



## The Harvard Management Company (1994)

In the spring of 1994, Jack Meyer pondered which investment policies and long-run asset allocations would be most appropriate for the Harvard University endowment. He had been hired several years earlier as president of the Harvard Management Company, after prior positions at the Rockefeller Foundation, the New York City pension funds, and the Lionel Edie investment organization. The Harvard Management Company (HMC) had been founded in 1974 to provide in-house management for the Harvard endowment as well as to oversee the activities of a limited number of external asset management firms that managed smaller and more specialized portions of the overall fund. HMC currently employed 133 people, including 37 investment professionals, and had an annual operating budget of \$31 million.

The current problem, as Jack Meyer saw it, was to review, adjust, and re-establish agreement on a very long-run "policy portfolio"; that is, the portfolio that represented the best long-run mix of assets for Harvard in the absence of any particular shorter-run or tactical market judgements. This "policy portfolio" was the benchmark against which tactical asset allocation decisions were made, and was thus the central tendency around which past asset allocations had varied and around which future asset mixes were likely to vary. In addition, the hypothetical performance of an indexed version of this policy portfolio was the key benchmark against which the actual investment performance of the management company was monitored, and the compensation of senior HMC professionals, including Meyer, was determined.

### The Role of the Endowment

Harvard University had been founded in 1636, and from the beginning its endowment played an important role in the financial structure of the institution. As of March 1994, the endowment totaled approximately \$6.2 billion. Each of the various schools within the University owned "units" of the endowment, much like an individual would own shares in a mutual fund. The returns from this endowment provided the basis for distributing endowment income to the various schools within the University, which was distributed pro-rata to all schools on the basis of the units each school owned. The annual spending from the endowment represented approximately 20% of the total budget of the University, ranging from a low of 9% for the Business School (because it had only a small endowment relative to its operating budget), to a high of 45% for the Divinity School (because,

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*This case was prepared as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.*

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conversely, it had a large relative endowment). In fiscal year 1994, a total of \$275 million was expected to be spent by the schools from these distributions, or about 4.5% of the current value of the fund.

Within its characteristically decentralized financial and budgeting system, colloquially referred to as the "every tub on its own bottom" system, Harvard had attempted to manage its spending from the endowment in such a way as to provide important and relatively predictable cash distributions to the individual schools. The recent history of endowment spending is shown in Exhibit 1. Each year, the Harvard Corporation (the university's operational governing body) would consider the overall financial situation of the University, weighing the collective financial needs of its individual schools at the moment against the desire to maintain the endowment's long-run purchasing power. On the basis of these deliberations, the Corporation would decide upon a percentage increase in the dollars per endowment unit to be distributed to the schools for the following year. In recent decades, the annual increases had been as small as 3% and as large as 20%.

The general plan was to try to preserve the real (inflation adjusted) value of the endowment and its income distribution in perpetuity. If, for instance, in the long run the endowment fund was able to earn a 4% average incremental return over future Higher Education Price Index inflation (estimated at roughly 2% over future CPI inflation), then the University could spend 4.5% to 5.0% of the endowment annually, assuming that annual gifts to the endowment continued at their recent rate of roughly 1%. But, of course, in the short-run, things were never really average, and the perceived needs of the institution, the inflation rate, and financial market returns could fluctuate widely. If and when financial markets plunged, the spending as a percent of the endowment's market value would rise commensurately. When this percentage rose above some level, say 5% or so, Harvard had attempted to temper its spending increases, even if inflation was quite rampant. In the 1970's, for example, when inflation was rampant and financial markets had not performed well, spending increases were generally smaller than inflation, and the various schools within Harvard had thus experienced some substantial contraction in financial support from the endowment (in real terms). Conversely, when financial markets rose dramatically, the spending rate as a percentage of the endowment's market value would plunge. When this spending rate fell below 4%, there were clear pressures to increase the distributions from the endowment at a more rapid rate. In the late 1980's, for example, distributions had been dramatically increased because of the effects of the great bull market of that period. In the last several decades, spending as a percent of endowment value had been as high as 5.8% (at the bottom of the market in 1982) and as low as 3.7% (at the top of the market in 1987), and had averaged about 4.7%.

While Harvard's endowment was considerable, the institution, like all universities, was not without its financial pressures and concerns. A decade-long contraction of federal support for education and research, rising faculty salaries, increased needs for financial aid, the need to maintain and renovate an aging physical plant, and the desire to restrain tuition increases so as to keep a quality education within the reach of middle-income Americans were a set of financial pressures to which no American university, including Harvard, was immune. After a careful University-wide planning process to assess the University's future needs, the Harvard Corporation had decided that a massive new fund drive would be required, with a goal of raising in excess of two billion dollars. There had also been substantial discussion of the endowment spending rate in recent years, and a clear desire to raise that spending rate if it could be accomplished without exceeding the expected long-term returns from the endowment. The asset allocation decisions were thus importantly connected to the more general ongoing discussions of the University's financial condition. If a new asset allocation policy could yield greater expected long-run returns from the endowment, it could support greater spending

rates and thus contribute substantially to alleviating current financial pressures (for example, by allowing smaller tuition increases and/or greater faculty salaries). If Harvard chose an allocation with lower risk and lower expected returns, however, it might suggest a contraction of the current rate of endowment spending, or at least only very limited future growth for some period of time.

### **The History of the Asset Mix**

The asset mix and methods for managing the endowment had been evolving rapidly over the most recent 15 years. Before 1980, for example, the endowment had been invested almost completely in domestic stocks, bonds, and cash, with an asset mix that averaged about 60/30/10% (stocks/bonds/cash) over time. In the middle and late 1980s, however, HMC shifted over 25% of its funds into private (non-marketable) investments, notably venture capital, real estate, and some oil and gas investments.

