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# How To Study Capital Market History

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A recent CFA Institute Magazine article asked the formidable question “Should financial history matter to investors?”<sup>1</sup> We unquestionably agree with the article’s survey results, which found that “when asked about the importance of economic and financial history to their success as investment professionals...” an overwhelming majority (96%) answered that it was either very or somewhat important.”<sup>2</sup>

However, the same article found that “some may not know how to use this knowledge to make better investment decisions (or, at the very least avoid poor ones)”.<sup>3</sup> Hence, the objective of this article is to illustrate how the study of capital market history can provide investors with “helpful guidance on how historical perspectives can be incorporated into investment decision-making processes.”<sup>4</sup> We have the following key takeaways for investors studying capital market history:

1. Start with the hypothesis being tested
2. Always visually inspect the data
3. Analyze the entire distribution
4. Calculation frequency matters<sup>5</sup>

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<sup>1</sup> “Should Financial History Matter to Investors?” by Desi Allevato, (Sept/Oct 2015), CFA Institute Magazine, page 17.

<sup>2</sup> Ibid.

<sup>3</sup> Ibid.

<sup>4</sup> Ibid.

<sup>5</sup> Frequency refers to the periodicity (i.e. intra-day, daily, weekly, monthly, yearly) of the data and how it is used in the calculation. For example, the risk of an asset class, which is typically described as the standard deviation of the returns of the asset class, could be calculated using daily, monthly, quarterly or yearly return data measurement. As discussed later in this article, the frequency employed in this calculation matters for different frequencies can result in significantly different results. This is discussed in more detail in Short Horizon Inputs and Long Horizon Portfolio Choice by William N. Goetzmann and Franklin R. Edwards, *The Journal of Portfolio Management*, (Summer 1994), pages 76-81. While it is beyond the scope of this paper to discuss the inputs for portfolio optimization, the ultimate discussion with solutions for handling portfolio optimization can be found in *Efficient Asset Management: A Practical Guide to Stock Portfolio Optimization and Asset Allocation*, by Richard Michaud and Robert Michaud, Oxford University Press; 2 edition (March 3, 2008), 144 pages.

## Hypothesis #1: Business and Stock Market Cycles Are Predictable

The popular financial press often features investment professionals predicting the direction of the business cycle or the stock market. This behaviour leads investors to believe that business and stock market cycles repeat in a predictable manner. Typical educational sources imply this predictability using a classical smooth waved chart to illustrate the business cycle. Even employing the word *cycle* to describe long-term business and stock market movements further reinforces the idea that these “patterns” represent predictability and repeatability. Therefore, our hypothesis is that, over time, business and stock market cycles repeat in a predictable fashion.

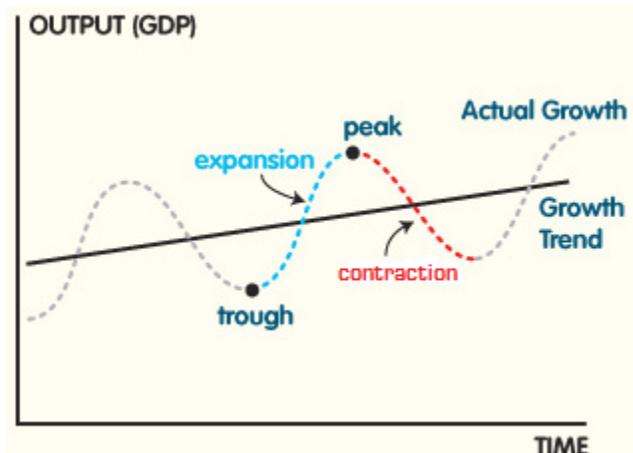


Exhibit source: <https://econ101-powers.wikispaces.com/Business+Cycle,+Recession,+Depression>

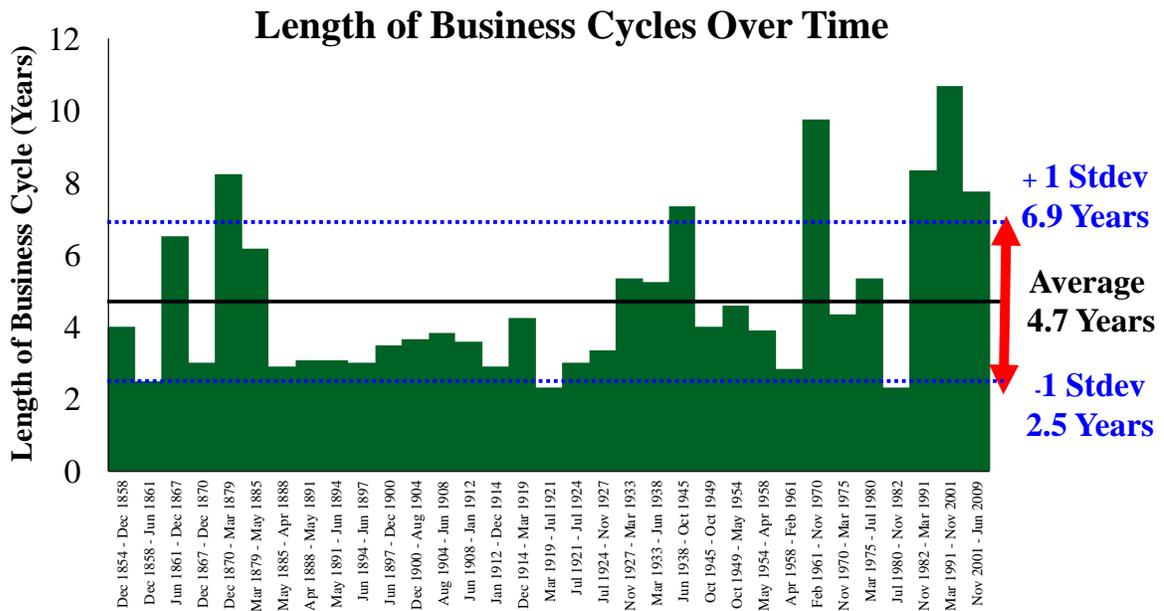
In examining long-term capital market time series data, it is often helpful to depict this quantitative information and *visually* examine it in order to assess the evidence and determine

