

An Analysis and Description of Pricing and Information Sources in the Securitized and Structured Finance Markets

**The Bond Market Association and
The American Securitization Forum**

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EXECUTIVE SUMMARY

I. Introduction

- The Bond Market Association's MBS/ABS/CDO Structured Products Division and the American Securitization Forum jointly undertook a research project to understand and describe pricing and information sources; and offer insights and observations of a general nature into the price discovery and valuation process.
- The goal of the resulting report was to be objective and analytical, focusing on current marketplace practices and available pricing and data information sources. The project does not nor is it intended to offer comparisons about the relative quality, adequacy or effectiveness of the pricing and information sources and does not take a position on current marketplace and regulatory issues.

WHAT DOES THE STUDY COVER?

- The study covered the entire range of structured and securitized product sectors¹ including Asset-backed commercial paper ("ABCP"); Agency Pass-through Residential Mortgage-Backed Securities ("RMBS"), including generic TBA (To Be Announced) and specified pools; Collateralized Mortgage Obligations ("CMO") — agency and non-agency; mortgage-related asset-backed securities ("ABS") including nonconforming jumbo, subprime and home equity loans; other consumer ABS, including auto, student loan and credit card; commercial ABS, including inventory, receivables, equipment loans and leases; Commercial Mortgage-Backed Securities ("CMBS"); and Collateralized Debt Obligations ("CDO")/Collateralized Loan Obligations ("CLO") - cash and synthetic structures.
- While acknowledging the increasing importance and benefits of securitized product credit derivatives and indices in price formation and discovery, the study generally focused on the cash market.
- The pricing and information sources covered in this report include pricing information for trading, repurchase agreement collateral valuation, risk management, mark to market portfolio and position valuations and Net Asset Value ("NAV") accounting; data sources, particularly relating to underlying collateral and structured and securitized finance transactions; and independent vendor models.

II. Broad Observations and Conclusions

- *Each Product Sector Is Unique, Though Some General Conclusions May Be Drawn:* Each product sector is distinct based on issuers, investors, origination, servicing and collateral management, trading and pricing systems, and type and volume of available information. These differences lead to distinct pricing and valuation conventions, liquidity levels and risk exposures and sensitivities. There, however, is a generic and general valuation process applicable across the sectors which involves identification of the most recent market quote and comparing that quote to the investor's view of intrinsic value taking into account risk exposure, economic conditions and the interest rate environment.
- *Structured Finance Products Trade in Dealer Markets:* As is the case across fixed-income sectors, the securitized and structured finance markets are dealer markets. Price and market quote information is ultimately derived and verified through dealers based on the dealers' market making and liquidity providing function. By virtue of their size and market presence, large institutional investors can influence price discovery and formation based on their trading and portfolio positions.
- *Primary vs. Secondary Pricing:* The study concentrates on the secondary market, that is, once the securitized and structured transaction has begun trading. Primary market pricing refers to establishment of

¹ The term structured finance refers to both asset-backed and mortgage backed (ABS and MBS) securitized products and CMO, CDO and CLO structured transactions unless otherwise noted.

pricing at the time of issuance and involves direct distribution through private placement, 144A issuance or public offering to investors typically through a syndicate of dealers/underwriters. Primary market “on the run” pricing is important and widely followed due to its liquidity.

■ ***Pricing Information Contexts and Applications:*** Traders, analysts and investors/portfolio managers are called upon for market quotes and valuations within a number of different contexts. The contexts and applications may be classified as trading, repo transaction collateral valuation, risk management, position and portfolio valuation and NAV accounting. The information is available from dealers, independent price evaluations and through electronic trading platforms in liquid product sectors.

■ ***Examples of Price Discovery Process:*** Price identification or discovery, especially in the trading context, is the result of interaction between market participants. Depending on market liquidity and product sector, the process may be one in which price quotes are accessed and trade completed within a short period of time as is the case with agency (TBA) RMBS or ABCP or a more protracted negotiation that begins with submission of a “bid list” with potential buyers having a period of time to submit an offer as may be the case, for example, with more credit sensitive (below-investment grade) CMBS.

