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# Financial Myths Reexamined from Real Stock Price History

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**ABSTRACT**

*History can provide us a perspective that is often lost in the daily noise and short-term thinking that overwhelm us. This article provides a historical perspective of stock market returns in real terms, and uses that perspective to guide our thinking about future investment. Specifically, this article tackles the three financial 'myths' dominant in the financial community: 1. Stocks offer the best long term return; 2. Buy and hold is the best policy; 3. America is in a great growth period. Analyzing data on the Dow Jones Industrial Average (DJIA) Index since the 1920s, the paper draws the conclusion that the calculated certainty equivalent of the long-term past DJIA is slightly inferior to long-term Treasury Inflation Protected Securities (TIPS) held to maturity yielding ca. 2.7-3.2 %/year real interest rate.*

***Keywords:*** *real stock price history, stock market returns, Dow Jones Industrial Average Index, buy and hold*

## INTRODUCTION

Charlie Munger once said: if you want to be a better investor, read history, read history, read history. History can provide us a perspective that is often lost in the daily noise and short-term thinking that are so overwhelming today. However, there have been relatively few studies in investment that provide a historical perspective, and for the few that do, they often don't provide a sufficiently long horizon or their perspectives might be biased. It is the purpose of this article to provide an appropriate historical perspective of stock market returns, and use that perspective to guide our thinking about future investment.

Before the recent 2008 financial crisis, it had become an almost commonly held 'truth' in the financial community that over a long period of time, equities will deliver better results than bonds. For decades, financial advisors were recommending people to invest a major proportion of their retirement account in stocks if they have a long horizon before retirement. People were educated that for the long term the stock market 'always' outperformed other investments, both from books in academics — going as far back as to Smith (1924) and more recently Siegel (1994), and an overwhelming number of articles in financial media. In fact, it is sometimes believed that this kind of public learning had contributed to the great bull markets in the 1920s and late 1990s to early 2000s.

Supposedly based on the history of US stock data all the way back to 1802, Siegel (1994) came to the conclusion that became almost faith to investors: Ever since Jefferson was president, stocks have generated a remarkable average return of nearly 10% a year. Siegel's conclusion and methodology have been challenged by many afterward (e.g. Shiller, 2004; WSJ, 2009a). One major drawback of the approach is that looking at stock market history in nominal price only tells us how much our wealth has grown on paper — which might look huge, but not how much it is actually worth — which is often surprisingly much less. That is why it is so important to use inflation adjusted stock price in order

to provide the right picture of stock market returns over a long period of time.

For example, The Dow Jones Industrial Average Index (DJIA) is the U.S. stock market price indicator most quoted by the financial media. Figure 1 shows an example of the kind of charts we commonly see in financial media that describes the history of Dow index. We can see if charting the history of the nominal DJIA, it looks like our wealth has grown enormously in the past decades. For example, in the peak-to-peak 70.3 year interval from September 1929 to January 2000, DJIA rose by 30.9 fold, as seen in Figure 1.

However, what is not shown in Figure 1 is that over this same period of time, consumer price inflation has also grown a lot. In the same period as in the interval from 9/1929 to 1/2000, consumer price index CPI-U rose by 9.8 fold, as can be seen in Figure 2.

Thus, we can see, a big part of the stock market appreciation is just the consumer price inflation. After accounting for the inflation, the Real Dow rose by just 3.2 fold in that same period from 9/1929 to 1/2000, as can be seen in Figure 3. This is shocking given the general impression we have obtained from financial media that stocks offer good long term investment growth.

The comparison above shows what an extraordinarily different impression using real stock price index versus nominal stock price index makes in our minds and how deceptive nominal stock price can be! Real stock market price history paints a much less optimistic and more realistic picture of the stock market than the common conception of 10% long term stock market return according to the financial community and the media.

Yet most of time, the communication we receive from the industry insiders or financial media is couched in terms of nominal price indices. This could be misleadingly optimistic because nominal prices do not take into account inflation and are not good measures of purchasing power or quality of life. Economists have recognized this big problem in our society's failure to take account of money illusion — failure to reckon money as its purchasing power at the time (Shiller, 2009). Surprisingly, our financial media are still dominated by nominal prices, and very rarely do we see real stock market price and price history representations. This difficulty for mainstream financial media to change to the more accurate real price measurement has proved costly and misleading for the general public.

