CAMBRIDGE ASSOCIATES LLC

FIXED INCOME INVESTING FOR ENDOWMENTS AND FOUNDATIONS: POLICY AND PRACTICE

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ABSTRACT

1. In recent years, an increasing number of endowments and foundations have reduced their allocation to bonds and narrowed the purpose of that allocation to protecting their spending against the depredations of an economic contraction likely to trigger a severe and protracted decline in equities. At the same time, the fixed income landscape has been reshaped by the shrinking of the U.S. Treasury market, the burgeoning supply of corporate bonds, and the plethora of higher-yielding and riskier instruments. Since these changes have been reflected in the composition of standard fixed income indexes, there is an increased risk that institutions may be mis-benchmarking their bond portfolios; that is, implementing their allocation to fixed income in ways that subvert their objectives for this asset class.

2. When an institution allocates a relatively small percentage of the total portfolio to bonds (e.g., <15%), defining their purpose as insurance against a protracted decline in equity prices, it should ensure not only that it has sufficient duration in the bond portfolio, but also that this duration is pure. Bonds that are susceptible to adverse economic conditions (e.g., low-quality corporate bonds) or bonds that will fail to fully participate in rallies induced by massive rate cuts (e.g., mortgage-backed securities) should not be included in a portfolio intended to protect against severe economic contraction. The additional return one forgoes, over time, by excluding such securities from the fixed income portfolio is minimal relative to the expected increase in total portfolio return resulting from the higher allocation to equities.

3. Historically, bonds have provided effective protection during periods of economic contraction or virulent deflation. For example, in the early 1930s, when severe deflation pummeled already depressed stock prices, bonds were the only asset class that offered investors shelter from the storm. In addition, bonds have significantly outperformed during economic pull-backs following periods of prolonged equity outperformance. Lastly, bonds can provide protection from sudden and unexpected financial distress. For example, during the 1998 Asian financial crisis, fearful investors engaged in a rapid flight-to-quality. Long-term U.S. Treasury bonds performed best, returning 8.0%, while at the other end of the risk spectrum, U.S. large-cap stocks returned -19.0%, and riskier investments in U.S. small-cap and emerging markets equities returned -33.0% and -27.0%, respectively.

4. While bonds of all types significantly outperform equities during periods of economic contraction, intermediate- and long-term government bonds perform best *overall* because they lack the call risk and reinvestment rate risk associated with mortgage-backed securities (MBS), and the quality and call risk associated with corporate bonds. As the Fed lowers short-term interest rates in response to a slowing economy, the curve typically steepens, with long rates remaining more-or-less flat while short rates decline (during the most recent period of Fed easing, long rates have actually risen slightly).

Long-term bonds are therefore likely to be most rewarding in pre-recession periods during which the curve is flattening, while short- to intermediate-term bonds (e.g., two to ten years) may perform better as the curve steepens in response to Fed easing. However, the key to surviving a *prolonged* economic contraction is to make sure one has sufficient duration in the portfolio to realize capital gains large enough to help sustain a minimal level of spending without having to liquidate equities at fire-sale prices.

5. Broad market indexes, such as the Lehman Brothers Aggregate or Government/Credit indexes, are becoming less and less suitable for core bond allocations designed to protect portfolios during difficult economic conditions. The weights of U.S. Treasury bonds in the Lehman Brothers Government/ Credit and Aggregate indexes are now just 44% (from 64% in 1990) and 27% (from 46% in 1990), respectively, and are headed dramatically lower in coming years. As Treasuries have been replaced by corporates in the Government/Credit index and by MBS in the Aggregate index, the quality of the former and the call-protection of the latter have diminished appreciably.

6. Above all, the role of bonds in the policy portfolio should dictate their duration. For example, if bonds are explicitly held solely as a hedge against economic contraction or equity price deflation, they should be of intermediate- to long-term duration. At the other end of the spectrum, funds that are more concerned with protecting themselves against inflation should own Treasury inflation-protected securities (TIPS) whose effective duration is short. Sector allocation should also reflect the role of bonds in the total portfolio. When the bond portfolio is managed to maximize total return and can incur substantial volatility in doing so, non-dollar, high-yield, corporate, and MBS may be included to provide the flexibility needed to outperform broad domestic fixed income benchmarks. On the other hand, when the objective is portfolio protection, U.S. Treasury securities will provide the best insurance, and high-yield and emerging markets bonds have no place.

7. When implementing their fixed income allocation, investors should consider whether active managers have any scope to add value when their mandate excludes investments in "spread" products (i.e., higher-yielding corporate, asset-backed, or mortgage-backed securities). Although they may outperform during most periods, portfolios overweighted in higher-yielding, lower-quality bonds (the most common active strategy) are entirely at odds with the concept of fixed income as an insurance policy, because such portfolios will perform relatively poorly precisely when the investor most needs to cash in the policy. Consequently, most institutions that have reduced their bond allocation and defined its purpose as a hedge against economic contraction should consider a relatively passive approach, either investing in an intermediate- or long-term government bond index, or constructing their own laddered portfolio of intermediate- to long-term government securities. Both cost very little to implement and require minimal maintenance—just an annual check-up to gauge whether the current insurance coverage is sufficient.

SUMMARY

Introduction

Unless they first define the precise role they want bonds to play in their portfolios, investors cannot determine the appropriate allocation to fixed income securities, cannot select a relevant benchmark, and cannot properly implement the investment. This need to assess the purpose of bonds has assumed greater urgency as the fixed income landscape has been reshaped by the shrinking of the U.S. Treasury market, the burgeoning supply of corporate bonds, and the plethora of higher-yielding and riskier instruments. These changes are reflected in significant shifts in the composition of standard fixed income indexes, increasing the risk that investors may be mis-benchmarking their bond portfolios; that is, implementing their allocation to fixed income in ways that subvert their objectives for this asset class.

The Evolution of Fixed Income Investing

Fifty years ago, prudent institutional investors held most of their assets in fixed income securities because they considered equities too speculative to warrant a dominant allocation. After all, in the first 45 years of the 20th century, bonds had returned 5.1% annually, with a standard deviation of 3.9%, while stocks had returned 7.3% annually but with a standard deviation of 23.2% (see Exhibit 1). Although such precise measures as Sharpe ratios were not part of the investment vocabulary of those days, investors have always understood the trade-off between risk and return, and so it is instructive to note that the Sharpe ratio for bonds during these 45 years is 0.41 while for equities it is 0.16—indicating that bonds generated a higher risk-adjusted return than equities. As post-war inflation eroded the value of fixed income holdings, while the earnings power of U.S. companies expanded, institutional thinking gradually shifted towards a realization that the need to preserve purchasing power necessitated increased long-term allocations to equities, despite the greater variability of their returns. However, although investors were increasingly aware of the long-term opportunity cost of a significant allocation to fixed income, they still valued bonds for their shorter-term diversification benefits: during the period 1945-69, stock and bond returns had a correlation of -0.04, in contrast to a correlation of 0.49 for the period 1901-45. By the early 1980s, most institutional investors had asset allocation policies of 60% in stocks and 40% in bonds, or 70%/30% for more aggressive investors seeking to earn higher real returns.

Today, institutions measure variability at the total portfolio level, rather than by the volatility of individual asset classes. They realize that relatively risky but uncorrelated asset classes can be combined to construct a portfolio with aggregate risk significantly below the weighted average of its components, and regard themselves as long-term investors that can tolerate the greater short-term variability associated with higher allocations to equities. The relatively high correlation of stock and bond returns in the early 1990s (0.60, more than double the 0.27 correlation of the previous decade), further encouraged investors

to seek other asset classes to enhance portfolio diversification,[1] while the sharp decline in bond yields pointed to future nominal bond returns in the low single digits, which was a heavy opportunity cost for institutions like endowments and foundations that aimed to earn a real return in excess of their spending rate of 5% or so. In addition, the proliferation of total-return spending policies had reduced institutions' dependence on current cash flow, allowing them to reduce fixed income holdings in favor of assets that promise greater real growth over time.

Investment Approach

As an institution develops an investment plan, it must determine its own risk profile to assess how much tolerance it has for portfolio returns that fall at the lower end of the expected range and how capable its trustees are of sticking with a disciplined investment policy through thick and thin.[2] During periods of economic contraction or equity bear markets, bonds have significantly outperformed stocks (see Exhibit 3). Such periods of dismal equity performance imply spending shortfalls, the magnitude of which are highly correlated with an institution's spending rate and relative allocation to bonds (see Exhibit 5). For example, over a five-year period when equity returns are at the bottom end and bond returns at the top end of their respective ranges, an institution with 85% in equities (well diversified) and 15% in fixed income, spending 5% of the trailing 12-quarter average market value, would experience a cumulative decline of 18.5% in portfolio wealth. Under the same return and spending rate assumptions, an institution with 65% in equities (relatively less diversified) and 35% in fixed income would experience a 14% cumulative decline in portfolio wealth. However, an institution with 65% in equities and 35% in bonds, but spending only 3%, would experience only a 4.4% cumulative decline in portfolio wealth, or approximately one-half the decline that would be suffered by a portfolio with 85% in equities, 15% in bonds, and a 3% spending rate.

How much an institution should invest in fixed income is very much a function of the role bonds are intended to play in the total portfolio [3]—which is why defining that role is a prerequisite for sizing the bond allocation. Increasingly, institutions are maintaining a relatively small allocation (e.g., 10% to 15%) in an attempt to minimize the long-term opportunity cost of bonds while simultaneously mitigating

[1] For example, from 1980-2000 the returns of venture capital, real estate, and emerging markets equity had correlations in the range of 0.26-0.19 with the returns of U.S. equities, while commodities provided the best diversification relative to equities with a correlation of -0.10 (see Exhibit 2).

[2] On which, see two recent papers, *Diversification: A Warning Note* (2000), and *Behavioral Finance* (2000).

[3] For endowments and foundations, this is generally one or more of the following: serve as a hedge against a prolonged economic contraction, such that program spending could be maintained without the wholesale liquidation of equity holdings at fire-sale prices; offset specific liabilities (e.g., debt); enhance total portfolio diversification; earn the best possible risk-adjusted return; and/or generate current income.

the higher risk of equities by diversifying among many different kinds of equity assets. Those adopting this approach have determined (or should have determined) that they have the financial resources and political will to withstand a prolonged period (e.g., five or more years) during which equity returns are *not* sufficient to support spending rates of 4% or 5%, forcing them either to cut spending or to tolerate depreciation—perhaps significant depreciation—in the real value of their fund.

It should be emphasized, however, that institutions taking this approach should ensure not only that they have sufficient duration in the bond portfolio to realize sharp gains in the event of a decline in equities triggered by a prolonged economic contraction, but also that this duration is pure—that is, bond prices will not be adversely affected by poor economic conditions (as is the case with low-quality corporate bonds), or fail to participate fully in rallies induced by aggressive rate cuts (as is the case with MBS.) In other words, if an institution holds a relatively small allocation to bonds, intended to serve primarily as insurance[4] against a severe and protracted decline in equity prices, it should figure out how much duration is needed to provide the protection it seeks, and should make sure the quality of that duration is not diluted by allocations to sectors of the market liable to underperform Treasuries under such conditions.

