

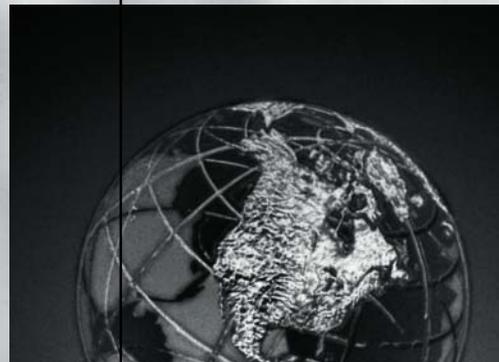
LEHMAN BROTHERS

Fixed Income Research

**A Guide to the**  
*Lehman Global Family of  
Fixed Income Indices*



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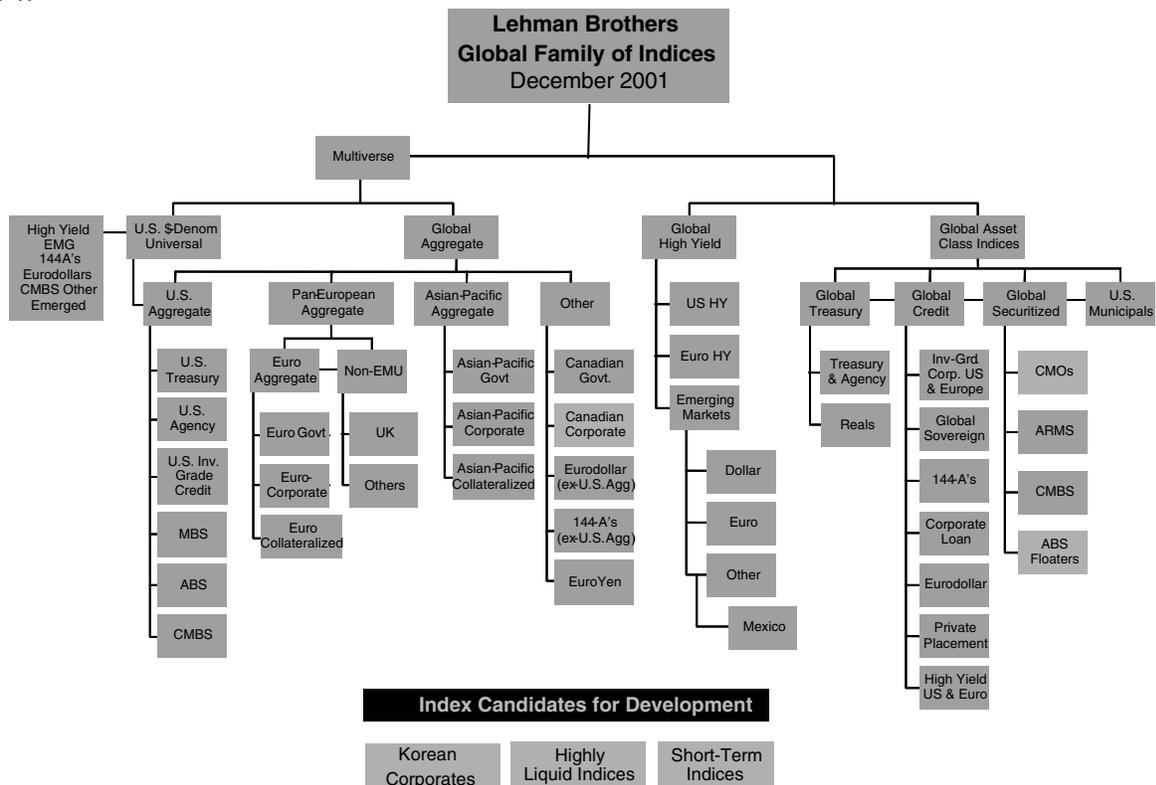
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## INTRODUCTION

As shown in Figure 1, our Global Family of Indices blossomed over the past five years. Consistent with the globalization of the capital markets, we initiated a major strategic effort to internationalize our family of indices. Although still useful, local fixed-income indices alone cannot help much in the new world of global relative value decision-making. As of January 1, 2002, our Global Family of Indices included 57,000 securities with a total market value of over \$16 trillion and constituted the largest fixed-income index array in the world.

Looking back, our index-creation efforts during the 1990s were devoted largely to extinguishing the measurement voids for individual asset classes such as U.S. high-yield corporates, emerging-market debt, Rule 144A securities, and European spread product. By the mid-1990s, we envisioned the inevitable need for another generation of even broader macro indices to encompass this growing collection of non-aggregate indices. But our micro-index construction efforts were incomplete, especially in the European bond markets. And we also recognized that a premature set of new macro indices, missing vital components, would have been statistically imperfect and likely lacked portfolio relevance. Finally, with the birth of our U.S. Investment Grade 144A Index on January 1, 1998; Euro-Aggregate Index on July 1, 1998; and Commercial Mortgage-Backed Security Index on January 1, 1999, we were positioned to introduce this “Third Generation of Macro Indices” on January 1, 1999.

Figure 1.



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Lehman did not unilaterally create and design this new generation of indices. We had plenty of help. For example, we were invited to meet a small group of U.S. plan sponsors and consultants in May 1998. They delivered disconcerting information. Something was amiss with U.S. bond portfolio management practices. U.S. sponsors had advanced their allocation to equities up to the 70% neighborhood during the 1990s and were delighted with the result: multiple years of double-digit returns in the U.S. equity market. (During 1995 through 1999, the S&P 500 posted an average annual return of 28.71%, 3.62x the 7.92% average annual return generated by our U.S. Aggregate Index.) Plan sponsors also understood well the sources of risk and return in the equity market. And the performance of equity asset managers could be easily classified, allowing for a better manager selection process.

In contrast, plan sponsors had spent about 70% of their time on the 30% of their assets in the fixed-income realm, where they had earned a fraction of the return achieved in the equity market. Both sponsors and consultants reported difficulty in distinguishing between luck and skill among fixed-income asset managers. There were several problems, but the chief obstacle cited was “benchmark realism.”

This divergence between market reality and indices was less of a problem for sponsors and other index users in the 1970s and 1980s. In the 1970s, the U.S. fixed-income capital markets were less developed. The mortgage-backed security market was entering adolescence, high-yield corporate debt was a tiny sideshow to the mainstream investment-grade corporate market, and asset-backed securities did not exist.

Mortgage-backed securities became more popular during the 1980s. By the mid-1980s, the menu of investment-grade portfolios typically featured the increasingly popular MBS sector. This development prompted Lehman and other index providers to develop indices for MBS securities. In 1986, Lehman broadened its Government/Corporate Index to include MBS securities. This expansion was called the U.S. Aggregate Index and backdated to 1976. The U.S. Aggregate Index and its subcomponents have become the dominant fixed income benchmarks used by U.S. money managers, pension fund sponsors, and plan consultants to measure and evaluate the investment performance of fixed income portfolios. An estimated 90% of U.S. fixed income index users rely on this index.

Since our last macro index introduction in 1986, the evolution of the global capital markets has accelerated. Our index development has mirrored this reality, but often with a lag. U.S. high-yield corporates (1992), emerging markets (1993), Rule 144A securities (1998), Eurodollar bonds (1992), and CMBS (1999) represent other U.S. dollar-denominated indices that have joined our index family to help close this gap.

In their quest for outperformance over our investment-grade only U.S. Government/Corporate and Aggregate indices, U.S. bond investors increasingly broadened their portfolio choice set during the 1990s to include lower-quality issues

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(“crossovers” rated between Baa3/BBB- and Ba2/BB and general high-yield, often through the single B rating category), as well as dollar-denominated emerging-market debt securities. As a consequence, active bond investors frequently manage portfolios that include out-of-index securities that increase portfolio-tracking error relative to the benchmark index. Plan sponsors, consultants, and investors alike recognize the opportunities afforded by this broader choice set. And these key index users express reservations about the adequacy of narrower benchmarks to quantify both the expected incremental return and the attendant risks of out-of-index portfolio strategies.

At the urging of the index-user community, we introduced in recent years a suite of macro indices, including the Global Aggregate Index, the U.S. dollar-denominated Universal Index, the Global High Yield Index, the Pan-European Universal Index, and the Global Credit and Securitized Indices. We expect that many index users will embrace these indices as performance benchmarks. We can neither predict the take-up rate of new indices nor directly recommend any index. Index selection resides in the realm of sponsors, consultants, and investors.

This report is a general introduction to the Lehman Brothers Global Family of Indices. We begin with a brief discussion of indices as a benchmark for measuring investor performance and an overview of the Lehman Brothers indices for the fixed income markets. We then discuss the basic principles used to construct Lehman Brothers indices and review the evolution of the indices.

Next, we provide descriptions of every index within our family beginning with our new macro indices. We then follow with the U.S. Aggregate Index and its major components: the Government Index, the Credit Index, the Mortgage-Backed Securities Index, the Asset-Backed Securities Index, and the Commercial Mortgage-Backed Securities Index. Descriptions of other members of the Lehman Brothers index family, including our Pan-European Aggregate and Asian-Pacific Aggregate indices, follow.

### **Using Benchmarks to Measure Performance**

Increasingly, the investment performance of money managers is being measured against broad market-based benchmarks in addition to or instead of peer group reviews. Three of the most frequently used are the S&P 500 in the equity markets and the Lehman Brothers Government/Credit and Aggregate Indices in the fixed income markets. There are also many specialized indices tailored to match more specific market sectors or investment objectives and constraints. A good benchmark should include the following properties:<sup>1</sup>

- Universe is well defined.
- Securities are investable.
- Daily performance is available.

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<sup>1</sup> Adapted from Bailey, Jeffrey V., "Are Manager Universes Acceptable Performance Benchmarks?" *Journal of Portfolio Management* (Spring 1992), 9-13.

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- Current characteristics are available (e.g., price, coupon, duration, etc.).
  - Historical information is available.
  - Investment style is clearly defined.
  - Risk profile is well defined.
  - Benchmark is specified in advance.
  - Turnover is low.

The Lehman Brothers Global Family of Indices conforms to these standards. All are rule-based, meaning that inclusion in a Lehman Brothers index depends on satisfying clearly pre-specified criteria. Comprehensive statistics about each index are readily available to investors, and performance results are available daily for most indices.

### **THE LEHMAN BROTHERS GLOBAL INDEX FAMILY**

To meet the needs of fixed income investors, Lehman Brothers has developed a family of performance indices over the past 28 years that spans the global fixed income markets (Figure 1). Since 1973, Lehman Brothers has compiled and distributed its U.S. Government and investment-grade Credit indices (formerly the Corporate indices). The U.S. Aggregate Index and its subcomponents have become the dominant fixed income benchmarks used by money managers, pension fund sponsors, and plan consultants to measure and evaluate the investment performance of fixed income portfolios. An estimated 90% of U.S. Fixed Income Index users rely on this Index. Lehman Brothers has also introduced indices covering non-corporate securities, fixed, and commercial mortgage-backed securities, asset-backed securities, high yield corporate securities, municipal securities, dollar-denominated Eurobond securities, nondollar sovereign, corporate, and collateralized debt securities, emerging market securities, private placements securities, and 144A securities. These major sectors are composed of subindices that divide the market by issuer industry sector, maturity range, and credit quality.

The newer indices have been developed in response to investor needs and changes in the marketplace. For example, the MBS Index was introduced in 1986 with history back to 1976, just as the MBS market was embarking on a five-year growth spurt during which the amount outstanding would nearly triple, exceeding \$1 trillion by 1990. Lehman Brothers also introduced its family of mutual fund indices in 1992, before the Securities and Exchange Commission implemented in 1993 a rule that mutual funds must disclose performance in relation to major market benchmarks.

In the U.S., the primary index group is the Lehman Brothers U.S. Aggregate Index, which now comprises the U.S. Government, Investment-Grade Credit, MBS, ABS, and CMBS indices and has a total market value of about \$6.8 trillion. It was created in 1986 with history to January 1976. To qualify for inclusion in the U.S. Aggregate Index, securities must be U.S. dollar denominated and investment grade and have a fixed-rate coupon, a remaining maturity or average life of at least one year, and a par amount outstanding of at least \$150 million

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(different liquidity constraints apply to the ABS and CMBS sectors; refer to the U.S. Aggregate section of this document).

The U.S. Government Index is divided into the Treasury Index (\$1.5 trillion market value as of December 31, 2001) and the Agency Index (\$821 billion). The Credit Index has a market value of \$1.84 trillion and is divided into subindices that cover the industrial, utility, finance, and non-corporate sectors. Another classification covers credit quality sectors (Aaa, Aa, A, and Baa). The Government and Credit indices are also reported by maturity, with subindices covering intermediate (less than 10-year) and long (10+ year) maturity securities. The MBS Index (market value \$2.4 trillion) includes subindices for each agency (GNMA, FNMA, and FHLMC) and major product type (30-year, 15-year, 20-year, and balloon). The ABS Index (\$117 billion) has subcomponents for credit/charge card, auto, home equity loan, stranded-cost utility, and manufactured housing securities. On July 1, 1999, the ERISA-eligible component of our Commercial Mortgage-Backed Securities (CMBS) Index was added to the U.S. Aggregate Index. This index had a market value of \$145 billion on December 31, 2001.

