HARVARD | BUSINESS | SCHOOL

9-213-051

REV: JUNE 10, 2015

SAMUEL HANSON
ERIK STAFFORD
LUIS VICEIRA

Grantham, Mayo, and Van Otterloo, 2012: Estimating the Equity Risk Premium

In early 2012, Jeremy Grantham, the chief investment strategist of the investment firm Grantham, Mayo, and Van Otterloo (GMO), was preparing for an important series of client meetings. GMO was a Boston-based asset management firm with $97 billion of total assets under management and over 500 employees. Over its 35-year history, GMO had amassed a stellar track record of making adept market calls. Grantham's quarterly investor letters had become required reading for savvy investors and were regularly quoted in *Barron's*, *The Economist*, *The Financial Times*, and *The Wall Street Journal*.

In preparation for these client meetings, Grantham was about to meet with Ben Inker, the head of GMO's asset allocation team, to discuss an update of their 7-year forecast for the main asset classes in which they invested client money. This forecast, and their confidence in its accuracy, were two key drivers of how they invested their clients' money across a diverse array of asset classes. Of these asset classes, stocks, especially U.S. stocks, were particularly important given their size and prominence in capital markets. According to Inker, there were two key outputs of GMO's analysis. The first was GMO's estimate of the *equity risk premium*, the return that investors *required on stocks over riskless bonds over the long run*. GMO thought that investors demanded such a risk premium because stocks tended to lose money at "bad times." However, because GMO thought that market prices could significantly deviate from fundamental value, it also believed that the *expected return on stocks over the intermediate term* could differ from investors' long-run required return, consistent with the famous value-investing adage: "In the short run, the market is a voting machine, but in the long run, the market is a weighing machine."

As of early 2012, GMO operated offices in Amsterdam, London, San Francisco, Singapore, Sydney, and Zurich in addition to its Boston headquarters. Of the $97 billion of total assets under management, roughly $37 billion was in accounts where GMO had meaningful discretion to alter the mix between stocks, bonds, cash, and other assets in accordance with the firm's evolving views about expected returns. The 7-year expected returns estimates it produced were the single most important input to these asset allocation decisions. GMO's value added was to form market views that were more informed than those of other investors. Getting the 7-year forecast wrong could mean large losses for GMO's clients, and eventually client withdrawals and a loss of reputation for GMO.

During the 140 years from 1871–2011, U.S. stocks had earned an average real return of 5.2% over short-term bonds. However, from 2000–2011, stocks had actually *underperformed* short-term bonds by

---

Professors Samuel Hanson, Erik Stafford, and Luis Viceira prepared this case. It was reviewed and approved before publication by a company designate. Funding for the development of this case was provided by Harvard Business School and not by the company. HBS cases are developed solely as the basis for class discussion. Cases are not intended to serve as endorsements, sources of primary data, or illustrations of effective or ineffective management.

0.1%, one of the worst periods of extended underperformance stocks had ever suffered. Analysts called this period "the lost decade." Some believed that this period had been an aberration and that stocks would continue to outperform bonds at their previous historical rate going forward. Other analysts worried that, after a great run during the 20th century, stocks were now permanently "dead."

While GMO was not as bearish as it had been at the height of the late 1990s stock market boom, its intermediate-term outlook on U.S. stocks in 2012 was dim. Valuations had fallen from their 1999 peak, but were still high by historical standards. Indeed, after a brief drop in 2008, the (cyclically adjusted) price-earnings ratio on the S&P 500—a standard measure of U.S. stock valuations—stood at 19.9, above its long-run average of 16. Skeptical that U.S. firms could sustain the record profit margins they had delivered since 2009, GMO was also pessimistic about future earnings growth. However, over the longer run, GMO was confident that stocks would continue to earn a healthy risk premium. Inker thought that "reports of the death of equities had been greatly exaggerated."

Background on GMO's Asset Allocation Business

Jeremy Grantham earned his MBA from Harvard Business School in 1966 and cofounded GMO in 1977 with Richard Mayo and Eyk Van Otterloo. Ben Inker joined GMO in 1992 after earning his BA in Economics from Yale University. In his years at GMO, Inker had served as a manager of numerous equity and asset allocation portfolios, as head of international quantitative equities, and as the CIO of quantitative developed equities. In addition to his current role as head of GMO's Asset Allocation group, Inker served alongside Grantham on GMO's board of directors.

GMO's original approach had been to invest in "value" stocks that were currently out of favor among investors. The firm's first product was based on traditional company analysis combined with sector allocation decisions. Mayo selected the individual stocks, and Grantham was the macro strategist. As GMO's assets under management and its breadth of product offerings grew, clients became increasingly dependent on GMO for asset allocation advice. Specifically, clients would ask GMO how to best allocate their portfolios between stocks, bonds, cash, and other asset classes. Starting in 1982, GMO began to develop quantitative models that it used to assess the value of different asset classes. And in 1994, GMO began publishing estimates of the expected returns on a variety of assets over a 10-year horizon, including U.S. stocks, international stocks, emerging-market stocks, long-term U.S. bonds, and cash (i.e., short-term, riskless bonds).[1]

Over time, GMO had compiled an impressive track record of spotting both overvalued and undervalued asset classes. For instance, it had turned bearish on Japanese stocks in the late 1980s, bearish on U.S. stocks in the late 1990s, bearish on *all* risky assets during mid-2007, and bullish on U.S. stocks in the fall of 2008. In all four cases, GMO's market call had eventually proven correct. As a result, GMO's return forecasts were widely followed by the investment community. **Exhibit 1** reproduces GMO's 10-year return forecast from December 2001 along with the subsequent realized return from January 2002 to December 2011. As shown in **Exhibit 1**, 10 years later, GMO's forecast had proven to be almost entirely correct. While some argued that there was an element of luck behind the prescience of their December 2001 forecast, Grantham and Inker had nonetheless built a tremendous reputation as skilled macro strategists.