if there are any particular patterns.<sup>6</sup> In addition, visually inspecting the data is a good habit to develop in order to detect potential input errors.

Exhibit 1 below portrays 155 years of U.S. business cycle history. Visually inspecting the long-term data gives one the impression that there is little predictability or cyclicity in the series.

“This is perhaps an inevitable outcome given the changing nature of business cycles. The fact that business cycles are not all alike naturally means that variables that predict activity have a performance that is episodic.”<sup>7</sup>

**Exhibit 1**



Source: The National Bureau of Economic Research, Hillsdale Investment Management. Business cycles above are based on trough-to-trough.

<sup>6</sup> For a further discussion of the benefits of depicting quantitative data, see the works by Edward R. Tufte including: The Visual Display of Quantitative Information, Graphics Press; CT, 2nd edition (2001), 200 pages and Visual Explanations, Graphics Press, CT, (1997) 158 pages.

<sup>7</sup> Page 1149 in “Facts and Challenges From the Great Recession for Forecasting and Macroeconomic Modeling,” by Serena Ng and Jonathan H. Wright, Journal of Economic Literature, (2013), 51(4), pages 1120 - 1154.

The summary business cycle statistics in Exhibit 2 support this view as the “typical” U.S. business cycle length averages 4.7 years with a high degree of variability as the standard deviation of the average cycle is 2.2 years.<sup>8</sup> In other words, the underlying length of the business cycle has broadly ranged anywhere from 2.5 years to 6.9 years 68% of the time.

**Exhibit 2**

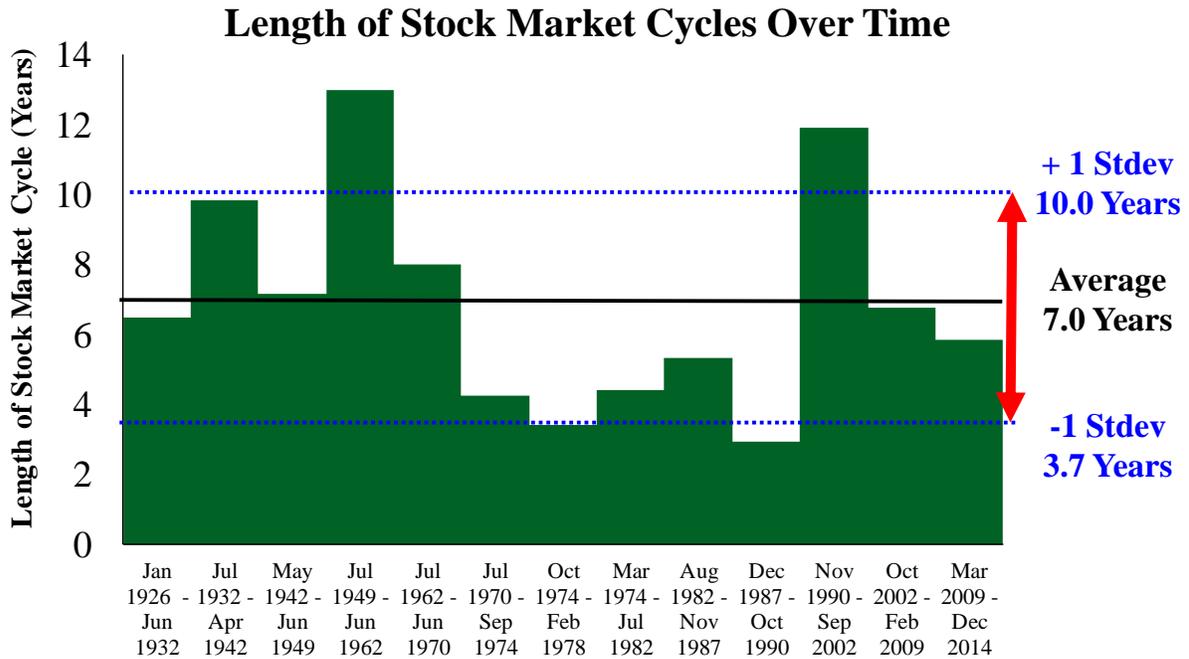
1854 - 2009	Years		
	Recessions	Expansions	Total Cycle
<b>Average</b>	<b>1.5</b>	<b>3.2</b>	<b>4.7</b>
<b>Standard Deviation</b>	<b>1.0</b>	<b>2.3</b>	<b>2.2</b>
<b>High</b>	<b>5.4</b>	<b>10.0</b>	<b>10.7</b>
<b>Low</b>	<b>0.5</b>	<b>0.8</b>	<b>2.3</b>