In addition, Lehman Brothers has worked with a variety of investors to develop hundreds of customized indices to meet specific needs and preferences. These specialized benchmarks have ranged from combinations of several existing indices in proportions that differ from normal market weightings to the creation of unique indices that reflect specific objectives and constraints.

### **BASIC PRINCIPLES OF THE LEHMAN BROTHERS INDICES**

Although each of the Lehman Brothers indices has been constructed to reflect the essential characteristics of the securities and markets it covers, all Lehman Brothers indices conform to certain general standards and principles.

**Rule-Based**—The Lehman Brothers indices are rule-based. That is, to be included in a Lehman Brothers index, a security must meet all published eligibility criteria.

Thus, the Lehman Brothers indices are representative of the marketplace, replicable, and reliable. They are unbiased, in that subjective factors, such as Lehman Brothers' current inventory or whether it managed the underwriting, do not enter into the selection process. This is in contrast to portfolio-based indices, in which the performance benchmark is an arbitrarily selected basket of securities.

The criteria are specified so that, in general, a given security can contribute to only one index or group of indices. For example, within the U.S. Aggregate Index, a security cannot be part of both the Credit Index and the Agency Index. But it can be part of both the Credit Index and the higher-level Aggregate Index. In both cases, the security is contributing to only one index.<sup>2</sup>

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<sup>2</sup>There are a few exceptions to this principle among the international indices. For example, U.S. Treasury securities are included in both the U.S. Aggregate Index and the Global Index. Global bonds contribute to both the Eurobond and Corporate indices. This is not a problem since these indices do not contribute to a higher-level index.

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**Returns and Statistics Universes**—Each Lehman Brothers index consists of two universes of securities. Returns are based on a set of securities determined at the beginning of each month and held constant until the beginning of the next month. This universe is **not** adjusted for securities that become ineligible for inclusion in the index during the month (e.g., because of downgrades, called bonds, or securities falling below one year in maturity) or for issues that are newly eligible (e.g., upgrades, newly issued bonds). Daily and monthly returns reflect the performance of the returns universe. Holding the returns universe constant throughout the month means that a fund manager avoids having to hit a moving target and is able to rebalance at the end of the month.

The statistics universe is a dynamic set of bonds that changes daily to reflect the latest composition of the market. This universe accounts for changes due to new issuance, calls, ratings changes, and remaining maturity. Changes due to new issuance, calls, or partial redemptions (e.g., sinks) occur as of settlement date. Statistics such as market values, sector weightings, and various averages (e.g., coupon, duration, maturity, yield, price) are updated and reported daily. At the end of each month, the latest statistics universe becomes the returns universe for the coming month. The statistics universe allows a manager to monitor changes in the market throughout the month. Active managers can modify their portfolios before the index changes, while passive managers can be prepared to execute all rebalancing transactions at the end of the month to match the upcoming returns universe. Figure 2 illustrates how several transactions are treated in the returns and statistics universes over the course of a month.

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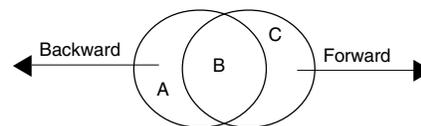
Figure 2. **Returns and Statistics Universes:  
Sample Transactions**

1. *XYZ Co. 7.75% of 3/15/2003 meets all criteria for the investment grade Corporate Index as of May 31. On June 4, the bond is downgraded to Ba1 from Baa3.*
  - This bond will contribute to the returns reported for month-end June.
  - It will not contribute to the statistics universe as of June 5 because it is below investment grade.
2. *ABC Co. 5.875% of 6/15/2005 meets all index criteria when it is issued on June 15.*
  - This bond will not contribute to the returns for month-end June.
  - It will contribute to the statistics universe upon settlement and will be included in the returns universe for July.
3. *U. S. Treasury 6.25% of 8/15/2023 was issued months ago and has years to go to maturity.*
  - This bond is included in both the returns and statistics universes.
4. *QRS Co. 8.125% of 6/10/2002 meets all criteria for the investment-grade Corporate Index on May 31, 2001.*
  - This bond will contribute to the returns universe for month-end June.
  - It will not contribute to the statistics universe after June 10 since it has less than one year remaining to maturity.
5. *LMN Co. 7.5% of 6/15/2002 is called on April 15.*
  - This bond contributes to the returns universe for April. The ending price is the call price.
  - It will not contribute to the statistics universe as of the call date.

The relationship between the returns and statistics universes during a month can be represented by two overlapping circles (Figure 3). Circle 1 (solid line) is the returns universe; Circle 2 (dotted line) is the statistics universe during the month. Area B represents securities that are in the returns and the statistics universes. Area A represents securities that have dropped out of the statistics universe during the month but remain in the returns universe, and Area C is new additions to the statistics universe that will become part of the returns universe beginning with the next month.

**Data Quality**—The quality of the returns and statistics universes is critically dependent on timely and accurate data. The Lehman Brothers indices are priced predominantly by traders (for example, the market value of the U.S. Aggregate Index); in addition, for the Credit Index, the traders used about 200 benchmark securities to price the index on a daily basis. Using these benchmark securities, the remaining issues are then priced using matrix pricing algorithms that take into account sector, quality, duration, option features, and issuer-specific factors. After price data are collected, they are analyzed for errors through both statistical routines and scrutiny by the research staff. Bonds are priced at 3 pm EST each day. Bonds in the index are priced on the bid side; corporate bonds new to the index are initially priced on the offer side, so the returns take into account the impact of the bid-ask spread. To ensure that the statistics universe is up to date, Lehman Brothers maintains an extensive database of call/put features and refunding and sinking schedules on outstanding bonds, and it continuously monitors the market for retirement, new issuance, and rating change activity.

Figure 3. **Lehman Brothers Index Dynamics**



**Returns Universe**

- Static universe set at beginning of month
- avoids "hitting a moving target"
- Includes bonds that during the month have been
  - called
  - downgraded below investment grade
  - sunk below \$100 million
- Used to report index performance (returns)

**Statistics Universe**

- Dynamic universe that changes daily
- used for rebalancing purposes
- Includes bonds that during the month have been
  - newly issued
  - upgraded to investment grade
- Used to report index statistics (duration, market values, etc.)

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**Settlement**—For index purposes, securities are assumed to settle on the next calendar day, except for mortgages, which are priced for Public Securities Association (PSA) settlement in the following month and then discounted back to same-day settlement at the mortgage repurchase rate to match the other indices. At the end of the month, however, the settlement date is assumed to be the first day of the following month even if the last business day is not the last day of the month. This procedure allows for one full month of accrued interest to be calculated.<sup>3</sup>

**Total Return**—Lehman Brothers index results are reported on daily, monthly, annual, and since-inception bases. Returns are cumulative for the entire period. Intramonth cash flows contribute to monthly returns, but they are not reinvested during the month and do not earn a reinvestment return. They are reinvested into the returns universe for the following month. Thus, index results over two or more months reflect monthly compounding.

Daily, month-to-date, and monthly total returns are calculated based on the sum of price changes, coupon received or accrued, gain/loss on repayments of principal (e.g., due to prepayments of MBS or calls of corporate securities), and, where applicable, currency value fluctuations, expressed as a percentage of beginning market value. If a security is no longer outstanding (for example, due to the exercise of a call option during a month), the ending price is the level at which it exited the market. The total return for an index is the weighted average of the total returns of the securities that make up the index, where the weighting factor is full market value (i.e., inclusive of accrued interest) at the beginning of the period.<sup>4</sup> Cumulative total returns over periods longer than one month are calculated by multiplicatively linking monthly returns.<sup>5</sup>

**Market Weighting**—Returns and most summary statistics published for the Lehman Brothers indices are full market-value weighted. Returns data are weighted by full market value at the beginning of the period. Statistics, such as index average duration and maturity, are market-value weighted based on end-of-period full market value. Average price and coupon are weighted by end-of-period par value.

## WHERE TO FIND LEHMAN BROTHERS INDICES

**Historical Results**—Lehman Brothers makes available information on the historical performance of its indices in its publications, on the index website, and on request. As a matter of policy, Lehman Brothers does not restate prior results to reflect rule changes in an index.

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<sup>3</sup>The only exception is the MBS Index, where end-of-month index returns are calculated assuming the trade date and settlement date are the last day of the month. This procedure is used since prepayment data for the month are not available when monthly returns are calculated. For information on the MBS Index return calculations see the Lehman Brothers report, *MBS Index Returns: A Detailed Look*, August 1998.

<sup>4</sup> We use the term full market value to reflect market value including accrued interest.

<sup>5</sup> If the monthly returns for three months are 1%, 1.5%, and 0.75%, the quarterly return would be 3.28%  $[(1.01 \times 1.015 \times 1.0075) - 1] \times 100$ .

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**Reporting Results**—The results of the Lehman Brothers indices are available daily and monthly in a variety of media, including our client website, Bloomberg, and Reuters. Figure 4 summarizes how to access these sources. If you do not have access to these media, please contact your Lehman Brothers salesperson.

In addition, Lehman Brothers publishes the *Lehman Global Family of Indices* report each month, which summarizes monthly returns and month-end statistics and provides a brief written analysis.

To offer our clients a solution to pricing their portfolios daily, Lehman Brothers has recently introduced a pricing service. This service provides daily prices on all securities in the Lehman Brothers U.S. Aggregate Index. These prices are the same prices used to calculate the U.S. Aggregate Index. The prices are made available by 4:30 pm eastern time daily.

In order to provide a more timely estimate of our U.S. Aggregate Index results on a daily basis, we are now publishing a *Flash Index Report*. This report is intended to provide an accurate estimate of the daily performance of all sectors within the U.S. Aggregate Index by 4:30 eastern time. The Flash Index Report can be found on both our index website and Bloomberg. Our official index results will continue to be published normally at 6:30-7:00 pm.

## MACROINDICES

### The Global Aggregate Index

Just as the U.S. Aggregate Index surpassed the original macro index—our Government/Corporate Index—in user popularity, we expect the Global Aggregate Index to supercede our U.S. Aggregate Index, Euro-Aggregate Index, Global Treasury Index, and similar government-only indices available from other sources as the most widely used benchmark for debt investors operating in multiple currencies over the course of the first decade of the 21st century. Starting in 1999, some major government and private pension fund sponsors began analyzing a possible switch to the Global Aggregate Index from global government-only indices. Given the growing volume of inquiry in 2000 from investors, consultants, and plan sponsors, many organizations contemplated adopting the Global Aggregate Index. In particular, many investors cite the “Japan problem” as a rationale for their conversion from the government-only indices to the Global Aggregate Index. Under various scenarios of Japanese government debt expansion to finance a

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Figure 4. **Lehman Brothers Index Information Sources**

The Lehman Brothers Bond Indices are available on:

Website	<a href="http://live.lehman.com">http://live.lehman.com</a>
Bloomberg	LEHM <GO>
Reuters	LEHINDEX

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chronic fiscal deficit and ongoing shrinkage of U.S. and European government debt, the Japanese government bond share (25.7% of our Global Treasury Index and 35.5% of our Global Treasury Index, ex-U.S.) of a government-only index could approach 50% over the next decade. This is an unappealing prospect for multi-currency debt investors in search of diversity.

For the first 18 months of its existence (January 1, 1999, to June 30, 2000), the Global Aggregate Index represented the union of the U.S. Aggregate Index, the Pan-European Aggregate Index, and the Global Treasury Index (ex-U.S. and European government securities). (The securities in our Global Treasury Index not present in either the U.S. or Pan-European aggregates are the treasury obligations of Canada, Japan, Australia, and New Zealand.) On July 1, 2000, the Eurodollar and U.S. Investment-Grade 144A indices joined the Global Aggregate Index. On October 1, 2000, the Global Aggregate Index was augmented by our new Asian-Pacific Aggregate Index. Parallel to the U.S. and Pan-European Aggregates, the Asian-Pacific Aggregate incorporated the government and corporate bond markets of Japan, Australia, New Zealand, Hong Kong, South Korea, Singapore, Taiwan, and Malaysia.

On October 1, 2000, the liquidity constraint for all securities in the Global Aggregate Index was raised to \$300 million (or equivalent) from \$150 million. The liquidity constraint change was made to give global investors a benchmark that reflects the most liquid portion of the investment-grade bond markets. The result is a benchmark that represents the mix of more-liquid government, credit, and collateralized securities available in the marketplace.

On January 1, 2002, the Global Aggregate Index liquidity constraint changed from the current \$300 million equivalent to multiple constraints, based on the three major component currencies, \$300 million, EUR300 million, and JPY35 billion. The liquidity constraints for other minor currencies included in the Index are now pegged to the regional currencies of the above denomination. GBP will be pegged to the euro. The exchange rate was set on November 30, 2001, and will be reset annually. Specifically, the percentage of yen-denominated securities will decrease from 21.51% to 18.15%, and the percentage of JGBs will decrease from 17.57% to 13.38%. The percentage in most other sectors and currencies will increase slightly as a result of the decrease in these yen-denominated securities. In addition, bonds denominated in the Malaysian ringgit, Chinese yuan, and Taiwanese dollar will no longer be eligible for inclusion in the Global Aggregate Index. We have excluded these currencies because there is no viable method of hedging the currency exposure.

