Stocks for the Long Run: Historical Facts and Statistical Fallacies

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Buy-and-hold passive investment strategies are arguably the most prevalent form of investments in today's pension funds and individual retirement accounts. The *conventional wisdom* behind these strategies is that the inherent risks of stocks and other similarly risky assets diminish if investors have sufficient patience to hold their portfolios for long periods of time, say 20 to 40 years. Not only that, but investors are lead to believe that their patience will be handsomely compensated "almost for sure" with significantly higher returns than safer investments such as government bonds or money market accounts. In the US markets, long-term returns on stocks are estimated using over 100 years of market history, and are around 9% annually in dollar terms and around 6% annually in real terms. By comparison, returns from safe bonds (e.g. US Treasury bonds) have been in the 4%-5% range in dollar terms. Furthermore, pension funds and individual investors have routinely adopted these long-term returns estimates in their retirement planning projections.

The doctrine of "*Stocks for the Long Run"* has enjoyed enormous popularity during the past decades. The catalysts of this phenomenon were the contemporaneous onset of the 1980-2000 bull market, one of the strongest in history, and the emergence of modern financial theories like Modern Portfolio Theory and The Efficient Market Hypothesis. In its simplest form, the Efficient Market Hypothesis states that markets efficiently reflect any economic news into the prices of stocks, and that stock prices will fluctuate but generally mean-revert to their "true" expected returns over a sufficiently long period of time. During the 1980-2000 period equities appeared to fluctuate but ultimately mean-revert to "efficient prices" delivering consistently remarkable returns. The ensuing "*This Time is Different!*" euphoria, together with profit-driven industry marketing, and ultimately ignorance about historical lessons, contributed to create the so called "*Cult for Equities*" and has lead to the dogmatic acceptance of simplistic interpretations of academic financial theories.

A hugely profitable industry has developed around the principles of buy-and-hold investing, and many products such as mutual funds have been marketed as the vehicle of choice to build significant and safe nest eggs for all retirees. Most investors and institutions have been advised to invest in broadly diversified portfolios of stocks and bonds representing as wide as possible a sample of the stock market, or industry sectors, or other broad styles like value and growth, and hold them passively for a very long time. Diversified portfolios are expected to minimize the "idiosyncratic," or "non-compensated," components of market risks, while distilling the returns from the "systematic," or "compensated," market risks over the long-term.

Typical marketing brochures and research material contain statements implying something like:

"Regular savings in diversified portfolios of common stocks, such as mutual funds, if maintained over many years, through highs and lows in stock prices, will always lead to an increase in real wealth greater than any investment alternative."

These broadly diversified passive portfolios, also known as optimal Policy Portfolios, are built using the process of Asset Allocation. The Asset Allocation process utilizes Modern Portfolio Theory (MPT) to determine the optimal fractional proportions of capital that should be invested in each stock, bond, mutual fund or other assets given the expected returns, volatilities and mutual correlations of each asset. Policy Portfolios are meant to remain mostly static over time, except for some occasional rebalancing or reallocation. Further, Policy Portfolios are used as de-facto benchmarks against which the performance of more active managers is evaluated, thus fostering a benchmark-centric investment culture.

The "*conventional wisdom*" that the risks of stocks decrease over longer holding periods plays a central role in the asset allocation process. In particular, it guides the relative allocation of capital to stocks vs bonds over time. Its conceptual justification relies on the mentioned belief that markets are efficient and that stocks, given sufficient time, will inevitably recover from the occasional downturns and mean-revert to their long-term growth rate (also known as the Time Diversification Effect). Investors with longer time horizons would therefore be better positioned to benefit from the long-term positive returns while reducing the negative effects of the downturns. As a corollary, investment advisors routinely recommend that the proportion of capital invested in stocks should be higher during investors' earlier working years and decrease as they approach their retirement age. So, for example, investors in their 20s could allocate up to 90% of their savings to stocks, then decrease the allocation to, say, 30% or 20% by age 65 and older. Some recent products, the Target Date funds, aim to implement this time-based allocation strategy automatically on behalf of investors.

"*Conventional wisdom*" Asset Allocation strategies have delivered results much below expectations due to the recent market downturn, actually more like zero or negative real returns for the past 10 years or so. Note that the recent price of the S&P500 Index has been at the same levels first reached 5-10 years ago, thus delivering a zero realized dollar returns, and negative real returns, for the past decade. If one then considers the relative returns against bonds (with typical yields of about 4% per year), then one has to go back 20-30 years before the returns from stocks outperform those from bonds. Clearly, passive buy-and-hold, index-based portfolios, arguably representing the vast majority of retirement investments by asset size, have failed to see their expectations realized (to put it mildly) for many years now, and they have suffered very large losses in the recent market downturn.

By now it is becoming painfully apparent to the larger public that the "*conventional wisdom*" Asset Allocation strategies **expose investors to larger risks** than previously expected **even over relatively long time horizons**. In hindsight, it is apparent that the simplistic application of academic concepts like Modern Portfolio Theory and the Efficient Market Hypothesis was neither truly optimal nor realistic.

Some Historical Facts

In this article we revisit critically some of the premises behind "*conventional wisdom*" Asset Allocation strategies in light of historical evidence dating well before the early 80's

bull market experience. In particular, we re-examine the key assumption that stocks become safer investments over long time horizons. Our analysis is not entirely new and some notable research has been published in the past[1]. However, much of the ensuing debate has remained confined to academic circles, and has not reached the wider public despite the potentially significant implications for ongoing investment practices.