Source: Hillsdale Investment Management

Similarly speaking, a visual inspection of U.S. stock market cycle history over the period 1926 – 2014 also indicates a high degree of variability in the length of each cycle.

<sup>8</sup> The high degree of variability in the length of the stock market cycle supports the famous quote of noble prize winning economist Paul Samuelson: “The stock market has forecast nine of the last five recessions.” quoted in: John C Bluedorn et al. *Do Asset Price Drops Foreshadow Recessions?* (213), p. 4 (1966),

**Exhibit 3**



Source: The National Bureau of Economic Research, Hillisdale Investment Management. Stock market cycles are based on bear to bear for the S&P 500. A *bear market* is defined as a period of falling securities where prices have *fallen* 20% or more from the most recent *high*. A *bull market* is defined as a period of rising securities where prices have *risen* 20% or more from the most recent *low*.

Stock market cycle statistics support the fact that the length of a typical stock market is highly variable averaging 6.9 years with a standard deviation of 3.1 years, i.e. 68% of the time a stock market can range from 3.7 years to 10.0 years.

**Exhibit 4**

1926 - 2014	Years		
	Bears	Bulls	Total Cycle
<b>Average</b>	<b>1.8</b>	<b>5.2</b>	<b>6.9</b>
<b>Standard Deviation</b>	<b>1.4</b>	<b>3.0</b>	<b>3.1</b>
<b>High</b>	<b>5.2</b>	<b>12.5</b>	<b>13.0</b>
<b>Low</b>	<b>0.3</b>	<b>2.3</b>	<b>2.9</b>

Source: Hillisdale Investment Management

Since the length of business and stock market cycles are highly variable and not predictable, investors should avoid investment decisions based on attempting to predict the length or the turning point of either business or stock market cycles.<sup>9</sup> The historical data also suggests that money managers should be assessed over longer periods than the standard 3 or 4 years, as the average stock market cycle is 6.9 years. Predicting the duration of the business cycle was aptly summarized by noted business cycle analyst Victor Zarnowitz, who said “few business cycle peaks are successfully predicted; indeed, most are publicly recognized only with lengthy delays.”<sup>10</sup>

### **Hypothesis #2: Market Timing Can Add Value**

If business and stock market cycles are highly variable, it follows that stock market timing decisions based on this sort of analysis is a low odds strategy.<sup>11</sup> The experience of professional forecasters and most empirical studies of active timers support this viewpoint.<sup>12</sup> Consultant guru John Ilkiw summarized active manager studies and found that the median result from asset mix timing detracted 40 basis points from fund performance while the top quartile “market timer” result yielded only 10 bps in value added. In contrast, these studies support the

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<sup>9</sup> The failure of experts in predicting the length of either the business cycle or the stock market cycle is discussed in more detail by noted stock market historian Jeremy J. Siegel in Chapter 15, Stocks and the Business Cycle, in *Stocks for the Long Run*, McGraw Hill Education, New York, 5<sup>th</sup> Edition.

<sup>10</sup> Victor Zarnowitz. “Has the Business Cycle Been Abolished?” (October 1998), *Business Economics*, Vol. 33, No. 4, pp. 39-45.

<sup>11</sup> These older studies were nicely summarized by pension guru John Ilkiw in his handbook *The Portable Pension Fiduciary*.

<sup>12</sup> The experience of professional forecasters was nicely summed up by Jeremy J. Siegel in “The gains of being able to predict the turning points of the economic cycle are large, and yet doing so with any precision has eluded economists of all persuasions.” Page 238 in *Stocks for the Long Run*, 5<sup>th</sup> Edition. The empirical studies can be found in *The Portable Pension Fiduciary: A Handbook for Better Pension Fund Management*, by John Ilkiw, Toronto: Benefits Canada, (1997), page 62..

view that security selection is a “higher odds” approach for attempting to generate value added.<sup>13</sup>

Other theoretical studies have supported this hypothesis, finding that a sizeable success ratio of anywhere from 60% to 70% is required to beat a buy and hold strategy.<sup>14</sup> Noble prize winning economist Paul Samuelson described the challenges in market timing best: “Scores of documented statistical studies attest that not one in ten “timers” ends up getting back into the market at bargain prices lower than what they sold at earlier.”<sup>15</sup>

Why is market timing so challenging? This question can be answered by examining the long-term nature of stock returns. Market returns are better characterized by “jumps”.<sup>16</sup> This means that financial prices do not change in a continuous fashion but instead “jump, skip and

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<sup>13</sup>The Portable Pension Fiduciary: A Handbook for Better Pension Fund Management, by John Ilkiw, Toronto: Benefits Canada, (1997,) page 62,. More recent analysis, supports the thesis that market timing is a low odds strategy. For a summary of more recent research See Winfried Hallerbach, “On The Expected Performance of Market Timing Strategies”, Journal of Portfolio Management, (Summer 2014), pages 42-51.