Unfortunately, many institutions have sharply reduced their allocations to bonds (copying a trend set by leading endowments and foundations), but have changed neither their benchmark nor their manager guidelines to align their actual portfolio with the narrower mandate of a reduced fixed income allocation. This is dangerous because it may result in an institution discovering, after the fact, that it has failed to buy as much insurance as it needs. The danger arises because (1) a diversified bond portfolio, including MBS, lower-grade corporates, and other instruments, will outperform a plain, boring, government-only bond portfolio *most of the time*, and (2) bond managers have far greater opportunity to beat their benchmark, net of fees, if they are free to buy "spread product" (i.e., securities that trade at a higher yield than Treasuries because they have higher credit or prepayment risk). Consequently, when an institution reduces its bond allocation and re-defines the purpose of the bond portfolio as insurance against a prolonged downturn in equities, its incumbent manager may point out, with supporting documentation, that a narrower mandate of this sort means the bond portfolio will almost certainly generate lower returns over time, and argue for the maintenance of a broad index as the performance benchmark. Although the data marshaled in support of this argument may be accurate, both the premise and the conclusion are wrong. When the purpose of a fixed income portfolio is to provide enough disability insurance to sustain a defined level of program spending during a prolonged downturn in the equity market, how that portfolio performs *most of*

[4] Temporary disability insurance provides the closest analogy. Just as such insurance is designed to ensure that employees can maintain something close to their previous standard of living during a prolonged illness, without eating up their accumulated savings, so a core bond portfolio should be designed to ensure that an institution can maintain something like its former level of program spending without liquidating equities at fire-sale prices, since this would be tantamount to eating the seeds of its portfolio's recovery and subsequent growth.

the time is a secondary question, entirely subordinate to the question of how well it performs when the insurance is needed. No doubt one can save a little money buying disability insurance from a poorly-rated rather than a highly-rated underwriter, but is that a sensible gamble? Similarly, why incur the risk that mortgage-backed or corporate spread products might underperform during a flight to quality occasioned by severe economic contraction, when the critical point is to ensure that the insurance pays off in full when needed?[5] After all, the margin of return one might forgo by investing the bond portfolio conservatively is minimal by comparison with the increase in return expected from a larger allocation to equities. In other words, if one shrinks the bond allocation from, say, 25% to 15% of the total, and eliminates spread products from the bond portfolio, the long-term estimated return on the *total* portfolio should still be substantially greater than before.

The essential point is that the smaller the allocation to fixed income, the longer and purer the duration of the bonds should be. This applies even to portfolios that are not heavily invested in stocks, but are broadly diversified among various equity investments—including absolute return strategies—that may prove more vulnerable to economic stress than anticipated if the alternative investments have a common risk factor of minimal cash flow. Because no one really knows how these eclectic strategies might perform during a severe bear market, there is an unusually high risk of estimation error in the assumptions about correlation and standard deviation that provide the rationale for diversified equity portfolios. On the other hand, it seems reasonable to assume that high-quality bonds will continue to provide a safe haven and bring valuable stability to a fund during periods when there is a negative risk premium for equities and investors become highly sensitive to the risk of absolute loss.

For institutions that retain a higher allocation to bonds than may be necessary for insurance purposes alone, we would recommend a two-tiered approach to implementing the allocation. The portion of the portfolio designed to absorb short-term volatility and protect spending during periods of economic contraction or financial distress should be invested specifically for that purpose. The rest of the bond portfolio can then be invested opportunistically in spread products, such as high-yield and emerging markets debt, with the objective of providing both diversification and incremental return to the total portfolio. (This is the allocation that has increasingly been diverted in recent years from fixed income to absolute return and hedge fund strategies, with the expectation that these will provide higher returns with lower volatility and consistently lower correlations to equities. We very much doubt that over time the

[5] Note that we don't *know* that highly-rated corporate bonds or carefully structured mortgage portfolios will necessarily underperform under such conditions—this is a topic of many debates and much data mining from the 1930s (corporates only, since MBS are a more recent invention)—but why take the risk that they *might* do so?

average absolute return or hedge fund manager will in fact deliver the holy grail of equity-like returns with a low standard deviation and zero correlation to the stock and bond markets, and so manager selection and diversification of manager-specific risk become critical elements in the implementation of such programs.)

Is Insurance Really Necessary and Does it Work?

Bonds do provide protection during periods of economic contraction or virulent deflation. For example, in the early 1930s, when severe deflation pummeled already depressed stocks prices, bonds were the only asset class that offered investors shelter from the storm (see Exhibit 3). Although there may be a relatively low probability of deflation occurring again in the United States, it would be cavalier to assume the threat has disappeared forever. In 1990, the U.S. banking system came uncomfortably close to the situation in which the Japanese found themselves fending off runs on financial institutions that were clearly insolvent. The relative performance of the Japanese stock and bond markets since 1990 illustrates vividly the effects of deflation threat: in the 11 years since the beginning of 1990, the stock market has had an average annual compound return (AACR) of -5.7% and bonds an AACR of 6.4% (i.e., an average annual negative risk premium of -12.1%). During this period, inflation averaged 1.0% a year, including three years of deflation (1995, 1999, and 2000). Of course, the Japanese have compounded their problems with fiscal policy mistakes, while the U.S. economy is both more open and more flexible. Nevertheless, the notion that "it can't happen here" is naïve and could even be construed as irresponsible in those with fiduciary responsibility to ensure that even if their fund is knocked for a loop in a brutal economic downturn, it will at least live to fight another day—job one is to stay in the game.

Exhibit 3 also illustrates the relative performance of stocks and bonds during economic contractions and equity bear markets. All the economic pull-backs follow relatively long periods of economic expansion or equity outperformance. For example, the eight-month contraction between August 1957 and March 1958, during which ten-year government bonds outperformed equities by 29.3%, followed a three-year expansion when equities returned 22.6% annually, bonds, -2.1%, and inflation, 1.6%. The 16-month recession from July 1981 until October 1982, during which ten-year government bonds outperformed equities by 23.7%, followed a six-year inflationary expansion when equities returned 13.1% annually, bonds, 2.6% and inflation, 9.0%. Although each period had its own set of unique circumstances and economic conditions, one consistent trend emerges: prolonged equity bull markets were followed by rather abrupt periods of severe equity underperformance and high absolute returns for bonds.

Although the United States has experienced no prolonged economic contractions in modern times (i.e., post-1945), it is also instructive to consider the shelter bonds have provided during periods of

sudden and unexpected financial distress. For example, during the 1998 Asian financial crisis, fearful investors engaged in a rapid flight-to-quality (see Exhibit 4). Long-term U.S. Treasury bonds performed best, returning 8.0%, while all types of U.S. investment-grade bonds had positive performance. At the other end of the risk spectrum, U.S. large-cap stocks returned -19.0%, while riskier investments in U.S. small-cap and emerging markets equities returned -33.0% and -27.0%, respectively. During a more protracted decline of this sort, portfolios with very high allocations to equity investments could well be forced to liquidate equity holdings in order to support minimal spending needs at a time when the markets demanded a steep liquidity premium.

In addition, there may be some correlation between economic conditions and the surplus/deficit status of some institutions' budgets. For example, if an economic downturn reduced a university's gift flow, it could be forced to lean more heavily on the investment portfolio to meet spending needs. Presumably, this would also coincide with higher demand for student financial aid, which is typically supported from endowment spending. As these examples suggest, calculating how large a bond allocation one needs involves a good deal of guesswork in addition to careful modeling.

What Type of Bonds?

While bonds of all types significantly outperform equities during periods of economic contraction, long-term government bonds perform best because they lack the call risk and reinvestment rate risk associated with MBS and the quality and call risk associated with corporate bonds. During a recession or severe economic slowdown, the Federal Reserve typically cuts interest rates in an effort to reinvigorate economic activity. For example, rates have been cut an average of 550 basis points (bps) during past economic slumps. The bond market tends to anticipate such rate cuts, with the earliest adjustments occurring at the long-end of the yield curve. This usually results in falling rates and significant price appreciation for holders of long-term bonds. However, a rapid decline in mortgage rates results in a concomitant increase in the level of refinancing and mortgage-backed bonds are often called. The result is that the price appreciation of MBS is capped on the upside (i.e., they exhibit negative convexity)[6] and investors are faced with reinvesting the proceeds at substantially lower rates. In recent years, moreover, not only has the mortgage-backed sector grown rapidly (especially in relation to the shrinking supply of Treasuries), but the degree of prepayment risk also has increased sharply.

[6] In a bond portfolio with negative convexity, duration increases as interest rates rise, resulting in higher risk.

Investment-grade corporate bonds will only be called if interest rates fall rapidly and remain low. In addition, many corporate bonds issued today no longer include embedded call options. However, corporate bonds have quality risk, which increases as one slides down the quality scale from low quality investment-grade bonds to sub-investment-grade, or junk-bonds. While AAA corporate bonds have a very remote chance of actual default, they do not perform as well as Treasuries during a rapid flight-to-quality such as that of 1998. In addition, the supply of non-callable ten-year+ AAA corporate bonds pales in comparison to the supply of Treasury bonds of the same maturity. As a result, many investors would find it impossible or prohibitively expensive to construct a portfolio with a relatively large allocation to ten-year+ AAA corporate bonds.

When the economy shows signs of overheating, the Federal Reserve generally raises short-term interest rates in an explicit attempt to cool the motor by raising the cost of capital. As a result, the yield curve typically flattens, as short rates rise while long-term rates, which are less responsive to the Fed's actions, may remain unchanged, or even drop slightly if the market anticipates a dramatic slowdown. When the Fed subsequently lowers short-term interest rates, however, the curve typically steepens, with long rates remaining more-or-less flat while short rates decline (during the most recent period of Fed easing, long rates have actually risen slightly). Long-term bonds are therefore likely to be most rewarding in pre-recession periods during which the curve is flattening, while short- to intermediate-term bonds (e.g., two to ten years) may perform better as the curve steepens in response to Fed easing.[7] As already emphasized, however, the key to surviving a *prolonged* economic contraction is to make sure one has sufficient duration in the portfolio to realize capital gains large enough to help sustain a minimal level of spending.

Investors looking to add incremental return in addition to protecting against economic contraction may want to include an allocation to high-quality investment-grade corporate bonds, since these (AA-rated) have outperformed Treasuries by an average of 40 bps annually. While such investments are a less efficient hedge against contractions and distress, their relative outperformance when conditions are more benign suggests that they do have a role in a diversified portfolio of bonds. In addition, these bonds have only slightly underperformed long-term Treasuries during recent recessionary periods (see Exhibit 3), while significantly outperforming equities.

