Target Date Funds:
A Wonder Drug for Participants or a Pandora's Box for All Concerned

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Author
Richard D. Glass

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We learn from crisis to crisis that MPT [Modern Portfolio Theory] has the empirical and scientific validity of astrology (without the aesthetics).
—Nassim Nicholas Taleb

Although competing firms race to release target maturity solutions, most target maturity equity glide paths lack theoretical substance.
—Tom Idzorek

The curious task of economics is to demonstrate to men how little they really know about what they imagine they can design.
—Friedrich Hayek

Financial markets are alive but a model, however beautiful, is an artifice…To confuse the model with the world is to embrace a future disaster driven by the belief that humans obey mathematical rules.
—Emanuel Derman

In 2008, the 31 target date funds thought to have the most conservative asset allocations—the ones with the year 2010 in their name—fell on average 17%. The best of these 31 funds fell 3.5% while the worst fell 41.3%[1].

This "rude awakening" has led (perhaps more correctly, forced) Congress, the Department of Labor (DOL), and the Securities and Exchange Commission to reexamine their understandings of and expectations for the use of these funds in 401(k) plans, especially since the assets in this Qualified Default Investment Alternative (QDIA) are expected to swell to $2.6 trillion in assets in 2018 from $311 billion in 2008[2]. After all, Congress made target date funds a QDIA because it recognized that the average employee needs help in achieving her retirement dreams.

The purpose of this paper is to demonstrate why it is in the best interest of 401(k) sponsors, participants, and the fiduciaries themselves for the latter to carefully reexamine their processes for choosing and then monitoring the behavior and use of target date funds (or any other QDIA and/or advice provider). Further, if fiduciaries think it is wise not to do anything until Congress or the DOL takes a course of action, they may be:

- setting the stage for their participants to incur disastrous outcomes;
- subjecting themselves and their sponsors to time consuming litigation that could easily run into the millions or tens of millions of dollars.

401(k) fiduciaries should reexamine their approach to target date funds if for no other reasons than:

- Fiduciaries cannot assume that selecting a product from either a company founded by a Nobel laureate or a large, highly regarded investment manager will shelter them from lawsuits alleging that their process for selecting target date funds had serious flaws. After all, receiving a Nobel Prize is not equivalent to arriving at a theory that is universally accepted or even correct.

  For example, Milton Friedman, Paul Krugman, Paul Samuelson, Joseph Stiglitz, and George Akerlof won Nobel Prizes for economics and the latter four have serious disagreements with the father of the deregulation of American financial institutions. And don't forget that it was the financial innovations of two other Nobel laureates—Myron Scholes and Robert C. Merton—that necessitated the bailout of Long Term Capital Management.

  Recently, Abidi and Quayle pointed out that "selecting from among the variety of target date products is a formidable task." To illustrate this point, they showed the performances in 2007, 2008, and 2009 of three 2010 target date funds from highly respected fund families. [3]

	2007	2008	2009
Oppenheimer	7.16%	-42.20%	23.80%
Fidelity Freedom	7.43%	-25.30%	24.82%
Wells Fargo Advantage	7.10%	-10.75%	12.76%

- Fund fact sheets usually describe these professionally managed investment options as having the appropriate asset allocations for participants who plan on retiring close to or during the year included in the fund's name. Fiduciaries, then, must be able to explain why the asset allocations were "appropriate".

- Recent research has found that participants view default options as implied advice.[4]

- According to the final regulations for QDIAs:

  > *The selection of a particular qualified default investment alternative (i.e. a specific product, portfolio or service) is a fiduciary act and… A fiduciary must engage in an objective, thorough, and analytical process that involves consideration of the quality of competing providers and investment products, as appropriate.*[5]

  Unfortunately for fiduciaries, "an objective, thorough, and analytical process" is what linguists call an ambiguous phrase.