## MYTH 1: STOCKS OFFER THE BEST LONG TERM RETURN

Choosing the two big peak to big peak intervals as comparable periods (i.e., 9/1929-1/1966 and 1/1966-1/2000, together = 70.3 years), during which Real Dow Index increased 3.2 times, we obtain the rate of increase +1.64%/year compounded annually as the long-term past performance of the Real Dow." The obtained +1.64%/year looks very solid for the long-term past performance of the Real Dow. It comes from relating two periods/groups; further division into four groups gave +1.61%/year. Note here that 'the entire price ride' was taken by the composite average DJIA stocks-holder ('the average of everybody'), whose price experience we seek to characterize. His dividends received and frictional costs he paid out are cash flows, separate from the price experience.

A numerical characterization of the long-term past performance of the Real Dow follows. (We attempt to avoid dependence of the characterization on choice of starting and ending dates.) We choose two big peak to big peak intervals (i.e., 9/1929-1/1966 and 1/1966-1/2000) as comparable periods (together = 70.3 years).

During the 36.3 year first period, the Real Dow averaged 19.3, "centered" (the first moment of the period's Real Dow prices about the "center" date equals zero) at 10/1/1951. During the 34.0 year second period, the Real Dow averaged 33.5, "centered" at 8/10/85. The ratio of these two average is 1.735 (= 33.5/19.3), and the two "centers" are 33.9 year apart.

This factor of 1.735 increase in Real Dow in 33.9 year equals +1.64%/year compounded annually. We offer this rate of increase as a fair characterization of the long-term past performance of the Real Dow. Of course, this rate is in addition to keeping up with inflation, and it includes neither the positive cash flow of dividends paid nor the negative cash flow of frictional costs paid (frictional costs = the expenses associated with the DJIA component stocks-holding and transactions).

Market Price Volatility refers to: up and down price movements = price fluctuations = price vacillation = neither steady nor steadily trending price. The plot of Real Dow since 1/24 is dramatically very far from being a steady trend, as shown in its history. The smooth curve in the Real Dow plot below in Figure 4 increases at exactly 1.64 %/year compounded annually (please here ignore the six black triangles and squares). It is scaled such that, over the 9/29-1/00 interval of 845 mo, the average of all the 845 differences between the Real Dow and the curve, expressed as factors > 1, is a minimum. (NOTE: a Real Dow = twice the curve's value, and a Real Dow = half the curve's value, are both a factor of 2 difference — first is times 2, second is divided by 2.) Thus, this curve is a best-fit, as described, constant rate of increase (exponential) to the Real Dow over the 9/29-1/00 interval. Notably, the