### **The U.S. Universal Index**

The U.S. Universal Index mirrors the increasingly popular “Core Plus” choice set used by many U.S.-dollar investors and is the union of the U.S. Aggregate Index, the U.S. High Yield Corporate Index, the 144A Index, the Eurodollar Index, the Emerging Markets Index, the non-ERISA portion of the CMBS Index, and the CMBS High Yield Index. Municipal debt, private placements, and non-dollar-

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denominated issues are excluded from the Universal Index. The Emerging Markets Index contains floating-rate securities; 0.55% of the U.S. Universal Index has a floating coupon. No other constituent of the U.S. Universal Index contributes floating-rate debt.

As a reminder, the U.S. Aggregate Index spans the U.S. investment-grade fixed-rate bond market and includes government and corporate bonds, agency mortgage passthrough securities, asset-backed issues, and ERISA-qualified CMBS. The Lehman U.S. High-Yield Corporate Index covers dollar-denominated, fixed-rate, below-investment-grade debt. The 144A Index includes fixed-rate, investment-grade, non-convertible, dollar-denominated securities issued under Rule 144A; below-investment-grade 144A securities are included in the U.S. High-Yield Corporate Index. The Eurodollar Index encompasses non-SEC-registered, as well as global investment-grade, fixed-rate U.S. dollar-denominated issues. The Emerging Markets Index includes dollar-denominated local, corporate, sovereign, and Brady bonds of emerging-market countries.

Our investment-grade and high-yield CMBS indices, also launched in January 1999 (with data back to January 1997), became part of the U.S. Universal Index on July 1, 1999. The ERISA-eligible component of the investment-grade CMBS Index also joined the U.S. Aggregate Index on July 1, 1999.

The specific rules governing the construction of each of the index constituents are applied without modification in building the U.S. Universal Index. The rules for each specific index are detailed in the following sections of this publication. There are securities that are in both the Aggregate and another of these indices. For example, global corporate bonds are included in the Aggregate Index and the Eurodollar Index. Some emerging-market debt contributes to both the Aggregate and Emerging Markets indices. Securities will not be double-counted, and we will report the performance of Eurodollar ex-Aggregate and Emerging Markets ex-Aggregate subindices, which exclude these securities.

### **The Multiverse Index**

Almost concurrent with the birth of our third-generation macro indices, the U.S. Universal Index and Global Aggregate Index, on January 1, 1999, we began to comment publicly about the inevitable introduction of a fourth-generation macro index that would include all investment-grade and high-yield securities, regardless of currency. Originally, we envisioned the debut of such an all-encompassing measure of global bond market performance sometime between 2003 and 2005. But once again responding to investor demand for a fully global bond index and after consulting with major institutional investors throughout Europe, Asia, and the U.S., we decided to move up our planned start date to January 1, 2001.

As with most new indices, the Multiverse Index was not full size at birth. Although this \$12.9 trillion index contained approximately 8,600 issues at inception, the Multiverse Index was missing several small pieces. Thanks to the creation of our Asian-Pacific Aggregate Index in 2000 and its inclusion in our Global Aggregate

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Index on October 1, 2000, our index mapping of the global investment-grade markets has now been largely completed. Canadian corporates, to be added over the next two years, constitute our only substantive omission. On the high-yield side, we have captured the entire U.S. dollar and euro-denominated high yield and EMG debt asset classes. As yet, our global high-yield indices do not include the potentially eligible local currency portions of the EMG market. As previously stated, our index strategic plan calls for the eventual mapping of these asset classes over the next three years. Even with these acknowledged omissions, we roughly estimate that the fledgling Multiverse Index will hold at least 95% of the full universe of investment-grade and high-yield fixed-rate securities as of January 1, 2002.

Why the name “Multiverse”? The Multiverse Index represents the union of the U.S. Universal, Pan-European Universal, and Asian-Pacific Universal indices. Given the union of multiple universes and drawing upon a term already in use by physicists to characterize the increasingly popular notion of many physical universes, we decided to use “multiverse.” We did consider the term, “global universal.” But we found this to be slightly contradictory. As a quick shortcut to thinking about our index hierarchies, aggregate = all investment-grade securities in a currency or across currencies, universal = all investment-grade and high-yield securities within a single currency, and multiverse = all investment-grade and high-yield securities in all currencies.

Does the Multiverse Index have any purpose for the vast legions of investors confined to a single currency or to investment-grade only securities? Yes. Already, as mentioned above, there are some investors who have existing funds or plan new funds that would be better compared with a comprehensive global bond index. And for all investors, whether direct users or not, the Multiverse Index will provide new information about the overall status of the global debt asset class. Our conjecture: maybe, just maybe, the global bond market has slightly better performance characteristics versus the global equity class than previously surmised based on long-term, local-currency-only investigations (mainly in the dollar and gilt markets). In turn, multinational plan sponsors might be inclined to consider a less effusive equity overallocation. Of course, our conjecture may prove completely incorrect over the long run. But at least for the first time in capital market history, plan sponsors, consultants, academics, asset managers, and strategists can legitimately compare the entire global debt asset class (including spread product (46.05% of the Multiverse Index) with the global equity asset class. This index should make for fascinating studies for years to come, in our view.

### **The Global High Yield Index**

On January 1, 1999, the fusion of the non-investment grade portions of our Emerging Markets Index with the U.S. High Yield Index, the Pan-European High Yield Index, and, subsequently (on July 1, 1999), the CMBS High Yield Index began generating our Global High Yield Index. On January 1, 2002, the Pan-European Emerging Markets Index began contributing to the Global High Yield Index.

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### **The Pan-European Universal Index**

With the addition of the Pan-Euro EM Index, we can now publish a Pan-Euro Universal Index. This index launched on January 1, 2002, includes contributions from the Pan-Euro Aggregate Index, the Pan-Euro EM Index, and the Pan-Euro High Yield Index.

### **Global Credit and Securitized Indices**

To complement our Global Treasury Index, we announced two new global asset class indices on July 1, 2001: the Global Credit Index and the Global Securitized Index. The Global Credit Index contains both investment-grade and high-yield credit securities from our Multiverse Index (Multiverse = Global Aggregate + Global High Yield). The investment-grade component is a subset of our Global Aggregate Index and contains credit securities from our U.S. Aggregate, Pan-European Aggregate, Asian-Pacific Aggregate, Eurodollar, 144A, and Euro-Yen indices. The high yield component will contain securities from our U.S. Corporate High Yield, Pan-European High Yield, and Emerging Markets indices.

The Global Securitized Index is mainly composed of the securitized component of the Global Aggregate Index (MBS, ABS, CMBS, Pfandbriefe); U.S. high yield CMBS is the only contribution from the Global High Yield Index.

We are not sure that these essentially customized extracts from our mainline generic indices will become popular portfolio benchmarks. But as with several of our other indices, the Global Credit and Global Securitized indices represent “informational indices,” whose study, we hope, will benefit asset allocators, product portfolio managers, and individual security analysts.

### **U.S. AGGREGATE INDEX**

The Lehman Brothers Aggregate Index covers the U.S. investment-grade fixed-rate bond market, including government and credit securities, agency mortgage passthrough securities, asset-backed securities, and commercial mortgage-based securities. These major sectors are subdivided into more specific indices that are calculated and reported on a regular basis (Figure 6).

To qualify for inclusion in the U.S. Aggregate Index, a bond or security must meet certain criteria:

- It must have at least one year to final maturity, regardless of call features. Asset-backed securities must have a remaining average life of at least one year, while mortgages must have a weighted average maturity (WAM) of at least one year. There is no limit on final maturity; bonds with 50- and 100-year maturities may be included in the Aggregate Index (perpetuals are excluded).
- It must have at least \$150 million par amount outstanding, although during 2002, it is possible that the liquidity constraint will be raised to either \$200 or \$250 million. For ABS securities, the minimum outstanding is \$500 million deal size and \$25 million tranche size. For CMBS securities, original deal size must be at least \$500 million with at least \$300 million

amount outstanding remaining in the deal. The amount outstanding may differ from the original issue size due to various factors, including reopenings, sinking schedules, partial calls, and prepayments.

- It must be rated investment grade (Baa3 or better) by Moody's Investors Service (except for U.S. government or agency securities, which are generally not formally rated). If a Moody's rating is unavailable, then the Standard & Poor's Corporation rating is used. This implies that the index may include bonds that are split-rated. A bond rated Baa3 by Moody's and BB+ by S&P would be included; however, if Moody's assigns a rating below investment grade, the bond will be excluded even if the S&P rating is BBB- or better.
- It must be fixed rate, although it can carry a coupon that steps up or changes according to a predetermined schedule. Adjustable- or floating-rate securities

Figure 5. **Lehman Brothers U. S. Aggregate Bond Index Sector Hierarchy**

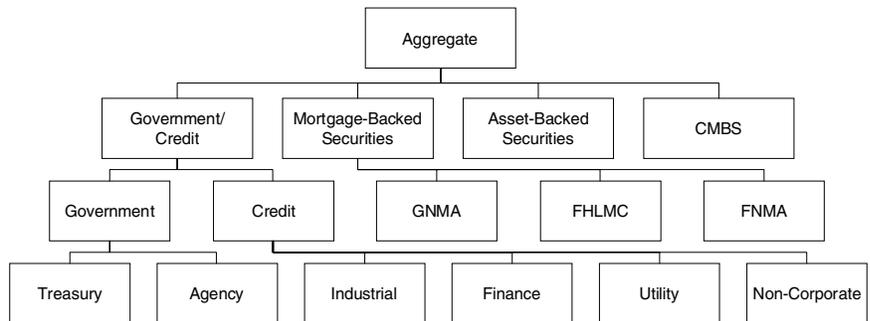
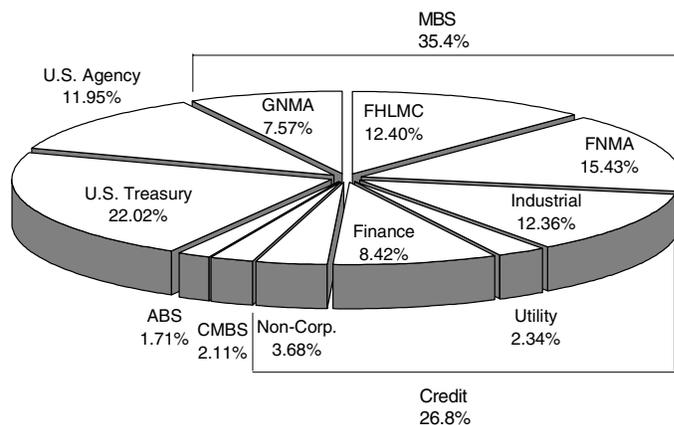


Figure 6. **Distribution of the Lehman Brothers U.S. Aggregate Index**  
December 2001



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with periodic coupon changes based on changes in market rates are excluded. Stripped securities created from coupon securities are excluded, while the underlying coupon security is included. Zero coupon bonds may be included. Medium-term notes are included only if they were underwritten issues and meet other eligibility criteria.

- It must be dollar denominated and nonconvertible. All corporate and asset-backed securities must be registered with the Securities and Exchange Commission (SEC).
- It must be publicly issued, but 144A securities with registration rights are included.

Generally speaking, the Aggregate Index does not include securities with esoteric or one-of-a-kind features, such as structured notes or range notes with coupons that depend on movements in market rates.

### **Evolution of the U.S. Aggregate Index**

The Aggregate Index has evolved in response to changes in the marketplace, addition of new sectors, and revisions to the eligibility criteria. Figure 7 summarizes milestones in the evolution of the Aggregate Index.

The Aggregate Index was created in 1986, with history built back to 1976. It originally included the Government/Corporate Index, which was introduced in 1973, and the newly created MBS and Yankee indices. (The Yankee Index consisted of SEC-registered dollar-denominated debt issued or guaranteed by foreign sovereign governments, municipalities, corporations, government agencies, and supranational entities.) Initially, the Government/Corporate Index had a market value of \$221 billion and contained 3,609 issues. The liquidity constraint was only \$1 million. The Aggregate Index at inception (1976) had a market value of \$361 billion and contained 4,514 issues. By 1986 and 1996, it had grown to \$2.1 trillion and \$5.0 trillion, respectively (Figure 8).

In August 1988, the liquidity constraint for all components of the Aggregate Index was raised from \$1 million to \$25 million. As a result, the number of issues in the index fell by 5%, from 6,293 to 5,926. The issues omitted from the index were small and illiquid; consequently, the index shrank by only \$26 billion, or about 1% in market value terms. In 1990, the liquidity constraint for government issues was raised to \$100 million. In 1991, the liquidity constraint for the other sectors of the index was raised to \$50 million. These changes had little impact on the market value of the index due to a growing preference by issuers for larger-sized issues. The liquidity constraint was raised again in January 1994, to \$100 million, again causing little change in the size of the Aggregate Index.<sup>6</sup> The liquidity constraint for the Aggregate Index remained at \$100 million until July 1, 1999, when it was updated to \$150 million. This change decreased the number of issues in the index by 2,177 but decreased the market value by only \$189 million.