GMO's asset allocation clients were primarily large institutional investors, such as public and private pension funds, foundations, university endowments, and sovereign wealth funds. **Exhibit 2** shows the total return performance of the GMO Global Asset Allocation Fund (ticker symbol

[1] In 2002, GMO switched from a 10-year to a 7-year forecasting horizon.

GMWAX) from 1997–2011 versus the return performance of its benchmark. GMWAX was an institutional mutual fund with a minimum initial investment of $10 million and was just one type of asset allocation fund that GMO managed on behalf of large investors. **Exhibit 3** shows the portfolio allocation of GMWAX from 1996–2011 broken down into five broad asset classes: U.S. stocks, U.S. fixed income, international stocks, international fixed income, and other. GMO also managed several retail mutual funds on behalf of Wells Fargo Funds Management, LLC. Specifically, in 2002, Wells Fargo introduced a fund that invested in GMO's asset allocation strategy. GMO's asset allocation group included 25 investment professionals. GMO charged for its services with management fees ranging from 0.5%–1.0% of assets for its asset allocation products.[2]

Estimating the Long-run Required Returns on Equities

Inker believed that, over the long run, investors required a risk premium over riskless bonds to hold stocks. This was "not simply because stock returns were volatile," but because stocks tended to have poor returns when investors could least afford it—i.e., at "extremely inconvenient times" such as recessions, financial crises, economic depressions, and the outbreak of major wars. As Inker put it, "At those times when you were most at risk of losing your job, your bank account, your house, or your life, you could rely on equities to be piling on the misery." This is illustrated in **Exhibit 4**, which shows that, over the previous 140 years, major declines in the stock market had tended to coincide with economic recessions. Thus, Inker reasoned, it was only natural "for equity holders to demand a decent return for taking that very unfortunate return path."

GMO started from the premise that the current (or time 0) *fair* or *fundamental value* of U.S. stocks, denoted P_0^*, should reflect the present discounted value of cash flows (dividends) that stocks were expected to produce in the future. Letting R^* denote investors' *long-run required return* on stocks, and D_t denote the expected dividends at time t, this implied a fair value of:

$$P_0^* = \frac{D_1}{1+R^*} + \frac{D_2}{(1+R^*)^2} + \frac{D_3}{(1+R^*)^3} + \frac{D_4}{(1+R^*)^4} + \cdots = \sum_{t=1}^{\infty} \frac{D_t}{(1+R^*)^t}.$$

Under the simplifying assumption that dividends were expected to grow at a compound rate of G forever, this implied that the fair value of stocks was:

$$P_0^* = \frac{D_1}{R^* - G}.$$

This was known as the "Gordon growth model" after Myron Gordon, who popularized this famous formula in 1959.[3] Turning the equation around, the long-run required return on stocks was the sum of the fair dividend yield, D_1/P_0^*, required by investors and expected long-run dividend growth, G:

$$R^* = D_1 / P_0^* + G.$$

[2] Management fees for GMO's asset allocation products depended on the type of portfolio and the trading strategies used by GMO. The GMWAX institutional mutual fund, which was long only and had a 65% equity/35% fixed income benchmark, charged fees of roughly 0.50%. GMO's Benchmark Free Allocation strategy charged an average fee of 0.85%. Strategies that involved short selling charged hedge-fund-like fees, including a 1% management fee and 20% of measured outperformance.

[3] See Myron J. Gordon, "Dividends, Earnings and Stock Prices," *Review of Economics and Statistics* 41, no. 2 (1959): 99–105. The formula followed from the fact that $P_0^* = \frac{D_1}{1+R^*} + \frac{D_1(1+G)}{(1+R^*)^2} + \frac{D_1(1+G)^2}{(1+R^*)^3} + \cdots = \frac{D_1}{R^*-G}$.

Thus, to estimate the long-run required return on stocks, GMO needed to estimate the dividend yield investors were likely to require over the long run and the expected long-run dividend growth rate.

To do so, GMO examined historical data on the dividend yield and real dividend growth for U.S. stocks. However, GMO thought that future long-run or "steady-state" levels for the dividend yield and dividend growth did not need to be the same as their historical averages. For example, some analysts argued that a more stable macroeconomic environment and increased opportunities for diversification had lowered the required return on stocks. Accordingly, future dividend yields might be lower than the historic average. While sympathetic to these arguments, GMO thought bullish analysts tended to overstate the case. In Grantham's words, "We believe in 'paradigm drift' as opposed to 'paradigm shift.'"

Forming a View about Expected Stock Returns

GMO believed that *actual* market prices could deviate from fundamental value, sometimes significantly, and its asset allocation products were designed to exploit this difference. According to Inker, GMO *expected* equities to earn their required return only "when the pricing of the stock market gives enough cash flow to shareholders to fund that return," or when the current market price was equal to GMO's assessment of fair value. One scenario where GMO's forecasts of expected stock returns differed from the required return was when GMO disagreed with the market consensus expectation of future dividends. For instance, when the market had an overly optimistic view of future dividends, market prices exceeded fair value. GMO believed that investors would eventually realize they were too optimistic and that prices would revert toward fair value. In these situations, GMO's forecasts of expected future stock returns would be less than the required return.

Similarly, investors might be too optimistic about risk in the economy, and apply too low a discount rate to expected dividends. In that case, market prices would be above fair value and would eventually revert to fair value as investors realized their mistake. At those times, GMO expected future returns on equities to be low until prices fell back to fair value.