We review some stylized facts about the performance of stocks over very long time horizons by using over 100 years of data for the S&P500 Index, publicly available on R. Shiller's web site on *Irrational Exuberance*[2]. A more comprehensive study of long market histories for several countries has been published elsewhere, but the basic conclusions are identical[3].

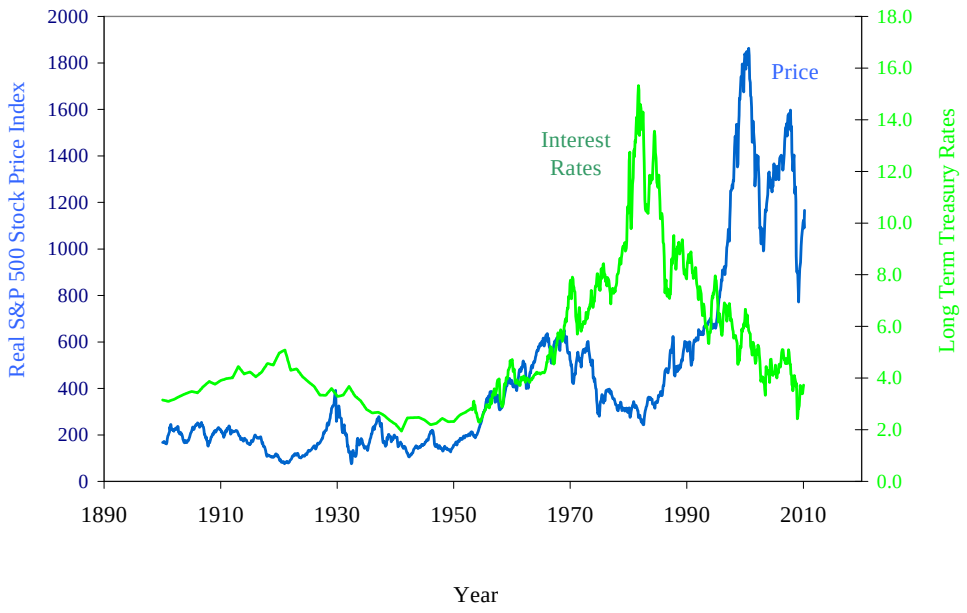

Figure 1: the S&500 Index historical level and the 10-Year US Treasury Rates for the period 1900-2010 [Source: www.irratonalexuberance.com].

In the following figure, we summarize the distribution of the final return on investments at the end of the investing period, i.e. the Holding Period Returns, that an investor would have achieved by holding a passive investment in the S&P500 Index (see Figure 1) over

[1] See e.g. "Triumph of the Optimists: 101 Years of Global Investment Returns," by E. Dimson, P, Marsh and M. Staunton (2002) "; "The Hedge Fund Hedge," by M. Boucher (1999); www.crestmontresearch.com; "The Long-Term Case for Equities" by P. Samuelson (1994).

[2] See www.irrationalexuberance.com

[3] See the above reference to the book of Dimson, Marsh and Staunton, and www.crestmontresearch.com.

a given time-horizon during the period between 1900 and 2009. By Holding Period Returns we mean the returns due to the increase in price as well as to the re-investment of dividends. So, for example, the distribution of returns for the 20-year time-horizon is obtained by calculating the returns, inclusive of re-invested dividends, from a hypothetical investment starting in 1900 and ending in 1920, then one starting in 1901 and ending in 1921, and so on and so forth to end with an investment started in 1989 and ending in 2009. The size of the blue boxes provides a visual summary of the distributions of returns and their uncertainties associated with investments lasting 1, 2, 3, …30 years respectively[4].

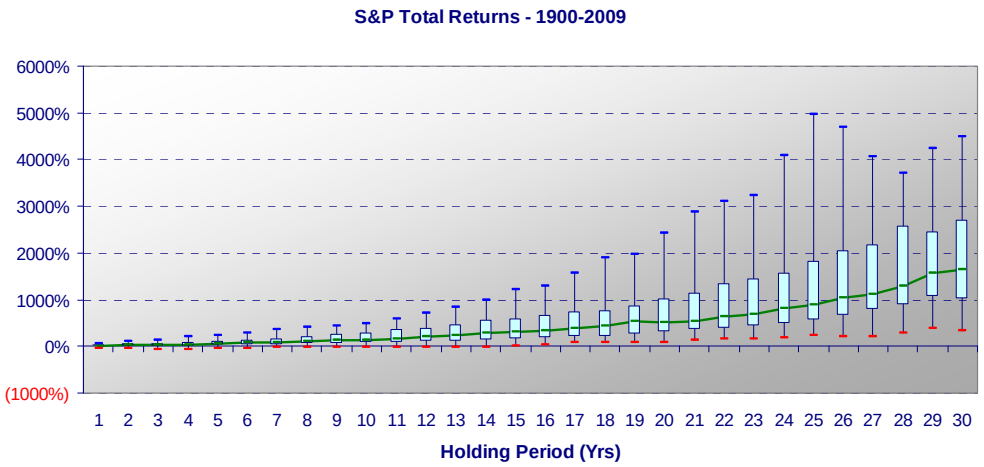

Figure 2: Summary statistics of historical Holding Period Returns on the S&P 500 over different time-horizons for the period 1900-2009 The Holding Period Returns include the effects of the stock prices appreciation and of the re-investment of dividends. The green lines shows the *median* returns, the box shows the 25% and 75% percentiles, the whiskers show the minimum (red) and maximum (blue) total returns ever achieved for a specific holding period in the 1900-2009 historical time span [Source: www.irrationalexuberance.com].

