of 1929 found echoes in 1999. Some business models of the early Internet era were preposterous, and the market subsequently began its unpleasant journey back to reality in March 2000, exacerbated by 9/11 and the ensuing recession. But the ingenuity, breakthroughs, and patents on disruptive innovation raged on, as they did following the crash of 1929, per Nichols’ account:

“Scientific knowledge became increasingly exploited as firms developed larger stocks of organizational capital. Within firms, star scientists played central roles in the commercialization of basic science, though unlike their counterparts in the life sciences today, few went on to start their own enterprises. Irving Langmuir spent more than four decades at General Electric—his experiments leading to the invention of the gas-filled incandescent lamp and a Nobel Prize for chemistry in 1932. At Du Pont’s research center during the 1920s, Wallace Carothers’ investigations into the molecular structure of polymers led to the discovery of neoprene and nylon, which were commercialized in the early 1930s. At Eastman Kodak, Kenneth Mees and Samuel Sheppard significantly advanced the science of photography; by reducing the width of photographic film, Kodak’s research scientists permitted ever-smaller, lighter weight cameras to be introduced.”

Innovation, with its combination of positive effects for productivity and output, along with the destructive effects for the processes, business models, and jobs it replaces, has been in a state of continual ascent over the past two-and-a-half centuries, going back to the first Industrial Revolution, the advent of mass production, and the accelerating pace of technology replacing manual labor. Today’s technological revolution is unmistakably a cognitive one, in contrast to its predecessor in the 18th and 19th centuries, in which human muscle was an integral component, as manual labor was alleviated and expedited through mechanical power. The accelerating processing power of microchip transistors driving the speed and capacity of computers, as predicted by Moore’s Law, has given way to exponential processing speeds in areas such as artificial intelligence today. These technologies are replicating brain power at a stunning pace that dwarfs the revolution of the muscle.

These two concepts of underappreciated intellectual capital and accelerating technology are at the heart of our discussion on INVP. What equity markets have demonstrated is that innovators can both command higher multiples and be considered cheap, while at the same time some vulnerable value stocks can have low valuations and still be expensive. The outperformance of Growth over Value styles and the startling excess returns from non-earners in recent years appear irrational alongside Benjamin Graham’s Margin of Safety and Fama-French’s Value Premium. But identifying cheapness likely requires some updates.

Sources

Elsaify, A. (2017). “The Innovation Premium”. Retrieved from http://repository.upenn.edu/fnce_papers/6

Fama, Eugene; French, David (1992). “[The Cross-Section of Expected Returns](#)”, The Journal of Finance

Garleanu, Nicolae; Kogin, Leonid; and Panageas, Stavros (2009). “[The Demographics of Innovation and Asset Returns](#)”. National Bureau of Economic Research

Lord Abbett Research, incorporating data from Bloomberg, FactSet, 2020.

Nichols, Tom (2007). “[Stock Market Swings and the Value of Innovation, 1908-1929](#)”. Harvard Business School

Thaler, Richard and Bernartzi, Shlomo (1993), “[Myopic Loss Aversion and the Equity Premium Puzzle](#)”, National Bureau of Economic Research Working Paper Series



One interesting analysis cites a “displacement risk factor” that should be associated with businesses potentially in the crosshairs of innovation. In 2009, a NBER paper, entitled “The Demographics of Innovation and Asset Returns” (Garleanu, Kogan, Panageas)², sought to illustrate that the Value Premium is a by-product of the threat of innovation:

First, the displacement risk factor is connected to cross-sectional differences in stock returns. We assume that existing

firms participate in innovation, but some firms are more likely to innovate than others. The more innovative firms derive a larger fraction of their value from future inventions and earn higher valuation ratios, which makes them “growth firms.” Because of their relatively high exposure to the innovation shocks, growth firms offer a hedge against displacement risk. Moreover, innovation shocks generate co-movement among value stocks and among growth stocks, giving rise to a value-growth factor in stock returns.

For Three Iconic Companies, Innovation Hastened Extinction

Kodak

In 1996, **Kodak** had a market value of around \$30 billion. But the company was slow to capitalize on digital photography (a technology it invented) and was displaced by the emergence of the smart phone and photo-sharing upstarts like Instagram. Bankruptcy beckoned in 2012.