To estimate the expected return on stocks, GMO used a valuation framework based on the idea that one can obtain a better forecast by focusing on the individual components of stock returns. To start, the return on stocks from time 0 to time 1, denoted R_1, was defined as:

$$R_1 = \frac{D_1 + P_1 - P_0}{P_0} = \overbrace{\frac{D_1}{P_0}}^{\text{Dividend yield}} + \overbrace{\left(\frac{P_1}{P_0} - 1\right)}^{\text{Capital appreciation}},$$

where P_0 was the stock price at time 0, P_1 the price at time 1, and D_1 the dividend at time 1. The next step was to note that capital appreciation could be decomposed into two terms, one reflecting the expected expansion or contraction in price-earnings multiples and a second reflecting the expected growth in earnings per share:[4]

[4] The symbol "≈" meant "is approximately equal to." This approximation held because, assuming x and y are close to zero, the product of x and y was tiny, so $(1 + x)(1 + y) - 1 = x + y + xy \approx x + y$. For instance, $(1 + 0.02)(1 + 0.03) - 1 = 0.0506 \approx 0.05$.

$$R_1 = \frac{D_1}{P_0} + \left(\frac{(P_1/E_1)}{(P_0/E_0)} \times \frac{E_1}{E_0} - 1 \right) \approx \overbrace{\frac{D_1}{P_0}}^{\text{Dividend yield}} + \overbrace{\%\Delta(P/E)}^{\text{Multiple expansion/contraction}} + \overbrace{\%\Delta(E)}^{\text{Growth in Earnings per share}} .$$

Finally, earnings growth had to come through either sales growth or profit margin growth:

$$R_1 = \frac{D_1}{P_0} + \left(\frac{(P_1/E_1)}{(P_0/E_0)} \times \frac{(E_1/S_1)}{(E_0/S_0)} \times \frac{S_1}{S_0} - 1 \right) \approx \overbrace{\frac{D_1}{P_0}}^{\text{Dividend yield}} + \overbrace{\%\Delta(P/E)}^{\text{Multiple expansion/contraction}} + \overbrace{\%\Delta(E/S)}^{\text{Change in profit margin}} + \overbrace{\%\Delta(S)}^{\text{Growth in sales per share}} .$$

In other words, GMO built its forecast using the fact that the return on stocks was equal to the dividend yield, plus the percentage change in the price-earnings multiple, plus the percentage change in profit margins, plus the percentage changes in sales per share.[5]

GMO's intermediate-term return forecast was built on the premise that both price-earnings multiples and profit margins would tend to revert to their long-run, steady-state levels. Depending on the state of the business cycle, GMO's forecast for intermediate-term sales growth could also diverge from its steady-state growth forecast.

In practice, GMO used even finer decompositions of the components of return for every asset class, not just U.S. stocks. And it focused on predicting the behavior of each component based on a careful analysis of historical and current data. GMO went beyond merely extrapolating historical trends into the future, developing a thorough quantitative and qualitative understanding of the economic determinants of returns. In Grantham and Inker's view, it was essential to understand the underlying forces that drove prices to deviate from fair value in order to gauge their confidence in their return predictions and guide asset allocation decisions.

Returns could be projected at different horizons (i.e., the amount of time from period 0 to period 1 could be a month, a year, a decade, etc.), so GMO needed to be specific about the horizon over which it was forecasting changes in multiples, changes in margins, and sales growth. While recognizing that it was difficult to know how long it would take multiples and profit margins to converge to their steady-state levels, GMO found it useful to form return forecasts under the assumption that both would converge over a 7-year horizon. In its experience, the 7-year horizon was long enough for most market imbalances to work themselves out, but still short enough to be relevant for investors.

Since GMO expected multiples and profit margins to converge toward their steady-state levels, it expected long-run capital appreciation to be driven solely by sales growth. Thus, over the very long run, GMO's approach to forecasting expected returns was consistent with the Gordon growth formula in which required returns were equal to the sum of the dividend yield and dividend growth.

The 7-year forecast for stocks was sometimes referred to as the "conditional" forecast because it depended on GMO's views on future fluctuations in valuation multiples and profit margins and

[5] When using this formula, GMO computed the price-earnings ratio as the ratio of the year-end real (i.e., inflation-adjusted) stock price to real earnings in that year. For instance, using the data in **Exhibit 6**, the P/E ratio was 15.0 = 1,300.58/86.95 as of year-end 2011. This was to be contrasted with the "cyclically adjusted" or "Graham-Dodd" price-earnings ratio, defined as the ratio of the real price to average real earnings over the previous 10 years, which stood at 19.9 in 2011. In their classic 1934 book, *Security Analysis*, Benjamin Graham and David Dodd recommended dividing by 10-year average earnings (as opposed to current earnings) to address short-term earnings fluctuations due to the business cycle.

intermediate-term sales growth. This was contrasted with GMO's estimate of the long-run required return on stocks, which was sometimes referred to as the steady-state or "unconditional" forecast.

Inker's Analysis

In constructing its conditional and unconditional forecasts, GMO used historical data on prices, earnings, and dividends for companies in the S&P 500. Inker and his team had also assembled an array of U.S. macroeconomic data, including data on the timing of recessions, gross domestic product (GDP), inflation, and corporate profits. **Exhibit 5** presents this data on an annual basis from 1871–2011. **Exhibit 6** presents the same data on an inflation-adjusted or "real" basis. As shown in **Exhibit 7**, Inker's team had also gathered per-share balance sheet and income statement data for the S&P Industrial Composite dating back to 1947, which they used to assess trends in corporate profitability. Finally, the team had assembled estimates of the past real returns on stocks and excess returns relative to short-term bonds for a number of developed countries from 1900–2010 (see **Exhibit 8)**.

Exhibit 9 shows GMO's unconditional estimate of the required return on stocks over the long run, as well as GMO's conditional estimate of the expected real return over the next seven years as of June 2007. As of June 2007, GMO expected stocks to earn a real return of –1.9% over the next seven years and to underperform riskless bonds by almost 4%. This bearish forecast was driven by GMO's expectation that both P/E ratios and profit margins were elevated and would compress meaningfully going forward. **Exhibit 10** shows the proposed update (as of year-end 2011) of GMO's return forecast that Inker and his team had prepared.

GMO's Asset Allocation Philosophy

GMO believed that most investors were less than perfectly rational in the sense that they predictably made certain types of mistakes. Specifically, GMO thought that most investors suffered from cognitive biases, which at times made them overly optimistic or pessimistic about the future performance of certain assets. Furthermore, in the short run, GMO believed that "career concerns" and other structural aspects of the investment management industry typically prevented the most sophisticated investors from correcting the valuation distortions introduced by others' mistakes.