Upon his arrival in 1990, Jack Meyer found an asset allocation which, relative to comparable institutions, had a smaller weighting in U.S. stocks (because the HMC staff thought the equity market was over-valued), a smaller weighting in foreign stocks and/or bonds, and a larger weighting in cash and private investments. One of his first actions, upon arriving, was to begin an extended set of analyses and discussions with many officers and constituencies of the university about asset allocation, risk tolerance, and an appropriate "policy portfolio" for the institution. Harvard had not utilized the concept of a "policy portfolio" before, and some members of the community found the distinction between discussing the long-run policy portfolio and the current tactical asset mix somewhat elusive. Nonetheless, Meyer persisted; and after a rather formal analysis using portfolio theory, and, more importantly, a long series of qualitative discussions, HMC established the policy portfolio shown in Exhibit 2. Between 1991 and 1994, the actual asset allocation generally had been kept reasonably close to the policy portfolio, with some underweighting of real estate and commodity-related investments throughout the period and some underweighting of U.S. stocks in the latter part of the period. In general, Jack Meyer believed that HMC should not be making any large tactical asset allocation "bets" away from the policy portfolio unless they could make a very strong case that the market had it "wrong". Most of the time, of course, this was a difficult case to make. The actual asset allocation as of March 1994 is shown in Exhibit 2. A comparison of these actual allocations with the policy portfolio suggests there were some clear but limited tactical "bets" in place as of March 1994, including notably a higher cash position than in the policy portfolio.

### **The Investment Processes**

Within each of the asset categories, the funds tended to be managed in several diverse and sometimes non-traditional ways. Within domestic equities, for example, there was a relatively traditional portfolio managed by a staff of six analysts and a portfolio manager. The portfolio's industry composition and composite characteristics (e.g., average P/E, earnings growth rate, size, volatility, etc.) were managed such that they tracked the S&P 500, but its individual stock holdings were determined on the basis of in-depth company analysis. In addition, there was a separately-managed aggressive "long/short" trading account, which pursued opportunities such as warrant and convertible arbitrage, hedged closed-end fund strategies, hedged balance sheet or cross-ownership arbitrage strategies, synthetic security arbitrages, and other relatively esoteric techniques often involving the use of complex derivative securities. The performance benchmark of this fund, like the other domestic equity funds, was the S&P 500. Finally, there was a "tactical asset allocation" portfolio which utilized futures and other derivative securities to adjust the domestic equity exposure up to or down to its desired level. At the current time, this desired allocation to domestic stocks was

about 37% of all assets, as shown in Exhibit 2. This overall level of exposure, however, represented the net equivalent exposure of all of the individual domestic equity portfolios, often including some fairly large offsetting long and short positions in individual stocks, convertibles, futures, options, and/or other complex securities.

In the foreign stock area, there was a large index fund that tracked the EAFE index. There also was a smaller separate account managed by an outside firm which used disciplined value-oriented techniques for investing in the less efficiently-priced sectors of large foreign markets. And there were two emerging market funds, one managed internally and one managed by an outside firm. Most importantly, there was a long/short trading account that, like its domestic equity counterpart, looked for arbitrage or hedged positions that could be used to exploit any perceived relative mispricings of various equity securities, convertibles, or derivative instruments.

Within domestic bonds, there was a large and relatively unconventionally-managed in-house fixed income portfolio, with sub-portfolios including large trading accounts and swap accounts, with long and short positions in fixed-income securities, futures, and swap arrangements. These positions were calculated to arbitrage special features of the fixed-income market which might be mispriced, such as credit risk, yield curve shape, call features, option characteristics, or all of the above. The performance benchmark of this portfolio was the Salomon Brothers "BIG" Fixed-Income Index. At the current time, the endowment's net exposure to domestic bonds was about \$820 million or about 13% of its total value, consisting of both long positions and short positions of many times this amount. There was also an additional \$190 million of high yield bonds, most of which was managed by an external firm that specialized in distressed securities, and the remainder of which was managed internally (by a separate portfolio manager devoted exclusively to this task).

Within foreign bonds, there was one internally-managed bond portfolio that was managed with a philosophy similar to the other long/short portfolios. That is, it often took rather large and partially offsetting long and short positions in the foreign fixed income markets and in derivatives defined on those markets in the hope of benefiting from a perceived mispricing. Its performance benchmark was the J.P. Morgan (non-U.S.) Fixed Income Index. The endowment's current net equivalent exposure to foreign bonds was just shy of \$300 million, or 4% of its total value.

The remaining 25% of the endowment was invested in private non-marketable assets and managed by the Aeneas Management Company, a subsidiary of the Harvard Management Company. The largest portion of these assets were invested in what were termed "ventures", which included venture capital in its traditional sense (start-ups and early round financings of new companies, which accounted for approximately 40% of the "venture" investments), private equity positions in later stage companies, and LBO's. Most of these investments were made via limited partnership interests in externally-managed pools, though some were made directly by the in-house Aeneas group for the endowment. The direct investments included equity interests in over 90 small companies, concentrated largely in the consumer, technology, media, and medical sectors. The real estate investments consisted primarily of direct equity investments in income-producing properties, including about twenty individual holdings diversified across hotels, office buildings, retail space, and residential properties. The "commodity-related investments" consisted primarily of direct private equity investments in small companies in the oil and gas business. There also were a few investments in mining ventures, and there was an experimental portfolio managed by HMC's "foreign equity manager" which invested in a broadly diversified pool of commodity futures designed to produce returns in excess of several well-known commodity indices.

In recent years, much of HMC's value-added relative to market benchmarks had come from the four large in-house long/short portfolios: domestic equity, foreign equity, domestic fixed income, and foreign fixed income. The four individuals managing these portfolios sat together around a central "trading desk" from which they managed their portfolios. Each of them had one or more assistants who helped them analyze particular opportunities and/or trade particular securities. The process looked and felt much more like a longer-term version of the proprietary trading operations of the major Wall Street broker/dealers than it did a conventional money management firm. Indeed, several of the key individuals had been hired away from the proprietary trading desks of just such firms. The four of them were all fairly young, quantitatively-oriented, opportunistic, price-sensitive investors who continually monitored the structure of relative prices throughout the global financial and derivative markets, looking for "mispricings" wherever they might be found. They maintained contact with and received ideas and trade suggestions from a wide variety of traders located throughout the world. They had few prior convictions about how to invest, but rather let the always-changing structure of securities prices dictate their flexible strategy. Each of them was responsible for developing ideas and structuring a portfolio in their own domain (e.g., foreign equities), but they also worked well as a team, challenging, testing, enhancing, and critiquing each other's ideas. In general, they attempted to avoid any major "directional bets" and instead hoped to find small relative mispricings that could, with high reliability, be counted upon to close, yielding a small but relatively certain value-added. If owning the mispriced security entailed some directional market risk, they would typically look for a financial instrument with which to hedge that risk. And, if a particularly interesting "arbitrage" idea could be acted upon in size, they would not be averse to substantial long and short positions to capture the potential of a small mispricing in a very big way. Harvard's triple-A credit rating sometimes allowed them to accomplish this more effectively than most other investors. Not only did it allow them to finance large positions, but it made them a preferred counterparty for swap transactions, which were sometimes a key link in the overall process. Examples of some of their recent portfolio positions are shown in Exhibit 3.