BLOCKBUSTER

Blockbuster video rental stores were ubiquitous in the 1990s and early 2000s. (Its market value peaked at \$5 billion in 2004.) But the bricks-and-mortar model proved no match for the convenience of Netflix’s digital offering, and Blockbuster reached the point of no return, filing for bankruptcy in 2010.

BORDERS

Bookstore operator **Borders** saw its share price peak in 1997 before the ecommerce innovator Amazon (which at one time contented itself with being “Earth’s largest bookstore”) began to assert its dominance. The final chapter (11) came for Borders as it filed for bankruptcy in 2011.



This interrelationship between innovation and value becomes quite clear when the displacement risk factor results in total destruction of stubborn businesses that could have adapted their models, but either didn't or were too late and ultimately collapsed, such as Kodak at the hands of Instagram and the iPhone, Blockbuster at the hands of Netflix, or Borders Books in the shadow of Amazon.

Intellectual capital and R&D: the root of the innovation premium

At the center of this discussion is the concept of intellectual capital that is often underappreciated on balance sheets, and R&D investment that diverts current potential earnings on income statement—and whose potency for future business growth and momentum is chronically underestimated. As discussed in the examples above, with AT&T in the 1920s and DuPont in the 1930s, the internally-generated intangibles that came from intensive R&D, i.e., intellectual capital, were not sufficiently reflected in the

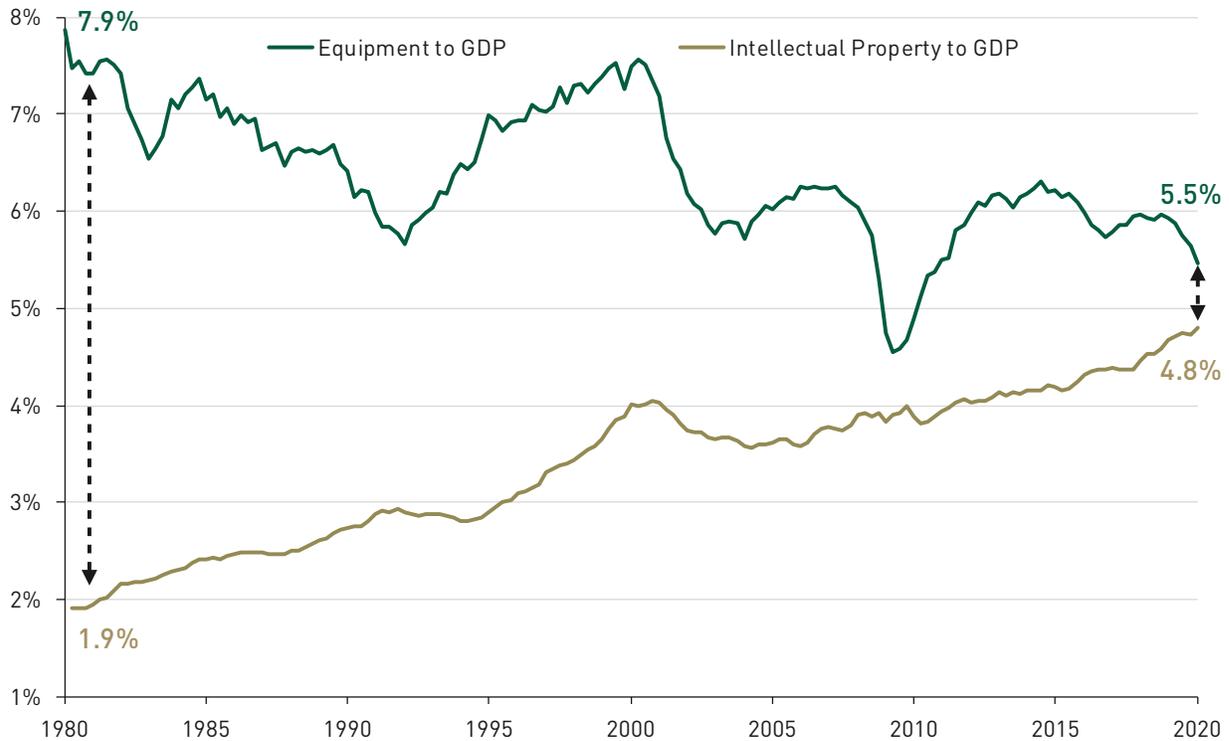
book value of those firms. Today, with the asset-light configuration of e-commerce, cloud software, biotech, and streaming content companies (to name a few), factoring the full intellectual capital—a potential wellspring of massive future pricing and earnings power—of these innovators can re-rate them from superficially expensive, high price-to-book companies into what we might consider the cheapest of stocks.