<sup>14</sup> Hallerbach (2014) suggests a sizable success ratio of 60%, 66% (Bauer and Dahlquist [2001]) 70% (Sharpe [1975]). Hallerbach (2014) suggests that based on the Fundamental Law of Active Investment Management market timing in equities would require a “... a sizeable success ratio...to match the Sharpe ratio of a buy and hold strategy.” Recent work analysis by CEM (2015) also suggests that security selection continues to dominate the value added generated by pension funds with little support for market timing.

<sup>15</sup> Canny Portfolios, by Paul Samuelson, CFA Magazine, (Jan-Feb, 2008), page 6. Professor Samuelson’s point is especially important as investors who support market timing believe that they can avoid the “worst” declines and manage to get back in to the market to enjoy the upside benefits. Since both positive *and* negative jumps in market returns occur in an unpredictable fashion, the odds are stacked against investors timing these decisions.

<sup>16</sup> Evidence on jumps in stock returns continues to be revealed as presented in “Systematic Risk and International Portfolio Choice”, by S. Das and R. Uppal, Journal of Finance, (December 2004), pages 3804-2834.

In our exhibit, the kurtosis for the distribution is 9 while a normal distribution is 3. Pioneering work in this area led by Benoit Mandelbrot who illustrated that “the tails of the distributions of price changes are in fact extraordinarily long, that the sample second moments typically vary in an erratic fashion. Page 395 in “The Variation of Certain Speculative Prices, The Journal of Business”, Vol. 36, No. 4 (Oct., 1963), pages 394-419. Today it is an accepted principal that “asset class return distributions are not normally distributed.” Page 23 in The Impact of Skewness and Fat Tails on the Asset Allocation Decision James X. Xiong, and Thomas M. Idzorek, Financial Analysts Journal Volume 67, No. 2, pages 23 – 35. For an excellent review of the properties of asset returns see “Empirical Properties of Asset Returns: Stylized Facts and Statistical Issues” by Rama Cont, Quantitative Finance, Volume 1,( 2001), pages 223- 236.

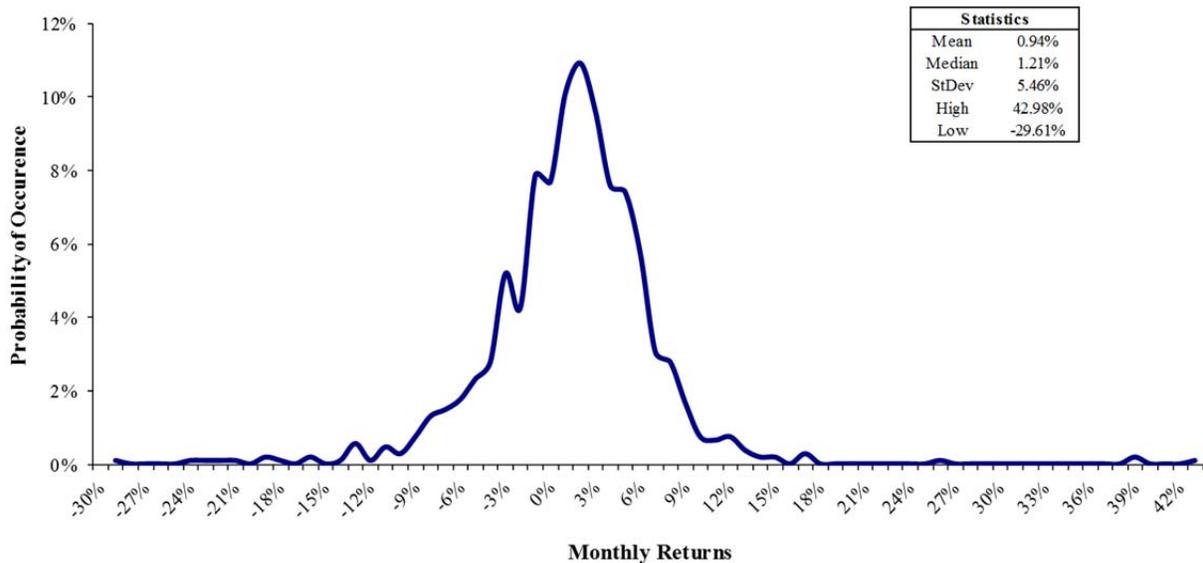
leap” up and down.<sup>17</sup> In other words, a significant percentage of very good (and bad) returns in the market occur in a limited number of days.