PRICING SOURCE OBSERVATIONS

■ ***Collateral and Structure Characteristics Determine Market Liquidity and Price Availability:***

Depending on the sector characteristics, structured products may trade in larger volumes and more frequently (e.g. TBA agency RMBS) or trade by appointment and less frequently (e.g. below-investment grade CMBS). Product sectors tend to be liquid to the extent the product is commoditized, structures are standardized, credit quality is high with minimal levels of defaults and delinquencies, and collateral is relatively uniform. The less liquid markets are characterized by more complex structures and cash flow “waterfall” allocation rules; less deal structure and collateral uniformity and standardization; and lower credit quality.

■ ***Trade Flow Driven Pricing vs. Model-Derived Pricing:*** Trade flow based pricing is more likely to be found in the more liquid structured finance product sectors (e.g. TBA agency mortgage pools and, to a lesser degree, high grade consumer ABS). At the other extreme, pricing in structured finance product sectors that trade less frequently and are less liquid is driven more by valuation models. In reality, model derived valuations are integral to price discovery across sectors. As product sectors develop and market participants increase, trade volume and supply and demand dynamics become more prominent in price identification and discovery.

■ ***Electronic Platforms Add to Price Discovery, Operate in Commoditized Product Markets:*** The growth and development of electronic trading and especially the multidealer trading platform industry has been a powerful force in enhancing liquidity and price availability. Trading platform activity has proliferated around product sectors whose characteristics are aligned with more liquid product trade flow determined pricing rather than model-determined price sectors. Indeed, agency RMBS and ABCP are the dominant products traded in multidealer-to-investor (also referred to as “B2C”) platforms

■ ***Dealers Provide a Great Deal of Information; Multiple Dealer Relationships Lead to Investor Price Knowledge:*** In their role, dealers provide a great deal of information concerning prices, collateral, relative value and insights, and, in some cases, model access to institutional buy-side customers. Generally, there is effective price knowledge for buy-side customers that have multiple (for example, five) dealer relationships and access to price quotes from multiple dealer sources. Obtaining quotes from multiple dealers is a good practice as valuation views may differ especially in less liquid markets due to underlying assumptions (e.g. mortgage prepayment speeds).

DATA INFORMATION AND MODELING SERVICE OBSERVATIONS

■ ***How and Why Market Participants Use Models:*** Models play a necessary and fundamental role in structured product price discovery/formation and valuation due to data intensive calculations and the

need for sensitivity and risk analysis that incorporates numerous operating interest rate and economic environment, collateral characteristics, and transaction structure assumptions.

- **Valuation and Price Determination is More than Credit Modeling:** Pricing and valuation is more complex than simply attaching a spread to a transaction's investment rating and credit performance. Numerous factors are taken into account, for example, imbedded options, cash flow volatility, collateral characteristics, issuer and servicer track record and technical market considerations such as demand and supply factors, liquidity and trade size.
- **Large Number of Data and Model Vendors; Higher Value Placed on Data than Generic Models:** The study identified over 40 structured and securitized data and model products. Depending on the product and vendor, the cost to the market participant can be minimal or free to substantial. The cost generally is higher for products that provide specific information about collateral data and deal structures. Market data are highly valued, and investor participation in certain product types and sectors is based on the data availability.
- **Quality and Quantity of Data on the Rise:** The clear consensus is that the quantity and quality of collateral and transaction data is on the rise as a result of institutional investor demand, the role of data and information access to increasing the investor pool, and the competitive responses by data and model vendors.
- **Greater Demand for Information and Modeling Services for Three Reasons:** The growth of complex structured products requires models to value and price the transactions and data inputs to run the models. Second, competition from both the buy-side and sell-side perspective has intensified and thus the need for tools to compete for clients. Third, performance matters and thus the demand has intensified for ways to measure performance, performance attribution and risk.
- **Frequent Updates:** Vendors update as soon as the information is available from the data sources.
- **Historic Data, Broad Coverage:** The information providers maintain historical data and capture virtually all of the common structures (for example, virtually all agency CMO structures are modeled as well as most of the leading private-label issuer CMO structures) and the capacity to model those that are not in their database library.
- **Information Products Broadly Distributed:** While some information sources exclusively concentrate on one sector, other information providers have developed suites of products that cut across the broader universe of sectors. Though there are exceptions, information products are distributed both directly to end-users and through other distribution channels.