The sometimes complex arbitrage positions, the derivatives, and the sometimes substantial long and short positions all were rather different from the holdings of a traditional money management firm, and could be perhaps a little disconcerting to the unfamiliar observer. And, of course, there could be real risks if these same tools were used towards different ends; for example, if the HMC portfolio managers were to begin making large "directional bets" on markets like some well-known hedge fund managers. Because of this, HMC had instituted and was continually refining a risk management process designed to ensure that the net positions of these portfolios did not expose the endowment to undue relative risk, either in a "normal" market move or in an extreme environment (such as October 1987).

#### **Incentive Compensation and Investment Performance**

HMC attempted to offer total compensation plans, including substantial incentive compensation programs, that could attract and keep excellent investment professionals. Since joining HMC, Jack Meyer had revised the compensation programs, expanding and modifying the uses of incentive compensation. The typical HMC fund manager was paid a salary and a sizeable "neutral bonus" each year, where the neutral bonus might be equal to his or her salary. The combined total of the salary and neutral bonus was typically respectable but not overly generous by industry standards for independent money management firms. Then, a performance bogey was established for each manager, typically equal to some market index for the asset class managed (for example, the S&P 500 Index for domestic stocks, or the Morgan Stanley/Capital International EAFE Index for foreign stocks). In addition, then, each manager received an incentive bonus, either positive or negative, for

every 1% that they outperformed or underperformed their respective bogey. The maximum negative incentive bonus was equal to the neutral bonus; so that if a manager performed poorly, they would receive only their salary and no bonus at all, meaning that they would not be paid well by industry standards. Conversely, the maximum positive incentive bonus was typically several times an individual's salary, so that if they performed well, they would receive a very large bonus and be paid quite well by industry standards.<sup>1</sup>

The top managers of HMC, including Jack Meyer, were paid in a comparable manner, but their incentive compensation was tied to the performance of the fund as a whole, measured relative to a performance bogey computed on the basis of the policy portfolio. Specifically, the performance bogey for the fund as a whole was a weighted average of the performance bogeys for each asset class, in which the weights were the asset allocations specified in the policy portfolio. The long-term policy portfolio thus played a critical role in determining what the top managers of HMC earned and, through its influence on their compensation, created a subtle but nonetheless real incentive to keep the current asset allocation close to the policy portfolio allocation.

The managers within the Aeneas group also had an annual incentive compensation program, except they received in addition a potentially lucrative "long-term carry" on the private investments, the rewards of which were tied to the realized gains on the funds invested. If the Aeneas managers performed very well, they would be among the highest paid individuals within HMC and would receive total compensation that was comparable to that of external firms in the venture capital and real estate businesses. If they did not perform well, they would not.

#### Recent Performance

The absolute performance of the endowment had been extremely good for the past 12 years, primarily due to the effects of favorable markets. The endowment's relative performance had unfortunately trailed others a bit in the 1989-91 period, primarily because of HMC's larger exposure to private investments (ventures, real estate, and oil/gas, all of which performed quite poorly in this period, particularly relative to U.S. stocks in which HMC had been under-invested). Since Meyer's arrival, however, the relative performance had been quite good both for the endowment as a whole and for most of its sub-portfolios, particularly the internally managed ones. Exhibit 4 shows detailed performance comparisons of the overall portfolio for the fiscal years in which the current investment processes had been in place.

A small part of the overall relative performance came from past tactical asset allocation decisions, and in particular from being under-weighted in real estate and commodities and somewhat over-weighted in foreign securities (notably in emerging markets). Most of the relative performance, though, came from the favorable performance of the various sub-portfolios compared to their respective benchmark indices.

#### The Asset Allocation Policies of Comparable Institutions

As part of his preparation for an asset allocation discussion, Jack Meyer collected information on the current asset allocation policies of four other nationally-prominent research-oriented universities with whom Harvard often compared itself. These are shown in Exhibit 5. Virtually all of the assets

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1. A portion of any positive bonus was withheld, and was subject to future clawback if future performance fell short of the appropriate bogey.

of these other universities were managed by outside firms, including both some fairly conventional institutional managers and some well-known and aggressive "hedge funds".

### The Optimal Portfolio Allocation Study

In order to enrich the ensuing asset allocation discussions with some hard quantitative analysis, Jack Meyer had instructed his staff to conduct an optimal portfolio theory analysis of the allocation problem, much as they had done for the first policy portfolio discussion several years earlier. To accomplish this analysis, they needed to specify assumptions about the future expected returns and risk of each asset class to be considered, and the correlation of future returns between each pair of asset classes. Given these assumptions, optimal portfolio theory (via a computer-based optimization algorithm) could specify the "efficient frontier" of possible portfolio allocations, i.e. that set of portfolios that would have the maximum expected return for a given level of risk and, conversely, the minimum risk for a given level of expected return.

The input assumptions that were used for the analysis are shown in Exhibit 6. A plot of the assumed expected real returns and risks for each prospective asset class is displayed in Exhibit 7. As these exhibits suggest, the analysis provided for up to eleven possible asset classes: large U.S. stocks (the S&P 500), a broader U.S. stock market including small stocks (the Wilshire 5000), U.S. bonds, EAFE stocks (from developed countries), emerging market stocks, foreign bonds, high-yield (or junk) bonds, real estate, venture capital, commodity-related investments, and cash.