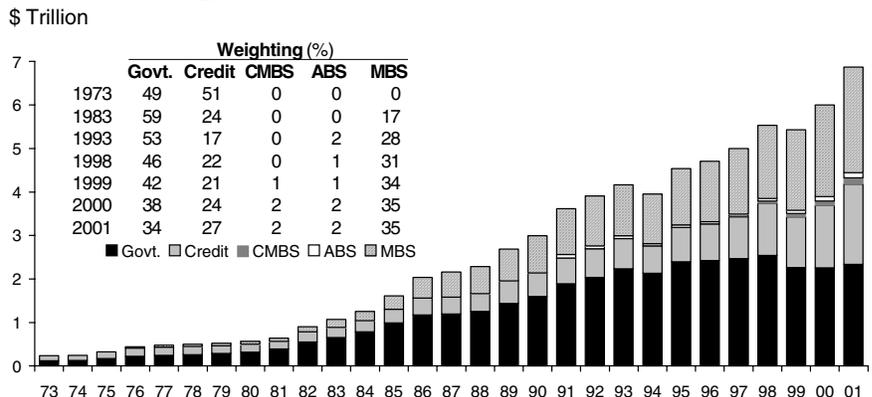
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<sup>6</sup>When the liquidity constraint was raised to \$100 million, the number of issues in the Aggregate Index fell sharply from 6,055 to 4,624 or 31%. However, the market value fell only 1.2%.

**Figure 7. Milestones in the Evolution of the Lehman Brothers U.S. Aggregate Index**

- 1/73 Inception date for Government/Corporate Index.
- 1/86 Introduction date for the Mortgage-Backed, Yankee, and Aggregate Indices, with returns and statistics calculated back to 12/31/75.
- 8/88 Liquidity constraint increased from \$1 million to \$25 million for corporate issues. Yankee Index absorbed into the Government/Corporate Index.
- 1/90 Liquidity constraint increased from \$25 million to \$100 million for government issues. Yankee sector absorbed into the Corporate Index. Title XI issues dropped from the Government Index. Asset-backed bullet issues added to the finance sector.
- 1/89 Published durations changed from Macaulay duration to maturity to duration to worst. Published yields changed from yield to maturity to yield to worst.
- 1/92 Asset-Backed Securities Index added to Aggregate Index. Balloon issues added to MBS Index. Liquidity constraint increased from \$25 million to \$50 million for nongovernment issues. Mobile homes dropped from MBS Index.
- 1/94 Liquidity constraint increased from \$50 million to \$100 million for all issues.
- 1/95 GPMs dropped from the MBS Index. Average coupons par-weighted instead of market-weighted.
- 12/97 Added stranded cost securities to the Asset-Backed Securities Index.
- 12/98 Manufactured housing securities added to the ABS Index. Quarter-coupons dropped from MBS Index. All World Bank Issues moved to supranational component of Corporate Index.
- 7/99 Liquidity constraint raised to \$150 million from \$100 million. ERISA-eligible CMBS added to the Aggregate Index.
- 7/00 Renamed Corporate Index to Credit. Absorbed all Yankee Corporates into their respective industry classifications. Changed the liquidity constraint on the ABS Index—old constraint: \$150 million per tranche; new constraint: deal must be \$500 million, tranche must be \$25 million. ERISA-eligible B pieces to be included also.
- 7/02 Possible increase in liquidity constraints for all asset classes.

**Figure 8. Market Value of the Lehman Brothers Aggregate Index Sectors 1973–2001**



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In January 1990, the Yankee sector became a component of the Corporate Index, and asset-backed bullet issues were added to the finance sector of the Corporate Index. Title XI securities, government-guaranteed shipping finance bonds, were excluded for liquidity reasons.

In January 1992, the Asset-Backed Securities Index was created and added to the Aggregate Index as a separate sector. Bullet ABS issues were transferred from the finance sector of the Corporate Index, balloon issues were added to the MBS Index, and manufactured housing MBS were dropped.

In April 1992, underwritten medium-term notes were added to the Agency and Corporate indices; they now account for about 9% and 1%, respectively, of these indices.

On July 1, 1999, CMBS was added as another major asset class in the U.S. Aggregate Index. Only ERISA-eligible CMBS are contained in the Aggregate Index. Please refer to the Commercial Mortgage-Backed Index section of this primer for more details regarding the CMBS Index.

On July 1, 2000, the U.S. Corporate Index was renamed the U.S. Credit Index. The newly named Credit Index is now unbundled into pure corporates (industrial, utility, and finance, including both U.S. and Non-U.S. corporations) and non-corporates (sovereign, supranational, foreign agencies, and foreign local governments). The term Yankees has been removed from our published classification.

### **U.S. Government Index**

The Government Index includes the Treasury and Agency indices. The Treasury Index accounts for 64.83% of the Government Index and includes public obligations of the U.S. Treasury that have remaining maturities of more than one year. Treasury bills are excluded by the maturity constraint. In addition, certain special issues, such as flower bonds, targeted investor notes (TINs), and state and local government series bonds (SLGs), are excluded.<sup>7</sup> Coupon issues that have been stripped are reflected in the index based on the underlying coupon issue rather than in stripped form. Thus, STRIPS are excluded from the index because their inclusion would result in double-counting. However, for investors with significant holdings of STRIPS, customized benchmarks are available that include STRIPS and a corresponding decreased weighting of coupon issues. If, in the future, the U.S. Treasury were to issue original-issue discount securities (e.g., zero coupon bonds), these could be eligible for the index.

U.S. Agency debt issues make up the remaining 35.17% of the Government Index and include both callable and noncallable agency securities. The index includes

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<sup>7</sup>Flower bonds were issued in the 1950s and early 1960s. They carry low coupons, but can be redeemed at par when used to settle federal estate taxes if owned by the decedent at time of death. One issue remains outstanding. TINs are targeted for foreign investors; SLGs are nonmarketable instruments issued to municipalities for defeasing tax-exempt debt.

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### **Hourly Treasury Index**

The Lehman Brothers Hourly Treasury Index is an hour-by-hour flash indicator of market performance. As of July 1, 1995, Lehman Brothers modified the Hourly Treasury Index (HTI), which is published by the *Wall Street Journal* and various electronic data vendors. The modifications synchronize the HTI with the Lehman Family of Indices allowing investors to compare this flash indicator directly with other Lehman Brothers fixed income benchmarks.

Daily returns are calculated from 3 pm to 3 pm on a static universe of Treasury securities determined each month-end. This means that new securities settling in the middle of a month will not contribute to returns until the beginning of the next month. Coupon reinvestment occurs on a monthly basis. However, statistics such as duration are calculated on a dynamic universe of Treasury securities that includes newly settled issues. Historically, the HTI had calculated daily returns on a dynamic universe of securities at 5 pm and assumed daily compounded returns and reinvestment of coupon return.

The Hourly Treasury Index consists of all U.S. Treasury securities with at least one year until maturity. The intermediate hourly index has a maturity range from 1 to 10 years. The long hourly index has a minimum maturity of 10 years. Treasury STRIPS do not contribute to these benchmarks. Index returns are market-value weighted with an inception date of January 1981.

publicly issued debt of U.S. government agencies, quasi-federal corporations, and corporate or foreign debt guaranteed by the U.S. government (such as USAID securities). The U.S. Agency Index also includes subordinated debt issues. The largest issuers are Fannie Mae, Freddie Mac, the Resolution Trust Funding Corporation (REFCORP), and the Federal Home Loan Bank System (FHLB). Figure 9 summarizes major issuers and market values.

### **U.S. Credit Index**

The Credit Index includes investment-grade bonds issued by corporations and non-corporate entities. The Credit Index is subdivided into industrial, finance, utility, and non-corporate sectors and had a total market value of \$1.84 trillion, or 26.8% of the Aggregate Index, as of December 31, 2001. The first three sectors date from 1973; the non-corporate sector (formerly a component of the Yankee Index) was separately introduced in 1986 with an inception date of January 1976 and was added to the Credit Index (formerly Corporate Index) in January 1990. Each of these major sectors is broken into at least two further layers of subcategories (see Figure 10 for a summary). For example, the Industrial Index is divided into eight components: basic industry, capital goods, consumer cyclical and noncyclical, energy, technology, transportation, and communications. Each of these components is further subdivided. Furthermore, all bonds must be SEC-registered (144As can be included but must be issued with registration rights). Lehman Brothers reports results for the major sectors daily and monthly. Results for smaller and more specialized subsectors are available on request.

Credit Index results are also available on the basis of credit quality (Aaa, Aa, A, and Baa) since 1973.

The Credit Index includes publicly issued U.S. corporate and non-corporate debentures and secured notes that meet the maturity, liquidity, and quality guidelines.

Figure 9. **U.S. Agency Market Composition**, December 31, 2001

	<b>Market Value (\$ mn)</b>	<b>% of Index</b>
Agency Index	649,580	100.00
FNMA	342,308	41.68
FHLMC	237,911	28.97
FHLB*	144,216	17.56
REF CORP	40,602	4.94
TVA	17,240	2.10
FFCB	12,416	1.51
Financing Corp	9,880	1.20
SLMA	11,100	1.35
State of Israel	1,889	0.23
PEF	2,401	0.29
Gov Trust	216	0.03
FACO*	874	0.11
NAFTR	308	0.04

\* This classification for agencies became available February 1994.

Figure 10. **Credit Index by Sector**, December 31, 2001

	<b>Market Value (\$ mn)</b>	<b>% of Credit Index</b>
<b>Financial Institutions</b>	<b>579,197</b>	<b>31.43</b>
Banking	235,102	12.76
Brokerage	77,534	4.21
Finance Cos.	204,245	11.08
Insurance	37,544	2.04
Reits	24,772	1.34
<b>Industrial</b>	<b>849,495</b>	<b>46.1</b>
Basic Industry	69,460	3.77
Capital Goods	67,757	3.68
Consumer Cyclical	139,345	7.56
Consumer Non-Cyclical	138,954	7.54
Energy	82,616	4.48
Technology	35,228	1.91
Transportation	54,632	2.96
Communications	251,227	13.63
Indust Other	10,275	0.56
<b>Utility</b>	<b>160,855</b>	<b>8.73</b>
Electric	116,755	6.34
Natural Gas	44,100	2.39
<b>Non-Corporate</b>	<b>253,187</b>	<b>13.74</b>
Supranational	76,607	4.16
Sovereigns	94,364	5.12
Foreign Local Govt	50,038	2.72
Foreign Agency	32,177	1.75

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Subordinated issues are included provided other criteria are met. Securities with normal call and put provisions and sinking funds are included, but structured notes with embedded swaps or other special features are excluded. Medium-term notes are excluded unless they are publicly underwritten. Private placements, 144As without registration rights, floating-rate securities, and Eurobonds are also excluded, but global issues that are SEC registered are included.

### **U.S. MBS Index**

The MBS Index covers the mortgage-backed passthrough securities of Ginnie Mae (GNMA), Fannie Mae (FNMA), and Freddie Mac (FHLMC). Introduced in 1986, the GNMA, FHLMC, and FNMA indices for 30- and 15-year securities have been backdated to January 1976, May 1977, and November 1982, respectively. Balloon securities were added in 1992, and 20-year securities were added in July 2000. The MBS Index excludes buydowns, graduated-equity mortgages, and project loans.<sup>8</sup> Manufactured homes (GNMA) were originally included but were dropped in January 1992 for liquidity reasons. Graduated-payment mortgages (GPMs) were dropped in January 1995 for similar reasons. Nonagency (whole loan), and jumbos are excluded. On December 31, 1998, quarter-coupon securities were dropped from the index. ARM securities are also excluded because they have an adjustable coupon. The growth and relative weightings of the MBS Index over time are shown in Figure 11.

The MBS Index also excludes CMOs. Similar to Treasury STRIPS, the MBS collateral pledged to CMOs is already included in the index; including CMOs would result in double-counting.

The MBS Index is formed by grouping the universe of over one million individual fixed-rate MBS pools into approximately 2,900 generic aggregates (although only a certain number meet the index criteria). These aggregates are defined according to the following parameters:

- Agency (GNMA, FNMA, FHLMC)
- Program (30-year, 15-year, balloon, 20-year, GPM)
- Passthrough coupon (6.0%, 6.5%, etc.)
- Origination year (1987, 1988, etc.)

In other words, each aggregate is a proxy for the outstanding pools for a given agency, program, issue year, and coupon. The index maturity and liquidity criteria

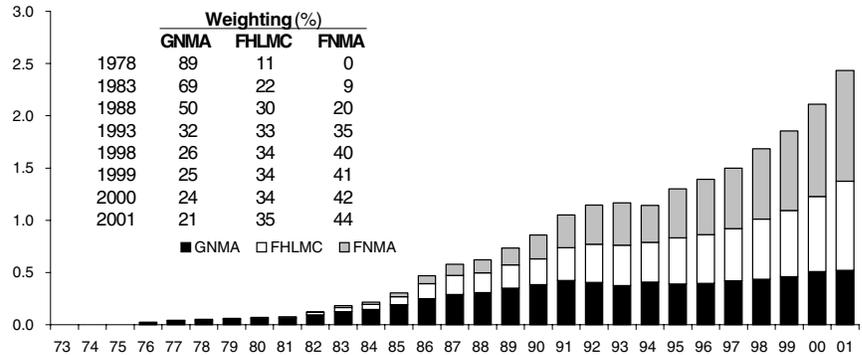
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<sup>8</sup>Graduated payment mortgages (GPMs) have constant coupon rates but payments that adjust upward in the early years. The payment is initially set below the fully amortizing level and adjusts upward according to a set schedule until it reaches a point where the loan is fully amortizing over the remaining term. Any shortfall between the interest charges and the payment is added to the principal balance.