GMO's asset allocation philosophy could be summarized as follows:

- GMO believed that most investors tended to overreact to recent trends. Overreaction resulted in bouts of over-optimism or over-pessimism and led prices to deviate from fundamental value. According to Grantham, "Everything concerning markets and economies (and everything, for that matter) regresses from extreme towards normal faster than people think (e.g., sales growth, profitability, management skill, investment styles, and good fortune)." Thus, GMO thought that the four most dangerous words in investing were "this time is different." Instead, GMO held the opposite view: "This time is never different" and "the more things change, the more they stay the same."

- GMO thought that prices could deviate from fundamental value, *particularly at the level of broad asset classes such as U.S. stocks*. Because it believed that prices would eventually revert to fundamental value over time, GMO thought that, as skilled macro strategists, they could generate significant risk-adjusted excess returns for clients by overweighting undervalued asset classes and by underweighting overvalued asset classes. Indeed, GMO

considered itself expert in spotting asset price "bubbles," and it maintained an in-house library chronicling over 300 historical asset price bubbles.

- GMO adhered to the value-investing view that the market was like a "voting machine" in the short run—tallying up which securities were popular and unpopular. GMO did not pretend to know how the voting machine would behave from one day to the next. However, in the long run it thought the market was like a "weighing machine"—assessing the fundamental economic value. And GMO thought it had a decent understanding of the market's long-run weighing machine. As a result, it thought that long-term market movements were easier to predict than short-term movements. In other words, GMO recognized that convergence toward fundamental value was not guaranteed to be rapid or smooth, so there were significant short-term "timing risks" in betting against asset classes it believed were overvalued. As discussed below, this timing problem meant that value investing entailed significant short-term "career risk."

- In addition, while GMO believed it had an advantage in forecasting long-run returns, it did not think timing modern capital markets was an easy business. Specifically, GMO recognized that its estimates of near-term expected returns were "noisy."

- Fully aware of short-term timing risk as well as the estimation noise inherent in its long-run forecasts, GMO generally took a conservative approach when translating forecasts into portfolio investments. For instance, if GMO was pessimistic about an asset class, it might modestly underweight those assets relative to a benchmark allocation. However, on rare occasions—what it called a "fat pitch"—GMO would be especially confident in a forecast and would make aggressive bets.[6] According to Grantham, "a failure to differentiate between high and low confidence and therefore between major and minor bets" was one of the biggest weaknesses of asset managers. "Managers are either risk takers or conservative," Grantham noted. "A better solution is to be conservative almost all the time but take large risks when the 'fat pitch' finally arrives." And GMO believed that a fat-pitch strategy was justified by its historical data. Specifically, GMO had identified 34 "major bubbles" within its larger library. In each of these 34 cases, prices had eventually reverted all the way back to their pre-bubble trend, which, Grantham said, "Warmed the cockles of our hearts when they needed warming."

- In addition to generating higher average returns, GMO thought that a contrarian, value-oriented approach to asset allocation helped to reduce portfolio risk over time. Specifically, it thought that its asset allocation decisions had helped to partially immunize client portfolios against the extreme price risk associated with over-valued asset classes. As shown in **Exhibit 2**, on average, the GMWAX fund had earned almost twice the return on its benchmark with only 70% of its benchmark's volatility. Thus, GMWAX's Sharpe ratio, defined as the ratio of average excess returns to the standard deviation of excess returns, was 0.46—more than 2.5 times that of its benchmark (0.17).

- Finally, because investment opportunities could develop rapidly, GMO believed that it was always wise to hold some "dry powder" in the form of cash that could be deployed to exploit attractive opportunities as they arose.

[6] A "fat pitch" was baseball lingo for an "amazing opportunity." According to one baseball glossary, "A 'fat pitch' is located exactly where the hitter is expecting it. The ball may look bigger than it actually is, and the batter may hit it a long way."

Career Risk in Asset Allocation

Most investment professionals managed money on behalf of a client. This was called a "principal-agent" relationship, with the client acting as "principal" and the manager acting as "agent." The potential distortion in incentives when working as an agent as opposed to a principal were referred to as "agency problems." For instance, managers acting as agents might be primarily concerned with keeping their existing clients happy in the short term and attracting additional business from new clients. By contrast, managers acting as principals might primarily be concerned with maximizing risk-adjusted expected returns over the long run. Agency problems arose when managers' pursuits of the former goals conflicted with the ultimate goals of their clients.

GMO believed the behavior of investment professionals was often driven by concerns for short-term career risks as opposed to long-term investment performance. Specifically, it thought that the biggest risk in the eyes of most managers was the risk of being fired for deviating from what others were doing. For instance, managers who refused to cater to the latest investor fad could pay a significant professional price. Due to career risks, GMO thought that, even when managers were confident that prices had deviated far from fundamentals, they were reluctant to act on this belief. In a play on a famous quote often attributed to the late economist John Maynard Keynes, Grantham said this was because "the market can stay irrational longer than the client can stay patient."[7]

GMO believed that these career risks were most pronounced at the level of broad asset classes. In Grantham's words:

> Career risk is very modest, for example, when you are picking insurance stocks . . . It will usually take four or five years before it becomes reasonably clear that your selections are far from stellar, and by then, with any luck, the research director will have changed once or twice and your deficiencies will have been lost in history. . . . Picking cash or "conservatism" against a roaring bull market probably lies beyond the pain threshold of any publicly traded enterprise. It simply cannot take the risk of being seen to be 'wrong' about the big picture for two or three years, along with the associated loss of business. . . . Thus, because asset class selection packs a more deadly punch in the career and business risk game, the great investment opportunities are much more likely to be at the asset-class level than at the stock or industry level.