III. SPECIFIC PRODUCT SECTORS

ABCP

PRICING

- **Liquid market:** The ABCP product is considered among the most liquid and transparent of the structured finance sectors. While ABCP electronic trading is increasing, the majority of trades — about 60 to 70 percent — are voice trades, as investors value the insights and “color” traders impart. Most electronically traded CP are shorter maturity, for example, less than 45 days.

DATA/MODEL

- **Trustee reports primary source of collateral data:** Trustee reports and issuer and conduit web sites are the ultimate and primary source of collateral data and are relied on by market participants. While trustee report data updated monthly are the dominant source of information on ABCP collateral, centralized and

systematic sources of trustee information enhances the efficiency of the collateral evaluation and monitoring process.

AGENCY RESIDENTIAL MORTGAGE-BACKED SECURITIES – PASS-THROUGHS AND CMOs

■ *Product characteristics drive liquidity, trading volume:* The agency TBA characteristics contribute to market liquidity: standardized conforming mortgage criteria and the TBA structure which is like a forward contract. Specified (or stipulated) pools and unique tranche structure and cash flow allocation “waterfall” rules in the case of CMOs reduce uniformity and introduce unique characteristics which make direct price comparisons from one security to another subject to more uncertainty.

PRICES – PASS-THROUGHS

■ *Transaction Pricing:* Agency MBS pricing and valuation is sensitive to and driven by prepayment speeds. With the development of sophisticated prepayment analytics, changes in prepayment speeds are quickly incorporated into market pricing. Generic TBA pricing is widely available from a number of sources. Pricing becomes more complicated as we move from generic to specified pools.

■ *Price Evaluation (“matrix pricing”):* The mortgage independent price evaluation process in general is developed by grouping mortgage pools with valuation and prepayment assumptions confirmed based on the dealer prices, bid lists, research and discussions with clients. Care needs to be taken to capture collateral characteristics in the specified pools.

PRICES – AGENCY CMO

■ *Transaction Pricing:* Though market liquidity has increased as volume has grown, there are numerous and almost infinite structures and cash flow rules and thus the CMO market pricing is largely model driven. The senior pieces and traditional structures (e.g. sequential, PAC) lend themselves to greater liquidity. Price determination is largely a negotiated process given the heterogeneous structures inherent in the CMO product sector.

■ *Price Evaluations:* In general, the collateral analysis is the starting point, taking into account geography and prepayment history, and then the “waterfall” structure is set up or modeled using derived prepayment speeds and assumptions. The price is verified based on dealer quotes, bid lists, research and discussions with clients.

COLLATERAL DATA AND MODELS

■ *Great Deal of Centralized Agency Pool Level Data:* Agency mortgage security analysis is data and statistic driven. The agency data have been available at the mortgage pool level, rather than the loan level, but Freddie Mac recently introduced public disclosure of loan level data on new issues.

■ *Prepayment Models and Agency Prepayment Data Tools Drive Mortgage Valuation Refinement:* Market participants base their historical prepayment analysis on the agency mortgage pool data that are updated monthly. Dealer prepayment speed projections and modeling are similarly based. Proprietary internal and external predictive prepayment forecasting tools drive third-party cash flow, evaluated pricing, and dealer and buy-side mortgage valuation models. Greater data availability and more detailed analysis have led market participants to refine the analysis and gain greater insights into mortgage consumer behavior.

■ *CMO Modeling Tools:* The cash flow allocation rules within the agency CMO structure presents an additional layer of analytical complexity. The modeling process involves collecting the issuance documents, applying interest rate and yield curve structure assumptions, collateral and transaction data updates, and modeling or “re-engineering” the deal.