In the process of generating appropriate assumptions, the HMC staff had examined both the long-term and shorter-term historical record of these different asset classes in terms of risk, return, and correlation, some shorter-term data from which are shown in Exhibits 8 and 9. They had also talked with a variety of people outside the HMC organization, and had compiled sets of assumptions used by various external experts in similar asset allocation studies, including those of Cambridge Associates (a consulting firm) and several money management firms that specialized in this type of analysis. Finally, they had adjusted the final choice of assumptions to correspond with their own view of how various capital assets were now priced, and had tried to make sure that the inter-asset comparisons made good common sense.

For example, the assumed expected real return of large U.S. common stocks (the S&P 500) was set equal to their approximate historical average real return in the 1926-1993 period (6.5%), and the risk on these stocks was set equal to their historical volatility in the same period (18%). The expected returns and risk of the broader U.S. equity market (the Wilshire 5000) were assumed to be a little greater than the S&P 500, by an amount equal to long-run historical difference between the two indices (because of the presence of smaller stocks). The expected real returns from foreign stocks was assumed to be the same as U.S. stocks minus an estimate of the additional costs of taxes, custody, and turnover.

In contrast, the expected real returns from various bonds classes were assumed to be substantially greater than their long-term historical averages, reflecting the apparent abnormal character of the 1950-80 period and the greater real returns available in the worlds' bond markets in recent years. As with stocks, though, the expected real returns from foreign bonds were assumed to be the same as domestic bonds, minus an estimate of the identifiable incremental costs.

Relatively little reliable historical data was available for private investments such as real estate, venture capital, and commodity-related assets. Here, HMC used a judgmental combination of

whatever data was available, the assessments of various outside experts, and its own sense of what seemed both appropriate and consistent across asset classes.

Given the assumptions, the computer-based algorithm produced the efficient frontier of optimal portfolios shown in Exhibit 10. From this analysis, it was clear that the portfolio optimizer sought substantial positions in commodity-related investments, U.S. bonds, and emerging market equities, but was less enthusiastic about U.S. stocks, venture capital, and real estate, at least until it reached relatively high levels of portfolio risk such as those associated with very substantial leverage (negative cash). Unfortunately, Jack Meyer and the HMC staff felt that some of the optimal portfolios of Exhibit 10 were just too non-traditional to be acceptable "institutional" alternatives. They decided, therefore, to constrain some of the key asset classes such as U.S. stocks, emerging market stocks, U.S. bonds, commodity-related investments, and cash to ranges in which everyone would probably feel more comfortable. Exhibit 11 shows the efficient frontier of optimal portfolios given these constraints, as well as the constraints themselves.

At one level, of course, this "optimal portfolio" analysis was all built on a fairly shaky foundation, as Meyer and others at HMC knew only too well. The output was quite sensitive to the input assumptions, and it was difficult indeed to make confident judgements, particularly about the long-run return assumptions. On the other hand, Meyer thought that portfolio diversification and risk management were very important objectives in the overall asset allocation (i.e., policy portfolio) choice. It was better, he thought, to attempt to tackle this problem explicitly with real numbers and analysis than just to sweep it under the rug and opt instead for today's organizational consensus. The trouble with organizational consensus as a guide was that it could shift dramatically over time (typically at just the wrong time) making it troublesome indeed for establishing and/or shifting asset allocations.

### Some Specific Questions

There were four specific issues that had all been highlighted in some initial qualitative discussions, the comparison of Harvard with its peer institutions, and the quantitative portfolio analyses:

1. *Emerging Markets:* For the first time the HMC staff had considered and analyzed so-called emerging markets equities as an asset allocation class separate and distinct from other foreign equities. Up until now, these markets had merely been thought of as one small niche of foreign equities in general.

HMC had a growing participation in these markets, including a \$120 million externally-managed Emerging Markets fund, and a \$150 million internally-managed fund that was implemented partially through positions in emerging market country funds and derivatives. Combined, these funds were currently 20% of the HMC foreign equity portfolio and 4.4% of the overall endowment. (Also, HMC was currently deciding whether to participate in several funds that would be investing privately in China and other China-related countries of South-east Asia.) Needless to say, these investments had been by far the best performers in HMC's overall endowment in 1993 (when emerging markets were very hot) and the worst performers in early 1994 (when the opposite held true).



Quite apart from any issue of timing, the HMC staff worried about whether and how much emerging markets exposure belonged in the long-run policy portfolio. The quantitative optimal portfolio analysis clearly suggested a larger exposure. But one could wonder whether the analysis contemplated the real risks and/or could provide guidance on an appropriate allocation in this kind of specialized and more speculative asset class.

2. *Small U.S. Stocks:* Up until now, most of HMC's U.S. equity holdings had been in relatively large stocks, and the S&P 500 had been the benchmark against which the U.S. equity portfolios were evaluated. Relative to the market as a whole, and also relative to many other institutional investors, the HMC portfolios were under-represented in small stocks. This had been a deliberate earlier choice, driven in part by the observation that the S&P 500 had by far the most liquid derivatives markets, and was therefore the easiest benchmark against which to manage a derivative-intensive portfolio such as HMC's.

This was, however, a debatable position, made all the more debatable by some published academic work that suggested that small stocks had delivered greater historical returns than large stocks, even after adjusting for their increased risks. If HMC were to increase its small stock exposure so as to bring its total equity size distribution closer to that of the broad market as represented by the Wilshire 5000 index rather than the S&P 500, it would require a sizeable new commitment to medium- and small-sized companies on the order of \$500 million or so.<sup>2</sup> Moreover, a substantial part of these new equities would presumably have to be managed by external firms, probably with reasonably expensive fee schedules. HMC now had only limited in-house capability in this area and it probably would not make sense to attempt to build this capability.

Given the risk and return assumptions of Exhibit 6 for the S&P 500 and the Wilshire 5000, the optimal portfolio analysis always preferred the slightly higher assumed returns from the broader index. Exhibits 10 and 11 show how this broader index combined with the other asset classes in the full optimal portfolio analysis. While the analysis preferred the broader index, it was also fair to conclude that it did not find domestic stocks, in general, very attractive.