Market performance occurs in unpredictable spurts, as equities have non-normal return distributions with skewed and fat-tailed distributions. As illustrated below in Exhibit 5, these non-normal return distributions can provide investors with a better understanding as to why there are such large opportunity costs of missing the 10 best days market returns are better characterized by “jumps”.<sup>18</sup>

**Exhibit 5**

**S&P500 Monthly Return Relative Frequency**

Jan 1927 – Mar 2016



Source: Hillsdale Investment Management

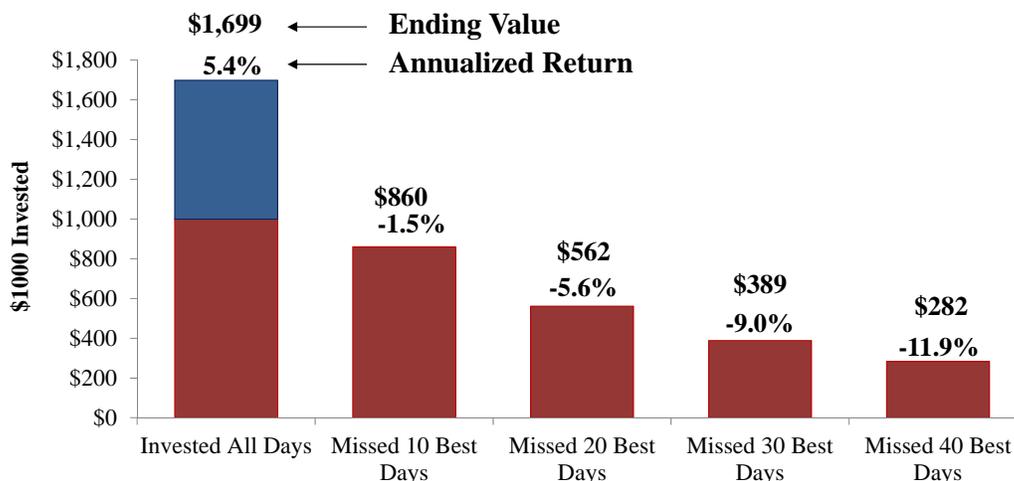
<sup>17</sup> Page 237 in *The (Mis)Behavior of Markets: A Fractal View of Risk, Ruin, and Reward*, by Benoit B. Mandelbrot, a pioneer in applying fractal geometry to markets, and Richard L. Hudson in HarperCollins Canada, Basic Books, 2004, Page 237. This book is a must read for all capital market students.

<sup>18</sup> For a discussion of some of issues involved in non-return distributions see Chapter 10 in *Perspectives on Institutional Investment Management*, Harry Marmer, (September 2002), Rogers Publishing.

## Exhibit 6

### Most Up and Down Market Performance Occurs In Unpredictable Spurts

S&P 500 Index, 10 Years Ending December 31, 2014



Source: Hillsdale Investment Management

Why do markets behave in this fashion? Noted mathematician and scientist Benoit Mandelbrot proposed that one possible source for these empirical traits “is the world outside the markets – what economists call “exogenous effects.”<sup>19</sup> Continuing with this theme, respected quant Paul Kaplan suggested that “financial crises and bank failures,” which have occurred throughout history, are to blame for fat tailed return distributions.<sup>20</sup> Others point at investor behavioral biases as a primary driver of the heavy or fat tails in asset class return distributions.<sup>21</sup> Given the behaviour of markets, investors can increase the odds of successfully achieving their long-term policy mix by not market timing. Instead, implement a disciplined rebalancing policy back to the long term policy asset mix.<sup>22</sup> Analyzing the entire return distribution provides a

<sup>19</sup> The (mis)Behavior of Markets, Benoit Mandelbrot and Richard Hudson, Basic Books, (2004), page 228.

<sup>20</sup> In Chapter 17 of his excellent book *Frontiers of Modern Asset Allocation*, Paul Kaplan discusses the underlying economic thought and possible explanations for financial crises. He also discusses return distributions and fat tails in Chapters 18 – 20 and 26.

<sup>21</sup> See, for example, *Fat-Tailed and Skewed Asset Return Distributions: Implications for Risk Management, Portfolio Selection and Option Pricing* by Svetlozar Rachev, Christian Menn and Frank Fabozzi, John Wiley & Sons, New Jersey, (2005).

<sup>22</sup> Much has been written about rebalancing policies and asset mix policies. The classic work by Perold and Sharpe (1988) discusses four kinds of asset mix policies. More recently, Harvey (2014) suggests that adding a momentum overlay would enhance the return to risk ratio of a constant mix strategy.

finer appreciation for the challenges involved in succeeding in market timing. In conclusion, market timing is a low-odds strategy as this approach runs counter to the very essence of how markets move over time.

### **Hypothesis #3: Equity Markets Are More Volatile**

It has become popular to argue that equity markets have become more volatile. This has been a prime motivation for institutional investors to move assets away from stocks into alternatives such as real estate, private equity and infrastructure, which appear less volatile than stocks.