Growing equity mortgages (GEMs) begin as fully amortizing 30-year mortgages. The monthly payment increases annually for the first 3-5 years, with the excess payment used to pay down the principal balance. As a result, the loan is paid off in full in 18-22 years. These are excluded from the MBS Index primarily for liquidity reasons.

Project loans are mortgages on multifamily buildings that carry federal insurance or guarantees. Very few would meet the \$100 million liquidity constraint for inclusion in the Index.

Figure 11. **Market Value of the Lehman Brothers MBS Index**  
1976-2001, \$ trillion



are then applied to these aggregates to determine which qualify for inclusion in the index. About 513 of these generic aggregates meet the criteria.

The aggregates included in the index are priced daily using a matrix pricing routine based on trader price quotations by agency, program, coupon, and degree of seasoning. In an effort to reflect more accurately the market prices of seasoned mortgage securities in the Lehman Brothers Mortgage Index, we introduced a new pricing algorithm for MBS securities on January 1, 1998. Under the old format, mortgages were divided into four seasoning groups: unseasoned securities originated after 1995, slightly seasoned (1988-1994 originations), moderately seasoned (1981-1987), and seasoned (pre-1980) securities. Lehman Brothers trading desks currently price each group according to the weighted average maturity (WAM), and all securities within the group are assigned the same price.

Starting January 1, 1998, we began providing further differentiation in pricing the Mortgage Index. For example, instead of the four groups used previously, 30-year GNMA 7.5s would be priced daily using trader bid side marks for TBA 7.5s, plus GNMA 7.5s of 1997, 1995, 1994, 1993, 1992, 1987, and 1977. Securities that are not priced explicitly will be assigned the same price as the benchmark with the closest WAM.

Because prepayment data for a given month are reported after index results have been calculated, paydown returns in the MBS Index are reported with a one-month delay. For example, the MBS Index results for January 1994 were reported by the second business day of February. Since complete factor (or prepayment) data for January were not available until mid-February, the paydown return for January reflected December prepayment data (which were made available by the agencies

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during January).<sup>9</sup> Paydowns are reflected in statistics after the 17th business day of a month. When the index was introduced, paydown returns each month were calculated based on estimated prepayments and then restated the following month. This was replaced with the present one-month lag procedure in January 1989.

### U.S. ABS Index

The Asset-Backed Securities (ABS) Index was introduced in January 1992. It has five subsectors—credit and charge card, auto, home equity loan, stranded-cost utility, and manufactured housing securities (added December 31, 1998) (Figure 12). The index includes passthrough, bullet, and controlled amortization structures. The ABS Index expanded in July 2000 to include securities with \$500 million deal size and \$25 million tranche size. ERISA-eligible B tranches were included in the ABS Index in the latter part of 2000.

Between January 1990 and the inception of the ABS Index, bullet ABS structures were assigned to the finance sector of the Credit Index (formerly Corporate Index).

### U.S. CMBS Index

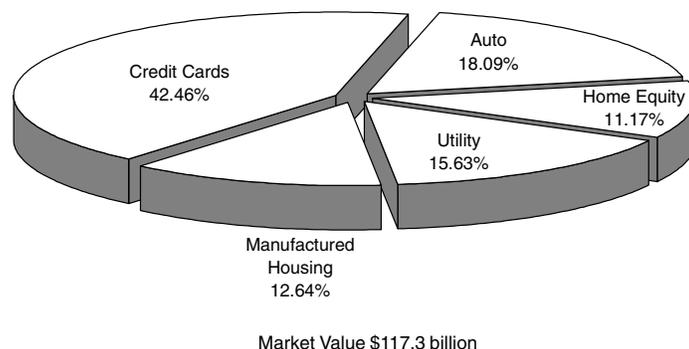
The Commercial Mortgage-Backed (CMBS) Index was introduced on January 1, 1999, and a portion of this index was added to the U.S. Aggregate Index on July 1, 1999. The CMBS Index has several components (investment grade, high yield, IO), but only the ERISA-eligible securities from the investment-grade component were added to the Aggregate Index. For complete details on this index, please refer to the Commercial Mortgage-Backed Index section of this document.

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<sup>9</sup>Each month the mortgage agencies report detailed information about every mortgage pool outstanding, including the remaining balance expressed as a percentage of the original balance. This information is used to calculate prepayment rates for the previous month. Freddie Mac releases its factor tape on the first business day of the month, Fannie Mae on the fifth business day, and Ginnie Mae on the fifth through ninth business days.

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Figure 12. **Asset-Backed Securites Index Composition, December 2001**



### PERFORMANCE OF THE U.S. AGGREGATE INDEX

The Aggregate Index and its major components have produced annualized total returns of 7.08%-7.67% over the latest 10-year period (Figure 13). Returns are higher for the longer horizons, reflecting the favorable impact of the bond market rally since 1982, higher coupon rates on bonds issued when rates were higher, and reinvestment. A clear correlation between duration and return is evident, with the long components of the major indices significantly outperforming the intermediate components. The long Government/Credit Index, for example, provided an annualized return over the past ten years of 8.42%, compared with 6.80% for the intermediate Government/Credit Index.

Figure 14 shows the cumulative return performance of the Aggregate Index and its major components by source of return, i.e., price, coupon, paydown, and other (mostly reinvestment). A surprising point is that the price return component over time has been insignificant. The Aggregate Index generated a total return of

Figure 13. **Annualized Performance For Selected Indices**, Periods Ended December 2001, %

Index	2 Years		3 Years		4 Years		5 Years		10 Years	
	Total	Annual	Total	Annual	Total	Annual	Total	Annual	Total	Annual
Aggregate	21.05	10.02	20.06	6.28	30.49	6.88	43.08	7.43	101.03	7.23
Intermediate	20.23	9.65	21.42	6.68	30.95	6.97	42.03	7.27	95.50	6.93
Gov/Credit	21.36	10.16	18.76	5.9	30.00	6.78	42.69	7.37	101.80	7.27
Intermediate	19.99	9.54	20.45	6.4	30.61	6.90	40.89	7.10	93.32	6.81
Long	24.62	11.63	15.08	4.79	28.63	6.50	47.30	8.05	124.51	8.42
Government	21.43	10.2	18.72	5.89	30.42	6.86	42.92	7.40	99.29	7.14
Intermediate	19.77	9.44	20.36	6.37	30.57	6.90	40.65	7.06	90.31	6.65
Long	25.51	12.03	14.56	4.63	29.91	6.76	49.56	8.38	127.38	8.56
Credit	20.77	9.89	18.4	5.79	28.56	6.48	41.71	7.22	109.54	7.68
Intermediate	20.16	9.62	20.35	6.37	30.33	6.85	41.22	7.15	104.51	7.42
Long	22.49	10.68	15.41	4.89	25.83	5.91	42.78	7.38	118.62	8.14
Mortgages	20.3	9.68	22.53	7.01	31.06	7.00	43.50	7.49	98.55	7.10

Figure 14. **Components of Cumulative Return Performance Since Inception**, to 12/31/01, %

	Price	Coupon	Paydown	Reinvest	Total
Aggregate	10.596	219.517	-2.025	681.177	909.265
Government	11.067	228.782	-0.003	816.097	1,055.943
Credit	-5.327	218.834	-0.027	892.906	1,106.386
Mortgage	1.277	217.230	-6.640	743.274	955.141

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909.27% between 1976 and year-end 2001, but the price component was only 10.60%. The explanation lies in the fixed maturity of bonds and the convergence of their prices toward par as they approach maturity or call date. Although, on a month to month basis, the price performance of a bond portfolio may be exhilarating or devastating, over time, it is a small element of the total return picture. The dominant component by far is reinvestment earnings. Of the Aggregate Index total return, the return attributable to reinvestment was 681.18%, about <sup>3</sup>/<sub>4</sub> of the total.<sup>10</sup>

Even over shorter periods dominated by falling interest rates, the price return component is comparatively minor. During the rally over the three-year period ending at December 1993, when the Treasury yield curve shifted downward by over 300 bp, the Aggregate Index posted a cumulative total return of 36.74%, but price performance contributed only about a quarter of this total (9.65%). Most of the return over this period was due to coupon income (24.75%). Reinvestment return was only 2.34%, reflecting the short horizon.

### **CUSTOMIZED INDICES**

Many total return investors have benchmark specifications that differ from the broad indices described above. To address these needs, Lehman Brothers has worked with investors to develop customized indices tailored to their unique objectives and constraints (Figure 15). There are three major categories of customized indices: enhanced constraint, composite, and liability-based.

The enhanced constraint index applies a more (or less) stringent set of constraints to an existing index. For example, a state pension fund that is interested in using the Aggregate Index but is not allowed to hold securities rated below single-A can

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<sup>10</sup> Prior to 1991, paydown return was included in price return. This causes the price return on the Aggregate Index to be modestly lower than it would otherwise have been. But a similar analysis of the Treasury Index, where there has not been sinking fund and call activity, gives a similar result. Of a 23-year cumulative return of 715.77%, price return accounts for only 8.15%.

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Figure 15. **Customized Indices**  
Examples of Customized Indices Currently Maintained for Investors

**Aggregate** (excluding Yankees and BBB)

This index includes all bonds in the Aggregate Index except Yankees and corporates rated BBB. This index represents about 92.4% of the market value of the Aggregate Index.

**Government/Credit 1-7 year A+**

This index includes government and corporate bonds with remaining maturities of 1-7 years and rated single A or higher. As of 12/99, this index had a modified adjusted duration of 2.69 years, a yield of 6.62%, and a market value of \$1796 billion.

**Customized Composite**

This index is a composite weighted 50% by the Aggregate Index and 50% by the Intermediate Government/Credit Index, MBS Index, and ABS Index.

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create a customized index with lower-quality bonds removed. The remaining bonds are still weighted according to market capitalization. In addition to credit quality, other constraints can include maturity, duration, liquidity, callability, and issuer.

In a composite index, investors can assign their own weights to sectors within the overall benchmark. For example, the chief financial officer of a fund can create an index to match the base asset allocation of 50% Treasuries, 25% mortgages, and 25% corporates, regardless of changing market values among sectors. Within each sector, the securities will still be weighted according to market capitalization.

The third type of customized index was created to help investors that are required to match a specific cash flow profile. For example, an insurance company with a liability profile that differs from the cash flow profile of a standard index can create a customized index that matches its cash flow objective.

The three types of customization can also be combined. For example, an investor can specify a benchmark with a specific cash flow profile; with sector weightings of 50% Treasuries, 25% mortgages, and 25% corporates; and excluding securities rated below single-A. This customized index would be a more relevant benchmark for the investor and a better gauge of management abilities than comparisons with standard indices. Furthermore, the customized indices follow the general Lehman Brothers rules for index inclusion and calculation. The Lehman Brothers customized indices are also an independent source of reliable information for plan sponsors and consultants.

Returns and statistics for the Lehman Brothers customized indices are analogous to those reported for the Aggregate Index and are available on a monthly basis. Historical series of returns and statistics on a customized index may also be constructed, data permitting.

## **NON-DOLLAR INDICES**

### **Euro-Aggregate Index**

The launch of European Monetary Union (EMU) on January 1, 1999, marked the birth of a new currency, the euro. Eleven national currencies were folded into the euro,<sup>11</sup> although they will remain in circulation as subunits of the euro through the first half of 2002. As of January 1, 2001, the Greek drachma has folded into the euro. This event eliminated foreign exchange risk within the euro zone. For fixed-income investors, EMU meant the creation, at one stroke, of the second-largest bond market in the world and potentially the largest, with the likely expansion of EMU during the first decade of the next century to include Great Britain, Sweden, and Denmark. The new market will be deeper and more liquid than the original combination of national markets and Eurobond currency sectors. The market's

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<sup>11</sup>Currencies of Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain.

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attractiveness to local and international investors will increase, leading to inflows of funds and tighter spread sectors.

This historic event can be viewed as the most important development for the global capital markets in the last decade of the 20th century, and probably the first decade of the 21st century. Probable implications stemming from EMU range from heightened institutional consolidation, convergence of yield and swap curves, and proliferation of credit product origination and portfolio utilization to the creation and distribution of new fixed-income indices and analytics. The prompt arrival of a euro-denominated fixed-income index may nurture the evolution of fixed-income portfolio management practices.

To track the progress and implications of EMU, we introduced the Euro-Aggregate Index on July 1, 1998 (Figure 16). This index serves as a broad and objective benchmark for fund managers across the global fixed-income markets. Like our U.S. Aggregate Index, this new index follows a rules-based structure to be an objective representation of the fixed-rate, investment-grade euro debt market.

#### **Index Criteria**

In addition to the standard index rules that apply to all Lehman Brothers indices, some specific rules apply to the Euro-Aggregate Index:

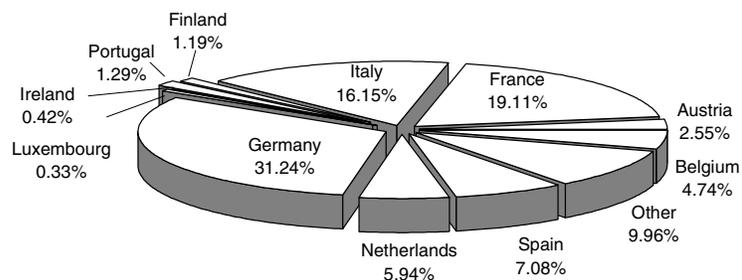
- All securities must be denominated one of the 11 other currencies<sup>12</sup> participating in EMU. The country of issue is not a criterion of the index; a security of an issuer from outside the euro zone will be included provided it meets all the criteria of the index.
- All issues must be rated investment grade or better (Baa3/BBB- or above). First, a Moody's Investors Service issue-specific rating is considered, and, if

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<sup>12</sup> Belgian and Luxembourg francs are considered identical.