3. *Commodity-related Investments:* The portfolio analysis clearly found commodity-related investments very attractive, even with their assumed low relative returns (see Exhibit 7). This was, however, one of the more unconventional "recommendations" of the analysis. Already the endowment held more in this asset class than any of its peer group, and one could wonder whether this kind of maverick asset class made good institutional sense. The

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2. The S&P 500 market capitalization was only 71% of the total market capitalization. The Wilshire 5000 was an index of essentially all publicly-traded U.S. stocks. Thus 71% of the Wilshire capitalization corresponded to the S&P 500, and 29% was an additional collection of small and medium-sized companies that did not belong to the S&P 500. See Exhibit 12 for more detail.

HMC staff wondered about how reliable the assumed correlations would be for future returns, and how far (if at all) to follow this rather intriguing but unconventional aspect of the overall "optimal portfolio configuration".

4. *Cash and/or Leverage:* While it was an unusual strategy for an endowment, the portfolio analysis clearly raised the question of adopting some leverage, that is a negative cash position. Here, though, one had to consider this element of the portfolio mix in terms of the institution's overall risk tolerance.

### The Broader Issues

In the broadest context, there were some critically important issues that were difficult to resolve. For example, how should Harvard think about providing for this generation of students and faculty versus future generations? Were the current needs of this generation greater than average, and could Harvard justify greater than "average" spending levels? Should the University's asset allocation and spending policies be coordinated, and if so, how?

Also, there were important potential issues concerning the appropriate framework for setting investment policies. For example, should Harvard care about how its own asset allocation policies compared to those of similarly-situated universities (such as those in Exhibit 5), or should it steer only by its own sense of an appropriate direction? To what extent could or should the output of optimal portfolio calculations (such as those in Exhibits 10 and 11) be used in setting appropriate policies? To what extent could the university make meaningful judgments about its own ability to tolerate portfolio risk or its ability relative to other investors? To what extent should all of the other major assets and liabilities of the institution influence HMC's overall policies, such as, for example, Harvard's extremely valuable campus real estate, or its valuable rare book and fine arts collections, or the sizable debt it had undertaken in recent years to construct and/or renovate student housing? And, what was it about universities in general, and Harvard in particular, that should cause the institution to hold a different portfolio than the average investor? These overriding questions had been debated within the university on several prior occasions and in several recent discussions, but with no clear consensus emerging. To focus discussion upon some of these general issues and specific questions, Jack Meyer selected five possible portfolios, shown in Exhibit 13. He then talked to several of HMC's advisors and each of its directors and asked them which of these five allocations they thought was most appropriate as the long-run policy portfolio, or which other specific portfolio they preferred. He also asked them to specify a range around their chosen allocation for each asset class; for example, U.S. stocks should be 30% of the policy portfolio but could range from 20 to 40%. This range was meant to specify the latitude within which the HMC staff could and should adjust the allocation over time according to their own sense of short-run tactical considerations, without returning to the Board to change the long-run policy.

In his own mind, Jack Meyer was tempted to conclude that a policy portfolio chosen from the more aggressive and "less conventional" end of the spectrum of portfolios, such as portfolio 4 or 5, might make the most investment sense in the long run. He thought that Harvard University could and should take a truly long-run perspective on its portfolio allocation. Expected long-run returns from this portfolio were substantial, and they might allow the University to expand its current rate of endowment spending without compromising its long-term goal of maintaining the expected real value of the endowment. And, equally important, the risks of this portfolio were not very great. On the other hand, he worried about whether such a mix was conventional enough to give Harvard comfort.

He wanted to make sure that the final choice of policy portfolio was broadly discussed, its implications were well understood, and that there was a fair consensus among individuals within HMC and within the University as a whole that it was an appropriate choice.

**Exhibit 1** Recent Endowment Values, Spending, and Spending Increases

Fiscal Year	Endowment Value (\$ millions)	Spending <sup>3</sup> from Endowment (\$ millions)	% Increase in Spending <sup>1</sup> from Prior Year	Spending <sup>1</sup> as a % of Endowment
1973	\$1,118	\$ 47	8.6	4.2
1974	960	51	7.9	4.9
1975	1,083	56	10.5	5.5
1976	1,189	57	2.2	5.0
1977	1,227	62	9.1	5.1
1978	1,210	64	2.4	5.2
1979	1,314	69	8.0	5.5
1980	1,491	77	11.3	5.5
1981	1,623	82	7.2	5.3
1982	1,617	95	15.1	5.8
1983	2,307	105	11.2	5.4
1984	2,188	111	5.9	5.0
1985	2,695	118	5.8	4.8
1986	3,435	125	6.4	4.2
1987	4,018	135	7.4	3.7
1988	4,156	149	10.8	3.7
1989	4,479	180	20.8	4.2
1990	4,760	201	11.7	4.3
1991	4,708	219	9.0	4.7
1992	5,118	231	5.5	4.6
1993	5,778	265	14.7	4.9
1994E	6,150E	275E	3.8E	4.5E

**Note:** Fiscal Year ends June 30. Data for fiscal year 1994 are preliminary estimates.

3. The "spending" from endowment in this exhibit is actually "Endowment Fund Income Availed of", the common measure employed at Harvard for reporting the use of endowment funds. The increase in this measure could be substantially smaller or larger than the planned increase in the distribution rate authorized by the Harvard Corporation. After the Corporation decided upon the allowable increase in the distribution rate per Endowment unit, the individual schools determined how much of this increase they would avail themselves of in their operating budgets. If not availed of (i.e. spent), the funds could be "banked" in unexpended endowment income balances, or re-invested in additional endowment units. Also, as a school received additional gifts for capital, its endowment units rose. In general, then, the growth in "Endowment Fund Income Availed of" was both larger and more erratic than the planned steadier growth in annual distributions per endowment unit. It was, however, a more accurate measure of the funds actually being spent throughout this decentralized system.