There are additional reasons why fiduciaries should make sure they understand the construction of their selected funds, and these include:

- The *Deloitte 2010 Top Five Total Rewards Priorities Survey* found that although the ability of their employees to afford retirement—including post-retirement health care—was not one of the top five corporate priorities, it was by far the most important concern the employee respondents had.[6] If target date funds periodically "blow up" like they did in 2008, fiduciaries can be sure that they will become targets of attorneys representing disgruntle employees.[7]

- Congress and the Department of Labor (DOL) assumed that there are "generally accepted investment theories"—such as diversification "to minimize the risk of large losses"—that can be used to create portfolios:

  > *…designed to provide varying degrees of long-term appreciation and capital preservation through a mix of equity and fixed income exposures based on the participant's age, target retirement date (such as normal retirement age under the plan) or life expectancy… such products and portfolios change their asset allocation and associated risk levels over time with the objective of becoming more conservative (i.e., decreasing risk of losses) with increasing age…*[8]

  Fiduciaries must ask what these "generally accepted investment theories" are and whether or not they have validity.

- Three of the guiding principles of Modern Portfolio Theory, the intellectual foundation for creating target date funds, are under renewed scrutiny. The assumptions being called into question include: markets are efficient[9]; investors are ruled by rational thought rather than Keynes' "animal spirits"[10]; and the riskiness of stocks decreases over time.

- Mean/variance optimization (MVO) and Monte Carlo simulations are routinely used to create a target date fund's glide path (i.e., how its asset allocation changes over time). The input for these techniques is usually historical data. The issue that all fiduciaries must address is whether or not historical data (or, for that matter, any other input) has any predictive value whatsoever. If this sounds overly dramatic, fiduciaries should ask themselves two questions:

  - Why do investment managers have disclaimers that state that their future performance may not be as good as their past performance?

  - Do participants care about what occurred in the past or is their only interest what will occur in the future—their ability to achieve a financially secure and comfortable retirement?

Fiduciaries should keep in mind the words of Christopher L. Jones, Financial Engines' Chief Investment Officer:

> *As much as we'd like to say history is a good guide to what the future holds, it simply is not true'...*[11]

If fiduciaries ignore the above issues, or worse yet, decide to do nothing in the hopes that Congress and the DOL will throw them a "life line", they will likely be making a big mistake.

Is the widely held belief that stocks are much better long-term investments than bonds something in which either 401(k) fiduciaries or the average participant should have faith?[12]

> *What happens is fact, not truth. Truth is what we think about what happens.*
>
> —Robert McKee[13]

A historical analysis of stock returns shows that stocks will be a better long-term investment only if a 401(k) participant can accumulate and then consume his nest egg at propitious times. If, for example, one dollar had been invested in a broad U.S. stock market portfolio in 1802 and kept there until February 2009, it would have grown to about four million dollars. Over that same time period, a dollar invested in U.S. bonds would have grown to only $27,000. A stock investor had a 2.5-percentage-point-per-year advantage over the bond investor.[14]

This is not the end of the history lesson, however. The "big picture" often masks many critical details, as Arnott has pointed out:

> *Starting any time we choose from 1979 through 2008, the investor in 20-year Treasuries (consistently rolling to the nearest 20-year bond and reinvesting income) beats the S&P 500 investor. In fact, from the end of February 1969 through February 2009, despite the grim bond collapse of the 1970s, our 20-year bond investors win by a nose. We're now looking at a lost 40 years!*[15]

From 1929 to 1949, U.S. bonds also outperformed stocks. However, for the 68 year period between 1932 and 2000, stocks "beat bonds reasonably relentlessly".[16] These examples clearly demonstrate that, depending on the time period, stock returns will beat, keep up with, or underperform those of bonds.

To make matters worse, stocks are not always the inflation hedge they are touted to be.[17] Browning has observed that the most recent example of this occurred in the last decade:

> *Despite its 2009 rebound, the Dow Jones Industrial Average today stands at just 10520.10, no higher than in 1999. And that is without*

> *counting consumer-price inflation. In 1999 dollars, the Dow is only at 8140.38 and would have to rise another 29% to return to 1999 levels. Using today's dollars and starting at 10520.10, the Dow would have to surpass 13595.49 to get back to its 1999 level in real, inflation-adjusted terms.*[18]

Additional insights into whether stocks are a sure-fire inflation hedge can be found by analyzing share prices measured in real terms rather than stock total return. Arnott demonstrated that over a 207 year period (1802 through February 2009), stock prices:

> *…have spent 173 years—more than 80 percent of the time—either faltering from old highs or clawing back to recover past losses. And that only includes the lengthy spans in which markets needed 15 years or more to reach a new high.*
>
> *Most observers will probably think that it's been a long time since we last had this experience. Not true. In real, inflation-adjusted terms, the 1965 peak for the S&P 500 was not exceeded until 1993, a span of 28 years. That's 28 years in which—in real terms—we earned only our dividend yield…or less. This is sobering history for the legions who believe that, for stocks, dividends don't really matter.*[19]