Grantham was also fond of contrasting the agency problems he thought were so pervasive in asset management with that of his longest-standing client—his sister. He took great care in managing her pension assets. However, unlike his other clients, he did not have to worry that she would fire him if her pension had a bad year or two. As a result, Grantham had been able to steer his sister's pension clear of assets he saw as overvalued and to aggressively purchase assets he saw as undervalued.

In the late 1990s, Grantham and Inker had seen firsthand how a contrarian stance could create significant risks for GMO's asset allocation business. GMO turned very bearish on U.S. stocks in 1997, when the price-earnings multiple on the S&P 500 eclipsed its 1929 peak. At this time, the firm began significantly underweighting stocks in its Asset Allocation funds. As U.S. stocks continued to soar between 1997 and early 2000, GMO's asset allocation funds underperformed and GMO lost nearly

[7] The original quote, "The market can remain irrational longer than you can remain solvent," was frequently attributed to Keynes.

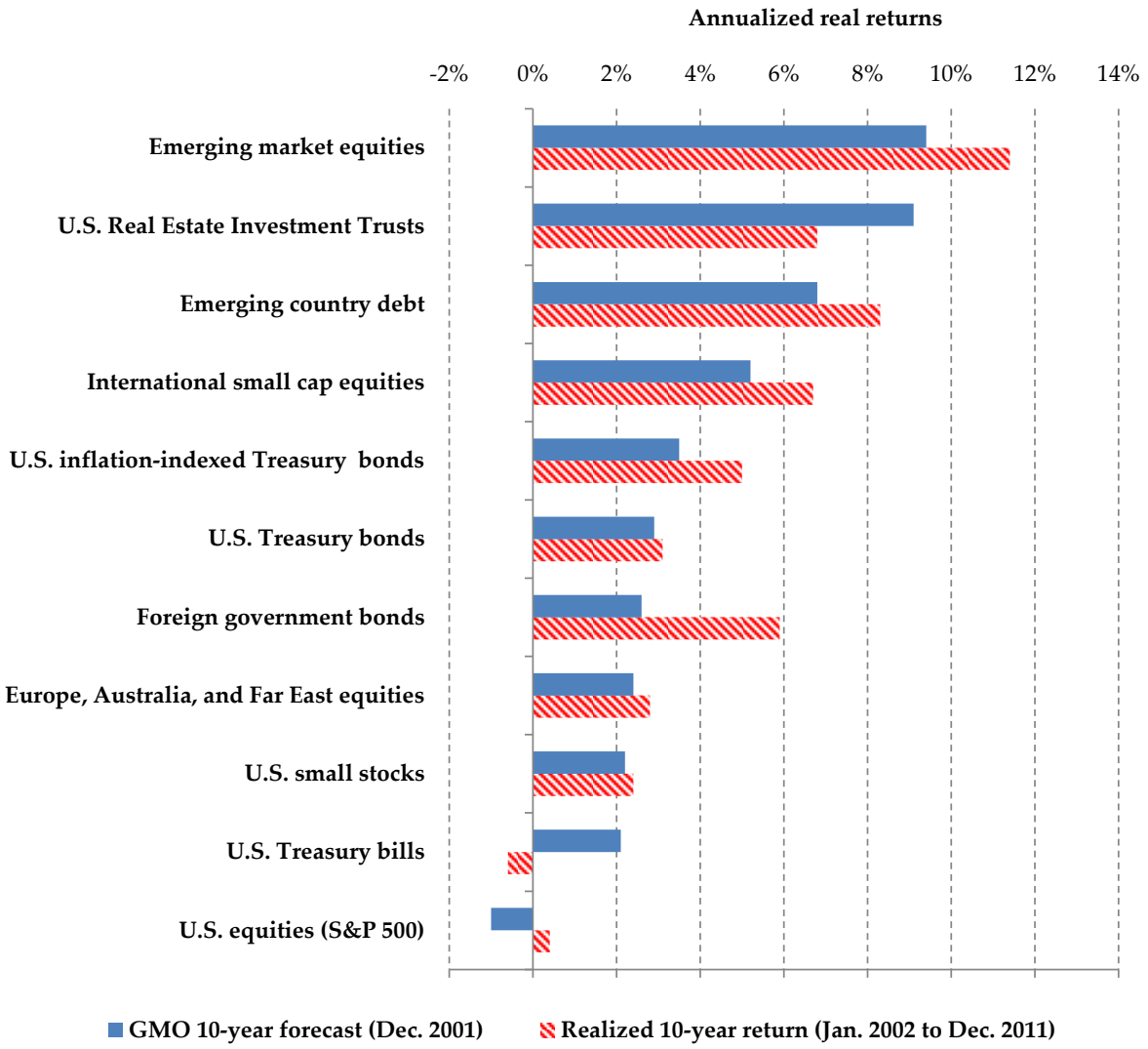
60% of its asset allocation business due to client withdrawals.[8] GMO's call proved to be right over the long run—by 2003, stocks were down more than 40% from their 2000 peak—and the firm eventually benefitted from significant client inflows. When later asked about the secret to GMO's successful call on U.S. stocks, Grantham replied, "We were simply willing to lose more business than anyone else."

Looking Forward

GMO's bearish intermediate-term outlook on U.S. stocks was beginning to attract attention from clients and the media. From his experience in the late 1990s, Grantham knew that a contrarian view on stocks exposed GMO's business to substantial risk. Specifically, there was a significant chance that clients would lose patience and pull their funds if equities did well, leading GMO's asset allocation accounts—which were currently underweight equities—to underperform. Grantham knew that he and Inker had a long weekend ahead of them. Wrestling with GMO's forecasts for price-earnings multiples and profit margins, Inker was still fine-tuning GMO's 7-year forecast for U.S. stock returns. And Grantham needed to figure out how to best put GMO's forecast in a broader context for clients.

[8] Indeed, many other managers who had turned bearish on stocks in the late 1990s had either gone out of business or lost their jobs. For instance, in February 2000, the legendary hedge fund manager Julian Roberts decided to close his funds after suffering massive investor withdrawals.