**Figure 1:** DJIA History

*Source:* stockcharts.com

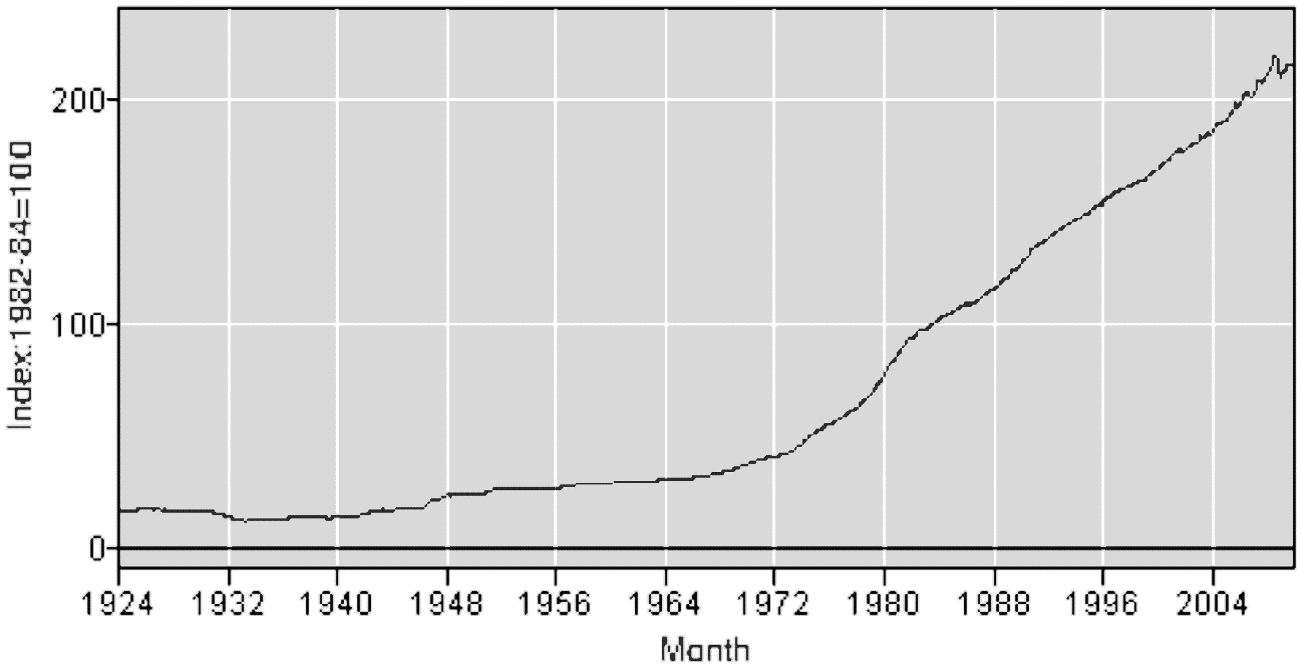


**Figure 2:** CPI-U history

*Source:* Bureau of Labor Statistics: *http://data.bls.gov/PDQ/servlet/SurveyOutputServlet*


**Figure 3:** Real Dow History

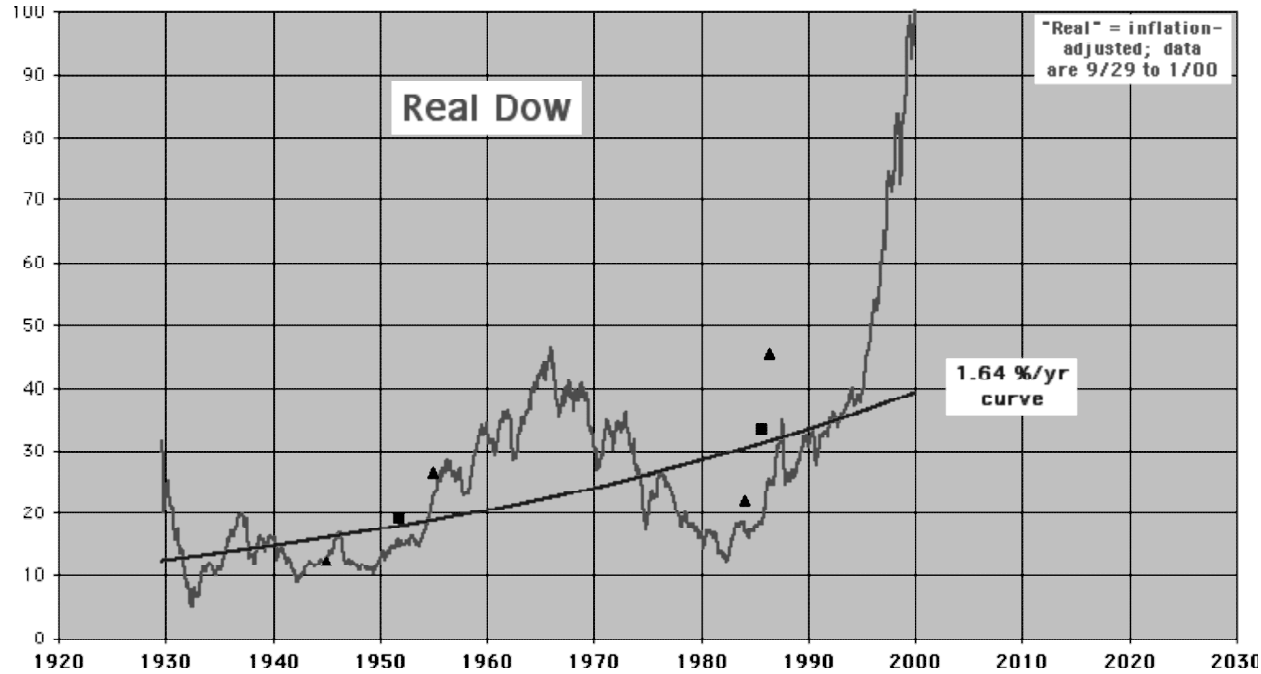


**Figure 4:** Fitting 1.64% Annual Compound Rate to Real Dow Historical Return

Real Dow equaled: 2.53*curve in 9/29; curve/2.57 in 7/32; 2.06*curve in 1/66; curve/2.38 in 6/82; 2.55*curve in 1/00.