The uncertainty of the *Final Realized Wealth* does *increase* with the time horizon, albeit not linearly, but it definitely does not *decrease*!

There are several observations that we can derive from Figure 2[5]:

[4] Incidentally, we note that the summary statistics cannot be interpreted as the statistics of truly independent random samples, since the samples of investment returns are based on partially overlapping periods. However, this issue is somewhat irrelevant for the current discussion.

[5] One potential caveat with such historical studies is that even 100 years of history is a relatively short period and it could artificially reduce the true uncertainty of long-horizon returns. In one extreme case, it would appear that the uncertainty for an investment lasting 100 years would be almost zero!

Historically, there have been opportunities for exceptionally high long-term returns as well as for disappointingly low ones. However, the uncertainty on the final accumulated wealth, as represented by the width of the boxes in Figure 2, *increases* with the length of the time horizon.

Long time horizons in excess 25-30 years do increase the probability of achieving positive returns due to the general growth in the economy [See the increasing level of the minimum returns for each investment horizon as represented by the lower whiskers in Figure 2]. However, since the effective investment horizon for most investors is 20 years or less[6], investors remain exposed to significant risks of negative returns.

In fact, there has been a 50% chance that the final realized returns would fall below the median return of about 9.3% per annum (by definition), i.e. way below the expected returns targeted by many retirement plans and pension funds.

Let's look for example, at a 20-year investment horizon. For the period between 1900 and 2009, the median Holding Period Return realized on a 20-years investment in the S&P500 Index would have yielded 523%, or 9.6% annualized, with half of the realized outcomes fluctuating between a low of 298% (about 7% annualized) to a high of 1003% (about 12.7% annualized). In extreme cases(about one in four of cases), the realized returns have been below 298% (about 7% annualized) and as low as 90% (about 3.3% annualized)! [Note that these are approximate estimates, and they could differ slightly from other published statistics]. While all these estimates are positive, in nominal dollar returns, it is well evident that investors with a 20-year horizon have experienced significant uncertainties in the amount of wealth ultimately realized, and that they have experienced a non-negligible risk of realizing a significantly lower amount of wealth than expected. A $10,000 investment for 20 years would in fact become worth about $52,300 if the median expected returns were realized, but only $29,800 or less with a 7% annualized return, something that has occurred 25% of the time during the past century, not a small chance. In particular, equities retain a sizeable chance of barely breaking even with inflation (about 3% annualized) or outperforming bonds (say, about 4.5% per annum).

As a final comment on these historical data, we note that the estimated returns do not include taxes, transaction costs and other issues that may prevent a regular investor from being invested at all times. Therefore, the figures presented should be considered highly indicative and potentially overly optimistic.

Lessons from History: A Closer Look

"History does not repeat itself, but it does rhyme" [Mark Twain]

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[6] The effective investment horizon can be estimated using simple assumptions about the life-cycle savings capabilities of typical investors. For example, the typical duration of a Defined Benefits plan liabilities is about 17 years. For individual investors with a working life between 25 and 65 years of age, the ability to save significantly and invest for retirement is also less than 20 years.

A quote attributed to Mark Twain states that *"History does not repeat itself, but it does rhyme."* Contradictory statements about the predictive power of historical market performance are ironically embedded in common practices: "*Past Performance is no Guarantee of Future Results*," reads the fund's prospectus while the investment advisor proceeds to select funds for their clients using asset allocation software that relies entirely on past historical performance ranking criteria!

The reality is that valuable historical lessons tend to be forgotten as a result of the "*This Time is Different"* euphoria, like during the recent technology, real estate and credit bubbles. The structure and tools of the markets change, but people hardly do. An analysis of financially related crises that occurred during the past 500 years[7] reveals a strikingly common pattern of an "*Easy Credit/Euphoria/Assets Bubble/Market Panic/Government Bailout*" cycle[8]. More in general, there is evidence that economies and markets tend to evolve in long cycles and not according to a smooth and steady growth pattern. So, while predicting the future from past history is always difficult, it remains useful to take a further look at historical evidence.

Figure 3 shows the historical profiles of the returns from and investment of $10,000 in the S&P500 Index with a horizon of 15 years. On each year, the final realized wealth (the Holding Period Return) is shown for an investment started 15 years earlier and ending on that given year. These data are the same data used to estimate the summary statistics of Figure 2 for the 15 years holding period. The results for other holding periods are qualitatively similar.