**Exhibit 2** Asset Allocation, Both Policy Portfolio and Current Actual Allocation as of March 1994

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Asset Class	Policy Portfolio	Current Actual Allocation (3/31/94)
Domestic Equity	40%	36.6%
Foreign Equity	18	21.3
High Yield Bonds	2	2.8
Private Investments:		
Venture Capital	12	13.0
Real Estate	7	4.8
Commodity-related	6	4.1
Domestic Bonds	15	13.4
Foreign Bonds	5	4.2
Cash	-5	-.2

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**Exhibit 3 Examples of Positions in Long-Short Portfolios****Domestic Equity Portfolio:**

1. Long: Home Depot 6¼% Convertible  
Short: Home Depot Common Stock
2. Long: Browning Ferris 6¼% Convertible  
Short: Browning Ferris 8½% Debentures
3. Long: Petrie Stores Common  
Short: Toys R Us (the major component of Petrie's balance sheet)

**Foreign Equity Portfolio:**

1. Long: Chiyoda warrants (detachable Japanese Euro-warrants)  
Short: Chiyoda Common  
Currency: Sell yen in FX market
2. Long: Foreign and Colonial German Closed-end fund  
Short: Futures on DAX index (German shares)
3. Long: Mercedes Holdings (the holding company)  
Short: Daimler Benz (the operating company)

**Domestic Fixed-Income Portfolio:**

1. Long: U.S. Treasury 10.75% 10 year  
Short: U.S. Treasury 0% 10 year  
U.S. Treasury 6.25% 10 year  
"Synthetic Current Coupon Treasury"
2. Long: AAA Asset-backed Floater (LIBOR + 50 bp)  
Short: 10 year Federal Agency Security (Treasury + 20 bp)  
Swap: Receive 10 year Treasury + 50 bp, and pay LIBOR
3. Long: 8 year German Treasury Bond  
Short: December Bund futures contract (future on German Treasuries trading in LIFFE)

**Foreign Fixed-Income Portfolio:**

1. Long: 6 year German government bond and repo @ LIBOR or less  
Swap: Pay 6 year fixed rate and receive LIBOR (DM Swap)
2. Long: 1 year forward Lire vs. DM  
Long: Contingent premium put options on Lire vs. DM
3. Long: French government "Balladur" bond with implicit put option  
Short: Standard French government bonds (delta weighted to hedge exposure)

## Exhibit 4 - Recent Investment Returns for the Harvard Endowment

	Endowment Return	Performance Benchmark <sup>1</sup>	Value- Added <sup>2</sup>
Fiscal Year 1992	11.8%	10.4%	1.4%
Fiscal Year 1993	16.7	12.7	4.0
Nine months of Fiscal Year 1994 (ending 3/31/94)	8.4	5.3	3.1

<sup>1</sup>A weighted average of the S&P 500, EAFE (Lite), Salomon Brothers BIG Domestic Bond Index, J.P. Morgan (non-U.S.) Bond Index, Venture Economics Venture Capital Index, and the other performance bogeys for the individual asset classes, with weights equal to the policy portfolio.

<sup>2</sup>The endowment return minus the performance benchmark.

**Exhibit 5** Current Asset Allocations at Four Other Major Research Universities versus Harvard's Policy Portfolio

	University 1	University 2	University 3	University 4	Average of the Four	Harvard's Policy Portfolio
Marketable Equities						
Domestic Stocks	47%	42%	33%	40%	41%	40%
EAFE Foreign Stocks	18	10	19	12	15	} 18
Emerging Markets Stocks	2	5	3	4	3	
Private Investments						
Real Estate	5	4	12	8	7	7
Ventures, Etc.	8	11	13	14	12	12
Commodity-related	0	1	1	3	1	6
Marketable Fixed Income						
Domestic Bonds	15	17	17	19	17	15
Foreign Bonds	5	8	0	0	3	5
High Yield	0	2	2	0	1	2
Cash	0	0	2	0	1	-5



Exhibit 6 The Input Assumptions for the Optimal Portfolio Allocation Analysis

Asset Classes	Expected Real Return <sup>1</sup>	Risk (Std. Dev.)	CORRELATIONS										
			S&P 500	Wilshire	EAFE Lite <sup>2</sup>	Emerging Markets Stocks	High Yield Bonds	Real Estate	Venture	Commodity-Related Inv.	U.S. Bonds	Foreign Bonds	Cash
1. S&P 500	6.5%	18.0%	1.00	.99	.42	.25	.55	.20	.65	(.10)	.45	.15	(.05)
2. Wilshire	6.7	18.5	.99	1.00	.40	.25	.60	.20	.70	(.10)	.42	.10	(.05)
3. EAFE Lite <sup>2</sup>	6.4	20.0	.42	.40	1.00	.25	.30	.15	.40	(.10)	.30	.55	(.05)
4. Emerging Markets	8.0	22.0	.25	.25	.25	1.00	.15	.15	.30	(.20)	.05	.10	.05
5. High Yield Bonds	5.5	16.0	.55	.60	.30	.15	1.00	.20	.45	(.20)	.45	.20	.10
6. Real Estate	5.5	16.0	.20	.20	.15	.15	.20	1.00	.20	.20	.30	.15	.15
7. Venture	9.0	30.0	.65	.70	.40	.30	.45	.20	1.00	(.10)	.25	.10	(.05)
8. Commodity-related	3.0	15.0	(.10)	(.10)	(.10)	(.20)	(.20)	.20	(.10)	1.00	(.25)	(.10)	.05
9. U.S. Bonds	3.4	8.0	.45	.42	.30	.05	.45	.30	.25	(.25)	1.00	.45	.10
10. Foreign Bonds	3.3	12.0	.15	.10	.55	.10	.20	.15	.10	(.10)	.45	1.00	(.05)
11. Cash	0.5	2.0	(.05)	(.05)	(.05)	.05	.10	.15	(.05)	.05	.10	(.05)	1.00

## NOTES:

1. All returns are assumed to be real returns, measured relative to the CPI.
2. EAFE Lite was a customized index with less of a weight in Japan than EAFE to compensate for Japanese cross-holdings.