NON-AGENCY MORTGAGE-RELATED SECURITIES: ABS AND CMO

- **Agency and Non-Agency Mortgage Securities Compared:** The non-agency or private label product sector has experienced dramatic growth and includes jumbo mortgage, subprime and home equity collateral. Private-label mortgage security collateral is not subject to agency loan size limits and uniform underwriting criteria, and thus the collateral is more diverse. While agency security valuation is prepayment driven, the non-agency sector is affected and incorporates both credit analysis and credit enhancement levels as well as prepayment analysis with the credit metrics becoming more important in the more subordinated tranche classes. Furthermore, non-conforming (non-agency) mortgage prepayment patterns may differ from conforming mortgages.
- **Pricing: Mortgage ABS:** Mortgage ABS dealer quotes are available directly through customer relationships, and through data vendors, primarily Bloomberg. The affordable and credit sensitive product innovations in the non-agency mortgage sector create valuation challenges: a price or spread initially is developed based on comparable generic securities and modeler experience and, as a data history becomes available, more product specific pricing methods are developed. Emergence of the ABS (home equity) CDS market is providing another source of pricing information and credit exposure hedging.
- **Pricing: Non-agency CMO:** The price discovery issues for non-agency CMOs are comparable to those discussed in the agency section, with the obvious exception that, as the collateral is non-agency rather than agency mortgages, credit analysis becomes more important and credit enhancement levels must be considered.

DATA/MODELS

- **Non-agency and Agency Data Compared:** While agency data have been mortgage pool level data, non-agency data are available at the individual loan level. There is generally a shorter history of prepayment and credit performance patterns. Many of the same vendors that provide prepayment and cash flow modeling services for the agency sector have developed non-agency modules.
- **Trustee and Issuance Data Products:** Trustee reports, as well as issuance documents, are important in the non-agency mortgage security valuation process. Vendors have developed searchable databases. As an example, a prominent non-agency data source, Loan Performance², collects and provides to market participants, including issuers, rating agencies, and traders, loan level data for over 85 percent of private label securitized collateral through relationships with 9 of the 10 leading originators.
- **Rating Agency Information Products:** The rating agencies make available publicly both data and models to evaluate non-agency mortgage securities, credit risk exposure, project probable ratings and required level of credit enhancement for both new deal structuring and monitoring of seasoned transactions. The information generally is the same information that is used internally by the rating analysts.

CONSUMER AND COMMERCIAL ABS

- **The General Price Discovery Process is Similar to Mortgage ABS:** The difference, of course, lies in the collateral attributes and collateral data availability. A distinction between non-mortgage ABS and mortgage ABS analytics is the importance and determinants of prepayment speeds. Furthermore, non-mortgage ABS prepayments are less interest rate driven, since they typically have shorter dated maturities, and the collateral loan balances are smaller.

PRICING

- **Transaction:** Transaction ABS are traded through a dealer market. Except for some older securities, prices are considered to be widely available, quoted by numerous dealers, and are considered liquid markets. Prices from dealers are quoted typically as swap spreads.

²CPR&CDR also has developed a non-agency performance database for some private-label mortgage clients. Other vendors such as Andrew Davidson and Co. and Intex have developed collateral analytics based on access to specific issuer data. Based on CUSIP count estimate as of June, 2005.

■ **Evaluated Pricing:** Cash flows, spreads, average life, speeds, and volatility are modeled based on issuer, collateral, coupon, average maturity, credit enhancement and security type, with an adjustment made for projected prepayment speeds. Dealer quotes and information are used for validation.

DATA AND MODELS

■ **Data:** The ultimate source of collateral data is trustee and servicer reports. While market participants will typically go directly to a trustee website for data, third-party vendors aggregate the data and provide trustee data services to track and monitor the securities and collateral. Rating agencies provide indices and data that enable comparison of collateral credit quality to peer aggregates.

■ **Models:** The modeling process is similar to the mortgage sector: representation (or “reverse engineering”) of “waterfall” cash flow rules, credit enhancements, issuance and trustee documents, economic conditions and interest rate term structure scenario are inputs in generating the ABS cash distribution and modeled price and yield values.

CMBS

■ **Model-driven Product, Though Increasingly Liquid for Senior Tranches:** The CMBS sector has become a more liquid market for senior high investment grade tranches. Diverse, non-uniform and non-standardized collateral and the heterogeneous CMBS structures, combined with trade volume frequency, result in more model-driven price analytics.

■ **Prepayment Protected, Credit Sensitive:** An advantageous product attribute is the presence of prepayment penalties during an initial lockout period which eliminates or minimizes prepayment exposure in the early years. CMBS pricing is thus more credit sensitive than interest rate or prepayment risk sensitive.

PRICING

■ **Transaction Pricing:** With greater high investment grade sector trade activity, the difference between secondary market dealer quotes on a CMBS issue has narrowed to a few basis points. The spreads differ based on deal type and collateral characteristics even within the high grade sector. Market participants pay attention to distinctions of similarly rated CMBS, and pricing reflects collateral type distinctions and views about relative quality within a grade. Below-investment grade tranches typically trade “by appointment.”