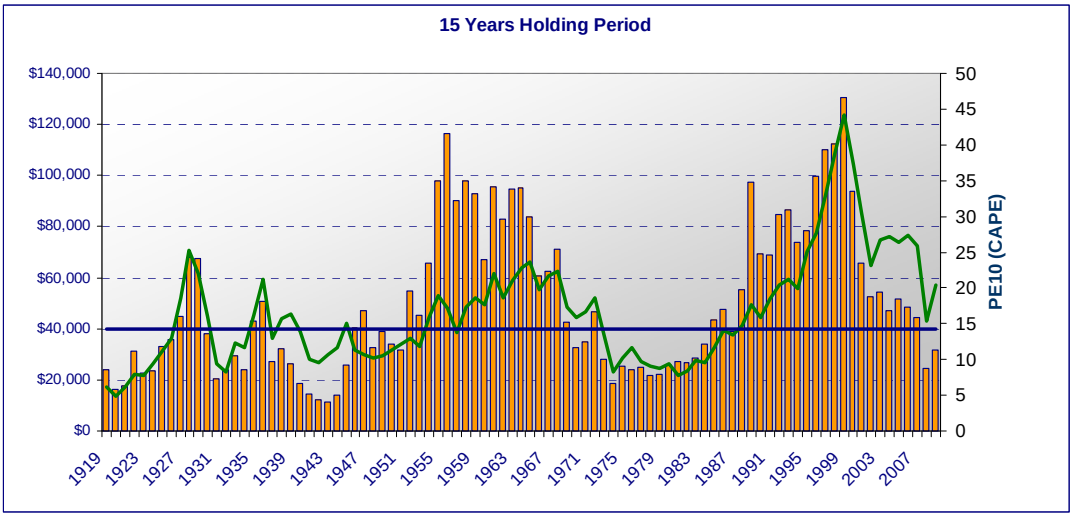

Figure 3: Historical Holding Period Returns (Total Returns) for a $10,000 investment in the S&P 500 with a horizon of 15-years and ending on any given year for the period 1900-2009.The horizontal line shows the median wealth. The jagged line shows the Cyclically Adjusted Price Earning Ratio (CAPE), i.e. the ratio of

[7] See "Manias, Panics and Crashes" by Charles Kindelberger

[8] A more formal theory of these economic cycles has been developed by the well-known economist Ludwig von Mises and other exponent of the *Austrian School of Economics*.

current Price by the 10-Year average Price Earning Ratio adjusted for inflation [Source: www.irratonalexuberance.com].

It is interesting to note how, over the past 100 years, the returns from long-horizon investments have followed a cyclical pattern, with periods of exceptional returns (Secular Bull Markets) alternated to periods of significantly below the median returns (Secular Bear Markets). There have been three episodes of sustained bull markets in the past 100 years culminating in 1929, in the Late 50s/Early 60s, and in the Late 90s, approximately distributed at about 35 years intervals. In between these cycles there have been equally prolonged secular bear markets. It is interesting to note that the cyclical declines in long-term returns are preceded by levels of the Cyclically Adjusted Price Earnings Ratio (CAPE) much higher than the historical average of about 15, while lower-than-average CAPE levels are precursors to periods of market outperformance. These cycles have been widely studied in the past, and macroeconomic theories have been developed to explain them. In this article we are mainly interested in raising awareness about them, and in discussing their potential impact on the commonly accepted investment practices for retirement portfolios.

Whether we believe that the past is an indication of future outcomes or not, at a minimum the past provides NO evidence that equities are a safe bet to guarantee robust returns in retirement portfolios for everyone at all times.

It would appear, instead, that achieving high returns on stocks is dependent on catching a favorable market cycle. Given that these cycles do not follow a perfectly regular pattern, though, there remains considerable uncertainty about the returns to be expected from future holding periods.

”Prediction is Difficult, especially of the Future” [Niels Bohr]

If, for example, it turns out that there is some truth to the historical market cycles scenario, we might not expect the next bull market cycle to begin until sometime around 2015-2020, with still a decade if not longer of flat to weak equity returns. This scenario would be quite compatible with the structural debt deleveraging cycle that we are currently observing in the economy. One sobering reminder of this possibility is given by the experience of Japan (see Figure 4 below). In the late eighties Japan experienced a phenomenal market run-up, with the Nikkei Index peaking on 29 December 1989 at a level of 38,916.

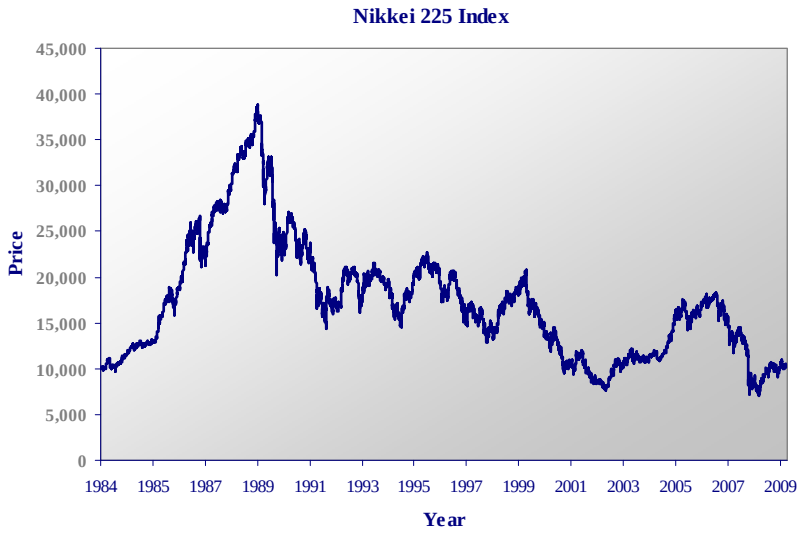

Figure 4: The Nikkei 225 Index for the period 1984-2009 [Source: Yahoo].