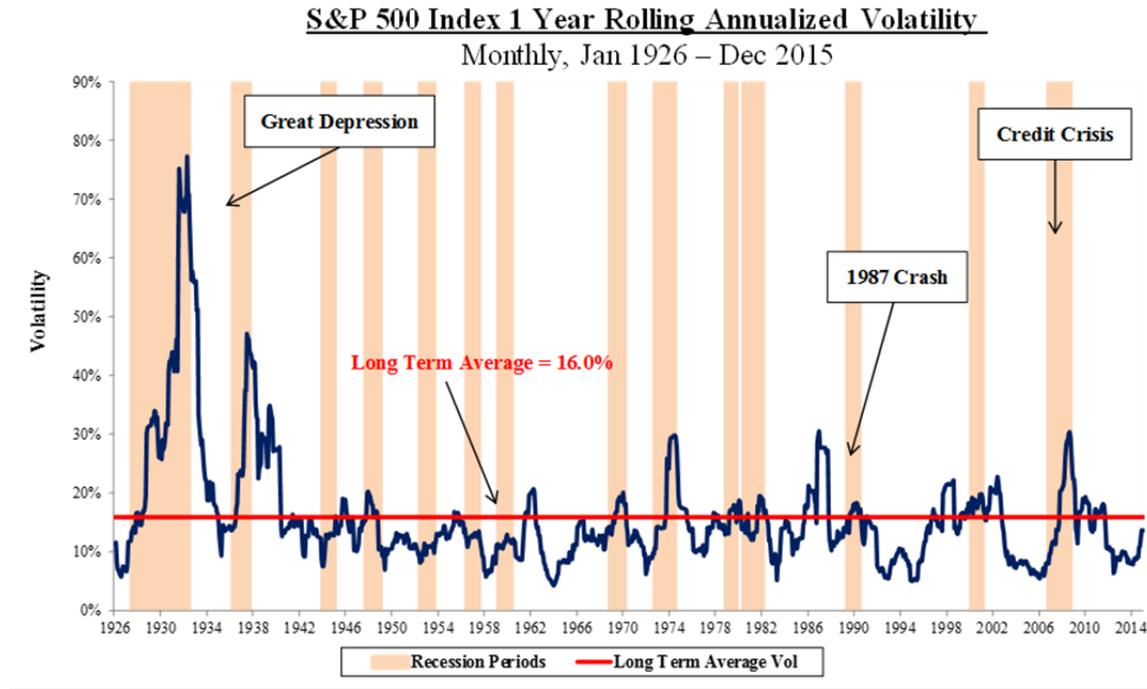
Empirical research and visual inspection of the exhibit below supports the following stylized facts concerning stock market return volatility:

- Volatility is negatively correlated with returns, i.e. volatility rises during “bad” times (recessions or bear markets)<sup>23</sup>
- Volatility persists or clusters, i.e. “large changes tend to be followed by large changes, of either sign and small changes tend to be followed by small changes”
- These observations lead to the conclusion that volatility is mean reverting, i.e. there is a normal level to which volatility will eventually return

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<sup>23</sup> Volatility negatively correlated with returns is known as the leverage effect or the asymmetric volatility phenomenon. These stylized facts on stock market return volatility are discussed in more detail in the following papers: Schwert, G William, (1989), “Why Does Stock Market Volatility Change over Time?” *Journal of Finance*, American Finance Association, Vol. 44(5), pages 1115-53; Masset, Philippe, (2011), “Volatility Stylized Facts”, Available at SSRN: <http://ssrn.com/abstract=1804070>; Osambela, Emilio, (2008). “Understanding Stock Return Volatility”, Swiss National Centre of Competence in Research; Poon, S.H. and Granger, C.W.J, (2003). “Forecasting Volatility in Financial Markets: A Review”. *Journal of Economic Literature* 41. Pages 478-539; Andersen, Torben, Bollerslev, Tim, Diebold, Francis X. and Ebens, Heiko. (2001). “The Distribution of Realized Stock Return Volatility”. *Journal of Financial Economics*, pages 61, 43-76; Marmar, Harry S., “Perspectives on Institutional Investment Management”, (September 2002), Rogers Publishing.