■ **Evaluated Pricing:** Daily pricing is provided on investment grade and often less frequently on below investment grade CMBS tranches. Considering the unique attributes of CMBS deals, pricing evaluation tends to be more “hand priced” than matrix priced found in other ABS and mortgage sectors.

VALUATION

■ **The Starting Point is Cash Flow and Deal Structure:** The key metrics measure credit risk. There are numerous variables used in CMBS collateral analysis, including property type concentration, financial performance of the commercial mortgage, tenant exposure, geographic composition and diversity, delinquency data, appraisals and loan modifications.

DATA/MODELS

■ **Trustee Servicing Reports:** Investors place a reliance on trustee and servicing reports updated monthly. There are specialized sources of data, for example, Trepp LLC and RealPoint, an affiliate of GMAC.

■ **Models:** Models play an important role with the Intex and Trepp models considered to be the most widely used. Correct interpretation of deal structure and terms is especially critical considering the heterogeneous nature of the CMBS market.

CDO/CLO

CLASSIFICATIONS AND DEFINITIONS

- **Classifications:** In general, a CDO is issued by a single purpose entity that issues multiple classes and debt and equity in a pool of debt obligations, either bonds or loans. Synthetic CDOs achieve credit exposure to debt instruments through credit derivatives. There are two motivations for a CDO sponsor (balance sheet CDO to remove assets and credit exposure from a party's balance sheet; and arbitrage to earn fees and a spread between collateral portfolio yield and cost of borrowed funds). The cash CDO may be cash flow or market value. Synthetic CDOs in the bespoke (customized structures to meet specific customer objectives) form have become increasingly common.
- **Collateral Manager Analysis:** Depending on type of CDO, there may be an asset or collateral manager. The asset manager may have a great deal, some or no discretion. As the volumes and new products have grown, there has been a dramatic increase in the number of asset or collateral managers. Especially cash CDO analysis thus takes into account asset manager evaluation.

CASH CDO

- **Cash Flow CDOs:** The objective is to generate income from principal, interest and default recoveries in the invested portfolio of assets as the source for repayment of CDO debt holders and generating a return to the CDO equity investors. The income first goes to pay administrative expenses and senior tranche interest. Other payments are subject to coverage ratios and collateral manager tests.
- **Market Value CDOs:** The objective is to generate income from collateral asset sales to repay the CDO debt holders and to generate a return to CDO equity investors. Market CDO performance depends on ability of manager to maintain or improve market value of the collateral and are preferred over cash flow when collateral cash flow is volatile, or the manager wants more discretion.

SYNTHETIC CDOs

- **Why the Growth:** Synthetics have grown with investor education, ISDA documentation development and credit derivative growth. Synthetic CDOs have these benefits: lower cost of funds; efficiency — more efficient and less complex structures without the necessity of cash flow allocations; easier to source as CDO collateral do not depend on the supply of assets issued in the cash market; allows for faster ramp-up compared to cash deals; and separation of default and interest rate risk and thus the investor can more explicitly have an opinion on credit default and spread risk; removal of prepayment/reinvestment risk; and more portfolio diversity.
- **Synthetic CDO Tranche Exposure:** Credit exposure is defined by underlying CDS tranche width — the attachment point at which it starts to take losses and detachment point when the losses absorbed eliminate the tranche value. Subordinate and equity pieces are the most sensitive to underlying collateral default risk.

SECONDARY MARKET EVOLUTION AND DEVELOPMENT

- **Buy-side Demand Drives Increases Transparency:** The dealer community has consciously developed tools to increase transparency in order to expand buy-side interest, committed resources and opened up access to some of the models that were formerly proprietary. Rather than one dealer offering quotes and to trade a CDO as was the case several years ago, there are now multiple dealer quotes leading to increased market liquidity. This is the case to a much greater extent for the more senior tranches. The CDO equity secondary market is less developed with returns typically estimated by model (internal rate of return or IRR) over the investment life. In addition, market participant growth and sector liquidity have been driven by the development and availability of data, modeling, analytical and risk management tools.