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Figure 16. **Euro-Aggregate Index: Country of Issue**, December 31, 2001



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unavailable, a Standard & Poor's Ratings Group rating is used. If neither rating agency has rated the specific issue, the issuer rating is applied, first from Moody's and then from S&P. If a rating for the specific issue and issuer is not available from either major rating agency but another issue from the same issuer has been rated, this implied rating is applied to all other issues. If none of these types of ratings is available, then the issue is considered unrated and does not participate in the index. Since German Pfandbriefe are considered very high quality securities and yet many are from unrated issuers (mortgage banks, special purpose banks, and Landesbanken), Lehman Brothers will assign ratings that are one full rating category above the issuer's unsecured debt. This is consistent with Moody's methodology and reflects the collateral supporting Pfandbriefe.

- All issues must be fixed-rate securities.
- All issues must have at least one year remaining to maturity.
- The minimum outstanding for the Euro-Aggregate Index is EUR300 million for all bonds. The exchange rates among the 10 EMU currencies were fixed up to January 1, 1999, but not their levels against the EUR, due to the presence of non-EMU currencies, such as sterling, in the basket.

The following security types are excluded from the Euro-Aggregate Index: convertible securities, floating-rate notes, warrants, linked bonds, structured products, and German Schuldscheine (quasi-loan securities, excluded due to their trading restrictions and unlisted status, which results in illiquidity).

Reporting of results for the Euro-Aggregate Index complies with European capital market conventions that implement standards set by ISMA (International Securities Market Association), as well as U.S. standards. Through December 31, 1998, Euro-Aggregate Index returns were published in ECU. Beginning January 1, 1999, all total returns are reported in euro. As with all Lehman indices, returns can be calculated in any currency and quoted on either a currency hedged or unhedged basis. Total returns on a cumulative basis beginning from July 1, 1998, will be reported for the index; however, with the introduction of the euro and redenomination of the index, the cumulative return was reset to a new base inception date of January 1, 1999.

The Euro-Aggregate Index as of December 31, 2001, can be broken into the segments shown in Figure 17.

Currently, Lehman Brothers' trading desks are the primary source for index pricing. Lehman traders price more than 75% of the market value of the Euro-Aggregate Index (with the ultimate goal of 100% trader priced); the remainder is priced by other independent vendors and exchanges or by a Lehman Brothers matrix. Prices reflect the bid side as of the end of the trading day in London, with the exception of new issues, which are quoted at the offer price for the first month. Moreover, as of January 2001, Lehman Brothers has published a real-time Euro-Aggregate Index. Starting initially with European governments, our Euro-Aggregate Index will be refreshed every 60 seconds.

Figure 17. **Euro-Aggregate Index Composition**, December 31, 2001

	<b>% of Index</b>
<b>Government</b>	71.18
Treasury	64.33
Agency	4.23
Local Authority	2.63
<b>Credit</b>	16.8
<b>Corporate</b>	13.47
Financial Institutions	6.53
Industrial	6.02
Utility	0.93
<b>Non-Corporate</b>	3.33
Supranational	1.6
Sovereigns	0.78
Foreign Local Govt	0.16
Foreign Agency	0.78
<b>Collateralized</b>	12.01
Pfandbriefes	1.47
Jumbos	8.95
Other	1.6

### **Pan-European Aggregate Index**

Our Euro-Aggregate Index, launched July 1, 1998, has met with early success. Many European and U.S. investors have already selected the Euro-Aggregate Index as their European fixed-income benchmark. But at their request and in recognition of the remaining portions of the European capital markets not included in the initial euro zone, Lehman Brothers introduced a Pan-European Index on January 1, 1999. This index, which features the Euro-Aggregate Index as its main subset, spans the entire Continent. In addition to the Euro-Aggregate Index, the Pan-European Index includes all the index-eligible, local currency, investment grade, fixed-rate government, asset-backed, and corporate issues of sovereigns such as the U.K., Sweden, Denmark, and Norway.

The inclusion rules for the Pan-European Index are identical to those of the Euro-Aggregate Index.

On January 1, 2002, the minimum liquidity for the Pan-European and European Aggregate indices was raised from EUR150 million to EUR300 million. The liquidity thresholds for securities not denominated in euro are based on currency rates from the WM/Reuters Closing Spot Rates. This change increased the percentage of treasuries in the Pan-Euro Aggregate Index from 58.96% to 64.19%. All other sectors decreased, with pfandbriefes (down 2.7%) and credit (down 2.5%) showing the largest moves.

### **Asian-Pacific Aggregate Index**

In our concurrent quests better to serve the growing needs of our clients and to provide the first full performance map of the global debt markets, Lehman Brothers introduced the Asian-Pacific Aggregate Index on July 1, 2000.

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Initially, this new index consisted of approximately 1,200 debt issues from governments, corporations, and supranationals. Eventually, collateralized securities will be included as well. For consistency across all global investment-grade debt markets, the Asian-Pacific Aggregate Index will be an objective “rules-based” index. Accordingly, the Asian-Pacific Aggregate Index will include all bonds meeting straightforward and transparent criteria similar to those of the U.S. and Pan-European Aggregate indices, including minimum quality, liquidity, and maturity constraints. This approach ensures that the Asian-Pacific Aggregate Index will be a consistent, objective, replicable, and reliable representation of the marketplace. In contrast, some other index vendors offer only “sample” or “basket” indices, containing a few dozen to a few hundred securities that are selected according to subjective, unpublished standards.

#### ***Index Criteria***

The rules for inclusion in the Asian-Pacific Aggregate Index are as follows:

- All issues must be rated investment grade or better (Baa3/BBB- or above). First, a Moody’s Investors Service issue-specific rating is considered, and, if unavailable, a Standard & Poor’s Ratings Group rating is used. If neither rating agency has rated the specific issue, the issuer rating is applied, first from Moody’s and then from S&P. If a rating for the specific issue and issuer is not available from either major rating agency but another issue from the same issuer has been rated, this implied rating is applied to all other issues. If none of these types of ratings is available, then the issue is considered unrated and does not participate in the index.
- Sovereign rating of the country must be investment grade (Baa3 or better by Moody’s Investor’s Service).
- Participating currencies are the Australian dollar, the Hong Kong dollar, the Japanese yen, the New Zealand dollar, the Singapore dollar, the South Korean won, and the Thailand baht.
- All issues must be fixed-rate securities.
- All issues must have at least one year remaining to maturity.
- The minimum outstanding for the Asian-Pacific Aggregate Index moved from JPY20 to JPY35 billion, and privately placed JGBs are excluded.

As of December 2001, the Asian-Pacific Aggregate Index has 1327 securities with a market value of 339 trillion yen. It comprises a 86.16% government component, a 13.19% corporate component, and a 0.64% non-corporate component. There is a small percentage in the collateralized sector, 0.01%.

The liquidity thresholds for securities not denominated in yen are based on currency rates from the WM/Reuters Closing Spot Rates.

#### **Global Treasury Index**

The Global Treasury Index, which includes local currency-denominated sovereign debt of non-emerging market countries, began in April 1992, with historical

data available back to January 1987. All issues in the Global Treasury Index must be fixed-rate, nonconvertible debt and have at least one year remaining to maturity. Securities from countries classified as emerging markets are excluded. The country components are weighted according to market capitalization. On January 2002, the Global Treasury Index became a subset of the Global Aggregate Index. The higher liquidity constraint set on January 1999 was changed to be consistent with the new liquidity constraints of the Global Aggregate Index (Figure 18—exchange rate to be reset annually: USD 300 million, EUR 300 million, JPY 35 billion). In addition, local currency government debt from Thailand, South Korea and Singapore were included in the Global Treasury Index. As of December 2001, the Global Treasury Index had a market value of \$6,404 billion, with 23.64% coming from U.S. Treasury securities (Figure 19).

Within the Global Treasury Index, the two major subgroups are the G-7 Index and the Lehman Brothers Majors Index. Additional customized indices can be created.

Returns for the Global Treasury Index are reported daily and monthly on a hedged and unhedged basis in U.S. dollars.<sup>13</sup> In addition, returns for any

<sup>13</sup> The one-month hedged return assumes that currency fluctuations on the beginning market value of the securities are fully hedged into U.S. dollars. The cost of the hedge is based on a computation using prevailing one-month forward exchange rates at the beginning of the month.

Figure 18. **Global Treasury Minimum Outstanding Requirements**

	Minimum Outstanding					
	Through 12/31/98		Beg. 1/1/99		Beginning 1/1/02	
	(million)	Currency	(million)	Currency	(million)	Currency
<b>EMU-Zone</b>						
ECU/EUR	500	ECU	500	EUR	300	EUR
AUSTRIA	200	ATS	500	EUR	300	EUR
BELGIUM	10,000	BEF	500	EUR	300	EUR
FINLAND	1,000	FIM	500	EUR	300	EUR
FRANCE	5,000	FRF	500	EUR	300	EUR
GERMANY	1,500	DEM	500	EUR	300	EUR
IRELAND	100	IEP	500	EUR	300	EUR
ITALY	3,000,000	ITL	500	EUR	300	EUR
NETHERLANDS	1,000	NLG	500	EUR	300	EUR
PORTUGAL	10,000	PTE	500	EUR	300	EUR
SPAIN	200,000	ESP	500	EUR	300	EUR
<b>Others</b>						
AUSTRALIA	200	AUS	1,000	AUS	35,000	JPY
CANADA	200	CAD	1,000	CAD	300	CAD
DENMARK	5,000	DKK	5,000	DKK	300	EUR
JAPAN	300,000	JPY	1,000,000	JPY	35,000	JPY
NEW ZEALAND	200	NZD	1,000	NZD	35,000	JPY
NORWAY	5,000	NOK	5,000	NOK	300	EUR
SWEDEN	10,000	SEK	5,000	SEK	300	EUR
UNITED KINGDOM	150	GBP	350	GBP	300	EUR
UNITED STATES	100	USD	500	USD	300	USD

Figure 19. **Global Treasury Index Composition, 12/31/01**

<b>Country</b>	<b>Inception Date</b>	<b>Market Value (\$ bn)</b>	<b>% of Index</b>
<b>Group of 7</b>		<b>5380</b>	<b>84.00</b>
Canada	1/87	171	2.67
France	1/87	485	7.57
Germany	1/87	513	8.01
Italy	1/87	551	8.60
Japan	1/87	1838	28.70
United Kingdom	1/87	308	4.80
United States	1/87	1514	23.64
<b>Majors (G-7 plus the following)</b>		<b>678</b>	<b>10.58</b>
Australia	4/88	29	0.45
Belgium	1/87	170	2.66
Denmark	1/87	64	1.00
Netherlands	1/90	141	2.19
Spain	1/89	223	3.48
Sweden	1/87	51	0.80
<b>Global (Majors plus the following)</b>		<b>2601</b>	<b>40.63</b>
Austria	1/87	86	1.34
Finland	7/91	39	0.62
Ireland	1/87	14	0.22
New Zealand	1/87	9	0.13
Norway	4/91	11	0.17
Portugal	8/91	41	0.65
Greece	6/01	77	1.21
Euro	1/91	2324	36.29

composite or individual country index are available in terms of any of the 23 currencies that are tracked. For example, G-7 returns are available in the currency of each of the seven countries. Prices for the index are provided by Lehman Brothers trading desks in London, New York, and Tokyo. Additional prices are provided by outside sources in the local markets. Currency rates are based on the WM/Reuters Closing Spot Rates.

## HIGHYIELDINDICES

### U.S. High Yield Index

The Lehman Brothers High Yield Index covers the universe of fixed-rate, non-investment-grade debt. The index was first introduced in January 1986, and historical data are available since January 1983. All bonds included in the High Yield Index must be dollar-denominated and nonconvertible and have at least one year remaining to maturity and an outstanding par value of at least \$150 million. This limit of \$150 million was raised from \$100 million in July 2000. Pay-in-kind (PIK) bonds, Eurobonds, and debt issues from countries designated as emerging markets (e.g., Argentina, Mexico, Venezuela, etc.) are excluded, but non-corporate and global bonds (SEC registered) of issuers in non-EMG countries are included. Original issue zeroes and step-up coupon structures are also included. Generally,

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securities must be rated Ba1 or lower by Moody's Investors Service. If no Moody's rating is available, bonds must be rated BB+ or lower by S&P. As of July 2000, Moody's Investor Service has been the primary rating agency for the High Yield Index. A small number of unrated bonds are included in the index; to be eligible, they must have previously held a high-yield rating or have been associated with a high-yield issuer and must trade accordingly. As of January 1, 1998, Lehman Brothers added 144A securities to this index, and, as of July 1, 2000, defaulted securities have been removed from the High Yield Index.

Lehman Brothers began publishing returns for this index on a daily basis from September 1, 1998.

The index has several subcomponents. Intermediate indices include bonds with remaining maturities of less than 10 years; long indices include bonds with remaining maturities of 10 years or more. The index also has subdivisions by credit quality (Figure 20).