The transformation of the most successful companies—and stocks—during the technology revolution of the past 50-plus years is most notable in this asset-light configuration of innovators, compared to the more physical capital-intensive companies during the manufacturing and production-centric economy of the 1900s. As shown below in Figure 1, there has been a 170% rise of importance in intellectual property on company balance sheets over the past 40 years, whereas physical equipment-share has declined 30% by comparison.

Figure 1: A Transforming Economy: The Rise of Intellectual Capital versus Physical Capital

Ratios to U.S. gross domestic product for the years 1980-2019

Contribution to GDP



Source: U.S. Commerce Department via Bloomberg. Data as of December 31, 2019. Gross domestic product refers to the monetary value of all the finished goods and services produced within a country's borders in a specific time period.

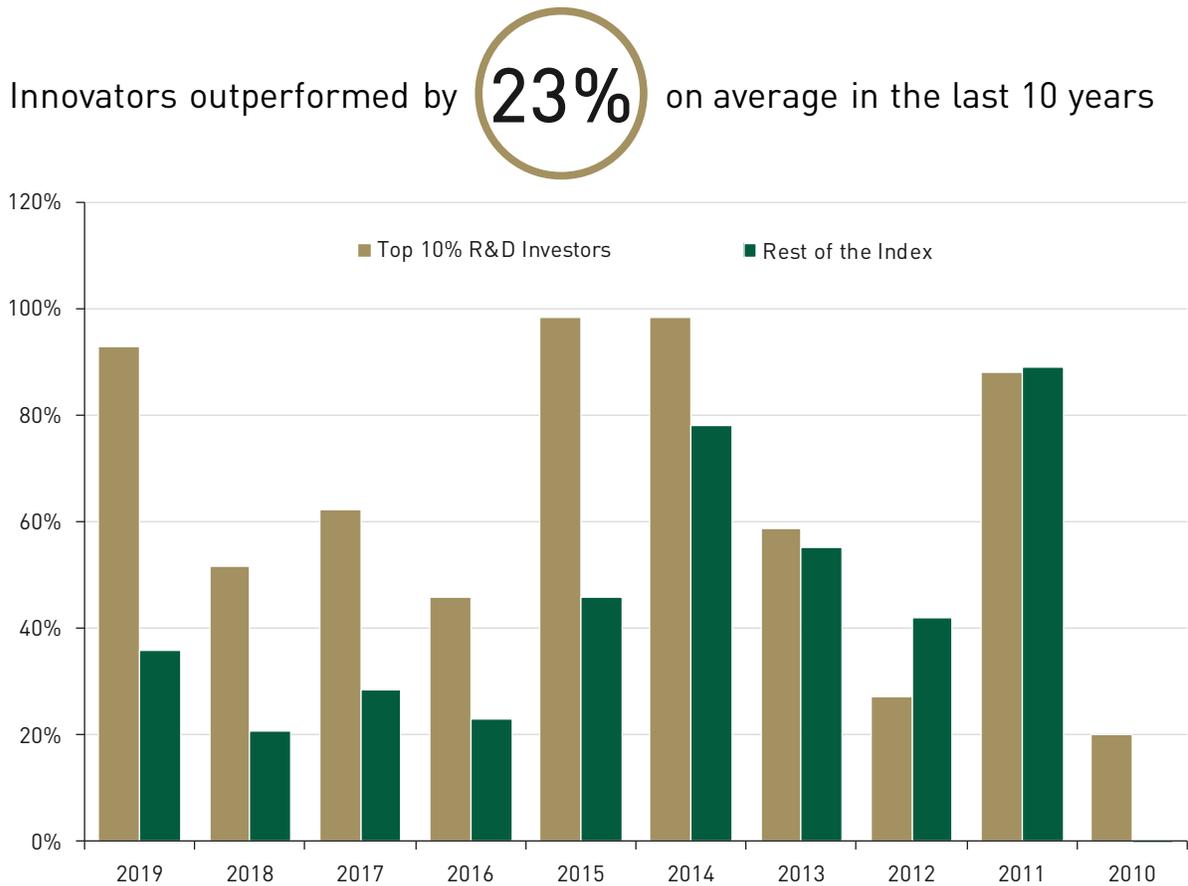


The result of this evolution of company configurations has been lower total book values on the winning side of innovation, and thus those companies with lower nominal denominators in the price-book equation.