- **Evidence of Secondary Market Growth:** There has been an increase in cash CDO bid lists and tighter spreads.
- **CDS Index Tranches are Considered Relatively Liquid** based on increased volume, standardization and price availability. The introduction of CMBS and ABS CDS indices have a similar effect on the SF (structured finance) CDO products.

PRICING

- **The CDO/CLO Market is a Model-driven Pricing Product**, though supply and demand dynamics are becoming more relevant to the market as trading volume increases. Traders provide the buy-side not only with information and quotes on the CDO tranches but also offer valuation insights and information on the underlying managed assets and collateral.

VALUATION

- **The CDO Product Sector is Characterized by Diverse Approaches** due to transaction complexity, varied collateral types, rapid development of new products and relatively short history. Regardless of approach, default, loss upon default, recoveries and asset correlation are important valuation metrics.
- **Cash Flow CDO Valuations** are based on modeling of the underlying cash flows taking into account transaction structure and the “waterfall” rules that govern allocation to the various debt and equity tranches. Discounted cash flow (DCF) analysis is largely followed with the discount rate incorporating risk factors including manager track record, collateral credit quality and performance of the transaction. Liquidation or NAV methodology is also used (an approach particularly relevant for market value cash CDOs).
- **Synthetic CDO Analysis:** Due to differences in subordination, equity value is more sensitive to probability of collateral default and loss and senior tranches to general market credit spreads.
- **Equity Tranches Generally Benefit** from high correlation (volatility) and senior tranches benefit from low correlation (volatility).

DATA/MODEL

- **CDO Transaction Level Analysis:** Publicly available models and tools such as Intex have been developed for the CDO product sector. To support transparency, The Bond Market Association through its CDO committee established trustee report standards. Similarly, The Bond Market Association established an independent repository or library of CDO structures that market participants may incorporate in cash flow and valuation models accessible by qualified institutional buyers (QIBs).
- **Rating Agency Products:** Rating agencies offer to investors models and performance data used internally to assess risk.
- **Asset Manager Tools:** The asset or collateral manager has at its disposal tools for CDO compliance testing and evaluating the effect of hypothetical trades and communicating results to participants, including trustees, in the CDO transaction.

I. INTRODUCTION

Study Objective

Structured product sectors³ have grown in response to issuer and institutional investor objectives. Structured finance transactions can be tailored to enable issuers to transfer and share risk, convert loan and other asset cash flows into marketable financial instruments, and, in some cases, lower their cost of funds. From the investor perspective, structured finance creates financial instruments that can be tailored to specific return, risk management and liquidity objectives subject to risk appetite and time horizon. In the aggregate, the number of outstanding securitized and structured finance instruments, including individual tranches and mortgage pools, exceed 2.5 million⁴ and, in fact, outnumber those in other fixed-income and publicly traded equity sectors. As of March 31, 2006, there were approximately \$8.2 trillion outstanding in the structured finance product sectors⁵.

The Bond Market Association's ("TBMA") MBS/ABS/CDO Structured Products Division and the American Securitization Forum ("ASF")⁶ jointly undertook a project to understand and describe price and information sources used by market participants in the structured product sectors. In addition, the project and this report were developed to offer insights and observations of a general nature into the price discovery and valuation process in each of the product sectors. The intended outcome of the research is a publicly disseminated report that would contribute to providing market participants — the buy-side, sell-side, regulators, and others — a common framework and understanding of price and information sources, the price discovery process and valuation approaches. The project can be viewed as the initial stage of a broader initiative of TBMA focused on structured and securitized finance pricing information consistent with TBMA and ASF's continuing interest in market transparency and liquidity.

This project, however, does not, nor is it intended to, offer conclusions about the relative quality, adequacy or effectiveness of the pricing and information sources. Furthermore, it does not take a view nor advocate positions with respect to current marketplace, regulatory and policy issues such as whether or not current levels of price transparency are adequate or whether there is a need for additional regulation.

The report is in three parts. The first section broadly addresses the price identification and discovery process and offers a general analysis of pricing and information sources. The second section presents an analysis of price discovery and price and information sources by specific product sector. Third, as an Annex, the report specifically describes the pricing and information source products, as well as electronic trading platforms. Based on the research and interviews conducted during the course of the research, it is believed that the report covers the major sources. Nevertheless, it is possible that there may be additional pricing and information systems and sources that were not identified.

WHAT DOES THE STUDY COVER?