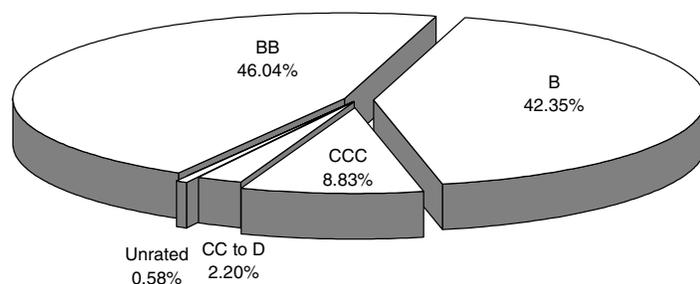
As of December 2001, the High Yield Index contained 1223 issues and had a market value of \$318 billion, with the largest portion in B (42.35%) and BB (46.04%) securities. Returns and statistics for this index are computed in the same manner as those for the U.S. Aggregate Index.

### Pan-European High Yield Index

The Lehman Brothers Pan-European High Yield Index covers the universe of fixed-rate, sub-investment-grade debt denominated in euros or other European currencies (except Swiss francs). This index was launched in January 1999 and includes only euro- and sterling-denominated bonds, because no issues in the other European currencies now meet all the index requirements. To be included, the bonds must have at least one year to maturity, a rating between D and BB1 from Moody's or S&P if not rated by Moody's, and an outstanding par value of at least EUR50 million. The Pan-European High Yield Index does not include non-rated bonds. Even though many otherwise investment-grade companies in Europe issue

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Figure 20. **Lehman Brothers High Yield Index Composition, 12/31/01**



bonds without ratings, this rule prevents us from trying to choose which issuers are high yield and which are investment grade. Like the U.S. High Yield Index, our Pan-European High Yield Index excludes debt from entities in countries that are designated as emerging markets.

The index currently has two subcomponents, euro and non-euro currency. As the number of issues increases, we will increase the number of subindices. As of December 2001, the index contains 147 issues and has a market value of EUR22.2 billion. The Pan-European High Yield Index was 68.17% euro and 31.83% non-euro.

### EMERGING MARKETS INDEX

Lehman Brothers introduced the Emerging Markets Index in January 1997 as part of its Global Family of Indices. Previously, Lehman Brothers had published an Emerging Americas Bond Index, consisting of debt of Argentina, Brazil, Mexico, and Venezuela that dates back to 1993 (Figure 21). The new index better reflects the development in other emerging markets in the following regions: Americas,

Figure 21. **Emerging Markets Index Composition by Country and Asset Class**, December 2001  
Emerging Markets Index Value = \$205.3 billion

	Market Value %		Market Value %
Emerging Europe	23.43	Emerging Africa	4.64
Bulgaria	2.10	Algeria	0.45
Croatia	0.34	Ivory Coast	0.06
Russia	16.24	Morocco	0.74
Slovakia	0.17	Nigeria	1.57
Turkey	4.08	S.Africa	1.07
Ukraine	0.50	Egypt	0.75
Emerging Asia	5.17	Emerging Middle East	2.83
Indonesia	0.20	Lebanon	2.83
Kazakhstan	0.38		
Philippines	3.79		
Thailand	0.80		
Emerging Americas	63.93		
Argentina	3.64		
Brazil	20.85		
Colombia	3.38		
Costa Rica	0.16		
Dominican Rep	0.25		
Ecuador	1.06		
El Salvador	0.18		
Guatemala	0.17		
Jamaica	0.20		
Mexico	23.43		
Panama	2.75		
Peru	1.70		
Uruguay	0.60		
Venezuela	5.53		

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Europe, Asia, Middle East, and South Africa. The new countries contributing to the Emerging Markets Index are shown in Figure 21. The existing Emerging Americas Bond Index was folded into the new index to preserve its historical information. As with other fixed-income benchmarks provided by Lehman Brothers, the Emerging Markets Index is rule-based, which allows for an unbiased view of the marketplace and easy replicability.

***Index Criteria***

The rules for inclusion in the Emerging Market Index are as follows:

- Maturity: At least one year to maturity.
- Minimum Liquidity Constraint: Brady, \$500 million; corporate, \$300 million; sovereign, \$300 million; local issues, \$500 million.
- Quality: Sovereign rating Moody's Baa3 or lower, or S&P BBB- or lower.
- Currency: U.S. dollar-denominated.
- Fixed/floating.
- Defaulted corporate bonds are removed from the index at the end of the month. Defaulted sovereigns remain in the index until they are restructured, defeased, exchanged, or no longer outstanding.

The liquidity constraint increased on January 1, 2001, from \$150 million to \$300 million for corporates and from \$200 million to \$300 million for sovereign bonds.

**Pan-European Emerging Markets Index**

In response to investor demand, the Pan-European Emerging Markets Index was launched on August 1, 2001. As is typical with all Lehman Brothers indices, this index is rules-based.

***Index Criteria***

The rules for inclusion in the Pan-European Emerging Market Index are as follows:

- Maturity: At least one year to maturity.
- Liquidity Constraint: Minimum EUR300 equivalent outstanding
- Fixed rate bonds only. Brady bonds are excluded.
- Quality: Sovereign rating Moody's Baa3 or lower, or S&P BBB- or lower.
- Currency: Denominated in euro or legacy currencies and British pounds, Danish krone, Swedish krona, and Norwegian krone.
- Defaulted corporate bonds are removed from the index at the end of the month. Defaulted sovereigns remain in the index until they are restructured, defeased, exchanged, or no longer outstanding.

**OTHERMBSINDICES**

**Commercial Mortgage-Backed Securities Index**

As the investor base for CMBS continued to broaden in the late 1990s, Lehman Brothers recognized the need for a formal CMBS index for use as a performance benchmark. In keeping with our tradition of offering rigorous indices, Lehman

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Brothers has designed a new index to capture the essential characteristics of the CMBS market. Similar to other members of the Lehman Brothers Global Family of Indices, our CMBS Index was constructed using a rules-based approach. Each security in our CMBS Index must meet all published eligibility criteria (see below). A well-defined set of rules was developed to minimize arbitrary exclusion of securities, assure that included issues have liquidity, and allow for the maintenance of complete market data.

This approach ensures that the CMBS Index is consistent, objective, reliable, representative of the marketplace, and replicable. As with all our other indices, this index is not influenced by our current inventory positions or by past and future underwriting roles for any issuer. This approach contrasts with sample “basket” or portfolio-based indices, in which the performance benchmark is an arbitrarily selected set of securities.

***CMBS Index Criteria***

As the CMBS market has evolved, newly originated, fixed-rate transactions have become the most liquid and most frequently issued type of transaction. Newly originated loans are those originated and underwritten for securitization. They usually contain structural features that are beneficial in a transaction, such as call protection and reporting requirements. For these reasons, as well as for their homogeneity, these new origination transactions form the base universe of our CMBS Index.

The CMBS Index has four subsectors:

- 1) CMBS Investment Grade Index—measures return for investment grade classes.
- 2) CMBS High Yield Index—measures return for non-investment grade and nonrated classes.
- 3) CMBS Interest-Only Index—measures return for interest-only classes.
- 4) Commercial Conduit Whole Loan Index—measures return for all bond classes and interest-only classes.

Securities that are assigned split ratings will be categorized according to their Moody’s Investors Service, Inc. rating. This is consistent with all other Lehman Brothers indices. If securities do not have a Moody’s rating, then the Standard & Poor’s (S&P) rating will be used. If the securities have neither an S&P nor a Moody’s rating, then FitchIBCA will be used; otherwise, we will use Duff & Phelps Credit Rating Co.

A number of specific criteria apply to all the Lehman Brothers CMBS indices:

- 1) All transactions must be private label. No agency transactions will be included.
- 2) The collateral for each transaction must be new origination, that is, originated specifically for securitization.
- 3) Each original aggregate transaction size must be at least \$500 million to be included in the CMBS Index. Aggregate outstanding transaction sizes must be at least \$300 million to remain in the CMBS Index.

- 4) All certificates must be either fixed-rate, weighted average coupon (WAC), or capped WAC securities. No floating-rate certificates will be included.
- 5) All certificates must have an expected maturity of at least one year.

Figure 22 shows the criteria that are specific to each index.

The CMBS Investment Grade Index is further subdivided into two components:

- 1) The ERISA-eligible component measures return for all investment-grade bonds that are ERISA eligible under the underwriter's exemption.
- 2) The non-ERISA-eligible component measures return for all investment-grade bonds that are not ERISA eligible under the underwriter's exemption. However, many of these bonds may be ERISA eligible under account-specific exemptions.

#### **CMBS Index Return Components**

CMBS Index returns are made up of four elements:

- 1) *Price return* is the return derived by price changes caused by interest rate movements and spread changes.
- 2) *Coupon return* is the return associated with the coupon payment on a certificate.
- 3) *Paydown return* is the return related to expected or unexpected payments of principal. In the case of commercial mortgage loans, prepayments are often accompanied by prepayment premiums. Paydown return may be associated with the related prepayment premium return component (see next item).
- 4) *Prepayment premium return* is the return due to additional premiums paid in connection with certain prepayments. Prepayment premiums are generally distributed to investors as excess interest.

#### **The CMBS Index Statistics**

As of January 1, 2002, there were 848 tranches, totaling \$145 billion current face value, in the CMBS Index. These transactions are categorized into eight rating/type groups. Figure 23 shows the composition of the CMBS Index.

Figure 22. **CMBS Indices: Criteria**

<b>Index</b>	<b>Criteria</b>
CMBS Investment Grade Index	All bonds rated investment grade by Moody's and offered publicly.
CMBS High Yield Index	All bonds rated below investment grade by Moody's and unrated securities; can be offered privately and publicly.
CMBS IO Index	Includes all interest-only securities.
Commercial Conduit Whole Loan Index	Aggregate of all classes that meet the general CMBS Index criteria.

Figure 23. **CMBS Index Composition**, as of January 1, 2002

	<b>Market Val.</b> (\$ mn)	<b>% of Index</b>	<b># of Issues</b>
<b>CMBS Inv. Grade</b>	<b>155,298</b>	<b>100.00</b>	<b>1078</b>
Aaa	127,286	81.96	390
Aa	9,000	5.80	177
A	9,763	6.29	248
Bbb	9,249	5.96	263
<b>CMBS High Yield</b>	<b>10,602</b>	<b>100.00</b>	<b>1039</b>
Bb	7,034	66.35	428
B	2,715	25.61	406
Other	853	8.05	205
Interest Only	8,778	100.00	219

#### ***Pricing and Data Quality***

The Lehman Brothers CMBS trading desk will be the primary source of pricing for the CMBS Index. A database maintained and updated by Lehman Brothers tracks deal information including, but not limited to, class sizes, new issues, and rating changes. Indicative bond data, including updates to certificate sizes and coupons, as well as collateral data, will be received each month from Intex. The Lehman Brothers proprietary trading system will provide the cash flows for the transactions. The Lehman Brothers system will also calculate the prices, average lives, durations, and principal windows under the specific pricing assumptions set by Lehman Brothers traders.

Spreads are updated every Friday and at month-end (when the month-end does not fall on a Friday). Pricing is on the bid side, representing 3 pm levels. The only exception to this procedure is that new issues are quoted at the offer price during their first month to avoid penalizing a fund manager who recently acquired the certificates.

#### ***CMBS Return History***

The CMBS indices will initially have history to December 1996, with a possibility of backdating to 1995. Historical indicative spreads on the outstanding new origination transactions will be used to create the historical index returns.

#### **EURODOLLARINDEX**

In the past few years, the Eurobond market has mushroomed. In 1993, dollar-denominated Eurobond issuance was over \$150 billion. To reflect changes in the market, Lehman Brothers introduced its revised Eurodollar Index in April 1994.<sup>14</sup> Index history has been built back to 1987, except for global bonds, which have history to 1989.

<sup>14</sup>The revised index was made more inclusive with the addition of Dragon and global bonds.

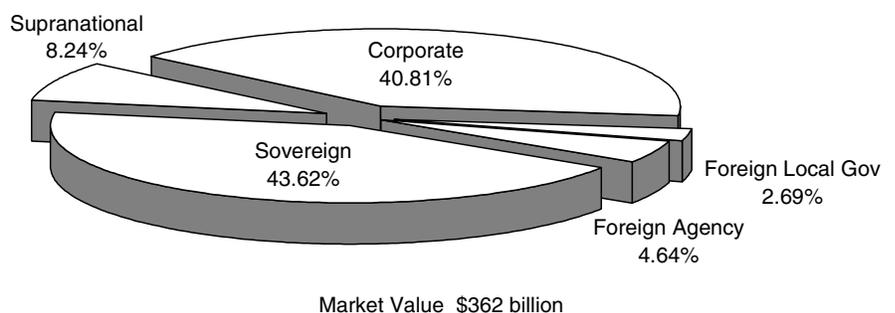
To be included in the Eurodollar Index, a bond must be a non-SEC registered (except for globals), fixed-rate U.S. dollar-denominated issue. Eurobonds issued as part of Euro-medium-term note programs may be included, as are Dragon bonds (bearer securities that are launched, syndicated and sold in Asia, excluding Japan). All bonds must be rated investment grade (Baa3) or better by Moody's, or another rating agency if a Moody's rating is not available. In a limited number of cases, bonds of investment-quality issuers are included despite the absence of a rating of an issue if they satisfy certain other criteria. These bonds must be widely perceived as investment-grade and trade accordingly. All bonds included in the index must have at least one year remaining to maturity and an outstanding par value of \$150 million, or \$200 million in the case of Japanese ex-warrant bonds. Floating-rate securities, convertibles, asset-backed, and bonds with warrants are excluded. As of December 2001, the Eurodollar Index included 1146 issues with a market value of \$1,485 billion.