As can be seen, the Nikkei Index has continued to trend lower for the past 20 years, despite occasionally substantial rallies not dissimilar to the one we have experienced in 2009: definitely not a good market for buy-and-hold retirement portfolios. Of course, we do hear several very well constructed argument claiming that "*This Time is Different*"!

Summary: Caveats about Conventional Wisdom

The one firm lesson we can safely conclude from past and recent history is that there is a large amount of unpredictability in long-term stocks returns. The reality is that stock markets, far from being efficient and stably mean reverting, are crisis-prone while swinging in and out of "irrational" speculative bubbles. In this context, Policy Portfolios have not been the optimal, passive benchmarks that they were commonly believed to be. Furthermore, the optimal Asset Allocation process is rendered highly ineffective by the inherent unpredictability of the real markets, meaning that statistics such as expected returns and correlations, a key input to the process, are inherently unstable and unreliable at best. Some of the conclusions presented can be summarized as follows:

> *"Conventional wisdom"* investing and asset allocation should not be accepted as a dogma – At a minimum, the foundations of modern financial theories and the undisputed belief in market efficiency should be reviewed critically in light of recent and historical market experience.
>
> *Time-based Asset Allocation*, i.e. the allocation of capital to various assets based on the expected time horizon of an investment, relies on the invalid assumption that passive investments in broadly diversified equity portfolios become increasingly safer as the length of the investment horizon increases. The principle of *Time-based Asset* Allocation has gained widespread support because most current investors have only experienced the bull market that started in the late 70s.
>
> However, historical data for the past 100 years provide indication that stock returns evolve in long cycles of bull and bear markets, and that there have been

wide variations in the potential returns from buy-and-hold strategies even on a 10-30 years time horizon. In other words: **stocks remain a risky investment even over very long investment horizons**. As we have shown, a 20-year investment in stocks can return anywhere between two- and forty- times the initial capital: that is a lot of variability in expected returns when planning for retirement!

To make the problem even more challenging, historical experience reveals that the returns on stocks over long time horizons are not purely random, but are strongly influenced by long term market cycles. These market cycles are characterized by prolonged periods of overvalued and undervalued stock prices (as characterized by above-average and below-average PE ratios). When investors allocate to stocks in a period of generally overvalued (undervalued) stock prices, there is high probability that the returns from long term buy-and-hold portfolios will be lower (higher) than the historical average.

As a corollary of this last observation, most retirement plans today expose participants to a Retirement Lottery determined by the evolution of market cycles: achieving high returns on investments appears to be more sensitive to being born in the right market cycle than anything else. Furthermore, investment strategies based on time-based Asset Allocation methodologies, like 40/60 equity/bonds portfolios, Target Date funds, or Parity Portfolios, are not designed to manage the risks of market cycles. If anything, they are likely to amplify them, since they are inherently "backward-looking" strategies, and rely on future market behavior to remain approximately similar to the most recent experience.

At the time of this writing there is considerable debate about the future expectations about stock returns. On one hand, the impressive rebound in the markets in 2009 and 2010 has been fostering widespread optimism (as it typically happens near the market's peaks following significant rallies). Mainstream industry reports strive to project mostly optimistic views on stocks and the economy (it turns out they are rarely pessimistic…) and they still expect good returns for long-term investors. On the other hand, we agree with an increasing number of other analysts[9] that this optimism should be taken with some caution especially by investment advisors.

Looking Forward: Beyond *"Conventional Wisdom"*

Having established that much of the "*conventional wisdom*" about long term returns on stocks and on investing for retirement requires some critical revision, the question remains about what can be done to design viable investment strategies for the long-term accumulation of retirement assets in the current market environment. The short answer is that there are strategies that can be considered to try and cope with the investment challenges in the current new "market reality." The real challenge is that these new strategies will likely require a significant revision of commonly adopted investment practices and infrastructure. In turn, this will translate in new requirements on the skills

[9] See, e.g. the commentaries from David Rosenberg, Chief Economist and Strategist at Gluskin Sheff + Associates Inc.

set necessary to manage retirement portfolios and, even more importantly, on the governance rules in force at most retirement plans. In this section we list a few initial discussion points that we'll develop further in subsequent articles.

Design "macro-sensitive" portfolios – *"Conventional wisdom"* asset allocation policies do not take fundamental macroeconomic cycles into account. In other words, they assume that the expected risk and returns characteristics of various asset classes, stocks in particular, do not change in time except for "unpredictable" price movements. As data like Figure 3 show, assets like stocks can remain relative expensive or relative cheap for prolonged periods of time. Buying cyclically expensive assets is almost guaranteed to deliver disappointing returns even in the long run.