While acknowledging the increasing importance and benefits of securitized product credit derivatives and indices in price formation and discovery, the study generally focused on the cash market. The study covered the entire range of structured and securitized product sectors, including:

- Asset-backed commercial paper ("ABCP")
- Agency Pass-through Residential Mortgage-Backed Securities ("RMBS"), including generic TBA ("To be Announced") and specified pools

³The term structured finance refers to both asset-backed and mortgage backed (ABS and MBS) securitized products and CMO, CDO and CLO structured transactions unless otherwise noted.

⁴Based on CUSIP count estimate as of June, 2005.

⁵The Bond market Association, *Bond Market Research Quarterly*, May, 2006

⁶One motivation for the study was a response to a finding of the ASF 2005 "Survey of Securitization Market Investors" that found there was a degree of confusion and lack of clarity about the pricing process among some securitized and structured finance market participants.

- Collateralized Mortgage Obligations (“CMO”) - Agency and non-agency
- Mortgage-related Asset-Backed Securities (“ABS”) including home equity loans (HEL), mortgages that do not meet agency underwriting criteria, e.g. subprime, and jumbo mortgages in excess of the agency conforming loan size limits
- Other consumer ABS, including the auto, student loan and credit card sectors
- Commercial ABS, including inventory, receivables, equipment loans and leases
- Commercial Mortgage-Backed Securities (“CMBS”)
- Collateralized Debt Obligations (“CDO”), including Collateralized Loan Obligations (“CLO”) — cash and synthetic structures

THE PRICING AND INFORMATION SOURCES COVERED IN THIS REPORT INCLUDE

- Pricing sources used in connection with trades, repo collateral valuation, mark to market valuation of portfolios and positions, risk management measurement and Net Asset Value (“NAV”) accounting. The sources include quotes from dealers, single dealer and multi-dealer electronic trading platforms, market data vendors, and price evaluation services;
- Data and information sources, particularly relating to underlying collateral of structured and securitized finance instruments, and
- Third party and independent vendor prepayment, credit, cash flow, scenario analysis and valuation models that may incorporate deal structure and collateral performance data. These models are a tool but are “agnostic” about assumptions. The user provides the model assumptions that drive the results.

The research methodology is found in Appendix A.

II. BROAD OBSERVATIONS AND CONCLUSIONS

EACH PRODUCT SECTOR IS UNIQUE, THOUGH SOME GENERAL CONCLUSIONS MAY BE DRAWN

Each of the structured and securitized product sectors is distinct based on product sector issuers, investors, origination, servicing and collateral management, trading and pricing systems, and type and volume of available information. These distinctions in part reflect the stage of product development and market sector liquidity characteristics. Each sector has its own price discovery dynamics and thus should be analyzed and evaluated separately as the transaction structures and underlying collateral generating the cash flows, rates of return and risk transfer mechanism differ across the product sectors. These differences lead to distinct pricing and valuation conventions, liquidity levels and types of risk exposures and sensitivities (e.g. prepayment patterns and credit profiles) among the product classes. Thus, caution is advised in drawing overly broad and general conclusions across product sectors.

Certain general observations are warranted, however. At its foundation, investment decision making involves identifying the most current indicated market quote and comparing the quote (in dollar terms or as an option-adjusted spread) to the investor’s (or price evaluator’s) view of current intrinsic value, taking into account risk exposure, and economic, interest rate and term structure environment and volatility.

STRUCTURED FINANCE PRODUCTS TRADE IN DEALER MARKETS

As is the case across fixed-income sectors, the structured finance markets are over-the-counter dealer markets. By virtue of their market making function and ability to commit risk capital to finance inventory and maintain positions in specific securities, dealers create market liquidity. Price information is ulti-

mately derived and verified through dealers based on the dealers' market making role — whether directly by voice or through automated systems, electronic platforms, and market data aggregators. Furthermore, independent price evaluations use dealer quotes for verification. Dealers make available a great deal of information to market participants in response to competition for institutional investor (buy-side) business and in order to increase institutional investor participation and expand trading activity in the product sector.

It would be incorrect, though, to assume that all institutional investors are simply price-takers and do not play a role in providing liquidity and contributing to price discovery. An important trend is the growing significance and influence of large institutional investors, including hedge funds. Even within the over-the-counter system, in certain cases, large institutional investors, based on their portfolio size, trading activity and market presence, play a role in providing liquidity and affect market pricing. Their size and presence based on their trading and portfolio positions influence market supply and demand dynamics and price levels.