As for the numerators, we turn to revenues and earnings, the ultimate drivers of stock prices. Here, we focus on R&D investment and its growing importance for company fortunes and stock prices.

Figure 2 looks at the impact of being a top-decile investor in R&D by intensity—defined as R&D investment per total revenues—and the subsequent three years of investment returns. What we see is a dramatic payoff to R&D investment intensity by comparing the top 10% of R&D investment investors to the remainder of the equity market (using the Russell 1000® Index).

Figure 2: R&D Intensity Has Been a Key Factor in Market Returns over the Past 10 Years



Source: FactSet. Data as December 31, 2019. Innovative companies are derived from the top-decile investor in R&D by intensity – defined as R&D investment per total revenues – and the subsequent next three years of investment returns (using the Russell 1000 Index).

Past performance is not a reliable indicator or guarantee of future results. For illustrative purposes only and does not represent any specific portfolio managed by Lord Abbett or any particular investment. Indexes are unmanaged, do not reflect the deduction of fees and expenses, and are not available for direct investment.



The conclusion offered by the data is powerful, in our view. Essentially, this penchant for firms with the highest R&D investment to repeatedly outperform the rest of the equity market reflects that these companies have demonstrated skill in transforming investment into results. This data is perhaps the most conservative relative to other studies we have come across, noting work done by researchers that have demonstrated that R&D intensity has been a clear leading indicator of future fundamental results and stock market performance. One noteworthy study from a University of Pennsylvania paper indicated a dramatic outperformance of R&D intensity, particularly when compared to the Fama French 3-Factor Model:

Relative to the Fama-French 3-factor model, a portfolio, which goes long the highest R&D/Investment firms and short the lowest R&D/Investment firms, earns monthly excess returns of 58 bps per month, or just over 7% annually. This is after accounting for the fact that these high R&D/Investment firms have slightly higher betas and tend to be small, growth firms. These results are significant at the 1% level, and, in contrast to previous studies on R&D, hold for value-weighted portfolios.³

One key explanatory variable as to why high R&D investors outperform is that they ultimately command far greater pricing power for their innovation. In short, there are two payoffs from being a serial and successful investor in R&D: It leads to strong and sustained revenue growth, and as noted by the same paper, it is correlated to future pricing power as the result of that investment:

There is significant evidence that high R&D/Investment firms charge significantly higher markups over cost, even after controlling for industry, size, and year effects. Moreover, the excess returns of these firms correlate significantly with the sales growth of another high-markup item, luxury goods. This effect holds even after controlling for the usual Fama-French factors. Combined, these pieces of evidence suggest that the risk encapsulated by the sales of these high-markup products is important to understand the higher returns of R&D-intensive firms.⁴

Finally, the last fundamental metric related to INVP focuses on the importance of current revenue growth relative to valuation. What we found over the past 15 years is that the former has been far more important than the latter, defying the Fama-French formulaic value proposition. This study shows that stocks with top-decile revenue growth in the United States, when compared with the rest of the market, have delivered more than 2.5x the returns over any three-year period, despite commanding a P/E ratio of roughly twice that of the same group. Keep in mind that the P/E ratios in this study reflect the valuation of the stocks before the three-year performance period starts, meaning that they have not yet demonstrated that top-decile revenue growth yet and still command high initial valuations.

Figure 3: Revenue Growth Has Been Far More Important than Nominal P/E since the “Tech Wreck”

THE HIGHEST REVENUE GROWTH COMPANIES HAVE BEEN WORTH THEIR PREMIUM
THREE-YEAR ROLLING AVERAGES (12/31/2004 – 12/31/2019)

Highest Revenue Growth Companies	have had	High P/E Ratios	but offered	Higher Earnings Growth	which led to	Higher Average Returns
Revenue Growth		P/E Ratios (Average Starting P/E)		Average Annual Earnings Growth		Annualized Return
Top 10%		37.3		12.9%		35.9%
Bottom 90%		18.1		2.9%		14.0%

Source: FactSet and Lord Abbett Research. Based on annual reported earnings. Most recent data available.