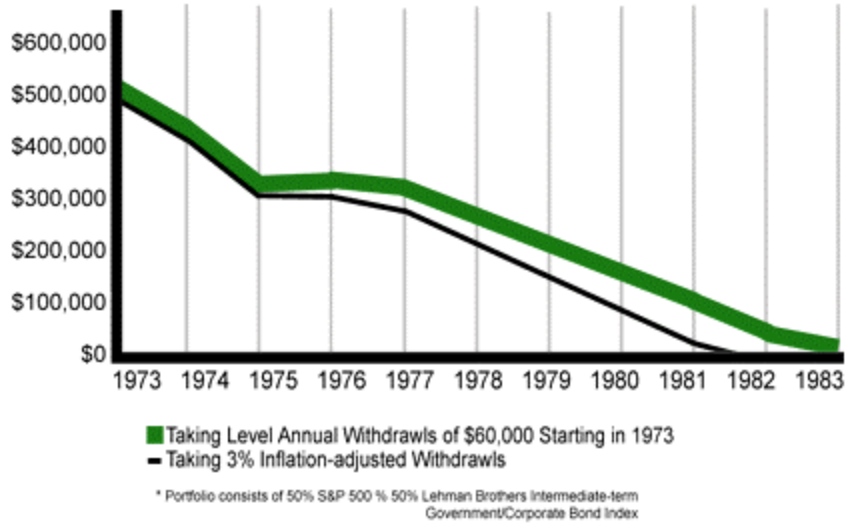
Nothing like a real life example brings these points home. In 1974, this author joined Toastmasters. One of the older members of the group was an executive from a Fortune 100 company. When we were chatting one day, my friend said that he had to postpone retirement indefinitely due to the stock market crash. Unfortunately, his experience is being relived by hundreds of thousands of workers today.

Figure 1 provides an insight into just how bad my friends' predicament may have been. This figure also illustrates how devastating poor stock market performance—even for a year or two, such as in 1973 and 1974—can be when it coincides with someone's retirement date. In 1973, the stock market lost 14.8% and then dropped another 26.4% in 1974.

In this example, the retiree needed to withdraw $60,000 annually from his retirement account. When he retired at the beginning of 1973, the account was worth $500,000 and was split equally between stocks (S&P 500) and bonds (Lehman Brothers Government/ Corporate Bond Index). By 1983, the account was depleted.

Further, if the investor withdrew an inflation-adjusted income (let's assume the inflation rate was 3%), the retirement nest egg would have been almost consumed by the end of 1981.

Figure 1
Generating Retirement Income*



The purpose of the above discussion is to highlight, in a non-technical manner, why there are still no definitive answers to:

- the extent to which stocks outperform both inflation and bonds—both the size and consistency of the equity risk premium[20];

- whether or not the riskiness of stocks decreases (or even increases) over time[21].

Endnotes 18 and 19 provide references to papers that address these topics using mathematical and statistical approaches. Paulos's discussions of the "gamblers fallacy" and regression to the mean are entertaining and explain just how easy it is imagine we see patterns when none exist.[22] Regardless of what you conclude, 401(k) fiduciaries and sponsors should keep in mind the pithy insight of Mark Twain (also attributed to Alfred Marshall and Benjamin Disraeli):

> *There are three types of lies: lies, damn lies, and statistics.*

Will mean/variance optimization (MVO) generate glide paths for target date funds that will deliver the retirement security 401(k) participants seek?