[7] This suggests that an institution with the requisite expertise might add value by shifting the maturity structure of the portfolio when the yield curve flattens or inverts, reducing the weight of longer-term Treasury bonds and increasing that of short- to intermediate-term bonds. If one assumes that the Fed would continue to ease as the economy weakened, pushing real short-term interest rates to zero (or less), an aggressive approach would be to leverage the two-year note, on the assumption that the carry would become increasingly positive as the curve steepened. The risk here is stagflation, which could result in a negative carry for a protracted period during which the fund desperately needed *positive* cash flow, or policy mistakes by the Fed.

An additional, albeit remote, risk is the possibility that economic weakness in the United States might trigger a sale of dollar-denominated securities held by foreign investors, leading to a decline in the value of the US$ (or, conversely, that a decline in the value of the US$ might trigger a fire sale of dollar-denominated securities). Roughly 44% of tradable U.S. Treasuries are held by non-U.S. investors, along with 20% of corporate bonds and 8% of marketable equities, at a time when the United States is running a large trade deficit that must be financed by inflows of foreign capital. If non-U.S. investors stop investing at the current rate of $1.7 billion a day or sell what they already own, interest rates might rise and bond values fall even under conditions of severe economic contraction. Apart from their own currencies, gold or the euro are the only real alternatives to the US$ for non-U.S. investors. Accordingly, it might be prudent to add some sovereign bonds denominated in euros to deflation-hedging portfolios.

Choosing a Benchmark

Although many endowments and foundations have reduced their allocations to bonds, most continue to benchmark their fixed income portfolios to broad market indexes, such as the Lehman Brothers Aggregate or Government/Credit indexes, that are becoming less and less suitable for core bond allocations designed to protect portfolios during difficult economic conditions. As Appendix A illustrates, the weights of U.S. Treasury bonds in the Lehman Brothers Government/Credit and Aggregate indexes are now just 44% (from 64% in 1990) and 27% (from 46% in 1990), respectively, and are projected to shrink even more dramatically in coming years. As Treasuries have been replaced by corporates in the Government/Credit index and by MBS in the Aggregate index, the quality of the former and the call-protection of the latter have diminished appreciably.

Approximately 35% of the Lehman Brothers Aggregate Index is composed of MBS, while the Lehman Brothers Government/Credit Index excludes MBS, but has a relatively higher weight in investment-grade corporate bonds (38.8% versus 23.8% for the Lehman Brothers Aggregate Index). The inclusion of MBS in the Lehman Brothers Aggregate Index results in higher call risk and a relatively lower maturity (8.3 years versus 9.7 years) and effective duration (4.6 years versus 5.6 years) than those of the Lehman Brothers Government/Credit Index (see Appendix B). However, MBS are quasi-government securities and, despite recent speculation over the underlying risks in their portfolios of assets, they have the highest quality rating (AAA). As a result, the inclusion of more corporate bonds in the Lehman Brothers Government/Credit Index, in lieu of MBS, results in higher quality risk. For example, 76.3% of the holdings in the Lehman Brothers Aggregate Index are rated AAA, compared to only 61.7% rated AAA in the Lehman Brothers Government/Credit Index.

Empirical evidence suggests that the trade-off between quality and call risk results in relatively similar performance results. For example, during the 16-month recession from July 1981 to October 1982, the Lehman Brothers Aggregate Bond Index had a cumulative return of 36.6%, while the Lehman Brothers Government/Credit Index returned 35.6%. During the eight-month recession from July 1990 to February 1991, the Lehman Brothers Aggregate Index returned 8.2%, compared to a return of 7.8% for the Lehman Brothers Government/Credit Index. However, during August and September of the 1998 flight-to-quality, the Treasury-laden Government/Credit index returned 4.9%, while the Aggregate index returned 4.0%. Finally, the trailing 20-year AACR for the Aggregate index is 10.5% and for the Government/Credit index, 10.4%.

It is worth noting that Wall Street firms do not create and maintain fixed income benchmarks as a public service, but in order to improve the breadth and liquidity of the markets so that order flow is enhanced for the benefit of their trading desks. Consequently, their interest is served by increasing the scope of the fixed income indexes as much as possible—bringing into the fold high-yield and non-dollar bonds, asset-backed securities, and all manner of other instruments of recent vintage, none of which should be included in the fixed income portfolio of an endowment or foundation seeking to maintain a core allocation of immaculate quality and pure duration for portfolio hedging purposes. Thus, for example, the relatively new Lehman Brothers Universal Bond Index is even less relevant than the Aggregate as a benchmark for such a core allocation, while global bond indexes—with their increasing allocation to Japanese government bonds—are positively dangerous.

Implementing the Fixed Income Policy

Once investors have defined the purpose of fixed income in their portfolios and the types of bonds best suited to perform this task, implementing the policy is relatively straightforward. The four determinant characteristics are the duration target and structure, sector allocations, management approach, and appropriate benchmark.

The Duration Target

Above all, the role of bonds in the policy portfolio should dictate their duration. For example, if bonds are explicitly held solely as a hedge against economic contraction or equity price deflation, they should be of intermediate- to long-term duration, with the duration determined by the size of the allocation (i.e., a smaller allocation requires a longer duration). At the other end of the spectrum, funds that are more concerned with protecting themselves against inflation should own Treasury inflation-protected

securities (TIPS) whose effective duration is short.[8] In all instances, however, maturity and duration targets should be set with a view to their effect on the variability of the total portfolio, not simply of the fixed income portfolio measured in isolation. For example, long-term bonds may appear unduly volatile when viewed in isolation, but in the context of the total portfolio the increase in variability resulting from an allocation to long-term, as opposed to intermediate-term bonds, may prove marginal.

The Sector Allocation

Sector allocation should also reflect the role of bonds in the total portfolio. When the bond portfolio is managed to maximize total return and can incur substantial volatility in doing so, non-dollar, high-yield, corporate, and MBS may be included to provide the flexibility needed to outperform broad domestic fixed income benchmarks. In addition, managers may make economic sector bets that strongly influence portfolio performance (e.g., underweighting telecom or overweighting financials). On the other hand, when the objective is portfolio protection, U.S. Treasury securities will provide the best insurance, and high-yield and emerging markets bonds have no place.

The Management Approach and Appropriate Benchmark

How the fixed income portfolio is managed should depend on the role of bonds in the portfolio. In this context, we are concerned that many institutions have slashed their fixed income allocations (implicitly re-defining the role of bonds), but have retained the same manager, with the same mandate, as when their allocation to bonds was twice the size. Active managers construct portfolios that differ from their benchmark in various ways the managers believe will add value (e.g., different duration, different sector weights, different quality rating). Of these strategies, the most common is to overweight higher-yielding, lower-quality bonds, because this approach will generally produce higher returns over time (although perhaps not in risk-adjusted terms). As noted above, however, this approach is entirely at odds with the concept of fixed income as an insurance policy because such a portfolio will perform relatively poorly precisely when the investor most needs to cash in the policy.

A second approach is a passive strategy, which can take the form of immunization, cash flow matching, or indexing. (Immunization and cash flow matching are more appropriate for pension funds that have defined liabilities whose duration changes with changes in interest rates.) An institution that indexes, however, should take care to identify an index whose characteristics properly reflect the role

[8] For an analysis of the likely performance of TIPS during deflationary conditions, please see our recent paper, *U.S. Treasury Inflation Protection Securities: Fixed Income Substitute?*

bonds are intended to play in the portfolio. Thus, for example, a small (e.g., <15%) bond allocation whose purpose is to ensure spending can be maintained even during a prolonged economic contraction and equity bear market should never be invested in a Lehman Brothers Aggregate or Lehman Brothers Government/Credit index fund since neither of these has the characteristics needed to fulfill such a purpose.

A variant on this approach is to buy and hold a laddered portfolio of intermediate- to long-term government securities as a plain vanilla insurance policy. This costs very little to implement and requires minimal maintenance—just an annual check-up to gauge whether the current insurance coverage is sufficient.

For those institutions that have decided to shrink their bond portfolios to what they regard as the minimum size needed for portfolio hedging purposes, we would recommend these relatively passive approaches to implementing the bond allocation. Active managers have almost no scope to add value when their mandate is reduced to holding only government or AAA corporate securities, and will constantly seek permission to invest in spread product in order to find some way of at least earning their fees. Meanwhile, the investor incurs a risk not only that the manager underperforms the appropriate, plain-jane government securities benchmark over the long term, but—more importantly—underperforms badly at exactly the wrong time. In addition, active managers need to be selected, monitored and measured, all of which occupies resources that might be better employed elsewhere in the portfolio, where there is more scope for value added.

EXHIBITS

Exhibit 1

NOMINAL RETURNS (%)

	T-Bills	Bonds[1]	5-Yr Govt Bonds[2]	10-Yr Govt Bonds[2]	10-15 Yr Treas Bonds	20-Year+ Treas Bonds	10-15 Yr Corp Bonds	LB Govt/ Credit	MBS	LB Agg.	Equities
Series Inception	1900	1900	1919	1900	1988	1980	1900	1976	1977	1976	1900
AACR											
Since Inception:	4.3	5.4	5.0	4.6	9.4	11.1	5.5	9.3	9.3	9.3	10.3
1900-44	3.5	5.1	---	3.5	---	---	4.6	---	---	---	7.3
40-Year	6.2	7.2	7.1	7.0	---	---	7.9	---	---	---	11.9
20-Year	6.8	11.5	9.8	10.6	---	11.9	12.1	10.4	10.9	10.5	15.6
10-Year	4.8	9.0	7.0	7.7	8.9	10.1	9.2	8.0	7.8	8.0	17.5
Std. Dev.											
Since Inception	2.8	7.8	6.0	7.3	8.3	14.2	6.3	7.9	9.7	8.0	19.8
1900-44	2.2	3.9	---	2.3	---	---	3.0	---	---	---	23.2
40-Year	2.7	11.0	7.3	10.5	---	---	8.8	---	---	---	15.9
20-Year	2.9	12.3	8.6	12.9	---	14.1	9.7	8.1	9.8	8.1	14.0
10-Year	1.0	10.8	7.0	10.6	9.3	13.7	7.8	7.3	5.7	6.7	15.3

REAL RETURNS (%)

	Inflation	T-Bills	Bonds[1]	5-Yr Govt Bonds[2]	10-Yr Govt Bonds[2]	10-15 Yr Treas Bonds	20-Year+ Treas Bonds	10-15 Yr Corp Bonds	LB Govt/ Credit	MBS	LB Agg.	Equities
Series Inception	1900	1900	1900	1919	1900	1988	1980	1900	1976	1977	1976	1900
AACR												
Since Inception:	3.2	1.1	2.1	2.0	1.4	6.0	6.9	2.2	3.3	4.4	3.3	6.9
1900-44	2.0	1.5	3.1	---	1.5	---	---	---	---	---	---	5.2
40-Year	4.5	1.6	2.6	2.5	2.4	---	---	3.2	---	---	---	7.0
20-Year	3.6	3.1	7.7	6.0	6.8	---	8.0	8.2	5.1	7.1	5.2	11.6
10-Year	2.7	2.1	6.1	4.2	4.9	6.1	7.3	6.4	3.6	5.0	3.6	14.4
Std. Dev.												
Since Inception	5.0	4.9	9.7	7.7	9.0	8.2	14.7	8.3	7.5	10.7	7.4	20.2
1900-44	6.1	6.3	8.4	---	7.4	---	---	7.7	---	---	---	23.4
40-Year	3.1	2.3	11.7	7.9	11.1	---	---	9.7	---	---	---	16.3
20-Year	1.7	1.9	12.3	8.5	12.8	---	14.1	9.7	6.3	9.7	6.1	14.4
10-Year	0.6	1.1	10.6	6.8	10.5	9.1	13.5	7.7	6.9	5.5	6.4	15.2

Source: Global Financial Data.