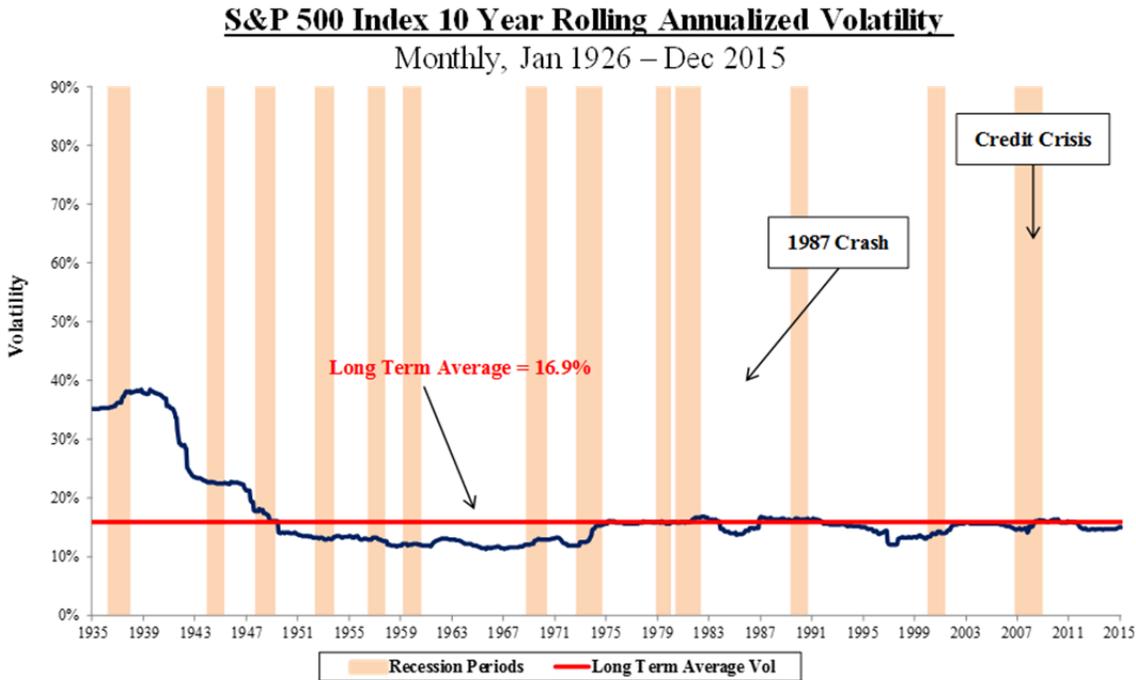
## Exhibit 7



Source: Hillsdale Investment Management

An important axiom that we can derive from these stylized facts is that the frequency in which this data is used in measuring and assessing investment risk matters. More specifically, if investors employed a long-term investment horizon such as ten years, which is similar in length to the investment horizon utilized by private equity investors, public equity volatility would appear very stable (see Exhibit 8).

## Exhibit 8



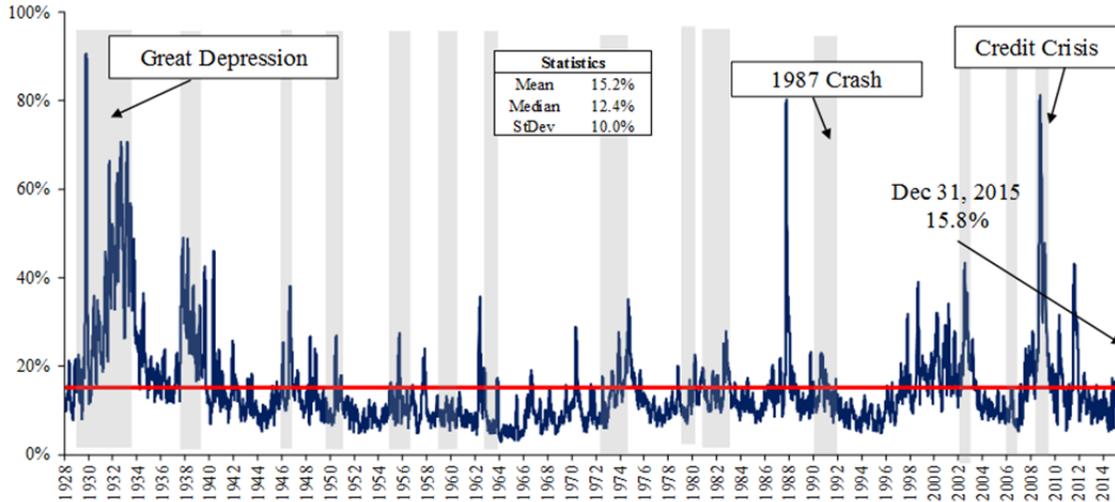
Source: Hillsdale Investment Management

There is no doubt that investor views on volatility have been influenced by the increasing focus on short-term indicators such as the VIX, which has become a popular indicator of market risk<sup>24</sup>. As displayed below, a visual examination of the time series history of the VIX illustrates that the VIX spikes significantly more often than the longer-term measure of stock market volatility and that these spikes are much higher as well. This is reflected in the statistically significant higher standard deviation of volatility for the VIX time series versus the standard deviation of the monthly rolling ten-year volatility (i.e. 10.0% versus 6.6%).

<sup>24</sup> This is discussed in more detail in Financial Attention, Nachum Sicherman, George Lowenstein, Duanne Seppi and Stephen Utkus, The Review of Financial Studies, Vol 29, #4, (2016), pages 863-897.