Returns and statistics are available monthly on the Composite Eurodollar Index and several of its components. The three major subsectors are separated by issuer type: sovereign, corporate, and supranational (Figure 24). In addition, the index is divided by credit quality and country of issue. Other subindices are available, as well: the AA or Higher Index includes bonds that are rated the equivalent of Aa2 or higher by Moody's; the High Grade Public Index consists of sovereign, supranational, and government-guaranteed Eurobonds rated AA or higher; and the Global Issues Index includes only bonds that can be settled in multiple countries.

### MUNICIPAL BOND INDEX

Lehman Brothers began publishing municipal bond indices in January 1980. They are broad market performance benchmarks for the tax-exempt bond market. Like the other Lehman Brothers bond indices, the Municipal Indices are rule-based and market-value weighted. As of December 2001, approximately 42,220 bonds were included in the Municipal Bond Index, with a market value of \$781 billion.

Figure 24. Eurodollar Index Composition, 12/01



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To be included in the Lehman Brothers Municipal Bond Index, bonds must have a minimum credit rating of at least Baa. They must have an outstanding par value of at least \$5 million and be issued as part of a transaction of at least \$50 million. The bonds must have been issued after December 31, 1990, and have a remaining maturity of at least one year. Taxable municipal bonds, bonds with floating rates, and derivatives are excluded.

As of January 1, 2000, the rules governing the Municipal Index were revised. Most notably, the issue size liquidity constraint was increased to \$5 million outstanding. In addition, certificates of participation (COPS) will be included in the benchmark. Details on these revisions follow:

- 1) The deal size/issue size liquidity constraint combination for inclusion in the Municipal Bond Index increased from \$50 million/\$3 million outstanding to \$50 million/\$5 million outstanding. All securities with an issue size below \$5 million were removed from the index effective January 1, 2000. The number of issues in the index decreased by approximately 28%, while the market value of the index decreased by 7%. This change had minimal impact on sector and state weightings. The largest change in weightings occurred in the insured sector, with a 0.41% decrease in representation. The greatest impact to the subsectors occurred in the local general obligation sector, with a weighting decrease of 0.44%. Changes in state representation were also relatively benign, as the New York State weight will register the largest difference, with a 0.58% increase in representation.
- 2) Certificates of participation (COPs) were added to the revenue sector of the Municipal Index. Using October 1, 1999, data, 804 COPs, with a market value of \$14.8 billion, were added to the index.

These rules changes will result in a more accurate, comprehensive, and consistent benchmark for the municipal asset management community. Please contact your Lehman salesperson for more details.

Beginning in January 1998, Lehman Brothers began calculating returns and statistics for the Lehman Brothers Municipal Bond Index on a weekly and month-end basis. As of January 2001, results are being reported and published on a daily basis. Prices are provided by the Muller Data Corporation. The index has four main sectors: state and local general obligation bonds, revenue bonds, insured bonds (including all insured bonds with a Aaa/AAA rating), and prerefunded bonds (Figure 25). Most of the index has historical data to January 1980. In addition, several subindices based on maturity and revenue source have been created, some with inception dates later than January 1980.

In January 1996, Lehman Brothers also began publishing a noninvestment grade municipal bond index and “enhanced” state-specific indices for Arizona, Connecticut, Maryland, Massachusetts, Minnesota, and Ohio. These indices are published separately from the Lehman Brothers Municipal Bond Index.

Figure 25. **Municipal Index Components, 12/01**

<b>Municipal Index</b>	<b>Number of Issues</b>	<b>Market Value (\$ Billion)</b>	<b>Inception Date</b>
Municipal Index	42,220	781.5	1/80
State GO	4,959	83.0	1/80
Local GO	5,112	73.6	1/90
Revenue	9,393	201.1	1/80
Prerefunded	3,339	66.1	1/88
Insured	19,417	357.7	1/90
California Exempt	4,890	101.7	7/93
New York Exempt	5,433	122.6	7/93

To be included in the Lehman Brothers Non-Investment Grade Municipal Bond Index, bonds must be nonrated or be rated Ba1 or below. They must have an outstanding par value of at least \$3 million and be issued as part of a transaction of at least \$20 million. The bonds must have been issued after December 31, 1990, and have a remaining maturity of least one year.

To be included in the Lehman Brothers Enhanced State Specific Municipal Bond indices, bonds must have a minimum credit rating of Baa. They must have an outstanding par value of at least \$2 million and be issued as part of a transaction of at least \$20 million. The bonds must have been issued after December 31, 1990, have a remaining maturity of least one year, and have been issued in the particular state.

#### **THE LEHMAN-ACLI PRIVATE PLACEMENT INDEX**

At the request of the American Council of Life Insurance (ACLI) and its member firms, Lehman Brothers investigated the feasibility of publishing an index consisting of private placement securities. Because security level information for private securities was not readily available, it proved to be complicated to construct an index using the successful rule-based methodology currently employed for our public benchmarks. To work through this obstacle, the member firms of the ACLI provided security level information to the ACLI, which in turn aggregated these data and sent the resulting database to Lehman Brothers. Lehman Brothers then applied its analytics, pricing, and index rules to this information to produce the Private Placement Index. The database of securities that Lehman Brothers maintains is currently limited to data from member firms that have chosen to contribute to the index. Of the approximately 4,000 securities in the database, 853 meet the index criteria. Lehman Brothers will work with the ACLI to improve the quality and quantity of securities in the index.

The index is composed of U.S. dollar-denominated private placement bonds that are investment grade and noncallable with a minimum issue size of \$25 million. At this time, 144A securities and ESOPs are excluded from the index. The investment grade determination is made using an ACLI-derived quality that can have the following values: AAA, AA, A1, A2, A3, BBB1, BBB2, or BBB3.

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The index uses the same methodology as the other major Lehman Brothers indices to calculate returns and statistics. Returns are based on a set of securities determined at the beginning of each month and held constant until the beginning of the next month. This universe is not adjusted for securities that become ineligible for inclusion during the month or for issues that are newly eligible. Thus, a new universe of securities is captured at the beginning of each month and is used to calculate returns for the upcoming month.

Securities in the index are priced once a month by Lehman Brothers. Trader quotations on specific securities and a trader-provided spread matrix that takes into account sector, quality, and maturity are used to price each issue in the private placement database. The spread matrix factors in an additional liquidity spread, which is added to the initial spread of each security.

### **GLOBAL REAL INDEX**

At the end of October 1997, Lehman Brothers began publishing returns on its first inflation-protected index, the Global Real Index. Following the introduction of U.S. Treasury inflation-protected securities (TIPS) in January 1997 and subsequent non-government issues, the investment community started to focus on this group of bonds as a new asset class. With cash flows linked to an underlying inflation index, these securities protect against adverse inflation and provide a minimum level of real return. Given their unique structure and return characteristics, the emergence of an inflation-protected asset class necessitates a concomitant index to measure its performance.

The rules for inclusion in the Global Real Index are as follows:

- All bonds must have cash flows linked to an inflation index.
- The initial countries covered will include the U.S., the U.K., Canada, Sweden, and France.
- The minimum amounts outstanding will be 100 million U.S. dollars, 100 million sterling, 200 million Canadian dollars, 100 million Swedish krona, or 100 million euro.
- All bonds must be sovereign issues and be denominated in the relevant national currency.
- All bonds must have more than one year to maturity.

Upon creation of the new Global Real Index, Lehman Brothers removed TIPS from its Aggregate Index on December 31, 1997.

### **THE INVESTMENT GRADE 144A INDEX**

The Investment Grade 144A Index was introduced in January 1998. This index is not a subset of our U.S. Aggregate Index but follows the same rules and pricing methodology. The liquidity constraint of the 144A increased to \$150 million on July 1, 1999, along with the U.S. Aggregate Index. On July 1, 2000, ERISA-eligible 144As with registration rights will be included in the U.S. Aggregate Index. In addition, when securities in this index become publicly

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registered, they move into the U.S. Aggregate Index, provided all other rules are met.

### **THE CORPORATE LOAN INDEX**

The Corporate Loan Index was introduced in 1993. It is composed of 40 equally weighted loans and has the following rules:

- Maximum issuer Moody's rating of Ba1, or not rated.
- Actively traded in the secondary market.
- One month's notice given when loans are added to or deleted from the index (except for refinancings)
- Not more than five loans added and/or deleted per month (exclusive of refinancings)
- Prices are provided by Lehman trading desk.

### **MUTUAL FUND INDICES**

The mutual fund industry has changed substantially in the past few years, with many institutional and retail mutual funds shifting their emphasis from maximizing current income to a greater focus on total return. To meet these needs, Lehman Brothers introduced its Mutual Fund indices in November 1992. In addition, the SEC ruled that, effective July 1, 1993, mutual fund managers must include in their prospectuses and annual reports a line graph comparing their performance with an appropriate broad-based market index, along with standardized 1-, 5-, and 10-year total return figures. The Lehman Brothers indices provide fund managers with objective and comprehensive market-based benchmarks for measuring performance, as an alternative or in addition to the more traditional peer group comparisons.

As of December 2001, Lehman Brothers had created a total of 16 indices, covering the most common fixed-income mutual fund sectors (Figure 26). The methodology used to compute the Mutual Fund indices is identical to that used for the other Lehman Brothers indices. When initially constructed, the original 15 Lehman Brothers Mutual Fund indices corresponded to categories listed by the Lipper Analytical Service. Additional Lehman Brothers indices have subsequently been added in response to client requests to reflect the range of fixed income mutual funds.

There are three major categories of Mutual Fund Indices: short, intermediate, and general. The short indices cover bonds with a maturity of 5 years or less. The intermediate indices cover securities with 5-10 years remaining to maturity. The general indices cover the full range of maturities in each category. Each of the indices assumes full investment in the objective of the fund. If a different allocation is desired, customized indices can be created to meet the specifications of fund managers.

### **GLOBAL CAPITAL SECURITIES INDEX**

On November 1, 2001, Lehman Brothers introduced the Global Capital Securities Index. The intent of the index is to provide a rules-based benchmark for use by

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Figure 26. **Mutual Fund Indices**, 12/01

**Short Indices**

Short (1-2) U.S. Government  
Short (1-3) U.S. Government  
Short (1-5) U.S. Government  
Short (1-5) U.S. Treasury  
Short (1-3) U.S. Credit  
Short (1-5) U.S. Credit  
Short (1-3) Government/Credit  
Short (1-5) Government/Credit  
Short World Multimarket

**Intermediate Index**

Intermediate (5-10) U.S. Government  
Intermediate (5-10) U.S. Treasury  
Intermediate (5-10) Investment Grade Debt  
Intermediate (5-10) Government/Credit

**General Indices**

Government/Mortgage  
Credit/Mortgage  
Credit/High Yield

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capital securities investors to monitor their relative performance more closely. The rules for inclusion are as follows:

- The security must generally be viewed as a hybrid fixed-income security that either receives regulatory capital treatment or a degree of “equity credit” from the rating agencies. This will typically include Tier 2/lower Tier 2 bonds, perpetual step-up debt, step-up preferred securities, or term preferred securities.
- The issue must bear interest at a rate that is fully taxable to the investor.
- The security accrues interest or dividends at a rate that is fixed either for the life of the security or until the first step-up date.
- Denomination size must be a minimum of either \$150 million, EUR150 million or GBP100 million.
- Must be rated investment grade by Moody’s Investors Service.
- The security must have a defined term (maturity). That term may be set either by a hard legal maturity, or, if it is a perpetual security, the rate must have a step-up designed to take out the securities on the first optional call date.
- Must have at least one year remaining to term/maturity.

**SWAPINDICES**

In November 2001, we introduced two families of total return indices for swaps. A paper describing the indices in full detail is available on our LEHMANlive website. To summarize:

Bellwether swap indices provide total returns of 32 swaps with the following maturities: three months, six months, one year, and annual increments thereafter out to 30 years. As an example, the 10-year Swap Index measures the total return

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of investing in 10-year par swaps over time. In addition to the bellwether swap indices, Lehman is to introduce the Swap Total Return Index as a single performance measure for the swaps market as a whole. This index tracks total returns of an equally weighted portfolio of bellwether swaps with maturities ranging from three months to 30 years (as described above).

Mirror swap indices provide total returns of a portfolio of swaps constructed to match the key-rate exposure of major Lehman Bond indices (Aggregate, Government/Credit, Credit, Agency, MBS). Each mirror index will reflect the performance of a weighted portfolio of bellwether swaps with the following maturities: 6 months, 2, 5, 10, 20, and 30 years. For example, the Mortgage-Mirror Swap Index is a portfolio of swaps that matches the key-rate exposures of the Lehman Mortgage Index and would be used to hedge the Mortgage Index. The total return of the Mortgage-Mirror Swap Index provides an easy way to measure the excess return of the Mortgage Index to a duration-matched portfolio of swaps.

We hope to add swaps indices for euro, yen, and sterling in 2002.

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