The average top 10% of high-revenue-growth stocks were chosen by screening all companies with a market capitalization greater than \$10 billion at the end of each three-year time period and then stacking the companies according to their revenue growth over that three-year time period. The historical data are for illustrative purposes only, do not represent the performance of any specific portfolio managed by Lord Abbett or any particular investment, and are not intended to predict or depict future results. Due to market volatility, the market may not perform in a similar manner in the future. **Past performance is not a reliable indicator or guarantee of future results.**



What does this data suggest? First, that valuation alone does not determine return. There was a key justification in these higher P/E stocks that warranted their higher return, that is, meeting or exceeding already high expectations. But it is also important to distinguish this type of analysis from ex-post studies of factors like revenue growth, where you would look at how companies that have already delivered the strongest revenue growth, then performed in the next few years with their high valuations. We are instead showing a divergence from the formulaic value proposition that higher-valuation companies must ultimately underperform, and that there are other business components driving equity returns besides temporal valuation.

II. Behavioral Explanations of INVP: Myopia, Disposition Effect, and the Legacy of “Margin of Safety”

Behavioral finance, which in its infancy was regarded as a fringe social science, has now become central to understanding market phenomena such as asset bubbles, price momentum, and the existence/persistence of risk premiums. In our discussion of INVP, three behavioral biases have played an important role in suppressing and delaying full market recognition of innovation winners. The first two biases are well-covered ground in public research but warrant a mention specifically to the explanation around INVP. The third is perhaps more controversial, in that we are arguing that the concept of a margin of safety has migrated from its long domain in value investing to the realm of innovation, perhaps best illustrated by market performance in the 2020 coronavirus pandemic.

Myopic Loss Aversion

The preference for returns today over higher returns in the future is a powerful and persistent human emotion. Even with compelling evidence that holding higher-returning, more volatile assets will create far greater growth and wealth than safer, low-returning, less volatile assets, behavioral studies show that we in aggregate prefer the latter. As Thaler and Bernartzi (1993) highlight in their seminal work on myopic loss aversion:

Loss aversion refers to the tendency for individuals to be more sensitive to reductions in their levels of wellbeing than to increases. The concept plays a central role in Daniel Kahneman and Amos Tversky’s (1979) descriptive theory of decision making under uncertainty-prospect theory. Empirical estimates of loss aversion are typically in the neighborhood of 2, meaning the disutility of giving something up is twice as great as the utility of acquiring it.⁶

Thaler and Bernartzi highlight the prevalence of myopic loss aversion across pension plans, endowments and foundations, and individual investors who, in aggregate, underweight stocks relative to rational expectations for future growth. The market impact of myopic loss aversion is an irrational preference for perceived safety despite overwhelming evidence that owning equities—even at a portfolio weighting of 100%—for a long time horizon is the most efficient use of capital. That is certainly our view. But

because humans seem to require frequent check-ins and re-evaluations of their finances, they make the mistake of forsaking wealth to feel safer in the near term. As such, equities are perennially undervalued by the effect of the aggregate investor demands for stability over rationality.

In the context of INVP, myopic loss aversion plays an amplified role, as the valuations of high-innovation stocks lead to the perception of greater loss potential. From the peak of the Internet bubble through today, there has been a persistent valuation compression in innovation-oriented stocks, particularly when compared to the multiple expansions of “bond proxy” equities over the last decade. Utilities, telecoms, REITs, and high-dividend, consumer staples stocks, in fact, saw the largest multiple expansion between 2010-2018. That may come as a shock to financial commentators, who constantly remind us of the Tech/Growth “run” during this period. Tech and healthcare, the areas with the most innovation, are actually in the bottom half of sectors when it comes to P/E multiple expansion, thanks to the rapidly-growing “E” in that valuation multiple.

Disposition Effect

Investors love the concept of mean reversion. The mantra of “buy low, sell high” is ingrained in the minds of most aspiring investors, professional and amateur. It is, of course, eminently sensible—one wants to buy when there is tremendous upside ahead and sell when there is tremendous downside lurking. However, the corruption of this concept comes when investors attempt to time reversals based on heuristics. The disposition effect is the tendency of investors to hold on to losers too long due to favorable experiences with company stocks in the past, as well as cutting winners too early due to pre-determined price or valuation signposts.