Note: Ten-, 20-, and 40-year figures are through 2000.

[1] Returns are a constructed series from 1900-68, composed of Global Financial Data (1900) and S&P yield data (1901-68); the Salomon Smith Barney High-Grade Bond index is used from 1969 forward.

[2] Series is 100% Treasury Bonds from 1988-2000, as represented by the Merrill Lynch 5- and 10-year Treasury Bond indexes.

Exhibit 2

CORRELATIONS OF ASSET CLASS RETURNS

Correlations of Annual Returns: 1950-80

	U.S. Equity	10-Yr. Govt. Bond	10-15 Yr. Corp
U.S. Equity	1.00		
10-Yr. GB	0.13	1.00	
10-15 Yr. CB	0.32	0.89	1.00

Correlations of Annual Returns: 1980-2000

	U.S. Equity	10-Yr. Govt. Bond	10-15 Yr. Corp
U.S. Equity	1.00		
10-Yr. GB	0.44	1.00	
10-15 Yr. CB	0.48	0.97	1.00

Correlations of Annual Returns: 1980-2000

	U.S. Equity	Global ex U.S. Equity	Em Mkts Equity	Abs. Return	Hedge Funds	Venture Capital	Priv. Equity	Real Estate	Comm.	LB Agg	5-Yr. Govt. Bd.	10-15 Yr. Treasury	20-Yr.+ Treasury	10-15 Yr. Corp	H-Y Bonds	Em Mkts Debt	MBS
USE	1.00																
GExUS	0.45	1.00															
EME	0.26	0.39	1.00														
AR	0.43	0.28	0.41	1.00													
HF	0.66	0.33	0.60	0.74	1.00												
VC	0.21	0.12	0.31	0.13	0.34	1.00											
PE	0.59	0.44	0.24	0.48	0.58	0.62	1.00										
RE	0.19	0.25	-0.38	0.15	-0.05	0.18	0.40	1.00									
CM	-0.10	-0.14	0.07	0.11	0.14	0.42	-0.14	-0.01	1.00								
LBA	0.40	0.18	0.04	0.46	0.35	-0.29	-0.04	0.01	-0.12	1.00							
5-Yr GB	0.34	0.17	0.00	0.44	0.30	-0.32	-0.08	0.04	-0.18	0.99	1.00						
10-15 TB	0.41	0.03	0.02	0.45	0.32	-0.38	-0.16	-0.12	-0.29	0.99	0.99	1.00					
20-Yr+ TB	0.41	0.22	-0.04	0.44	0.30	-0.31	-0.02	0.03	-0.13	0.96	0.95	0.98	1.00				
10-15 CB	0.38	0.27	0.09	0.47	0.30	-0.32	0.08	0.02	-0.19	0.97	0.96	0.95	0.95	1.00			
H-Y Bonds	0.58	0.44	0.41	0.53	0.63	-0.09	0.27	-0.31	-0.48	0.56	0.50	0.46	0.49	0.57	1.00		
EMD	0.28	0.27	0.63	0.88	0.80	0.12	0.29	-0.36	0.09	0.43	0.38	0.42	0.34	0.40	0.60	1.00	
MBS	0.38	0.13	0.07	0.40	0.37	-0.21	-0.08	0.02	0.03	0.96	0.94	0.94	0.90	0.90	0.53	0.47	1.00

Source: Global Financial Data.
Note: Five-year and ten-year Govt. Bond series are 100% Treasury Bonds from 1988 forward, as represented by the Merrill Lynch 5- and 10-yr Treasury Bond indexes.

Exhibit 3

RETURNS OF VARIOUS ASSET CLASSES DURING PERIODS OF ECONOMIC CONTRACTION

Period of Contraction Following Expansions/Equity Bull Markets	Months	Inflation	Equities	T-Bills	5-Year Govt Bonds	10-Year Govt Bonds	10-15 Yr Corp Bonds	20-Year Govt Bonds	MBS
August 1929 - February 1933	43	-8.3	-32.7	3.4	5.2	3.8	5.3	---	---
May 1937 - May 1938	13	-1.3	-37.4	0.3	4.9	4.0	4.6	---	---
August 1957 - March 1958	8	2.7	-13.9	3.0	14.2	15.4	8.8	---	---
December 1969 - October 1970	11	5.5	-8.8	7.0	10.8	7.0	3.6	---	---
July 1981 - October 1982	16	6.2	7.4	13.0	28.4	31.1	25.7	31.6	31.8
July 1990 - February 1991	8	5.7	7.7	7.4	13.1	16.5	15.0	12.4	13.9
April 2000 - March 2001	12 (+?)	2.9	-21.7	6.0	13.9	14.0	13.9	13.2	12.6

Notes on Each Period:

1929-33: A period of deflation and severe economic contraction, which followed a stock market bubble.
1937-38: Followed a four-year bull market in equities (1933-36) during which equities had an AACR of 35%, bonds, 9.5%, and inflation, 2.9%.
1957-58: Followed a three-year expansion (1954-57) during which equities achieved an AACR of 22.6%, bonds, -2.1%, and inflation, 1.6%.
1969-70: Followed a nine-year expansion (1961-69) during which equities achieved an AACR of 8.3%, bonds, 0.9%, and inflation, 2.6%.
1981-82: Followed a six-year expansion (1975-81) which had a brief six-month interruption from January 1980 to June 1980. Including the interruption, equities had an AACR of 13.1%, bonds, 2.6%, and inflation, 9.0%.
1990-91: Followed an eight-year expansion (1982-90) during which equities had an AACR of 18.2%, bonds, 13.0%, and inflation, 3.7%
2000-01: Followed a nine-year expansion (1991-2000) during which equities had an AACR of 19.5%, bonds, 8.1% and inflation, 2.7%.

Source: Global Financial Data.

Exhibit 4

1998 ASIAN FINANCIAL CRISIS: ASSET CLASS PERFORMANCE

Asset Class Returns: July 17, 1998 to October 8, 1998

Bonds

Long-Term U.S. Treasuries	High-Quality Corporates	MBS	High-Yield Bonds	Emerging Markets Debt
8.0%	5.0%	2.0%	-7.0%	-24.0%

Equities

U.S. Stocks	U.S. Large-Cap Stocks	U.S. Small-Cap Stocks	EAFE	Emerging Markets Equity
-22.0%	-19.0%	-33.0%	-21.0%	-27.0%

Source: "Pioneering Portfolio Management," David F. Swensen, 2000.

Exhibit 5

FIVE-YEAR SCENARIO TEST

This exhibit illustrates the performance of three portfolios with different Equity/Bond Allocations—65%/35%, 75%/25%, and 85%/15%—during a five-year period in which equities perform very poorly (e.g., at the bottom of the return distribution) and bonds perform relatively well (e.g., at the top of the return distribution). The returns (see Table 1) are based on the long-run observed distribution of returns. The normative or average returns for each asset class are presented in Table 2.

As illustrated in Exhibit 5, the 65/35 portfolio outperforms the other two portfolios, which have relatively lower allocations to bonds and higher allocations to equities, under both 3% and 5% spending rates. However, the 65/35 portfolio experiences a much more significant decline (14.0%) under the 5% spending rate than under the 3% spending assumption (4.4% decline). The *relative* downside protection provided by a larger allocation to bonds decreases as the spending rate increases.

Table 1

Five-Year Scenario Return Assumptions and Alternative Asset Allocation Assumptions

	Percentile of Return (%)	5-Year Returns (%)	Asset Allocation (%)		
			65/35	75/25	85/15
U.S. Equity	90	-2.1	50.0	40.0	30.0
Global ex U.S. Equity	75	0.9	10.0	15.0	15.0
Emerging Markets Equity	90	-6.0	0.0	0.0	5.0
Absolute Return	75	3.0	0.0	5.0	7.5
Equity Hedge Funds	80	1.2	0.0	5.0	7.5
Venture Capital	75	2.7	0.0	2.5	7.5
Private Equity	90	-2.9	0.0	2.5	7.5
Real Estate	60	4.0	5.0	5.0	5.0
U.S. Bonds	10	9.2	30.0	25.0	15.0
Cash	50	1.2	5.0	0.0	0.0

Table 2

Long-Term Normative Return Assumptions

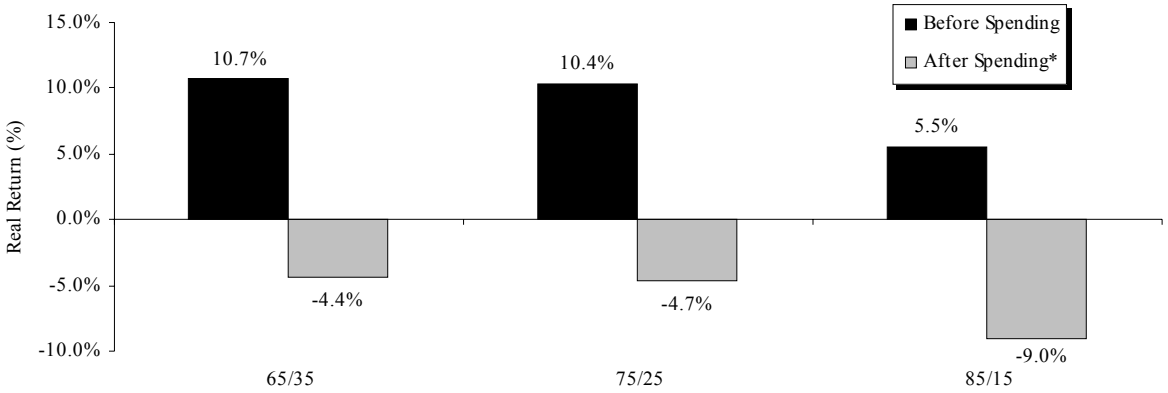
	Real Arithmetic Returns (%)	Standard Deviation (%)
U.S. Equity	8.0	16.5
Global ex U.S. Equity	8.0	19.0
Emerging Markets Equity	11.0	27.0
Absolute Return	5.8	8.3
Equity Hedge Funds	6.5	12.5
Venture Capital	13.0	26.3
Private Equity	11.0	22.3
Real Estate	6.3	13.3
U.S. Bonds	4.3	9.3
Cash	1.2	3.5

Exhibit 5 (continued)