> *In 1990, William Sharpe and Harry Markowitz won the [Nobel] prize three years after the stock market crash of 1987, an event that, if anything, completely demolished the laureates' ideas on portfolio construction...The great mathematical scientist Benoit Mandelbrot showed in the 1960s that these wild variations…are 'unexpected' only by the fools of economic theories…We learn from crisis to crisis that MPT [Modern Portfolio*

> *Theory] has the empirical and scientific validity of astrology (without the aesthetics).*
>
> —Nassim Nicholas Taleb

Congress made target date funds a QDIA (and also sanctioned auto-enrollment into 401(k) plans) because they recognized that the average American worker was not taking adequate steps to achieve his retirement security. What Congress may not have realized is that, as Lusardi has documented:

> *...the majority of Americans lack basic numeracy and knowledge of fundamental economic principles such as the workings of inflation, risk diversification, and the relationship between asset prices and interest rates.*[23]

Likewise, Congress may not have been aware (or simply ignored the fact) that MPT, and MVO in particular, have been and still are subjects of much criticism, and in particular as succinctly stated by Michaud:

> *MV optimized portfolios are "estimation-error maximizers"...Essentially, the algorithm is too powerful for the level of information often available in investment data.*[24]

Examples of error maximization in underestimating risk were pointed out by Mandelbrot and Hudson. From 1916 to 2003:

> *Theory suggests…there should be 58 days when the Dow moves more than 3.4%; in fact, there were 1,001. Theory predicts six days of index swings beyond 4.5%; in fact, there were 366. And index swings of more than 7% should come once every 300,000 years; in fact, the 20th century saw 48 such days. Truly, a calamitous era that insists on flaunting all predictions. Or, perhaps, our assumptions are wrong.*[25]

The simple fact is that traditional MVO, by its very nature, can't accurately capture risk. There are (at least) three reasons for this. First, the "heart and soul" of MVO is the bell-shaped curve or Gaussian distribution. Most asset classes, as Xion and Idzorek point out, don't have returns that follow a bell-shaped curve:

> *[T]he distribution is skewed to the left or right of the mean (expected) value. Additionally, many asset return distributions are more leptokurtic than normal or Gaussian distributions – a condition characterized by a higher peak in the center, "thinner waist" or fewer values between the center and the tails, and most importantly, "fatter tails."*[26]

The second reason for MVO's inability to capture risk—and one that plagues any form of optimization process—is the lack of a good "crystal ball":

> *[I]t is well known that it is difficult to estimate the required inputs – returns, standard deviations, and correlations – for MVO; a problem that can be substantially more difficult for more advanced techniques. The future is hard to predict accurately, especially in greater detail.*[27]

In short, if you can't accurately predict and then model returns, it is impossible to accurately assess risk. This inability is what most likely led to the implosion of so many 2010 target date funds in 2008.

The third reason why MVO often "misses its mark" is its inability to capture the vagaries of human behavior. It is for this reason that Andrew Lo is developing the Adaptive Market Hypothesis in order to reconcile traditional economic thought (Efficient Market Hypothesis) with the findings of behavioral economics. Lo purports that:

> *…this new framework is based on some well-known principles of evolutionary biology (competition, mutation, reproduction, and natural selection), and I argue that the impact of these forces on financial institutions and market participants determines the efficiency of markets and the waxing and waning of investment products, businesses, industries, and ultimately institutional and individual fortunes. In this paradigm, the EMH may be viewed as the frictionless ideal that would exist if there were no capital market imperfections such as transaction costs, taxes, institutional rigidities, and limits to the cognitive and reasoning abilities of market participants. However, in the presence of such real-world imperfections, the laws of natural selection—or, more appropriately, "survival of the richest"—determine the evolution of markets and institutions.*[28]

The obvious question is: Why are people still using MVO if it doesn't work? First, although alternatives[29] to MVO have been investigated, there is no clear consensus among practitioners and academics as to which works the best. Perhaps the real reason for the continued popularity of MVO is its ease of implementation. The math behind it is relative easy to program, and the output is easy to understand.

Champions of MVO argue that in spite of its limitations, the use of historical data, and the occurrence of supposedly unpredictable "black swan" events[30] and "Minsky moments"[31] , MVO can and does create asset allocations that work most of the time. Since "working most of the time" is all that can be expected from a model, "the baby—MVO—should not be thrown out with the bath water".

So what does "most of the time" mean? Since 1987, the financial markets have suffered four "earthquakes greater than 8 on the Richter scale". These quakes resulted in large part from the inherent weaknesses in other financial models: the ones that underlay portfolio insurance, Long Term Capital, the securitization of subprime mortgages, and credit default swaps. There is no evidence available that shows that institutional users of MVO escaped the fury of each "quake".