From the preceding, the minimized average factor (difference between the Real Dow and the curve) is 1.417; the median factor is 1.344; the geometric mean factor is 1.383. These factors equal +1.64%/year compounded annually for 21.4, 18.2, and 19.9 years, respectively. Thus, long-term Real Dow (market price) increase of 1.64 %/year was accompanied by average

volatility ("+ or – difference from the curve") equivalent to ca. 20 years of 1.64 %/year! And, this accompanying volatility included the five extreme months noted above, with factors 2.57 - 2.06, equivalent to 58 - 44 years (average 54 years) of 1.64 %/year.

Note that 1.417 is the average of factors > 1 that either multiply or divide the curve's value to equal the Real Dow. Thus, the range of (Real Dow) market price equivalent to this average volatility ("+ or – difference from the curve") is a factor of 2.0 = 1.417/ (1/1.417) = 1.417 squared.

The 1.417 is the average of 845 factors, ranging 1.00 to 2.57, and whose highest quartile average 1.87, which is equivalent to 38.5 years of 1.64%/year (see following Table 1).

Now we seek to explore for the scatter that composes the +1.64%/year compounded annually. The two comparable periods, 9/29-1/66 and 1/66-1/00 (here called 1 and 2), were used to get +1.64%/year compounded annually and the best fit curve. For each period (1 and 2), divide into the months (with Real Dow prices) above (A) the curve and the months below (B) the curve, giving four groups total; use the four couplings possible of these four groups to represent the scatter that composes the +1.64%/year.

All of the four groups have similar numbers of months. The centers of averages were calculated as above. In the Real Dow plot above, for each of the four groups, a black triangle is located at its Real Dow average/center thereof (and for each of the two periods, the same is a black square).

In the table preceding, the 2nd and 3rd columns combined give the annual compounded rate in the 5th column. Relative weight in the 4th column comes from the product: 2nd column*start group months*end group months; all four differ only modestly from 0.25. The four Rates' (-0.61 to 3.21) weighted average is 1.61 %/year, which is very satisfactorily close to the best fit curve's 1.64 %/year (obtained above, along with 33.9year). The results in the 6th column, from the annual compounding for 33.9year of the four rates, are ratios with the 1.716 from the 1.61 %/year, to give the Factors > 1 in the last column. Their weighted average is 1.451. A Factor > 1 in the last column is the difference in total capital at the end of 33.9year between the couple's rate and the 1.61 %/year average.

If we take into account the dividends and frictional costs, we come to the startling conclusion that "Calculated Certainty Equivalent of the Long-Term Past DJIA is Slightly Inferior To Long-Term TIPS Held to Maturity Yielding ca. 2.7-3.2 %/year Real Interest Rate". Guided by Campbell and Viceira (2002) and Goldstein, Johnson and Sharpe (2006), we used the constant relative risk aversion (CRRA) utility function, with the coefficient of relative risk aversion equal to 5. The resulting certainty equivalent ratio = 0.977 (a TIPS held to maturity = 1), which gives the above conclusion.

**Table 1: Distribution of the 845 Months' Factors (Differences between the Real Dow and the Curve): the Four Quartiles**

| *Which 25%* | *Range* | *Average* | *Equivalent to 1.64%/year for* |
|---|---|---|---|
| 1 (lowest) | 1.00 - 1.17 | 1.07 | 4.4 years |
| 2 | 1.17 - 1.34 | 1.25 | 13.6 years |
| 3 | 1.34 - 1.63 | 1.47 | 23.8 years |
| 4 (highest) | 1.63 - 2.57 | 1.87 | 38.5 years |

**Table 2: The Four Groups (together comprising the 9/29-1/00 70.3 year interval)**

| *Group* | *Months* | *Real Dow Average* | *Center of Average* |
|---|---|---|---|
| *9/29-1/66* | | *19.31* | *10/1/51* |
| 1A | 213.5 | 26.59 | 1/9/55 |
| 1B | 223 | 12.33 | 12/26/44 |
| 1/66-1/00 | | 33.49 | 8/10/85 |
| 2A | 196.5 | 45.63 | 6/7/86 |
| 2B | 212 | 22.24 | 1/14/84 |