FIVE-YEAR SCENARIO TEST

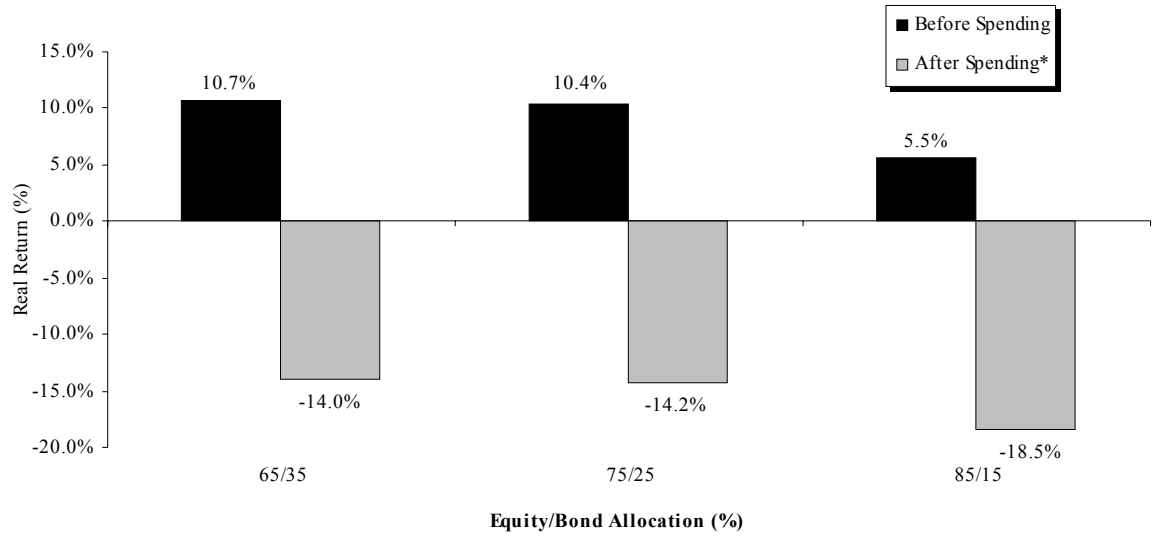
3% Spending

Five-Year Scenario: Cumulative Return



5% Spending

Five-Year Scenario: Cumulative Return

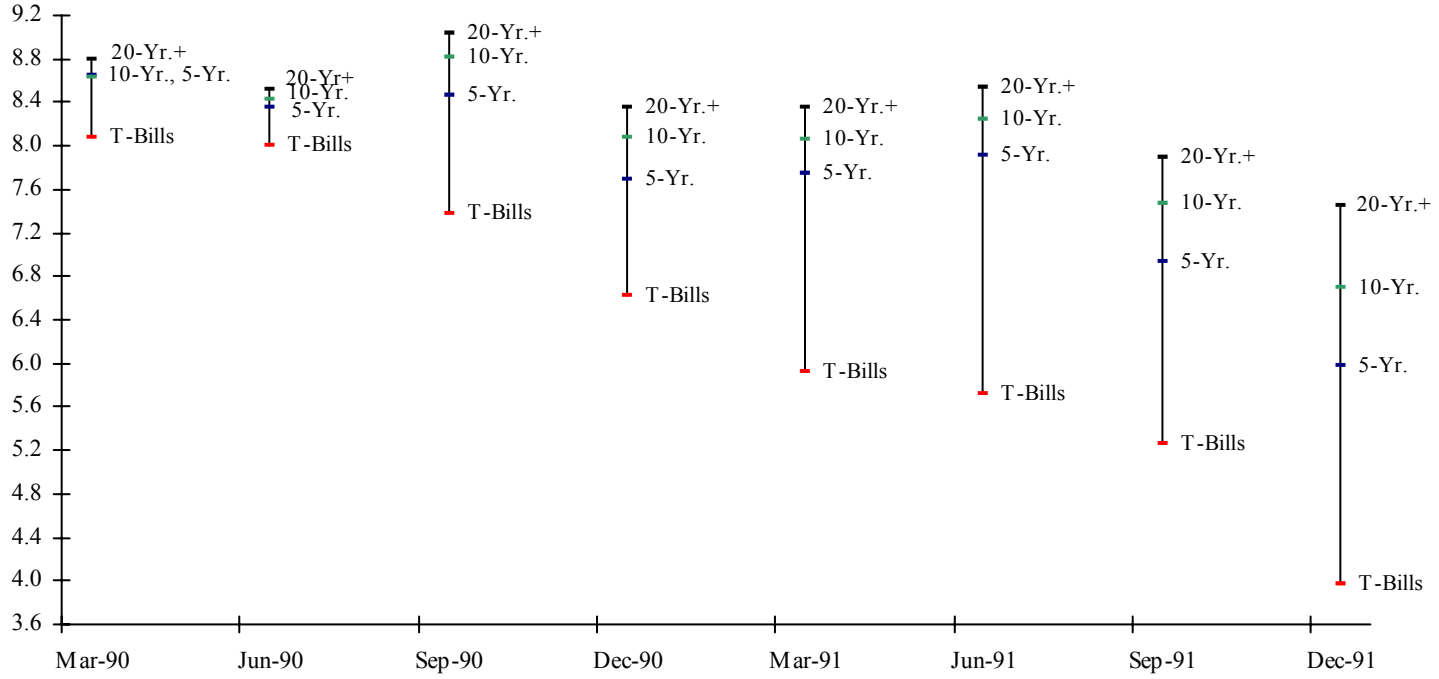


Note: Spending is 3% or 5% of trailing 12-quarter average market value with the added provision of not cutting nominal spending.

Exhibit 6

SHIFTS IN THE TREASURY YIELD CURVE DURING RATE CUTTING CYCLES

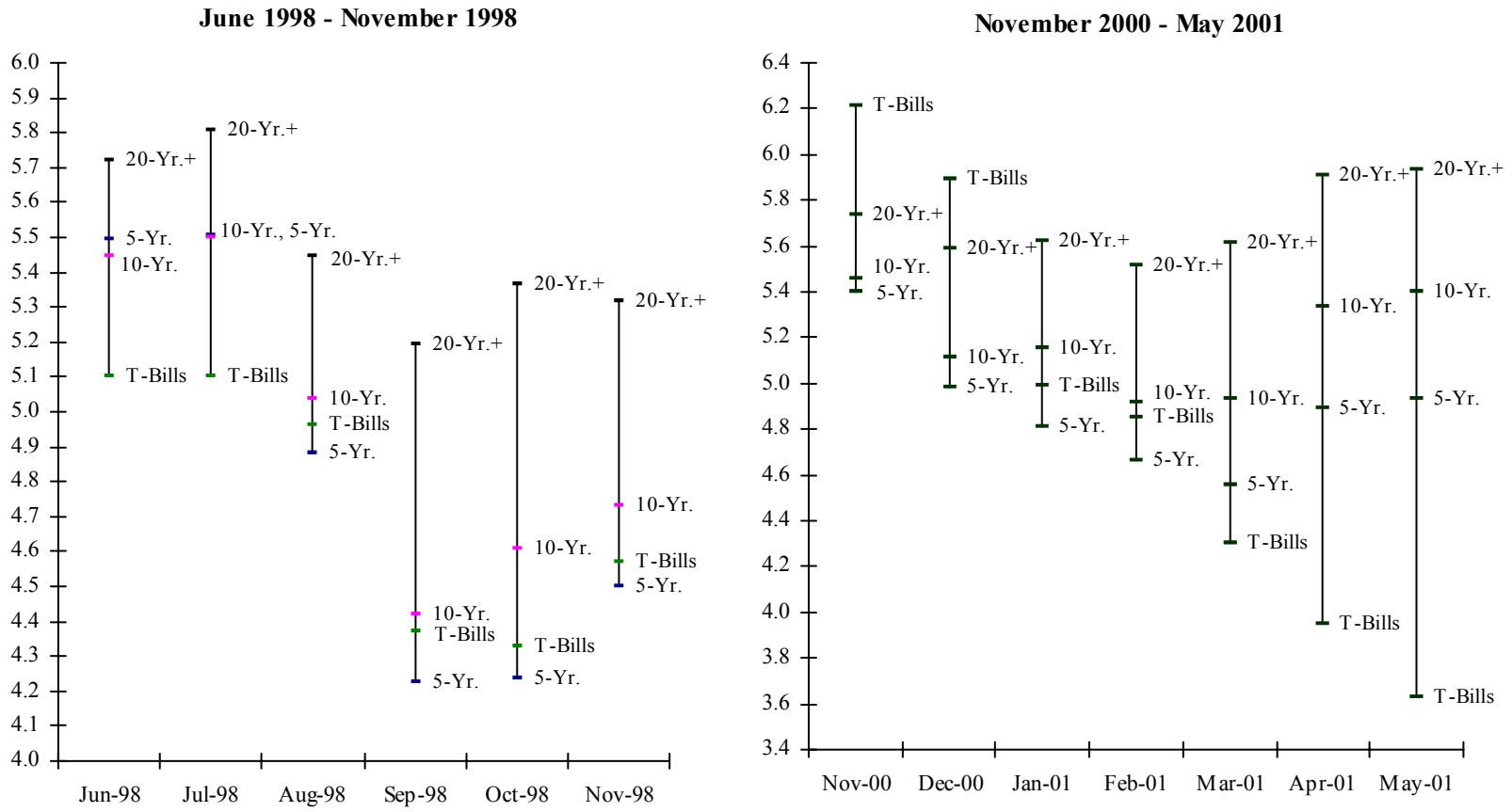
January 1990 - December 1991



Notes: Lines represent the yield curve between 20-Year+ Treasury Bonds, 10-Year Treasury Bonds, 5-Year Treasury Bonds, and T-Bills. The longer the line, the more positively or negatively sloped the treasury curve was at that particular point in time. In addition, the size of the line between two particular maturities (e.g., 10-Yr. and 5-Yr.) illustrates the slope of the curve between those maturities. For example, although the full yield curve (from T-Bills to 20-Year+ Treasury Bonds) had a slightly positive slope as of March 31, 1990, the curve was flat between 5-Year and 10-Year Treasury Bonds.

Exhibit 6 (continued)

SHIFTS IN THE TREASURY YIELD CURVE DURING RATE CUTTING CYCLES



Notes: Lines represent the yield curve between 20-Year+ Treasury Bonds, 10-Year Treasury Bonds, 5-Year Treasury Bonds, and T-Bills. The longer the line, the more positively or negatively sloped the Treasury curve was at that particular point in time. In addition, the order of different maturities, from the top to the bottom of the line, indicates whether the curve was positively sloped, negatively sloped (inverted), or twisted at specific maturity levels. For example, the Treasury curve was inverted between T-Bill and 5-Year Treasury Bonds as of August 31, 1998. The Treasury curve was fully inverted from T-Bills to 20-Year+ Treasury Bonds on November 30, 2000, despite twists in the curve at the 10-Year and 5-Year maturity levels.