To accurately model returns, we have to understand how the American economy works, including how it interacts with rest of the world. The question is: Does anyone have that understanding? Do free markets correct themselves if the government doesn't meddle (as Milton Friedman argued) or was the current economic crisis brought on by masked instability due to deregulation combined with financial innovation and excessive leverage (exactly what Keynes' "animal spirits" would thrive on) as the maverick economist, Hyman Minsky, would have likely argued?

Not only is our current economic environment a "world apart" from that of the past, it will continue to evolve.[32] Fiduciaries and sponsors should keep in mind the words of Henry Kaufman in his forward to Minsky's classic, Stabilizing an Unstable Economy:

> *But Hyman Minsky did not allow his analysis to be constrained by statistical models. He sagely understood that mathematical equations cannot properly account for significant crucial structural changes or shifts in behavioral patterns in economics and finance…*
>
> *I attribute this unwholesome development [that debt grew more rapidly than nominal GNP] to the rapid securitization of financial assets, the globalization of financial markets, and vast improvements in information technology that facilitated, among other thing, the quantification of risk taking. The risks inherent in exploding debt have been heightened by the failure of official policymakers to put into place safeguards that encourage financial institutions to balance their entrepreneurial drive with their fiduciary responsibilities.*[33]

The intent of the above discussions of "stocks for the long run" and MVO was to remind fiduciaries that the choice of target date funds as the QDIA should not be taken lightly. Fiduciaries must understand how different families of target date funds are constructed, how their glide paths are determined, the projected annualized compound rate of return of each fund in the series, and the processes their investment managers use to evaluate their past decisions and to make adjustments, be they minor or major. Last, but not least, fiduciaries must heed the words of Charles Ellis:

> *Managing market risk is the primary objective of risk management.*[34]

(All the issues that arise in the construction of target date funds are the same ones that fiduciaries should explore before selecting an advice provider.)

During the selection and monitoring process of their target date funds, fiduciaries would be wise to keep in mind Harry Markowitz's comments when asked how he structured his retirement account:

> *I should have computed the historical covariances of the asset classes and drawn up an efficient frontier. Instead, I visualized my grief if the stock market went way up and I wasn't in it—or if it went way down and I was*

> *completely in it. My intention was to minimize my future regret. So I split my contribution fifty-fifty between bonds and equities.*

What must fiduciaries do to monitor their target date funds and to help participants use them effectively?

The goal of the monitoring process is to assess whether the target date funds are meeting the needs and expectations of both fiduciaries and participants. Keep in mind that the participants' expectations are molded by how the fiduciaries and providers describe these funds.

As mentioned earlier, participants, especially when they are defaulted into target date funds, view the asset allocations of these funds as the appropriate ones for them. Since the participants are usually not given the projected growth rates of these funds and since the provider's materials usually describe these funds as being professionally managed (and thus implying that there is no need for the participants to monitor their accounts), participants are left with the belief that whatever they are contributing is adequate. That, more often than not, is simply not true. Except for the very young participants, the participants' contributions, along with their employer's match, are generally far below the amount that is needed to achieve the targeted inflation-adjusted retirement income.

For example, if at 45, an employee starts to save for retirement by being defaulted into a 401(k) plan, he should contribute 13% of pay if he wants his nest egg to last until age 90, assuming: his employer will match 50% of his contributions up to the first six percent of pay, the pre-and postretirement investment growth rates are 8% and 6% respectively, the employee will retire at 67, his current salary is $45,000 and it will increase by 3% each year until retirement. A 13% contribution rate is a far cry from the typical 3% default rate for auto-enrollment programs.

Two things in this example should jump out at fiduciaries. The first is that participants must be told—and they usually aren't—their target date fund's projected pre- and postretirement growth rates. If they aren't, they are being led down the "primrose path".

Secondly, given the current economic conditions and the rise of Asia as an economic power, using investment growth rates of 8% and 6% (pre- and post-retirement, respectively) is arguably too optimistic. Thus, participants must be given periodic updates as to what rates their managers suggest they use.

Managers must be required to increase the transparency of their processes, and participants must be told that there is a lot of uncertainty in investment/retirement planning. In fact, fiduciaries should consider giving each participant, on an annual basis, a gap analysis to help them understand where they are on the road to retirement security. In fact, such a requirement has been incorporated into the proposed Lifetime Income Disclosure Act (S. 2832).

Let's now move on to the three aspects of monitoring target date funds. First, fiduciaries must understand how the investment manager thinks, such as her views on the issues that were just discussed.