Exhibit 7 A Plot of Input Assumptions: Expected Real Returns and Risk for Eleven Asset Classes

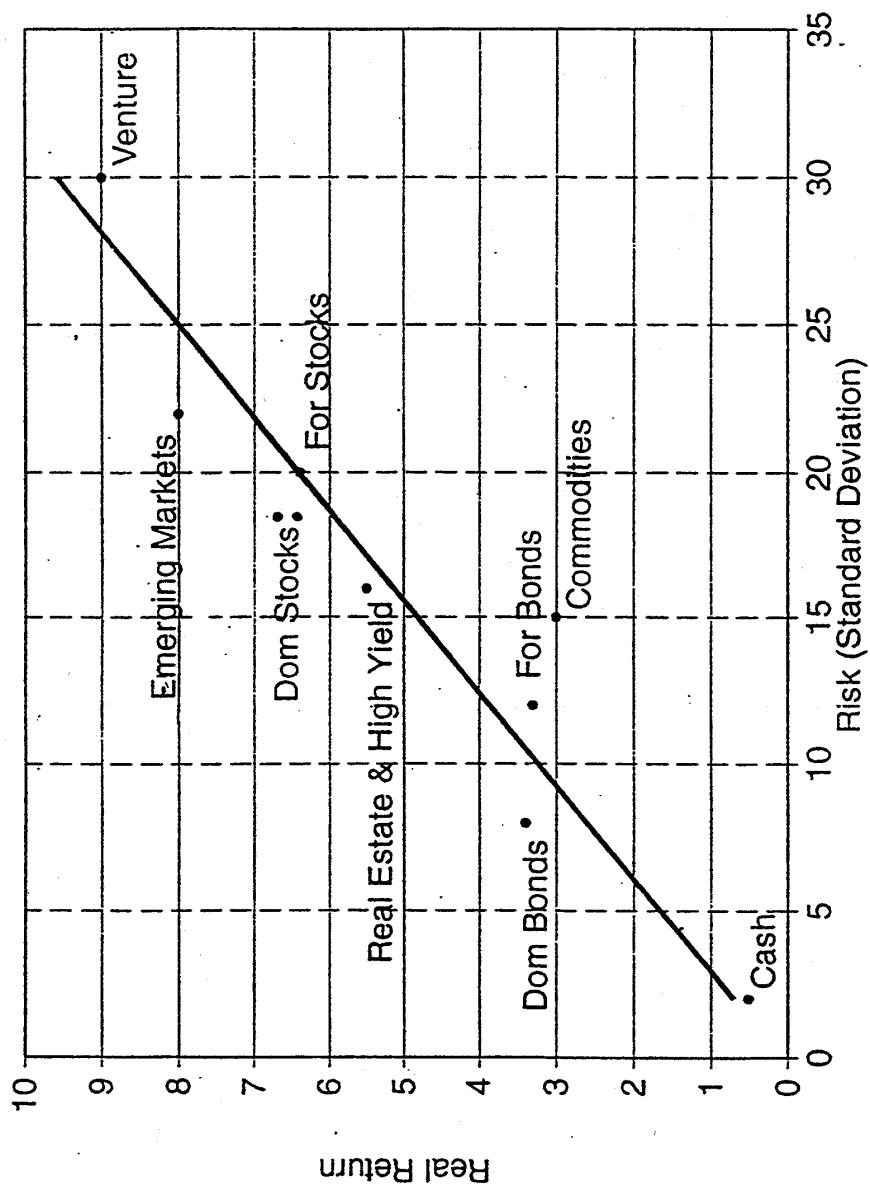


Exhibit 8 Selected Recent Historical Data, Developed from Monthly Returns, and their Correlations: 1984-1993

Asset Class	Index Used as Proxy	Average Annualized Return	Std. Dev.	S&P 500	Wilshire 5000	EAFE (Lite)	Emerging Markets	Ventures	Real Estate	Commodity Related	U.S. Bonds	CPI Infl.
1. Large U.S. Stocks	S&P 500	15.4%	15.6%	1.00	.99	.45	.28	.08	(.04)	(.12)	.30	(.18)
2. Broader U.S. Stocks	Wilshire 5000	14.9	15.7	.99	1.00	.43	.30	.12	(.06)	(.16)	.27	(.20)
3. Foreign Stocks	EAFE (Lite)	20.9	19.8	.45	.43	1.00	.26	.02	.10	(.06)	.19	(.26)
1. Emerging Markets Stocks	IFC Global EM	24.8	23.0	.28	.30	.26	1.00	.13	.09	(.18)	(.18)	(.08)
1. Ventures	Venture Economics	7.7	2.7	.08	.12	.02	.13	1.00	(.47)	(.23)	(.09)	(.20)
1. Real Estate	Russell R.E. (Leverage Adj.)	(.5)	3.7	(.04)	(.06)	.10	.09	(.47)	1.00	(.02)	(.01)	.10
1. Commodity-Related Inv.	PPI + 4%	2.8	1.2	(.12)	(.16)	(.06)	(.18)	(.23)	(.02)	1.00	(.09)	.48
1. U.S. Bonds	Salomon BIG	12.0	5.1	.30	.27	.19	(.18)	(.09)	(.01)	(.09)	1.00	(.20)
1. Inflation	CPI	3.7	.7	(.16)	(.20)	(.26)	(.08)	(.20)	.10	.48	(.20)	1.00

Asset Class	Index Used as Proxy	Average Annualized Return	Standard Deviation	S&P 500	Wilshire 5000	CORRELATIONS			
						EAFE (Lite)	Ventures	Commodity Related Inv.	U.S. Bonds
1. Large U.S. Stocks	S&P 500	12.9%	15.6%	1.00	.99	.48	.14	(.10)	.29
2. Broader U.S. Stocks	Wilshire 5000	13.4	16.1	.99	1.00	.48	.17	(.11)	.28
3. Foreign Stocks	EAFE (Lite)	16.2	17.7	.48	.48	1.00	.08	(.04)	.19
4. Ventures	Venture Economics	15.8	4.0	.14	.17	.08	1.00	(.04)	.12
5. Commodity Related Inv.	PPI + 4%	8.9	10.8	(.10)	(.11)	(.04)	(.04)	1.00	.32
6. U.S. Bonds	Salomon BIG	9.8	6.1	.29	.28	.19	(.05)	(.15)	1.00
7. Inflation	CPI	5.8	1.2	(.21)	(.21)	(.22)	.12	.32	(.19)