While we have examined US equity markets in details, the existence of cyclical 'macro-driven' market cycles is a characteristic of most asset classes, including foreign equities, commodities, fixed income, credit etc…

Adopt "macro-driven" dynamic asset allocation – Dynamic asset allocation is a broad concept with a broad range of possible implementations and uses. When applied to retirement portfolios, is too often confused with and demonized as the practice of "*Market Timing*," i.e. with the attempt to speculatively predict market tops and market bottoms. While it is true that trying to capitalize on speculative bets is more often counterproductive, the reality remains that the entry price (and the entry time) into an asset class represents the most difficult decision to take for long-term investors. In the context of portfolios sensitive to fundamental market cycles, however, a dynamic asset allocation strategy would tactically buy or sell assets as the macroeconomic conditions of the markets become favorable or unfavorable to that particular asset (e.g. generally expensive stock valuations that would lead to a considerable reduction in exposure to equities). This lesson was regrettably forgotten during the sustained bull market of the 80s and 90s. For investors who buy assets at a peak of a market cycle, like equities in 1999, no time horizon within their lifecycle will be sufficiently long to recoup the losses on those investments. In this framework, dynamic asset allocation would not rely on esoteric methodologies to try and predict when a bubble will burst. This proves to be an almost impossible task. However, a carefully constructed analysis would help "diagnose" a potentially dangerous situation and encourage the use of tactical reallocations, hedges and other protective overlays as a prudent portfolio management measure. Furthermore, a more dynamic asset allocation strategy would be required to generate positive returns should a "Japan-like" market scenario occur in the US in the coming decade. Overall bearish cyclical markets are characterized by broad decline in asset prices, but not without significant temporary rallies and corrections where returns can be generated (see e.g. Figure 4). As an aside, we note that:

The need to recognize and capture macroeconomic market cycles will be important also for traditionally 'bottom-up' investors such as classical "Graham and Dodd" value investors.

Traditional value investing, in fact, is predicated on the idea that the market value of assets will eventually "mean-revert" to the "true" fundamental value over a sufficiently long period of time (let's say, 7 to 10 years). This remains generally true. However, the "bottom-up" valuation process must acknowledge and

accommodate for potential changes in macroeconomic cycles, which is not usually the focus of value investors.

Implement a more "forward-looking" risk management processes – Most risk management practices implemented today rely on largely quantitative statistical measures based on historical data. However, even the most sophisticated measures in use such as Value-at-Risk (VaR) are inherently "backward-looking" since they rely exclusively on past historical price data. It is important to keep in mind that **investment risk involves several complex risk components that cannot be summarized in a single statistical summary**. In fact, some of the most important risks cannot even be quantified nor summarized. Furthermore, is it imperative that risk is defined on a "forward-looking" basis in order to diagnose potentially critical market conditions in the future. Needless to say, this is a much more complex task than calculating historical statistics, and it requires a multi-disciplinary approach that includes statistical, macroeconomic, microeconomic, behavioral and historical analysis. While some market events are inherently "unpredictable," the formation of speculative bubbles can often be at least "diagnosed" and anticipated.

Avoid "blind" diversification – Diversification remains an important concept in managing the risks of investment portfolios. However, diversification does not mean that investors should remain invested in all asset classes at all times. As emphasized in the previous paragraphs, buying cyclically expensive assets just for the sake of adding diversification is likely to prove counterproductive. Furthermore, the benefits of conventional diversification are severely diminished when they are most needed: during market crashes. Broad diversification might soften the impact of a strong market downturn, but it would still lead to significant losses as many funds have experienced in 2008.

Reduce reliance on "benchmarks" – The extreme reliance on passive index benchmarks and on "Policy Portfolios" is one of the more direct consequences of the unchallenged belief in the principle of Efficient Markets. However, historical experience (see again Figure 3) indicates that the returns on broad passive indices can exhibit strongly cyclical behavior with long phases of "structurally bear" markets characterized by low or negative expected returns. In a "macro-sensitive" optics, passive benchmarks and Policy Portfolios need to be revised continuously as market conditions change. Furthermore, more emphasis should be placed on achieving "absolute returns" and on preserving capital, rather than focusing almost entirely on delivering outperformance, or "alpha," over any given Policy Portfolio. We see a very large fraction of pension funds that mandate and compensate their managers to focus on delivering, say, 100 to 400 basis points of "alpha" on top of passive benchmarks. Clearly, such a mandates prove counterproductive when the passive benchmark itself collapses by 20% to 40%. And since managers have been so focused on their performance "relative" to the passive benchmarks, nobody ever considered that the passive benchmarks themselves might have been extremely out of line with their equilibrium fair values. It is no wonder that "nobody saw it coming"! Nobody was watching…

Carefully examine "new" old solutions – There are products now being offered that claim to be a "new" solution to the problems of the old products. Popular products include "*Target Date Funds*," "*Risk Parity Portfolios*" and certain dynamic asset allocation strategies for "*Liability Driven Investment*" (LDI). However, a detailed examination shows that these products have been

developed within the standard "*conventional wisdom*" investing framework, and may not always address the challenges of asset markets in the upcoming decades. In particular, these products still rely strongly on the ability to assume that returns on assets are stably mean-reverting and positive over long time horizons, an assumption that we strongly encourage to review critically. In short, any investment strategy that manages risks solely based on the length of the investment *time horizon* should be viewed with a degree of caution.