The second aspect is determining whether the investment manager's philosophy reflects the fiduciaries' own views. Trips to the new book and business sections of Barnes & Noble or Borders, regular reading of the *Wall Street Journal*, the *New York Times*, and free on-line publications like *BenefitsLink* and *NewsDash* from *PlanSponsor*, and attending conferences like those sponsored by Pensions and Investments and the Profit Sharing Counsel of America will put fiduciaries into a position to intelligently discuss the relevant issues with their investment managers and recordkeepers.

Lastly, fiduciaries must know whether the target-date funds are actually helping their participants secure a financially comfortable retirement. It is simply not enough to give participants gap analyses. Fiduciaries must get group retirement readiness assessments for both the plan as a whole as well as by different employee segments (see Appendix A, Retirement Readiness Assessment).

Concluding Remarks

ERISA mandates that 401(k) fiduciaries run their plan in a prudent manner. An important component of being prudent means acquiring knowledge and then learning how to apply it in a manner that is appropriate for a given set of circumstances. Prudence also requires ongoing learning and reevaluating what was done before. Perhaps the above discussion can best be summarized by the words of John Kenneth Galbraith:

> *The enemy of the conventional wisdom is not ideas but the march of events.*

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[1] Data from an Ibbotson Associates study quoted by Tim Iacono in his blog, *Target Date Funds Disappoint*, February 09, 2009.

[2] A study conducted by Casey Quirk, *Target-Date Retirement Funds: The New Defined Contribution Battlefield*, November 2009.

[3] Navaid Abidi and Dirk Quayle, *Fixing The Flaws With Target Date Funds*, Journal of Indexes, March/April 2010.

[4] Michael J. Liersch and Craig R. M. McKenzie, *Can We Put Our Trust In Defaults*, Defined Contribution Insights, November/December 2009.

[5] Federal Register / Vol. 72, No. 205, 60452 / Wednesday, October 24, 2007 / Rules and Regulations.

[6] http://www.deloitte.com/assets/Dcom-UnitedStates/Local%20Assets/Documents/us_consulting_2010TopFiveTotalRewardsSurvey_022210.pdf

[7] Current economic conditions that make workers view lawsuits as a possible escape from their financial woes include stagnant or reduced wages, a high rate of unemployment, home foreclosures, an anticipated jobless recovery, and likely permanent job losses in many sectors of the economy. An interesting discussion of many of the issues can be found in Don Peck, *How a New Jobless Era Will Transform America*, The Atlantic, March, 2010.

[8] Federal Register, ibid, 60461.

[9] Interesting discussions of the Efficient Market Theory can be found in Justin Fox, The Myth of the Rational Market, Harper Collins, New York, 2009 and John Cassidy, How Markets Fail, Farrar, Straus, Giroux, New York, 2009.

[10] George A. Akerlof and Robert J. Shiller, Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism, Princeton University Press, Princeton, 2009.

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[18] E.S. Browning, *Adjusted for Inflation, Bad Run Looks Worse*, Wall Street Journal, December 28, 2009, C1.
[19] Arnott, Ibid.
[20] See Robert Arnott and Peter L. Bernstein, *What Risk Premium Is "Normal"?*, http://papers.ssrn.com/abstract=296854; William N. Goetzmann and Roger G. Ibbotson, *History and the Equity Risk Premium*, Yale ICF Working Paper No. 05-04, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=702341.
[21] See *Are Stocks Safer in the Long Run?*, Fama/French Forum, December 14,2009, http://www.dimensional.com/famafrench/2009/12/qa-are-stocks-safer-in-the-long-run.html; Lubos Pastor and Robert F. Stambaugh, *Are Stocks Really Less Volatile in the Long Run?*, NBER Working Paper No. 14757, February 2009.
[22] John Allen Paulos, A Mathematician Plays the Stock Market, Basic Books, New York, 2003, pp. 61-67.
[23] Annamaria Lusardi, *Americans' Financial Capability*, Report Prepared for the Financial Crisis Inquiry Commission, February 26, 2010, p. 3.
[24] Richard O. Michaud, Efficient Asset Management: A Practical Guide to Stock Portfolio Optimization and Asset Allocation, Harvard Business School Press, Boston, 1998, p. 36.
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[33] Minsky, p. viii.
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