APPENDIXES

Appendix A

SHIFTS IN MATURITY WEIGHTS OF THE LEHMAN BROTHERS AGGREGATE INDEX (%)

1989-2000

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Forecasted 2004	Forecasted 2009
U.S. Treasury	45.5	45.5	45.0	45.3	47.0	47.1	46.1	45.1	42.9	37.9	32.5	26.8	10.0	5.0
Over 20 Years	9.1	9.1	9.3	9.3	9.8	8.7	9.1	7.7	7.6	7.5	5.8	5.1	---	---
15-20 Years	1.6	1.1	1.2	1.3	1.6	1.7	2.3	2.8	3.3	3.2	3.2	3.2	---	---
10-15 Years	2.4	2.5	2.2	1.9	1.5	1.0	0.8	0.8	1.0	1.1	1.2	1.4	---	---
5-10 Years	9.8	9.5	8.7	8.6	8.4	7.6	7.5	7.0	7.0	6.4	5.4	4.8	---	---
Less than 5 Years	22.6	23.4	23.8	24.3	25.7	28.1	26.4	26.8	24.2	19.8	16.9	12.2	---	---
U.S. Agency	8.1	7.8	7.2	6.8	6.7	6.8	6.8	6.5	6.6	8.4	9.1	10.8	12.0	13.0
Over 20 Years	0.8	1.4	1.5	1.5	1.6	1.4	1.5	1.4	1.4	1.3	0.9	1.0	---	---
15-20 Years	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.4	0.6	---	---
10-15 Years	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	---	---
5-10 Years	2.2	2.1	1.6	1.6	1.7	1.7	1.9	1.9	2.0	2.6	2.4	3.0	---	---
Less than 5 Years	4.9	4.1	3.8	3.5	3.2	3.6	3.2	3.1	2.9	4.2	5.3	6.1	---	---
Credit	19.1	18.0	16.6	16.9	16.8	16.1	17.5	17.8	19.3	21.8	21.5	23.8	26.0	28.0
Over 20 Years	4.7	4.3	4.1	4.2	4.2	3.8	4.3	4.3	5.1	5.7	4.9	4.8	---	---
15-20 Years	2.2	1.8	1.6	1.3	1.3	1.0	1.1	1.0	1.1	1.1	1.0	1.0	---	---
10-15 Years	2.3	2.0	1.8	1.8	1.5	1.2	1.2	1.1	1.1	1.4	0.7	0.8	---	---
5-10 Years	5.2	5.1	4.8	5.3	6.0	5.7	6.3	6.6	6.5	6.7	7.0	7.5	---	---
Less than 5 Years	4.7	4.8	4.3	4.3	4.0	4.4	4.6	4.8	5.5	7.0	7.8	9.7	---	---
MBS*	27.3	28.7	29.1	29.4	28.1	29.0	28.5	29.6	30.2	30.7	34.2	35.1	52.0	54.0
Over 20 Years	0.0	---	---	---	---	---	---	---	---	---	---	---	---	---
15-20 Years	3.1	---	---	---	---	---	---	---	---	---	---	---	---	---
10-15 Years	8.2	3.9	1.3	3.1	2.9	7.8	0.7	0.4	0.0	0.1	2.0	---	---	---
5-10 Years	12.9	22.5	21.5	21.9	13.9	17.9	14.3	22.8	18.2	12.8	28.7	27.8	---	---
Less than 5 Years	3.0	2.4	6.3	4.4	11.3	3.3	13.5	6.4	12.0	17.8	3.4	7.3	---	---
ABS*	---	---	2.1	1.6	1.4	1.0	1.1	1.0	1.0	1.2	1.3	1.7	---	---
Over 20 Years	---	---	---	---	---	---	---	---	---	---	0.0	---	---	---
15-20 Years	---	---	---	---	---	---	---	---	---	0.0	---	0.0	---	---
10-15 Years	---	---	---	---	---	0.0	0.0	---	---	0.0	0.0	0.1	---	---
5-10 Years	---	---	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.4	---	---
Less than 5 Years	---	---	2.0	1.5	1.3	0.9	1.0	0.8	0.7	0.9	1.0	1.3	---	---
CMBS*	---	---	---	---	---	---	---	---	---	---	1.4	1.7	---	---
Over 20 Years	---	---	---	---	---	---	---	---	---	---	---	---	---	---
15-20 Years	---	---	---	---	---	---	---	---	---	---	---	---	---	---
10-15 Years	---	---	---	---	---	---	---	---	---	---	0.0	0.0	---	---
5-10 Years	---	---	---	---	---	---	---	---	---	---	1.1	1.3	---	---
Less than 5 Years	---	---	---	---	---	---	---	---	---	---	0.3	0.4	---	---

*2004 and 2009 forecasted MBS weights include ABS and CMBS.

Appendix A (continued)

SHIFTS IN MATURITY WEIGHTS OF THE LEHMAN BROTHERS GOVERNMENT/CREDIT INDEX (%)

1989-2000

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Forecasted 2004	Forecasted 2009
U.S. Treasury	62.6	63.8	65.4	65.6	66.7	67.3	65.5	64.9	62.4	55.7	51.5	43.6	21.0	11.0
Over 20 Years	12.5	12.7	13.5	13.4	13.9	12.5	13.0	11.1	11.0	10.9	9.2	8.3	---	---
15-20 Years	2.1	1.5	1.7	1.8	2.2	2.4	3.3	4.0	4.7	4.7	5.1	5.2	---	---
10-15 Years	3.2	3.6	3.1	2.8	2.1	1.5	1.1	1.2	1.4	1.6	1.9	2.3	---	---
5-10 Years	13.5	13.3	12.6	12.4	12.0	10.8	10.6	10.1	10.2	9.3	8.5	7.9	---	---
Less than 5 Years	31.1	32.8	34.6	35.3	36.5	40.1	37.5	38.6	35.1	29.1	26.7	19.9	---	---
U.S. Agency	11.1	10.9	10.4	9.9	9.5	9.8	9.6	9.4	9.5	12.3	14.5	17.6	25.0	28.0
Over 20 Years	1.1	2.0	2.2	2.2	2.3	2.0	2.2	2.0	2.0	1.8	1.5	1.6	---	---
15-20 Years	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.4	0.6	1.0	---	---
10-15 Years	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	---	---
5-10 Years	3.0	3.0	2.4	2.4	2.5	2.4	2.7	2.7	2.8	3.8	3.8	4.9	---	---
Less than 5 Years	6.7	5.7	5.6	5.1	4.6	5.2	4.6	4.5	4.2	6.2	8.5	9.9	---	---
Credit	26.3	25.3	24.2	24.5	23.9	23.0	24.9	25.7	28.1	32.0	34.0	38.8	54.0	61.0
Over 20 Years	6.4	6.0	6.0	6.1	5.9	5.4	6.1	6.2	7.4	8.3	7.7	7.8	---	---
15-20 Years	3.1	2.6	2.3	1.8	1.8	1.4	1.6	1.5	1.6	1.6	1.6	1.7	---	---
10-15 Years	3.1	2.8	2.6	2.7	2.1	1.8	1.6	1.6	1.7	2.0	1.2	1.3	---	---
5-10 Years	7.2	7.2	6.9	7.7	8.5	8.2	9.0	9.5	9.4	9.9	11.1	12.2	---	---
Less than 5 Years	6.5	6.8	6.3	6.3	5.6	6.3	6.6	6.9	8.0	10.2	12.3	15.8	---	---

Source: Lehman Brothers, Inc.
Note: Percentages may not total due to rounding.

Appendix B

BOND SECTOR ANALYSIS: LEHMAN BROTHERS INDEXES

As of March 31, 2001

	Govt/Credit	Aggregate
Average Current Yield	6.5%	6.6%
Maturity Sector		
Cash and Equivalents	---	---
1-6 Years	50.0%	48.8%
6-11 Years	22.2%	34.0%
11-21 Years	13.1%	8.2%
21-30 Years	13.6%	8.4%
Over 30 Years	1.2%	0.7%
Average Maturity (Years)	9.7	8.3
Duration (Years)	5.6	4.6
Quality Sector		
AAA	61.7%	76.3%
AA	7.8%	4.8%
A	17.8%	11.0%
BBB	12.7%	7.8%
Below BBB	---	---
No Rating	---	---
Industry Sector		
U.S. Treasury	41.3%	25.4%
U.S. Agency (excluding Mortgage-Backed Securities)	17.7%	10.9%
Corporate/Industrial	18.8%	11.6%
Corporate/Utility	3.4%	2.1%
Corporate/Finance	13.3%	8.2%
Global ex U.S. (Sovereign, Supranational, Non-U.S. Agencies/Govt)	5.5%	3.4%
Mortgage-Backed Securities (GNMA, FHLMC, FNMA)	---	34.8%
Asset-Backed Securities	---	1.9%
Commercial Mortgage-Backed Securities	---	1.7%
Municipal	---	---

Source: Lehman Brothers, Inc.
Note: Sector totals may not add up to 100% due to rounding.

Appendix C

NOMINAL ANNUAL RETURNS (%)

Year	T-Bills	Bonds[1]	5-Yr. Govt Bonds[2]	10-Yr. Govt Bonds[2]	10-15 Yr. Treasury Bonds	20-Yr.+ Treasury Bonds	10-15 Yr. Corporate Bonds	LB Govt/ Credit	MBS	LB Agg.	Equities
1900	4.4	5.0	---	3.7	---	---	5.0	---	---	---	18.7
1901	4.2	5.8	---	3.2	---	---	4.0	---	---	---	20.3
1902	4.8	3.6	---	2.3	---	---	3.0	---	---	---	5.2
1903	5.6	2.0	---	2.8	---	---	3.1	---	---	---	-14.6
1904	4.2	8.6	---	2.4	---	---	5.2	---	---	---	31.2
1905	4.1	4.8	---	3.0	---	---	3.9	---	---	---	20.2
1906	5.6	2.0	---	3.1	---	---	3.0	---	---	---	7.3
1907	6.3	-1.6	---	0.8	---	---	0.8	---	---	---	-29.9
1908	4.5	10.6	---	4.1	---	---	7.7	---	---	---	44.8
1909	3.8	5.0	---	2.1	---	---	3.9	---	---	---	20.0
1910	4.8	3.9	---	3.4	---	---	3.7	---	---	---	-8.0
1911	3.8	4.4	---	3.1	---	---	4.2	---	---	---	5.8
1912	4.6	3.9	---	3.6	---	---	3.5	---	---	---	8.3
1913	5.6	3.0	---	3.1	---	---	2.5	---	---	---	-9.2
1914	4.9	4.0	---	3.6	---	---	4.1	---	---	---	-3.7
1915	3.4	6.9	---	3.7	---	---	6.1	---	---	---	35.5
1916	3.3	5.7	---	2.7	---	---	5.0	---	---	---	10.2
1917	4.6	-4.8	---	3.1	---	---	-1.7	---	---	---	-24.4
1918	5.9	6.0	---	-2.8	---	---	7.7	---	---	---	25.4
1919	5.5	-0.1	3.5	0.7	---	---	-0.5	---	---	---	19.7
1920	7.6	1.7	0.7	5.8	---	---	1.9	---	---	---	-18.8
1921	7.0	16.9	13.2	12.7	---	---	12.7	---	---	---	14.4
1922	4.7	9.7	4.9	3.5	---	---	8.8	---	---	---	27.2
1923	5.2	4.5	5.0	5.7	---	---	5.2	---	---	---	3.5
1924	4.1	7.4	6.7	6.4	---	---	6.3	---	---	---	25.8
1925	4.1	7.3	4.2	5.7	---	---	5.8	---	---	---	29.3
1926	4.4	6.8	4.4	6.4	---	---	6.3	---	---	---	11.6
1927	4.2	7.0	5.0	4.5	---	---	6.6	---	---	---	37.4
1928	4.9	2.4	1.1	0.1	---	---	3.4	---	---	---	43.6
1929	6.0	2.6	5.1	5.7	---	---	4.3	---	---	---	-8.5
1930	3.8	7.5	7.3	4.2	---	---	6.3	---	---	---	-24.8
1931	2.6	-2.3	0.9	0.4	---	---	-2.4	---	---	---	-43.1
1932	2.9	9.8	5.7	5.6	---	---	12.2	---	---	---	-8.3
1933	1.7	9.9	2.3	6.0	---	---	5.3	---	---	---	54.2
1934	1.1	13.8	5.9	5.9	---	---	9.7	---	---	---	-1.5
1935	0.3	9.8	3.5	3.3	---	---	6.9	---	---	---	47.4
1936	0.1	7.1	5.4	1.7	---	---	6.2	---	---	---	32.8
1937	0.5	3.1	0.4	4.6	---	---	2.5	---	---	---	-35.0
1938	0.1	6.5	4.0	4.7	---	---	4.4	---	---	---	33.2
1939	0.0	4.4	2.8	2.3	---	---	4.3	---	---	---	-0.9
1940	0.0	3.8	3.1	4.3	---	---	4.5	---	---	---	-10.0