Frictional Costs are the expenses associated with stocks-holding and stocks-transaction. Warren Buffett has elaborated at length on frictional costs. As reported, Warren Buffett has three times during mid-1999 to mid-2003 estimated these frictional costs: 1%/year, 7-9/1999; 1%/year, 7-12/2001; 1.5%/year, 5/2003. We accept Buffett's 1-1.5 %/year frictional costs for the recent U.S. stock market; and we use the same 1-1.5 %/year for the DJIA stocks, both for recently and for the long-term past. Sum of Both ca. 4.2%/year dividends minus 1.0-1.5 %/year frictional costs equals ca. 2.7-3.2%/year cash flow. While for TIPS, frictional costs are reckoned zero or negligible for TIPS held to maturity in TreasuryDirect. Nobel Prize winner Robert Shiller says: "the evidence that stocks will always outperform bonds over long time intervals simply does not exist" (Shiller, 2006, pp198). Moreover, even if history supported this view, we should recognize (and at some level most people must recognize) that the future will not necessarily be like the past.

## MYTH 2: BUY AND HOLD IS THE BEST POLICY

Another common advice from financial advisers is that individual investors should buy and hold if they have a long term investment horizon, and not try to time the markets or worry about short-term losses. This piece

of advice clearly builds upon the above conception that equities will generally in the long run do better than bonds. Not only that, people have been persuaded that the stock market is not really risky if held for the long term, and that a long term horizon would iron out the ups and downs in the markets. This view had been dominant in financial media for the decades before the 2008 financial crisis and became almost a 'truism'. After the financial crisis, other voices started to emerge that question this (e.g. WSJ, 2009b). However, this view has still seemed to play a big role in influencing the investment decisions of the masses.

As one representative example, in an article in August 2008 – in the depth of the financial crisis, John Brennan, chairman of Vanguard Group, said on Vanguard website that "financial theory and the empirical evidence suggest that stocks are our best chance at long-term growth", citing evidence that in the long run – periods of 20 or 30 years or more, stock returns are likely to revert to historical averages of closer to 10% per year (Brennan, 2008). While Mr. Brennan warned against the loss of perspective from short-term thinking, there is another equally dangerous loss of perspective from expecting people to hold stocks untouched for 20 or 30 years, which is extremely difficult and unrealistic for most people due to the changing life circumstances. For one reason, most people do not have the kind of discipline or financial means to hold their stocks for 20 to 30 years without withdrawal. Even more importantly, if people just buy and hold without paying attention to timing, they could have bought at the highest time, and it could take them a lifetime to get back to their original price and some times still lower. Therefore, there is no guarantee that buy and hold can ensure a positive and good return. Timing does matter, and people need to be savvy about timing rather than just turning a blind eye to it.

The real history as shown in Figure 3 clearly shows that if people just adheres to the buy and hold strategy and get in the market at the peak, it could sometimes take 30 years just to get back to the original level of real purchasing power, such as from 1929 to 1959, and from 1966-1996. Note that this is a much more dramatic picture than provided by the nominal Dow history, which may give a misleadingly optimistic picture of how fast stock market rebounds. Even more shocking, we can see that the Real Dow of 12.4 in June 1982 is even less than that of 56.6 years earlier in November 1925.

It is well known that financial markets are not efficient. It has been shown that the aggregate stock market in the United States in the last century has been driven primarily by psychology and fads and has shown massive excess volatility (e.g. Kindleberger, 2005, Shiller, 2004). Buffett describes Mr. Market as an emotionally unstable character, subject to wide mood swings, sometimes to an extreme extent. Since financial markets are made up of the collective actions of all investors, they are invariably influenced by human behavior. Collective herd behavior in the stock market can be so widespread that it leads to wildly inaccurate market valuations, overinflated during euphoria, and underestimated when pessimism overrules. In fact, there's something very hard-wired in human nature and psychology that produces financial bubbles and crises (e.g. Mackay, 1995).