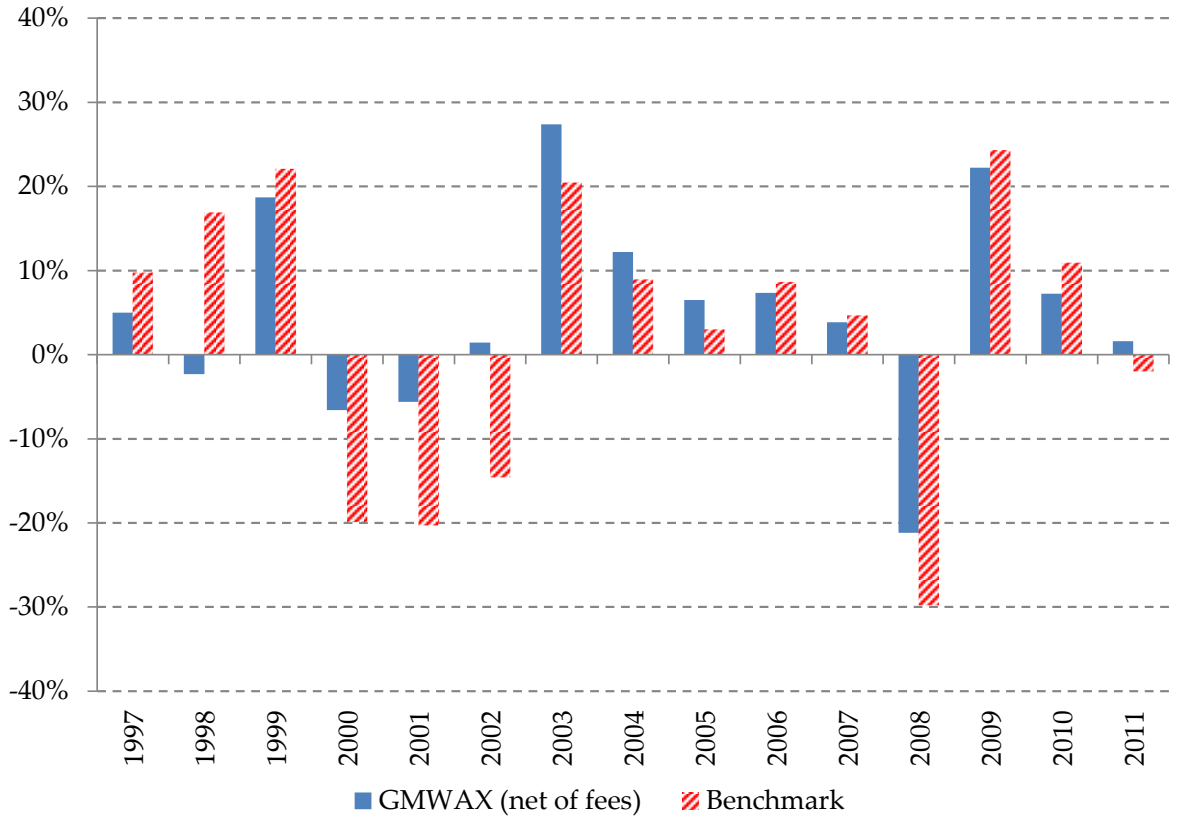
Exhibit 1 Performance of GMO's 10-year Forecast from December 2001



Source: GMO.

Note: This figure compares GMO's December 2001 forecast of 10-year annualized real returns on 11 asset classes with their realized performance from January 2002 to December 2011. The correlation between GMO's forecasted 10-year returns and the subsequent realized 10-year return was 86%. The correlation of the rank orderings was 95%.

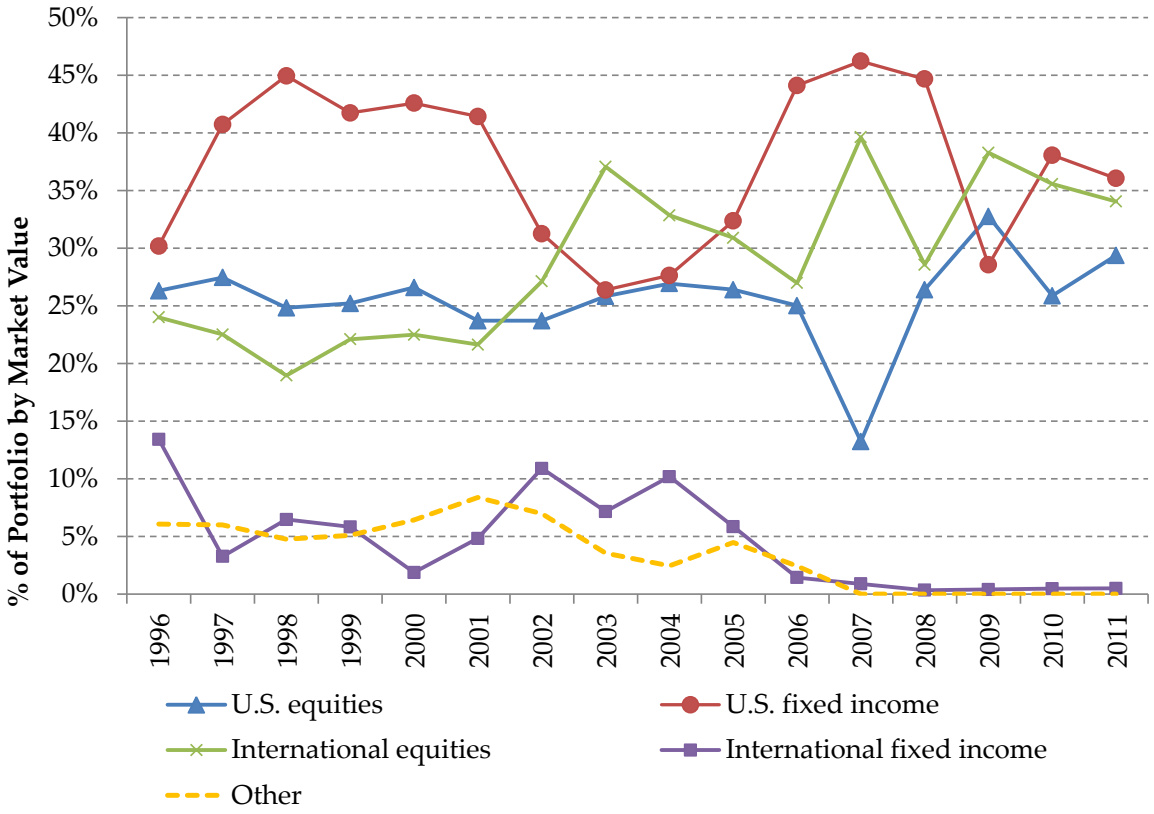
Exhibit 2 Total Return Performance of the GMO Global Asset Allocation Fund (GMWAX) versus Its Benchmark, 1997–2011