Appendix C (continued)

NOMINAL ANNUAL RETURNS (%)

Year	T-Bills	Bonds[1]	5-Yr. Govt Bonds[2]	10-Yr. Govt Bonds[2]	10-15 Yr. Treasury Bonds	20-Yr.+ Treasury Bonds	10-15 Yr. Corporate Bonds	LB Govt/ Credit	MBS	LB Agg.	Equities
1941	0.1	3.2	0.4	1.5	---	---	1.8	---	---	---	-11.8
1942	0.3	3.0	-0.3	1.8	---	---	3.1	---	---	---	21.0
1943	0.4	3.3	2.2	2.0	---	---	3.4	---	---	---	25.6
1944	0.4	5.2	1.1	2.3	---	---	3.1	---	---	---	19.5
1945	0.4	4.6	2.2	5.2	---	---	3.5	---	---	---	36.4
1946	0.4	2.3	0.5	0.6	---	---	2.6	---	---	---	-8.1
1947	0.6	-1.3	-0.1	-1.0	---	---	0.5	---	---	---	5.2
1948	1.0	4.3	1.5	2.7	---	---	3.7	---	---	---	5.0
1949	1.1	5.1	2.6	4.5	---	---	4.3	---	---	---	18.0
1950	1.2	1.6	0.3	-0.9	---	---	1.9	---	---	---	30.4
1951	1.5	-2.0	-0.7	-0.2	---	---	-0.2	---	---	---	24.5
1952	1.7	2.0	1.6	2.4	---	---	3.4	---	---	---	18.3
1953	1.9	3.4	3.8	2.3	---	---	2.1	---	---	---	-1.0
1954	1.0	4.7	2.4	3.1	---	---	4.7	---	---	---	52.1
1955	1.7	0.2	-1.4	-0.7	---	---	1.1	---	---	---	31.3
1956	2.7	-6.1	0.1	-1.6	---	---	-1.8	---	---	---	6.6
1957	3.3	7.0	6.5	6.8	---	---	4.5	---	---	---	-10.8
1958	1.8	-3.7	-0.2	-1.6	---	---	0.9	---	---	---	43.2
1959	3.3	-2.1	-1.3	-1.9	---	---	0.2	---	---	---	11.9
1960	3.1	8.6	11.4	11.1	---	---	6.7	---	---	---	0.5
1961	2.3	3.6	1.8	2.2	---	---	3.7	---	---	---	26.8
1962	2.8	7.4	4.9	6.0	---	---	6.2	---	---	---	-8.7
1963	3.2	1.8	1.7	1.4	---	---	3.2	---	---	---	22.7
1964	3.6	4.7	3.9	3.9	---	---	4.0	---	---	---	16.3
1965	4.0	-0.9	1.0	1.1	---	---	2.1	---	---	---	12.4
1966	4.9	-0.1	5.6	4.8	---	---	-0.3	---	---	---	-10.1
1967	4.5	-5.0	0.9	-2.3	---	---	-1.2	---	---	---	23.9
1968	5.4	-0.3	3.4	1.6	---	---	4.2	---	---	---	11.0
1969	6.8	-8.1	-1.0	-4.8	---	---	-2.5	---	---	---	-8.4
1970	6.7	18.4	18.2	18.1	---	---	11.2	---	---	---	3.9
1971	4.5	11.0	8.3	11.4	---	---	9.7	---	---	---	14.6
1972	4.1	7.3	2.8	2.5	---	---	8.3	---	---	---	18.9
1973	7.0	1.1	4.5	3.5	---	---	3.0	---	---	---	-14.8
1974	8.1	-3.1	5.7	3.8	---	---	0.2	---	---	---	-26.4
1975	6.0	14.7	7.4	5.6	---	---	11.0	---	---	---	37.2
1976	5.2	18.7	13.8	15.2	---	---	14.6	15.6	---	15.6	23.6
1977	5.3	1.7	1.1	0.6	---	---	5.5	3.0	1.9	3.0	-7.4
1978	7.2	-0.1	1.0	-1.0	---	---	1.8	1.2	2.4	1.4	6.4
1979	10.3	-4.2	5.3	0.5	---	---	-1.6	2.3	0.1	1.9	18.2
1980	12.0	-2.7	2.7	-0.6	---	-3.5	-5.0	3.1	0.7	2.7	32.3
1981	15.2	-1.2	9.1	2.6	---	-0.6	9.0	7.3	0.1	6.2	-5.0

Appendix C (continued)

NOMINAL ANNUAL RETURNS (%)

Year	T-Bills	Bonds[1]	5-Yr. Govt Bonds[2]	10-Yr. Govt Bonds[2]	10-15 Yr. Treasury Bonds	20-Yr.+ Treasury Bonds	10-15 Yr. Corporate Bonds	LB Govt/ Credit	MBS	LB Agg.	Equities
1982	11.3	42.5	33.0	44.0	---	41.5	34.9	31.1	43.0	32.6	21.4
1983	8.9	6.3	4.9	2.0	---	1.4	7.3	8.0	10.1	8.4	22.4
1984	10.0	16.9	15.3	16.0	---	14.7	17.1	15.0	15.8	15.1	6.1
1985	7.7	30.1	23.0	30.4	---	32.8	29.4	21.3	25.2	22.1	31.6
1986	6.2	19.8	15.3	22.9	---	24.4	21.3	15.6	13.4	15.3	18.6
1987	5.9	-0.2	1.5	-3.2	---	-3.3	-1.8	2.3	4.3	2.8	5.1
1988	6.7	10.7	5.1	6.3	8.6	9.2	13.8	7.6	8.7	7.9	16.6
1989	8.5	16.2	13.8	16.7	16.9	19.6	15.3	14.2	15.3	14.5	31.7
1990	7.8	6.8	8.7	6.9	7.9	5.8	8.6	8.3	10.7	9.0	-3.1
1991	5.7	19.9	14.6	17.2	18.4	18.5	15.6	16.1	15.7	16.0	30.5
1992	3.6	9.4	5.8	6.5	8.1	7.9	10.9	7.6	7.0	7.4	7.6
1993	3.1	13.2	9.4	12.1	14.2	18.0	14.7	11.0	6.8	9.7	10.1
1994	4.1	-5.7	-4.3	-8.3	-5.6	-8.2	-2.4	-3.5	-1.6	-2.9	1.3
1995	5.6	27.2	16.9	23.6	23.0	32.6	22.0	19.2	16.8	18.5	37.6
1996	5.1	1.4	2.3	0.0	1.8	-1.5	3.9	2.9	5.3	3.6	23.0
1997	5.2	13.0	8.0	11.2	10.1	16.2	11.1	9.8	9.5	9.7	33.4
1998	5.1	10.7	9.8	12.8	11.2	14.2	11.4	9.5	7.0	8.7	28.6
1999	4.8	-7.4	-2.5	-8.3	-3.6	-10.1	-2.3	-2.1	1.9	-0.8	21.0
2000	6.1	12.9	11.9	14.9	15.0	21.5	9.6	11.9	11.2	11.6	-9.1

Source: Global Financial Data.

[1] Returns are a constructed series from 1900-68, composed of Global Financial Data (1900) and S&P yield data (1901-68); the Salomon Smith Barney High-Grade Bond index is used from 1969 forward.

[2] Series is 100% Treasury Bonds from 1988 through 2000, as represented by the Merrill Lynch 5- and 10-year Treasury Bond indexes.

Appendix D

REAL ANNUAL RETURNS (%)