Figure 5 shows clearly 3 asset bubbles in the 80 + year history since the 1920s, and these bubbles have been publicly warned by a Fed chairman. Evidently, in the more than 90 years since the Fed was founded in 1913, a Fed chairman has only 3 times publicly warned that the stock market was overpriced, as seen around 1/1929, 5/1965, and 11/1996 in Figure 5. Note that there is no lack of easy rationalization for a herd behavior periodicity of ca. 3 to 3.5 decades — people only live so long, and they take their personal 'lived through it' experience with them; they get replaced with people who, at best, only read/heard about it. After all three Fed chairman warnings, the market crashed sooner or later.

## MYTH 3: AMERICA IS IN A GREAT GROWTH PERIOD

Another look at Figure 5 gives us the striking impression that the real Dow prices after the 1990s are very much higher and out of line with the previous decades in history. Compare that to a typical chart we read in the media, in there the time span is often much too short to show enough of a historical perspective, and it is often shown in nominal prices and thus doesn't provide the right benchmark across time. Short term thinking dominates what we see and hear every day, to the extent of overwhelming and misleading us, and in-depth historical perspectives in real price terms like these are seldom made available to the public to be seen.

Before the crash of 2008, most of what we heard in the media is that we had been living in the greatest growth era since the 1990s, and this grand growth was continuing. This is an easy conclusion if we simply look at the trend of nominal stock price since the 1990s, out of the context of the longer history. However, if we look at the long term Dow history as shown in Figure 5, we see extremes do commonly end and reverse "naturally", like how markets dropped severely after hitting a lofty point, after the previous two warnings from Fed chairman. The bubble burst because it formed (Sornette, 2004). Thus, looking at Figure 5, one has to wonder about that continuous growth picture painted

by the financial industry and media, and whether this kind of dangerously high level can sustain forever.

What is the engine that has been powering this greatest growth era of all? We have another chart, shown in Figure 6, which shows that Real Dow price and Real Home price seem to go up together after the 2004. Real estate has had an unprecedented boom after 2004 with large incentives and widespread propaganda coming from the financial industry, mainstream media, and the government. Consequently, the increasing home prices and home ownership had been one of the major underlying forces for the growth of the economy and the stock market after 2000s. The government has also admitted that the promotion of home ownership as 'American Dream' has been seriously misleading and is planning to shift to a more balanced housing policy.