Develop more realistic returns expectations – As we mentioned, the possibility that equity markets and other asset classes have entered a secular "bear" cycle for at least the next decade strongly suggests that asset returns expectations need to be thoroughly revised. At a minimum, this would be a prudent, albeit difficult, decision to minimize the risks due to excessively optimistic projections. For Defined Benefits and Defined Contribution plans as well, the "new reality" may require greater emphasis on encouraging savings rather than unrealistic expectations on asset returns. *"Stocks for the Long Run"* should become "*Savings for the Long Run."*

Adopt a "common-sense" approach – not a "*conventional wisdom*" one. The wide acceptance of "*conventional wisdom*" practices has lead to increased reliance on mechanical tools like "portfolio optimization software" for the design of strategic asset allocation portfolios. Similar mechanical rules are often recommended for tactical allocations, like time-based portfolio rebalancing and/or periodic relative weighting rebalancing. We advocate reinstating an approach to managing investment portfolios that relies on the same common sense applied to all other kinds of capital purchases: buy assets when they are advantageously priced and when it makes sense to do so. Absolute returns and preservation of capital should take precedence over achieving prescribed "alpha" and "beta" risk budgets. Or, as Warren Buffet puts it: a) "never lose money," and b) "never forget point (a)."

The last bullet is perhaps the most critical one. Financial theories and models help provide useful tools and frameworks for making investment decisions. However, all models have demonstrated limitations that must be well understood and vetted against the realities of the markets. Long-term investing can never be a mechanical process where investment frameworks are applied in a quasi "dogmatic" fashion. These *"conventional wisdom"* frameworks have often been proposed to investors as a relatively simple set of tools that would enable everyone to achieve satisfactory returns on financial assets over the long time. But just like any other product, due caution needs to be exercised when confronted with claims of excessively high expectations.

When we consider the current post-bubble (post multiple bubbles, actually) market, it is very likely that investors will face a much different environment than any of the more recent decades. In particular, it is unlikely that the markets will be characterized by the fluctuating but steady sustained growth of the recent past. While we have focused on stocks, these observations apply generally to all asset classes, including hedge funds and other alternative investments. Most hedge funds strategies, in fact, are significantly sensitive to the underlying macroeconomic market conditions as well as to the prevalent trends in the markets. For example, the majority of discretionary long-short equity strategies, which represents the largest class of hedge fund families by amount of capital, retains a significant exposure to the stock market direction (also known as "beta") and has come under pressure during the 2008-2010 market.

Successful investing in this "new market reality" will likely require a continuous, active investment process driven by research, creativity and good insights about market trends and macroeconomic fundamentals, all combined with expert execution. In short, we believe that investors and advisors will need to take a more proactive role in forming views about the current market environment and tactically adjusting portfolios accordingly, as opposed to simply relying on some fixed expectations about the long term returns on various asset classes. This in turn will require an expanded mix of professional expertise than typically available to pension funds and traditional investment advisors. More products are being developed to offer this kind of more active management, e.g. mutual funds with hedge fund-like active strategies, but investors will face the challenge of "seeing-through" the added complexity of these products to select the appropriate investment.

This proposed "macro-sensitive" investment framework is conceptually simple and intuitive, yet its implementation is anything but easy. The biggest challenge, besides the mentioned need to create new tools and expertise, will possibly be posed by retirement plans governance rules. Evolving away from the "benchmark-centric," formulaic "Policy Portfolios" asset allocation strategies will require a more proactive involvement of plan governance entities and boards in the portfolio management decisions. This will in turn induce an increased level of individual accountability than in the standardized *"conventional wisdom"* framework. Benchmark Policy Portfolios have the great advantage of representing a passive reference that can be used to assess the fund managers' skills in an "objective-looking" fashion. They also have the more questionable advantage of not holding the managers accountable when the overall "passive" markets decline. In 2008, for example, there have been public outcries at several public and private funds where the managers where eligible to earn bonuses for having "outperformed" the Policy Portfolios while the entire fund had suffered massive losses (i.e. for losing "only" 22% when the benchmark had lost, say, 25%). Furthermore, there are many practical and operational considerations that make it difficult to impose radical changes on investment policies and fund governance rules. Fortunately, many of the proposed ideas can be introduced incrementally into existing frameworks, using for example, tactical hedges and overlays to help adding protection as well as enhancing returns.

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Appendix

I. The Distribution of Annualized Returns: A Statistical Fallacy

Research publications from Investment advisors and financial institutions almost invariably present the data from Figure 2 in a different form, which is shown below in 55. The data are exactly the same, with the only difference that the returns figures are annualized[10].

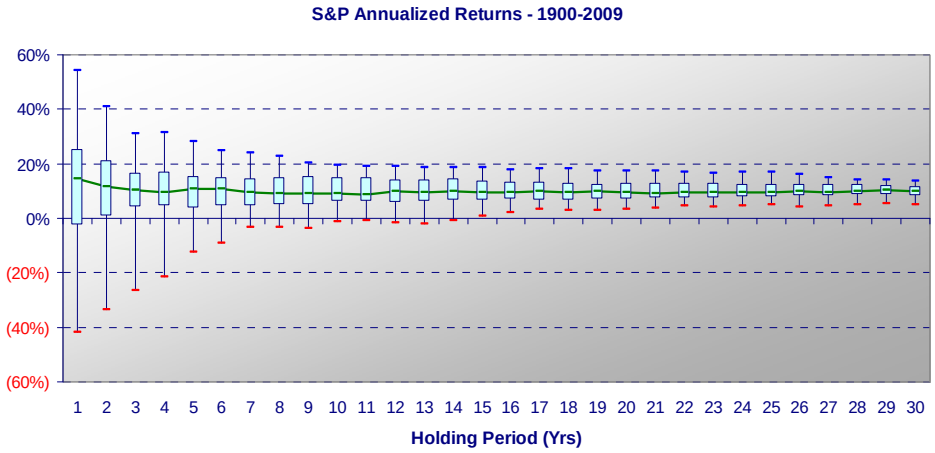

Figure 5: Summary statistics of historical Annualized Returns for different investment horizons for the S&P 500 for the period 1900-2009. This is the same data as in Figure 2, but with the *annualized* returns presented instead of the *total period* returns.