Year	Inflation	T-Bills	Bonds[1]	5-Yr. Govt Bonds[2]	10-Yr. Govt Bonds[2]	10-15 Yr. Treasury Bonds	20-Yr.+ Treasury Bonds	10-15 Yr. Corporate Bonds	LB Govt/ Credit	MBS	LB Agg.	Equities
1900	1.3	3.0	3.6	---	2.3	---	---	3.6	---	---	---	17.1
1901	2.6	1.5	3.1	---	0.5	---	---	1.4	---	---	---	17.2
1902	2.6	2.2	1.0	---	-0.3	---	---	0.4	---	---	---	2.5
1903	0.0	5.6	2.0	---	2.8	---	---	3.1	---	---	---	-14.6
1904	1.3	2.9	7.2	---	1.2	---	---	3.9	---	---	---	29.6
1905	2.5	1.6	2.3	---	0.5	---	---	1.4	---	---	---	17.3
1906	4.8	0.8	-2.7	---	-1.6	---	---	-1.8	---	---	---	2.4
1907	3.4	2.8	-4.9	---	-2.6	---	---	-2.5	---	---	---	-32.2
1908	0.0	4.5	10.6	---	4.1	---	---	7.7	---	---	---	44.8
1909	5.6	-1.7	-0.5	---	-3.3	---	---	-1.6	---	---	---	13.7
1910	0.0	4.8	3.9	---	3.4	---	---	3.7	---	---	---	-8.0
1911	2.1	1.7	2.2	---	1.0	---	---	2.0	---	---	---	3.6
1912	3.1	1.5	0.8	---	0.5	---	---	0.4	---	---	---	5.1
1913	2.0	3.4	0.9	---	1.0	---	---	0.5	---	---	---	-11.0
1914	1.0	3.8	3.0	---	2.6	---	---	3.0	---	---	---	-4.7
1915	2.0	1.4	4.8	---	1.7	---	---	4.1	---	---	---	32.9
1916	12.6	-8.3	-6.2	---	-8.8	---	---	-6.8	---	---	---	-2.1
1917	18.1	-11.4	-19.4	---	-12.7	---	---	-16.8	---	---	---	-36.0
1918	20.4	-12.1	-12.0	---	-19.3	---	---	-10.6	---	---	---	4.1
1919	14.5	-7.9	-12.8	-9.7	-12.1	---	---	-13.2	---	---	---	4.5
1920	2.6	4.9	-1.0	-1.9	3.1	---	---	-0.7	---	---	---	-20.9
1921	-10.8	20.0	31.1	27.0	26.4	---	---	26.4	---	---	---	28.3
1922	-2.3	7.1	12.3	7.4	6.0	---	---	11.4	---	---	---	30.2
1923	2.4	2.8	2.1	2.6	3.2	---	---	2.7	---	---	---	1.1
1924	0.0	4.1	7.4	6.7	6.4	---	---	6.3	---	---	---	25.8
1925	3.5	0.6	3.7	0.7	2.1	---	---	2.3	---	---	---	25.0
1926	-1.1	5.6	8.0	5.6	7.6	---	---	7.5	---	---	---	12.9
1927	-2.3	6.6	9.5	7.4	6.9	---	---	9.0	---	---	---	40.6
1928	-1.2	6.1	3.6	2.2	1.3	---	---	4.6	---	---	---	45.3
1929	0.6	5.4	2.0	4.5	5.1	---	---	3.7	---	---	---	-9.1
1930	-6.4	10.8	14.8	14.6	11.3	---	---	13.6	---	---	---	-19.6
1931	-9.3	13.2	7.8	11.3	10.7	---	---	7.6	---	---	---	-37.3
1932	-10.3	14.7	22.3	17.8	17.7	---	---	25.0	---	---	---	2.3
1933	0.8	0.9	9.1	1.5	5.2	---	---	4.5	---	---	---	53.0
1934	1.5	-0.4	12.1	4.4	4.3	---	---	8.1	---	---	---	-3.0
1935	3.0	-2.6	6.7	0.5	0.3	---	---	3.8	---	---	---	43.2
1936	1.4	-1.3	5.5	3.9	0.2	---	---	4.7	---	---	---	30.9
1937	2.9	-2.3	0.2	-2.4	1.7	---	---	-0.3	---	---	---	-36.8
1938	-2.8	2.9	9.5	7.0	7.7	---	---	7.3	---	---	---	37.0
1939	0.0	0.0	4.4	2.8	2.3	---	---	4.3	---	---	---	-0.9
1940	0.7	-0.7	3.1	2.3	3.5	---	---	3.8	---	---	---	-10.7

Appendix D (continued)

REAL ANNUAL RETURNS (%)

Year	Inflation	T-Bills	Bonds[1]	5-Yr. Govt Bonds[2]	10-Yr. Govt Bonds[2]	10-15 Yr. Treasury Bonds	20-Yr.+ Treasury Bonds	10-15 Yr. Corporate Bonds	LB Govt/ Credit	MBS	LB Agg.	Equities
1941	9.9	-9.0	-6.1	-8.7	-7.6	---	---	-7.4	---	---	---	-19.7
1942	9.0	-8.0	-5.5	-8.6	-6.6	---	---	-5.4	---	---	---	11.0
1943	3.0	-2.5	0.3	-0.8	-0.9	---	---	0.4	---	---	---	21.9
1944	2.3	-1.9	2.8	-1.2	0.0	---	---	0.8	---	---	---	16.9
1945	2.2	-1.8	2.3	-0.1	2.9	---	---	1.2	---	---	---	33.4
1946	18.1	-15.0	-13.4	-14.9	-14.9	---	---	-13.2	---	---	---	-22.2
1947	8.8	-7.6	-9.3	-8.2	-9.0	---	---	-7.7	---	---	---	-3.3
1948	3.0	-1.9	1.3	-1.4	-0.3	---	---	0.7	---	---	---	2.0
1949	-2.1	3.3	7.3	4.8	6.7	---	---	6.5	---	---	---	20.4
1950	5.9	-4.5	-4.1	-5.3	-6.5	---	---	-3.8	---	---	---	23.1
1951	6.0	-4.2	-7.5	-6.3	-5.8	---	---	-5.9	---	---	---	17.5
1952	0.8	1.0	1.2	0.9	1.7	---	---	2.7	---	---	---	17.4
1953	0.7	1.2	2.6	3.0	1.5	---	---	1.3	---	---	---	-1.8
1954	-0.7	1.7	5.5	3.2	3.8	---	---	5.4	---	---	---	53.3
1955	0.4	1.3	-0.2	-1.8	-1.0	---	---	0.7	---	---	---	30.9
1956	3.0	-0.3	-8.9	-2.8	-4.5	---	---	-4.6	---	---	---	3.5
1957	2.9	0.4	4.0	3.5	3.8	---	---	1.5	---	---	---	-13.3
1958	1.8	0.0	-5.3	-2.0	-3.3	---	---	-0.9	---	---	---	40.7
1959	1.7	1.6	-3.7	-3.0	-3.6	---	---	-1.5	---	---	---	10.0
1960	1.4	1.7	7.2	10.0	9.6	---	---	5.3	---	---	---	-0.9
1961	0.7	1.7	2.9	1.1	1.6	---	---	3.0	---	---	---	25.9
1962	1.3	1.4	5.9	3.5	4.6	---	---	4.8	---	---	---	-9.9
1963	1.6	1.5	0.2	0.0	-0.2	---	---	1.5	---	---	---	20.7
1964	1.0	2.6	3.7	2.9	2.9	---	---	3.0	---	---	---	15.2
1965	1.9	2.0	-2.7	-0.9	-0.8	---	---	0.2	---	---	---	10.2
1966	3.5	1.4	-3.5	2.1	1.3	---	---	-3.6	---	---	---	-13.1
1967	3.0	1.4	-7.8	-2.0	-5.2	---	---	-4.1	---	---	---	20.2
1968	4.7	0.6	-4.8	-1.2	-2.9	---	---	-0.5	---	---	---	6.0
1969	6.2	0.6	-13.5	-6.7	-10.3	---	---	-8.2	---	---	---	-13.8
1970	5.6	1.1	12.1	12.0	11.9	---	---	5.3	---	---	---	-1.5
1971	3.3	1.2	7.5	4.9	7.9	---	---	6.2	---	---	---	10.9
1972	3.4	0.6	3.7	-0.6	-0.9	---	---	4.8	---	---	---	15.0
1973	8.7	-1.6	-7.0	-3.8	-4.8	---	---	-5.3	---	---	---	-21.6
1974	12.3	-3.8	-13.7	-5.9	-7.6	---	---	-10.8	---	---	---	-34.5
1975	6.9	-0.8	7.2	0.4	-1.2	---	---	3.8	---	---	---	28.3
1976	4.9	0.3	13.1	8.5	9.8	---	---	9.2	10.2	---	10.2	17.8
1977	6.7	-1.3	-4.7	-5.3	-5.7	---	---	-1.1	-3.5	-4.5	-3.4	-13.2
1978	9.0	-1.6	-8.3	-7.4	-9.2	---	---	-6.6	-7.2	-6.1	-7.0	-2.4
1979	13.3	-2.6	-15.4	-7.1	-11.3	---	---	-13.1	-9.7	-11.6	-10.0	4.3
1980	12.5	-0.4	-13.6	-8.8	-11.7	---	-14.2	-15.5	-8.4	-10.5	-8.7	17.6
1981	8.9	5.8	-9.3	0.2	-5.8	---	-8.7	0.0	-1.5	-8.1	-2.5	-12.8

Appendix D (continued)

REAL ANNUAL RETURNS (%)

Year	Inflation	T-Bills	Bonds[1]	5-Yr. Govt Bonds[2]	10-Yr. Govt Bonds[2]	10-15 Yr. Treasury Bonds	20-Yr.+ Treasury Bonds	10-15 Yr. Corporate Bonds	LB Govt/ Credit	MBS	LB Agg.	Equities
1982	3.8	7.2	37.3	28.1	38.7	---	36.2	29.9	4.0	37.8	4.4	17.0
1983	3.8	4.9	2.4	1.1	-1.7	---	-2.4	3.4	10.8	6.1	10.9	17.9
1984	3.9	5.9	12.4	10.9	11.6	---	10.3	12.7	16.7	11.4	17.5	2.1
1985	3.8	3.8	25.3	18.5	25.6	---	28.0	24.6	11.4	20.6	11.0	26.8
1986	1.1	5.0	18.5	14.1	21.5	---	23.1	19.9	1.2	12.2	1.6	17.3
1987	4.4	1.4	-4.5	-2.8	-7.3	---	-7.4	-6.0	3.0	-0.1	3.3	0.6
1988	4.4	2.2	6.0	0.6	1.8	4.0	4.6	9.0	9.4	4.1	9.7	11.7
1989	4.6	3.7	11.1	8.8	11.5	11.7	14.3	10.2	3.5	10.2	4.1	25.8
1990	6.1	1.6	0.6	2.4	0.7	1.7	-0.3	2.3	9.4	4.3	9.3	-8.7
1991	3.1	2.6	16.3	11.2	13.7	14.9	15.0	12.2	4.4	12.3	4.2	26.6
1992	2.9	0.7	6.3	2.8	3.5	5.0	4.9	7.8	7.9	3.9	6.7	4.6
1993	2.7	0.3	10.2	6.5	9.1	11.2	14.9	11.6	-6.1	4.0	-5.5	7.1
1994	2.7	1.4	-8.2	-6.8	-10.7	-8.0	-10.6	-5.0	16.1	-4.2	15.4	-1.3
1995	2.5	3.0	24.1	14.0	20.5	19.9	29.3	19.0	0.4	13.9	1.1	34.2
1996	3.3	1.7	-1.9	-1.0	-3.2	-1.5	-4.6	0.5	6.2	2.0	6.1	19.0
1997	1.7	3.5	11.1	6.2	9.3	8.2	14.2	9.2	7.6	7.7	6.9	31.1
1998	1.6	3.4	9.0	8.1	11.0	9.4	12.4	9.7	-3.7	5.3	-2.4	26.5
1999	2.7	2.1	-9.9	-5.1	-10.7	-6.1	-12.4	-4.9	8.9	-0.8	8.7	17.9
2000	3.4	2.6	9.2	8.2	11.1	11.2	17.5	6.0	-3.3	7.5	-3.3	-12.1

Source: Global Financial Data.

[1] Returns are a constructed series from 1900-68, composed of Global Financial Data (1900) and S&P yield data (1901-68); the Salomon Smith Barney High-Grade Bond index is used from 1969 forward.

[2] Series is 100% Treasury Bonds from 1988 through 2000, as represented by the Merrill Lynch 5- and 10-year Treasury Bond indexes.