With regard to INVP, the disposition effect causes investors in high-innovation stocks to sell far too early in a company’s lifecycle, due to aversion to stocks rising “too much” or current market valuations reaching a predetermined level of discomfort. This selling pressure suppresses stock prices of winners far below their intrinsic value and amplifies the forward return potential of these stocks. Moreover, the disposition effect creates powerful short-selling opportunities for unraveling losers that investors identify as possessing false safety, due to their lower valuations and memory of prior successes. These stocks may be owned far past their peak period of stability and safety and are in fact far riskier now on the downside.

The Legacy of “Margin of Safety”

Lastly, unlike Fama-French who argued that cheap stocks are cheap because of their riskiness, the Graham-Dodd proposition of seeking a Margin of Safety is revered as a conservative strategy, searching for stocks of companies trading at a steep discount relative to their derived intrinsic value. The legacy of this approach has been alive and well in the equity markets since the Great Financial Crisis, with investors seeking safety within the equity markets in both fund and pension flows to “low-vol” stocks and dividend leaders that offer the promise of income and safety.



However, what we have seen in recent years, as innovation has ascended to “core” status within the economy and the equity markets, is a re-rating of where safety truly resides in equities. By no means are we arguing that there is a new direct correlation between high-valuation stocks and safety; however, there is a case to be made that the margin of safety described by Graham-Dodd is on thinner ice because of the displacement risk factor from innovation.

The 2020 coronavirus pandemic cast a harsh light on this erosion of safety within some areas of value (not all), and a rising level of resilience in areas of innovation. It remains to be seen how this disparity develops, but in the context of INVP, the new durability of innovation in the face of crisis may reflect a powerful shift in equity risk premia, which already existed during this technology revolution and got unexpectedly pulled forward.

III. The Relationship Between Innovation and Value: Implications for Investors

What's happened to Value?

Some exceptional Value practitioners have demonstrated beyond a reasonable doubt that there is validity to a strategy of identifying undervalued stocks of companies that are poised for a turnaround, oversold due to the market's overreaction to bad news, or some combination of fundamental or behavioral factors that leave a company's equity mis-priced today relative to an intrinsic value that will be realized tomorrow. All other factors held constant, it stands to reason that there would indeed be a margin of safety and the potential to earn a value premium through buying and holding truly undervalued stocks until they appreciate to their intrinsic values (assuming they are not threatened by innovation). Moreover, at minimum, there have been extended periods in history where owning simply lower-valuation stocks has outperformed (in some years substantially) the performance of higher-valuation Growth stocks, particularly following manic periods of market froth (e.g., 2000, 1929) when the market intensely demanded the perceived safety of low valuations above all else.

We believe Value remains a critical component for asset allocations, and that there will be environments and years where value companies deliver outsized market returns. However, we are very skeptical of the formulaic value regime that came to dominate the Fama-French study period and the belief that price-book cheapness alone will return to prominence for equity investors. Innovation, we believe, is one of the key explanatory variables as to why value stocks trade cheaply to begin with—many of them are at risk of being displaced by new technologies.

Ask more of “Growth” managers: Re-think innovation as a core asset class

Many investors with value tilts and allocations premised around the Value Premium are frustrated, particularly as this asset class was hit hardest by the pandemic crisis. We think this is likely not the time to punt on Value as some areas have become so cheap, have received enormous financial support from the Fed and fiscal relief, and are levered to an economic recovery. That said, the binary nature of innovation and its relentless threat to displace less agile areas of the economy requires investors to re-think their Growth allocations, in our view. Specifically, we believe investors need to become far more focused on whether their manager delivers access to the very same innovators that are causing such strain on value companies.

The technology revolution is creating distinct winners and losers in equities, which has real consequences for investors. Innovation has significant upside potential for companies driving it and significant downside for those displaced by it. The crucial investment focus then becomes identifying the emerging winners from false winners, while avoiding the losers altogether.

Key Takeaways and Next Steps

We believe an innovation-centric approach to growth investing can be just as successful as the Graham-Dodd approach on the value side of the ledger. The Innovation Premium (INVP) is a crucial part of this discussion and is based on two critical concepts:

- *Risk-Based:* The decision by innovators to invest their cash flows and earnings into risky intellectual-capital-based R&D projects for future growth rather than simply paying out that capital to investors, holding cash, buying back stock, or focusing on current operations creates uncertainty. Companies who invest well earn the innovation risk premium by making their prior (high) valuations instead look cheap via superior future growth rates.
- *Behavior-Based:* Behavioral biases that drive INVP are well-known—myopia, disposition effect, as well as the legacy of Graham-Dodd's Margin of Safety that has evolved over time.