**Figure 5:** Fed warning


**Figure 6:** History of Real Dow and Real Home Price

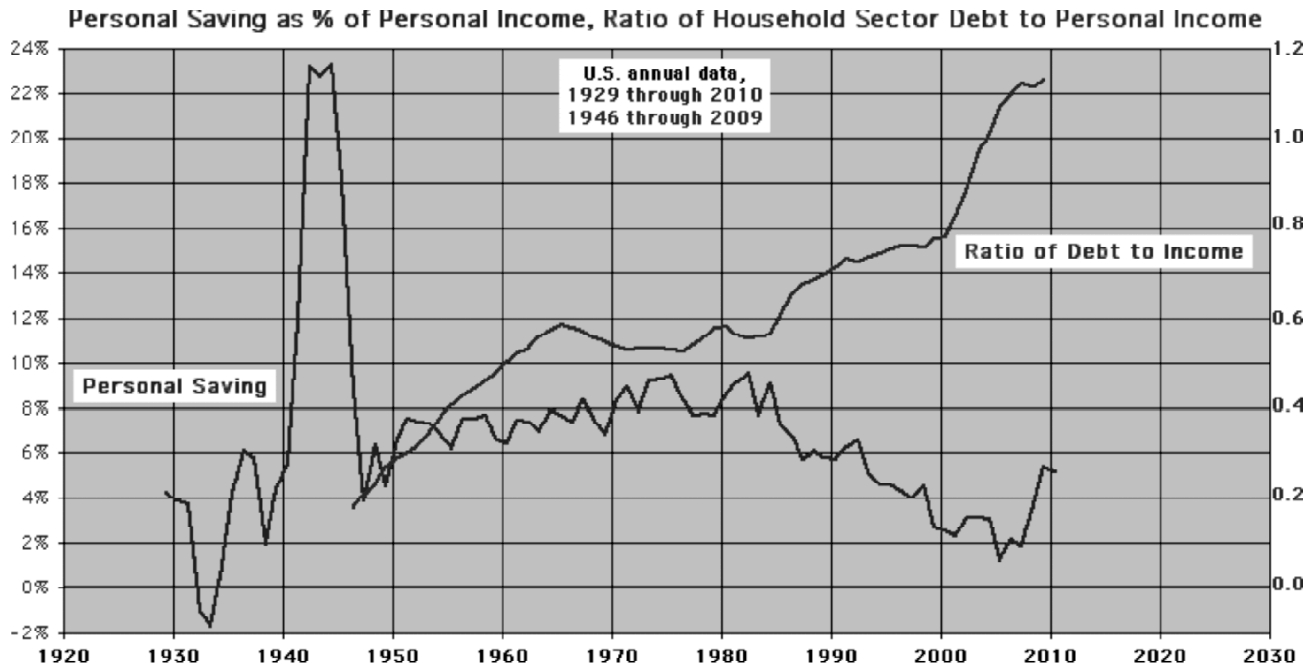


**Figure 7:** US Personal Savings and House Debt

**Table 3: The Four Couplings Possible, of the Four Groups**

| *Couple* | *Center to Center/yr* | *Real Dow Avgs, end/ start* | *Rel. Wt.* | *Rate %/yr* | *(end/start) for 33.9yr* | *Factor >1 = 1.716/ OR /1.716* |
|---|---|---|---|---|---|---|
| 1A— > 2A | 31.4 | 1.716 | .209 | 1.73 | 1.790 | 1.043 |
| 1A— > 2B | 29.0 | 0.837 | .209 | -0.61 | 0.812 | 2.113 |
| 1B— > 2A | 41.4 | 3.700 | .289 | 3.21 | 2.912 | 1.697 |
| 1B— > 2B | 39.1 | 1.803 | .293 | 1.52 | 1.667 | 1.029 |
| | | *Wtd. Avg. Rate = 1.61* | | | | |
| | | *1.61%/yr for 33.9yr —>* ***1.716*** | | | | |
| | | Wtd. Avg. Factor of The Four Couplings = 1.451 | | | | |

On the other hand, what has been financing all this growth in home ownership and home price? Figure 7 shows the personal saving rate and ratio of household debt to personal income. It is quite an alarming picture. Americans have been financing their homes with an ever-higher debt level, and the inflated home price has enabled to get into further debt. This paints a gloomy projection of what is going to drive future US consumer purchasing power and economic growth. Looking at this picture, we cannot help asking ourselves, where will the future engines come from that will drive future US economic growth? It seems unlikely that it could come from consumer purchasing power, given how debt-ridden American consumers are. It looks like the only hope is technology and innovation.

## CONCLUSION

Most of the public rely on the financial media to inform them about the stock market, and financial media rely on financial industry insiders to provide that kind of information or opinion. Sadly, however, the public is most often not rightly informed or even misled in the financial information and guidance that are given to them. This phenomenon is deeply rooted in the incentive structure and institutions of our financial industry, media, and the government (Bogle, 2008). For these financial industry insiders, it is more often than not in their favor to paint a rosy picture of the stock market so that more money can be made from more enthusiasm and participation in the stock market. Luminary investors such as J. P. Morgan, Benjamin Graham, and Warren Buffett have all pointed out the unpredictable nature of financial markets and the unreliability of market forecasts. However, the reality is that the public is still pounded and overwhelmed every day with market forecasts coming from authority posing figures that make it hard to ignore.

To solve this problem, we need to do two things. First, we need to continue to educate the public on critical thinking and independent judgment, especially when it comes to the financial markets. The public needs to take any financial information and market forecasts he or she gets from the media with a healthy grain of salt. Like J. P. Morgan has advised, instead of reading the headlines and listening to the opinions from mainstream media, people should read about the facts behind these stories and think for themselves. Secondly, we need to instill better ethics in financial media and encourage more intelligent information and stories and appeal to people's rational sense. American journalists for many years had a high level of ethics and sense of responsibility. However, in recent decades, many of the current media has been captured by a tendency to sensationalize stories in order to appeal to people's emotions and sell more copies, essentially capitalizing on people's weaknesses. It is important to go back to the roots of journalism and encourage in-depth, facts-based reporting, especially in financial news where there are big stakes.

## *References*


[1] Bogle, J. C. (2008). *Enough: True Measures of Money, Business, and Life* (First Edition.). Wiley.