The uncertainty of the Annualized Returns is a misleading indicator of the true uncertainty of a long-horizon investment

Managers and advisors use a version of Figure 5 as proof to their clients that the risk of holding equities decreases with the time horizon. The apparent decrease in risk is referred to as the "*Time Diversification Effect."* The logics is that, since returns are mostly random and independent year after year, the accumulation of many such random returns produces an effect similar to the normal portfolio diversification that results from accumulating many uncorrelated assets, also known as the statistical Law of Large Numbers. This, however, is a result of a fallacious interpretation of statistical results. True time diversification would be achieved, in fact, via an arguably contrived investment strategy where equal portions of the initial capital are invested separately in each and every year, and only for one year. For example, with a capital of $10,000 and a 10 year horizon, the investor would allocate $1,000 in year 1 and sell the investment after one

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[10] For a holding period of *N* years, the *Annualized Returns* are calculated from the *Holding Period Returns* as: $Annualized\,\mathrm{Returns} = \left(1 + HoldingPeriod\,\mathrm{Returns}\right)^{\frac{1}{N}} - 1$

year, then allocate another $1,000 in year 2 and sell it after one year, and so on and so forth. The law of large numbers would apply to such strategy, and the uncertainty of the distribution of returns, as measured by the standard deviation of the returns, would indeed decrease when the investment horizon grows from 10 to 20, 30 years or longer, as shown in Figure 5. Note also that the expected return on the $10,000 capital for this strategy would be the one year average historical return, not the 10-year average compounded return. However, if the $10,000 capital is wholly invested in the market for the full 10 years, with the returns compounded year after year, the law of large numbers no longer applies. The effect of compounding returns ends up amplifying the uncertainty, albeit slower than linearly with time, as shown in Figure 2. For example an investment lasting 20 years would not be 20 times more uncertain than an investment lasting for only one year: it would be only about 4.5 times more uncertain. At the same time, the expected returns would be about 20 times larger. We can see that the length of the time horizon provides some support to the time diversification concept in the sense that "the expected returns grow much faster than the risks" as the holding period increases. Whether a long holding period investment is "theoretically preferable to a shorter one based on the higher "expected return to risk" ratio is largely a philosophical debate. The point remains that the risk of investments increases over time.

This fallacy in the use of statistics to prove the long-term case for stock investments has been discussed in the past using formal arguments from statistical theory, and it hinges on the difference between the concepts of "*Risk Pooling"* vs *"Risk Diversification."* A deeper technical discussion is beyond our scope. We limit ourselves to just stating that the more appropriate representation of the risk for long-horizon investments is the uncertainty of the final value of an investment, i.e. the standard deviation of the Holding Period Returns. After all, this makes intuitive sense, since investors are interested in knowing the uncertainty of the total amount of wealth available to them upon retirement.

Unfortunately, the use of the summary statistics of the Annualized Returns is widespread, and it is hardly questioned by investors. There are many assumptions and expectations about markets and investments where reasonable individuals may hold diverging opinions. The incorrect use of these statistics, however, is an undisputable fallacy.

II. The Human Capital Argument

Another often quoted argument in favor of time based asset allocation is the so called "Human Capital" argument. In its simplistic form, the argument states that younger individuals have better ability to recoup eventual investment losses through their longer working and earning horizons. For this reason, the "Lifecycle Investment" proponents argue that younger individuals should start with a higher exposure to risky assets such as equities than older people, and then gradually move to safer assets as they grow older. This is the basic idea implemented, for example, in the "glide path" approach of "Target Date Funds."

While it is unquestionably true that younger individuals may have more time to recover from monetary losses, there are a couple of serious problems with the "Human Capital" argument:

1) First, Human Capital is not truly riskless. An individual could suffer, for example, from personal injuries, layoffs, and other economic setbacks that would severely reduce the ability to save significantly in the later stages of their working life.

2) Second, not even younger individuals might be able to recoup losses arising from market crashes. We have seen that market cycles evolve over several decades. Investors who entered the markets near the peaks of 1929 and 1999 could not recover their losses for over 20 years, let alone achieving positive returns (for the 1999 peak, the markets are still severely under water after over 10 years, and it may take another decade or more to reach those same levels). At a minimum, younger investors who started with large allocations to equities near or in the aftermath of a severe market crash are likely to see very low long term returns on their investments, thus affecting their net worth at retirement.

This and the other argument presented should make clear that not even Lifecycle Investing is a completely robust strategy in all market cycles. It may improve long term wealth accumulation during some market periods but it may also lead to more disappointing results in other periods, by encouraging excessive allocation to risky assets at the wrong time. Incidentally, this fact was noted in 2008 where many Target Date funds performed very poorly.

We re-emphasize once again that while age may certainly be a criterion when deciding asset allocations, the more sound strategy remains the one of investing in risky assets when the valuations of these assets warrants the chances for positive future returns. Simply put, the value of the assets should be a more important consideration than the time in an individual's life when these assets are purchased.