**Exhibit 10** Output of the Unconstrained Optimal Portfolio Analysis: A Broad Range of Portfolios from Along the Efficient Frontier  
(Low Risk to High Risk)

Optimal Portfolio #:	1	2	3	4	5	6	7	8	9	10	11	12
Risk (Std. Dev.)	5.91%	6.71	7.52	8.34	9.17	10.02	11.07	12.30	13.65	15.10	16.71	20.56
Expected Real Return	4.00%	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	10.00
Percentage Composition of Optimal Portfolios												
U.S. Stocks (Wilshire)	0%	0	0	0	0	1	5	10	14	18	21	25
Foreign Stocks (EAFE Lite)	5	6	6	7	8	9	12	15	17	20	21	23
Emerging Markets Stocks	11	13	15	16	18	20	23	25	28	30	34	40
High Yield Bonds	9	10	12	13	15	17	19	21	23	25	21	9
Real Estate	3	4	5	6	6	9	14	19	24	29	33	38
Venture	0	0	0	0	0	0	0	0	0	0	3	14
Commodity-related Inv.	22	25	28	31	34	35	33	30	28	26	16	0
U.S. Bonds	40	46	51	56	62	58	44	30	15	1	0	0
Foreign Bonds	0	0	0	0	0	0	0	0	0	0	0	0
Cash	8	-4	-17	-30	-43	-50	-50	-50	-50	-50	-50	-50

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Assumptions (Input):

Asset Class:	Constraints:		Expected Real Return:
	Minimum	Maximum	
U.S. Stocks (Wilshire)	0	150	6.7%
Foreign Stocks (EAFE Lite)	0	150	6.4
Emerging Markets Stocks	0	150	8.0
High Yield Bonds	0	150	5.5
Real Estate	0	150	5.5
Venture	0	150	9.0
Commodity-related Inv.	0	150	3.0
U.S. Bonds	0	150	3.4
Foreign Bonds	0	150	3.3
Cash	-50	150	0.5

**Exhibit 11** Output of the Constrained Optimal Portfolio Analysis: A Narrow Range of Portfolios from Along the Efficient Frontier (Medium Risk Range)

Optimal Portfolio #:	1	2	3	4	5	6	7	8	9	10
Risk (Std. Dev.)	9.21%	9.55	9.91	10.44	11.07	11.75	12.45	13.25	14.16	15.57
Expected Real Return	5.20%	5.40	5.60	5.80	6.00	6.20	6.40	6.60	6.80	7.00
Percentage Composition of Optimal Portfolios										
U.S. Stocks (Wilshire)	20%	20	20	20	20	21	24	20	24	39
For. Stocks (EAFE Lite)	10	10	10	16	20	22	24	23	25	25
Emerg. Mkts. Stocks	9	10	10	10	10	10	10	10	10	10
High Yield Bonds	0	1	4	5	5	5	5	5	5	0
Real Estate	14	15	15	15	15	15	15	15	15	7
Venture	5	5	5	5	6	8	9	15	15	15
Commodity-related Inv.	8	8	8	8	8	8	8	7	1	0
U.S. Bonds	25	25	25	25	21	16	10	10	10	10
Foreign Bonds	6	8	8	1	0	0	0	0	0	0
Cash	4	-1	-5	-5	-5	-5	-5	-5	-5	-5

Assumptions (Input):

Constraints:

Minimum	Maximum	Expected Real Return:
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Asset Class:

U.S. Stocks (Wilshire)	20	45	6.7%
Foreign Stocks (EAFE Lite)	10	25	6.4
Emerging Markets Stocks	0	10	8.0
High Yield Bonds	0	5	5.5
Real Estate	5	15	5.5
Venture	5	15	9.0
Commodity-related Inv.	0	8	3.0
U.S. Bonds	10	25	3.4
Foreign Bonds	0	10	3.3
Cash	-5	10	0.5

**Exhibit 12**    Alternative Domestic Equity Benchmarks

	<b>S&amp;P 500</b>	<b>Wilshire 5000</b>
Number of Issues	500	6,225
Total Market Cap	\$3,147.6 B	\$4,412.2 B
Largest Cap	\$84.7 B	\$84.7 B
Average Cap. (unweighted)	\$6.3 B	\$0.774 B
Median Cap	\$3.14 B	\$0.073 B
Smallest Cap	\$0.05 B	\$1 MM
% Market Coverage	71%	100%
Liquidity	Yes	Problematic
Derivatives	Yes	No
Introduction Date	1957	1978
Historical Returns	1926	1970
Rebalancing	As Needed	Daily

## Exhibit 13 Alternative Policy Portfolios

Asset Class	Alternatives				
	1	2	3	4	5
1. S&P 500	65	45	60	-	-
2. Wilshire	-	-	-	32	30
3. EAFE (Lite)	-	10	15	18	20
4. Emerging Markets	-	-	-	8	10
5. High Yield Bonds	-	-	-	2	2
Total Equity	65	55	75	60	62
6. Real Estate	-	5	5	7	10
7. Ventures	-	5	10	12	15
8. Commodity-Related Inv.	-	-	-	6	8
Total Private	0	10	15	25	33
9. U.S. Bonds	35	35	10	15	10
10. Foreign Bonds	-	-	-	5	5
11. Cash	-	-	-	-5	-10
Total Fixed	35	35	10	15	5
Expected Real Returns <sup>1</sup>	5.42	5.48	6.38	6.34	6.80
Risk <sup>1</sup>	13.20	11.84	15.19	13.52	14.65
Ratio <sup>2</sup>	.373	.421	.387	.432	.430

<sup>1</sup>Relative to CPI inflation, and based upon capital market assumptions shown in Exhibit 5.

<sup>2</sup>Sharpe's Efficiency Ratio: Excess return (return minus risk-free rate) divided by standard deviation.