## Exhibit 9

**S&P 500 30 Day Rolling Annualized Volatility**  
Jan 1928 – Dec 2015



Source: Hillsdale Investment Management

### **“History Never Repeats Itself; At Best It Sometimes Rhymes.”**

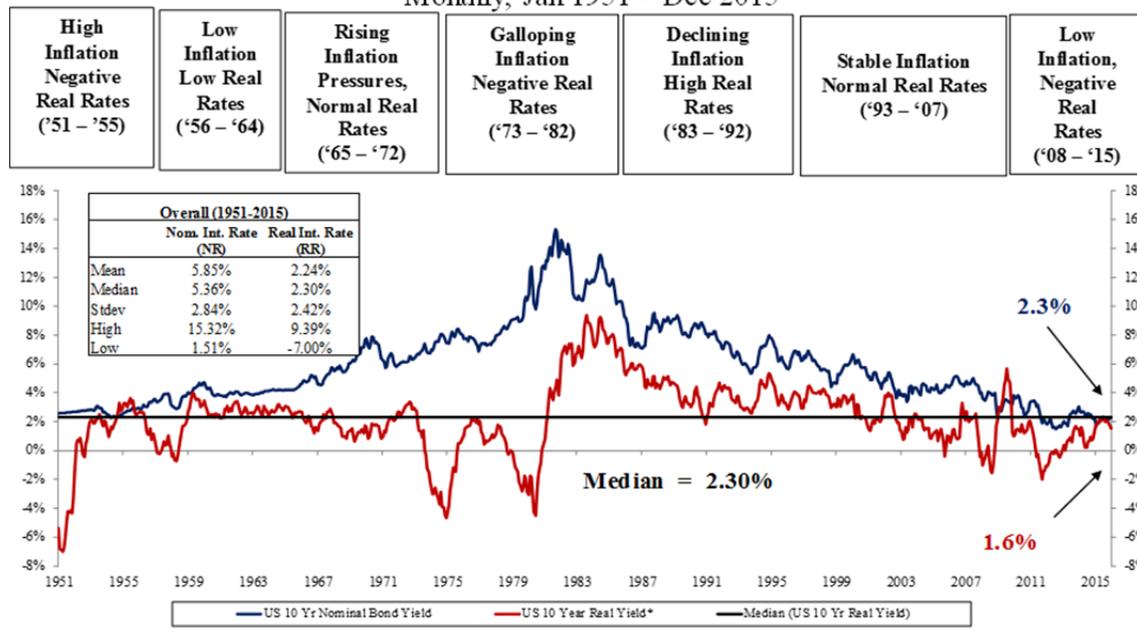
An important lesson to derive in studying capital market history is to recognize that history does not repeat itself. More specifically, history never repeats itself; at best, it sometimes rhymes. This becomes very clear when employing history in an attempt to understand and evaluate the current interest rate environment. A review of interest rates over the past 60 plus years reveals that there is no comparable historical environment to the current environment of low inflation and negative real yield. This reflects the stylized fact that “the ex-post real rate is essentially random around a mean that is different” over various periods and subject to jumps caused by structural events.<sup>25</sup>

<sup>25</sup> See abstract and conclusion in “An Analysis of the Real Interest Rate Under Regime Shifts” by Rene Garcia, and Pierre Perron, in “The Review of Economics and Statistics”, Vol. 78, No. 1. (Feb, 1996), pages 111-125.

However, looking back in time can provide us with an understanding of the many long-term drivers of nominal and real interest rates, such as “the rate of productivity growth, beliefs about future risks, consumer preferences, demographic shifts and the stances of monetary and fiscal policy.”<sup>26</sup> Understanding these long-term drivers can help us avoid the folly of managing portfolios in anticipation of some regime shift and instead keep us focused on helping clients invest to meet their long-term investment objectives and risk appetite.

**Exhibit 10**

**Interest Rate Regimes Classified By Inflation Environment<sup>1</sup>**  
 Monthly, Jan 1951 – Dec 2015



1. Further details on this approach can be found in “Perspectives On Institutional Investment Management”, by Harry Marmer, Rogers Publishing, 2002. Famous Author Mark Twain said, “History doesn’t repeat itself, but it does rhyme.” \*The Real 10 Year US Treasury Yield is based on 10-Year US Treasury Inflation-Indexed Yield, Constant Maturity from Jan 2003 to Jun 2013. Data prior to Jan 2003 is based on 10 Year US Treasury Bond Yield vs. 12 Month Change in US CPI. Data Source: Hillsdale Investment Management. Data as of September 30, 2015.

<sup>26</sup> “Long Term Interest Rates: A Survey”, Executive Office of the President of the US, (July 2015), page 40.

## **Concluding Comments**

This paper set out to show how investors could study capital market history to obtain “guidance on how historical perspectives can be incorporated into investment decision-making processes.” The interpretation of historical data from which to test investment hypothesis is also one of the key roles of an analyst.

Through the study of capital market history, we demonstrate important lessons that investors can employ to help them achieve their policy investment objectives by avoiding short-term mistakes and investing wisely for the long-term.<sup>27</sup> Indeed, investors can learn a great deal from the study of capital market history to further enhance their investment decision-making process. Noble Prize Winner and famous British Prime Minister Winston S. Churchill said it best: “Study, study history. In history lies all the secrets of statecraft.”

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<sup>27</sup> The concept of “avoiding mistakes and investing wisely” can be traced back to the bible where in Psalms 34 -14 we find the Psalmist suggest that “one should leave evil and do good.”

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