Source: GMO and authors' calculations.

Note: This figure shows the annual total excess return on the GMO Global Asset Allocation Fund (ticker symbol GMWAX) from 1997–2011 versus the excess return on its benchmark. Excess returns were computed relative to Treasury bills. GMWAX was an institutional mutual fund with a minimum initial investment of $10 million. GMWAX functioned as a "fund of funds," meaning that GMWAX invested in *other* GMO mutual funds in accordance with the evolving views of GMO's asset allocation group. Prior to 2011, the fund was called the GMO Global Balanced Asset Allocation Fund, and prior to 2003 it was called the GMO Global Balanced Allocation Fund. The returns are net of all management expenses and 12b fees. The benchmark is the GMO Global Asset Allocation Index, which is an internally maintained composite benchmark computed by GMO, comprised of (i) the MSCI ACWI (All Country World Index) through June 30, 2002; (ii) 48.75% S&P 500 Index, 16.25% MSCI ACWI ex-U.S. Index, and 35% Barclays U.S. Aggregate Index from June 30, 2002 through March 31, 2007; and (iii) 65% MSCI ACWI Index and 35% Barclays U.S. Aggregate Index thereafter.

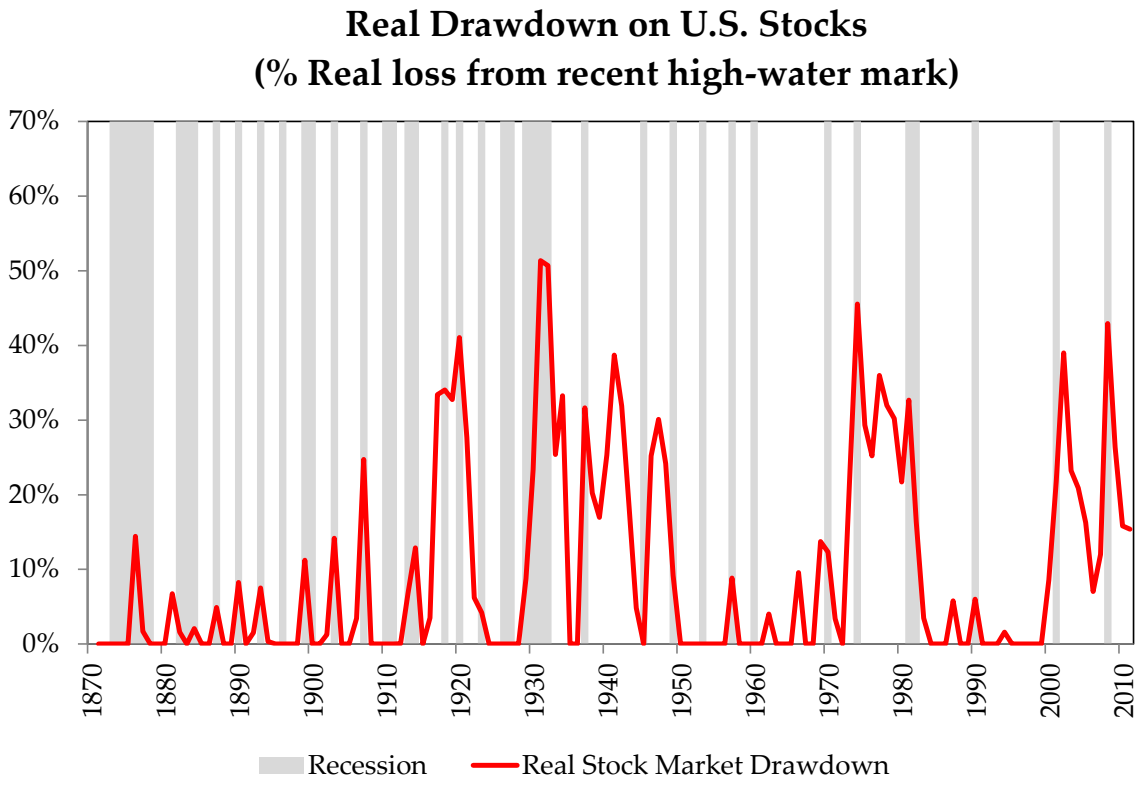
Exhibit 3 Portfolio Allocation of the GMO Global Asset Allocation Fund (GMWAX), 1996–2011



Source: Authors' calculations based on SEC forms N-30D, N-CSR, and N-Q filed by GMO Trust.

Note: This figure shows the portfolio allocation of the GMO Global Asset Allocation Fund (GMWAX) from 1996–2011 broken down into five broad asset classes: U.S. stocks, U.S. fixed income, international stocks, international fixed income, and other. GMWAX is discussed in the note to **Exhibit 2**. For the purposes of **Exhibit 3**, "other" assets include real-estate-related assets and alternative assets such as timber. The 1996 holdings are as of February 28, 1997. From 1997–2003, portfolio holdings are as of August 31 of each year. From 2004–2011, portfolio holdings are as of November 30 of each year.

Exhibit 4 Stocks Lose Money at "Extremely Inconvenient Times"



Source: Authors' calculations based on data in **Exhibit 6**.