[2] Brennan, J. J. (2008). "Chairman's Corner: Lost decade, found perspective." Retrieved from *https://institutional.vanguard.com/VGApp/iip/site/institutional/researchcommentary/article?File=NewsLostDecade.*

[3] Campbell, J.Y. (1987). Stock returns and the term structure. *Journal of Financial Economics, 18,* 373-399.

[4] Campbell, J. Y., & Viceira, L. M. (2002). *Strategic Asset Allocation* (1st ed.). Oxford University Press, USA.

[5] DeBondt, W., & Thaler, R. (1987). Does the stock market overact? *Journal of Finance, 40,* 793-805.

[6] DeBondt, W., & Thaler, R. (1987). Further evidence on investor overreaction and stock market seasonality. *Journal of Finance, 42,* 557-581.

[7] Fama, E. (1970). Efficient capital markets: A review of theory and empirical work. *Journal of Finance, 25,* 383-417.

[8] Fama, E. (1991). Efficient capital markets: II. *Journal of Finance, 46,* 1575-1617.

[9] Fama, E. (1998). Market efficiency, long-term returns, and behavioral finance. *Journal of Financial Economics, 49,* 246-273.

[10] Fama, E., & Schwert, G.W. (1977). Asset returns and inflation. *Journal of Financial Economics, 5,* 115-146.

[11] Goldstein, D. G., Johnson, E. J., & Sharpe, W. F. (2006). Measuring Consumer Risk-Return Tradeoffs. *SSRN eLibrary.* Retrieved from *http://papers.ssrn.com/sol3/papers.cfm?abstract_id=819065*

[12] Jegadeesh, N., & Titman, S. (1993). Return to buying winners and selling losers: implications for stock market efficiency. *Journal of Finance, 48,* 65-91.

[13] Jegadeesh, N., & Titman, S. (2001). Profitability of momentum strategies: an evaluation of alternative explanations. *Journal of Finance, 56,* 699-720.

[14] Jegadeesh, N., & Titman, S. (2002). Cross-sectional and time-series determinants of momentum returns. *Review of Financial Studies, 15,* 143-157.

[15] Kahneman, D., & Tversky, A. (1974). Judgment under uncertainty: Heuristics and biases. *Science, 185,* 1124-1131.

[16] Kindleberger, C. P., & Aliber, R. (2005). *Manias, Panics, and Crashes: A History of Financial Crises* (5th ed.). Wiley.

[17] Liu, X., & Hu, C. (2009). Sources of international momentum: An empirical study. *Journal of International Business and Economics, 9*(3), 95-119.

[18] Liu, X., Hu, C., Huang, B., & Foley, M. (2010). Momentum and market states: International evidence, *Journal of International Finance and Economics, 10*(4), 80-88.

[19] Mackay, C. (1995). Extraordinary Popular Delusions & the Madness of Crowds. Three Rivers Press.

[20] Shiller, R. (2009). "Til mortgage do us part: The science — economists discuss psychological and neurobiological aspects of nation's mortgage crisis." Video interview by NSF. Retrieved from *http://www.nsf.gov/news/news_videos.jsp?cntn_id=115310&media_id=65440&org=NSF*

[21] Shiller, R. J. (2004). The New Financial Order: Risk in the 21st Century. Princeton University Press.

[22] Shiller, R. J. (2006). Irrational Exuberance. Random House, Inc.

[23] Siegel, J. (1994). Stocks for the Long Run, 4th Edition: The Definitive Guide to Financial Market Returns & Long Term Investment Strategies (4th ed.). McGraw-Hill.

[24] Smith, E. L. (1924). Common stocks as long term investments. Kessinger Publishing.

[25] Sornette, D. (2004). Why Stock Markets Crash: Critical Events in Complex Financial Systems. Princeton University Press.

[26] Summers, L.H. (1986). Does the stock market reflect fundamental values? Journal of Finance, 41, 591-601.

[27] WSJ (2009a). Does stock-market data really go back 200 years? Wall Street Journal, July 11, 2009, By Jason Zweig. Retrieved from *http://online.wsj.com/article/SB124725925791924871.html*

[28] WSJ. (2009b). Rethinking stocks' starring role, Wall Street Journal, September 2, 2009. By Sam Mamudi. Retrieved from *http://online.wsj.com/article/SB10001424052970204313604574330733264429044.htm*