In the third installment of this four-paper series, we will look at momentum—both operating (business) and stock price (technical)—which we find to be an essential tool for portfolio managers seeking to capture the asymmetrical upside potential from innovation, while controlling for risk.



¹"Stock Market Swings and the Value of Innovation, 1908-1929", Nichols, Tom, Harvard Business School, 2007

²"The Demographics of Innovation and Asset Returns", Garleanu, Nicolae; Kogin, Leonid; and Panageas, Stavros; January, 2009, National Bureau of Economic Research

³Elsaify, A. (2017). "The Innovation Premium". Retrieved from http://repository.upenn.edu/fnce_papers/6

⁴Ibid.

⁵Source: FactSet, Lord Abbett Research, data from 2004-2019.

⁶Thaler, Richard and Bernartzi, Shlomo, (1993), "Myopic Loss Aversion and the Equity Premium Puzzle", National Bureau of Economic Research Working Paper Series.

A Note about Risk: The value of investments in equity securities will fluctuate in response to general economic conditions and to changes in the prospects of particular companies and/or sectors in the economy. While growth stocks are subject to the daily ups and downs of the stock market, their long-term potential as well as their volatility can be substantial. Value investing involves the risk that the market may not recognize that securities are undervalued, and they may not appreciate as anticipated. Smaller companies tend to be more volatile and less liquid than larger companies. Small cap companies may also have more limited product lines, markets, or financial resources and typically experience a higher risk of failure than large cap companies.

The information provided is for general informational purposes only. References to any specific securities, sectors or investment themes are for illustrative purposes only and should not be considered an individualized recommendation or personalized investment advice, and should not be used as the basis for any investment decision. This is not a representation of any securities Lord Abbett purchased or would have purchased or that an investment in any securities of such issuers would be profitable. Statements concerning financial market trends are based on current market conditions, which will fluctuate. There is no guarantee that markets will perform in a similar manner under similar conditions in the future. Past performance is not a reliable indicator of future results.

This commentary may contain assumptions that are "forward-looking statements," which are based on certain assumptions of future events. Actual events are difficult to predict and may differ from those assumed. There can be no assurance that forward-looking statements will materialize or that actual returns or results will not be materially different from those described here.

Intangible capital may include non-physical assets such as research and development spending, software, brands, and other intangible assets.

Intellectual capital refers to the intangible assets that contribute to a company's bottom line. These assets include the expertise of employees, organizational processes, and sum of knowledge contained within the organization.

Margin of safety is a principle of investing in which an investor only purchases securities when their market price is significantly below their intrinsic value. When the market price of a security is significantly below an investor's estimation of its intrinsic value, the difference is the margin of safety.

Price-to-Earnings Ratio: Stock analysts calculate a price-to-earnings ratio by dividing a stock's current price by its earnings per share on a trailing 12-month basis. A forward price-to-earnings ratio is calculated by dividing a stock's current price by estimated future earnings per share.

Research and development (R&D) expenses are associated with the research and development of a company's goods or services. A company generally incurs R&D expenses in the process of finding and creating new products or services.

The **Russell 1000® Index** measures the performance of the 1,000 largest companies in the Russell 3000 Index, which represents approximately 92% of the total market capitalization of the Russell 3000 Index.

Indexes are unmanaged, do not reflect the deduction of fees or expenses, and are not available for direct investment.

The information provided is not directed at any investor or category of investors and is provided solely as general information about Lord Abbett's products and services and to otherwise provide general investment education. None of the information provided should be regarded as a suggestion to engage in or refrain from any investment-related course of action as neither Lord Abbett nor its affiliates are undertaking to provide impartial investment advice, act as an impartial adviser, or give advice in a fiduciary capacity. If you are an individual retirement investor, contact your financial advisor or other fiduciary about whether any given investment idea, strategy, product or service may be appropriate for your circumstances.

The opinions in the preceding commentary are as of the date of publication and subject to change based on subsequent developments and may not reflect the views of the firm as a whole. This material is not intended to be legal or tax advice and is not to be relied upon as a forecast, or research or investment advice regarding a particular investment or the markets in general, nor is it intended to predict or depict performance of any investment. Investors should not assume that investments in the securities and/or sectors described were or will be profitable. This document is prepared based on information Lord Abbett deems reliable; however, Lord Abbett does not warrant the accuracy or completeness of the information.