Note: This figure shows the real drawdown on U.S. stocks, defined as the percentage loss of real capital from the most recent high-water market, and the timing of U.S. recessions from 1871–2011. Stock market data is from Robert Shiller. Data on U.S. recessions is from the National Bureau of Economic Research.

Exhibit 5 U.S. Stock and Economic Data in Nominal (Historical) Dollars, 1871–2011

PLEASE SEE COMPANION EXCEL SPREADSHEET FOR DATA.

Exhibit 6 U.S. Stock and Economic Data in Real (Inflation-Adjusted 2011) Dollars, 1871–2011

PLEASE SEE COMPANION EXCEL SPREADSHEET FOR DATA.

Exhibit 7 Nominal per Share Data for S&P Composite Companies and S&P Industrial Firms

PLEASE SEE COMPANION EXCEL SPREADSHEET FOR DATA.

Exhibit 8 Historical Equity Returns in Developed Countries, 1900–2010

	Real (Inflation-Adjusted) Return on Equities[a]		Real Excess Return on Equities over Short-term Bonds[b]	
	Mean	Standard Deviation	Mean	Standard Deviation
Australia	9.1%	18.2%	8.3%	17.6%
Belgium	5.1%	23.6%	5.5%	24.7%
Canada	7.3%	17.2%	5.6%	17.2%
Denmark	6.9%	20.9%	4.6%	20.5%
Finland	9.3%	30.3%	9.5%	30.2%
France	5.7%	23.5%	8.7%	24.5%
Germany	8.1%	32.2%	9.8%	31.8%
Ireland	6.4%	23.2%	5.3%	21.5%
Italy	6.1%	29.0%	9.8%	32.0%
Japan	8.5%	29.8%	9.0%	27.7%
Netherlands	7.1%	21.8%	6.5%	22.8%
New Zealand	7.6%	19.7%	5.7%	18.3%
Norway	7.2%	27.4%	5.9%	26.5%
South Africa	9.5%	22.6%	8.3%	22.1%
Spain	5.8%	22.3%	5.4%	21.9%
Sweden	8.7%	22.9%	6.6%	22.1%
Switzerland	6.1%	19.8%	5.1%	18.9%
United Kingdom	7.2%	20.0%	6.0%	19.9%
United States	7.8%	18.9%	6.2%	18.2%
Average	**7.3%**	**23.3%**	**6.9%**	**23.1%**

Source: Adapted by authors from Elray Dimson, Paul Marsh, and Mike Staunton, "Equity Premiums around the World," in *Rethinking the Equity Risk Premium*, edited by P. Brett Hammond, Jr., Martin L. Leibowitz, and Laurence B. Siegel (2011).

Note: The reported means reflect arithmetic averages.

[a] Adjusted for inflation.

[b] Annual excess returns are measured by taking the geometric difference: (1 + Equity return) / (1 + Risk-free return) – 1.

Exhibit 9 GMO's Forecast of U.S. Stock Returns as of June 2007

Panel A. Conditional forecast: Expected stock returns over the next 7 years

	P/E Ratio		Profit Margin		Real Sales Growth per Share		Dividend Yield		Real Expected Stock Return
Starting Level:	19.5		7.9%		0.9%		1.8%		
Level in 7-years:	16.0		6.0%						
	%Δ(*P/E*)	+	%Δ(*E/S*)	+	%Δ(*S*)	+	*D/P*	=	*R*(stock)
Assumption for Next 7 Years	-2.8%		-3.9%		2.4%		2.3%		-1.9%

Real Expected Stock Return		Real Expected ST Bond Return		Expected Return on Stocks over ST Bonds
R(stock)	−	*R*(bond)	=	*RX*(stock)
-1.9%		2.0%		-3.9%

Panel B. Unconditional or "steady-state" forecast: Estimate of the long-run required return on stocks

	P/E Ratio		Profit Margin		Real Sales Growth per Share		Required Dividend Yield		Real Required Stock Return
Steady-state level	16.0		6.0%						
	%Δ(*P/E*)	+	%Δ(*E/S*)	+	%Δ(*S*)	+	*D/P*	=	R^*(stock)
Assumption in in Steady State	0.0%		0.0%		3.2%		2.5%		5.7%

Real Required Stock Return		Real Required ST Bond Return		Equity Risk Premium
R^*(stock)	−	R^*(bond)	=	RX^*(stock)
5.7%		1.5%		4.2%

Source: GMO.

Exhibit 10 GMO's Forecast of U.S. Stock Returns as of December 2011

Panel A. Conditional forecast: Expected stock returns over the next 7 years

	P/E Ratio		Profit Margin		Real Sales Growth per Share		Dividend Yield		Real Expected Stock Return
Starting Level:	15.0		7.8%		1.9%		2.0%		
Level in 7-years:	15.0		6.0%						
	%Δ(*P/E*)	+	%Δ(*E/S*)	+	%Δ(*S*)	+	*D/P*	=	*R*(stock)
Assumption for Next 7 Years	0.0%		-3.7%		2.9%		2.5%		1.7%

Real Expected Stock Return		Real Expected ST Bond Return		Expected Return on Stocks over ST Bonds
R(stock)	−	*R*(bond)	=	*RX*(stock)
1.7%		0.1%		1.6%

Panel B. Unconditional or "steady-state" forecast: Estimate of the long-run required return on stocks

	P/E Ratio		Profit Margin		Real Sales Growth per Share		Required Dividend Yield		Real Required Stock Return
Steady-state level	15.0		6.0%						
	%Δ(*P/E*)	+	%Δ(*E/S*)	+	%Δ(*S*)	+	*D/P*	=	R^*(stock)
Assumption in in Steady State	0.0%		0.0%		3.2%		2.5%		5.7%

Real Required Stock Return		Real Required ST Bond Return		Equity Risk Premium
R^*(stock)	−	$\underline{R}^*$(bond)	=	RX^*(stock)
5.7%		1.5%		4.2%

Source: GMO.