Though larger buy-side firms and dealers rely on internal models that may be augmented by acquiring data, the same external information and data services generally are available to the sell-trade and the buy-side. Market participant views differ based on the assumptions built into the explicit or implicit valuation models. Intrinsic value is based on analysis of the underlying collateral data, transaction structure⁷ and analytical modeling that incorporate the interest rate (including term structure or “yield curve” and volatility) environment, prepayment speeds, market liquidity levels, credit exposure and economic environment to generate cash flow, return and (OAS) spread values.⁸

Types of Pricing

PRIMARY MARKET VS. SECONDARY MARKET

This research concentrates on secondary market pricing, that is, price of structured products once they begin trading. Distinctions should be made between primary market and secondary market price discovery and formation.⁹ Secondary trade prices are referred to as “off the run.” Primary market pricing relates to price determination of the security at the time of issuance and is termed “on the run” pricing. “On the run” prices are important as they are used as a guide by market participants for current price levels of comparable securities trading in the secondary market as the primary market is generally considered to be more liquid. Secondary market issues may trade relatively infrequently and, because of the time lapse, the last trade price may be “stale” and less current than a recent new issue price.

The primary market pricing process involves direct placement of securities to the investor by issuer and underwriting dealer. For example, typically the originator or issuer assembles a pool of loans, sells them to an issuance vehicle that issues securities supported by the loan. The dealer/investment banker is responsible for underwriting the securitized debt, working with the rating agencies to achieve a targeted rating on the debt, and making a market after the securities have been sold. Though a single dealer can distribute the new issue to investors, the distribution is generally organized through a syndicate of dealers or selling group under the leadership of the senior or co-managers in order to spread the risk and expand the sales distribution capacity. The underwriter establishes a price based on assessment of supply and demand, credit rating, and valuation of the security relative to benchmark yields, comparable transaction spreads brought to market, the economic environment, transaction and cash flow structure, and collateral characteristics.

There are five key stages to the syndication process: deal announcement, recommended price guidance, deal status, transaction launch, and transaction pricing. According to the ASF Market Standards and Practices “ABS Syndicate Best Practice,” the “minimum standard” for price guidance subject to market

⁷There are a large number (virtually infinite) of different “waterfall” structure “rules” that can determine cash flow in structured transactions.

⁸Note that not all structured finance sectors refer to OAS. OAS terminology is most frequently associated with the mortgage sector.

⁹Throughout the report, as appropriate, distinctions are made between primary market and secondary market pricing.

conditions is to clarify the appropriate price guidance range subjection to trade complexity (i.e. depending on collateral type, rating, etc.). According to the ASF statement, for transaction pricing, the “minimum standard” provides for giving underwriters a “heads up” of fifteen minutes, and best practice involves dollar price and coupon within an hour of pricing, CUSIPs available the day of pricing, and Bloomberg provided with final pricing details and cash flows the day of pricing.¹⁰

WHY PRICING INFORMATION IS IMPORTANT AND HOW IT IS USED? CONTEXTS AND APPLICATIONS

Tables 1 and 2 on page 13-18 present the leading price sources and trading platforms in the finance market sectors. Analysts, traders and investors are called upon for pre-trade market quotes and valuations under a number of different contexts, for different reasons and with varying precision requirements.

Secondary Market Trades/Transactions: The dealer or trading platform provides a quote for conducting a secondary market trade that may be based on supply and demand trade flows in the more liquid sectors and model-derived analysis. Price quotes may also be viewed on dealer pages from market data vendors, particularly Bloomberg. Relative to equities, even some of the more actively traded securitized products are likely to be traded relatively infrequently, especially “off the run.” (Structured products, of course, are also traded “on the run.”) These are particularly apt observations in less frequently traded product sectors.

Mark-to-Market /NAV: Current dealer indicative quotes are used for determining current mark-to-market portfolio values, for index development and incorporated in consolidated price services.¹¹ The quotes incorporate and are generally based on internal and proprietary dealer models but also taking into account supply and demand factors. An example is the prices provided by the Lehman trading desk that support the widely followed Lehman indices. SQX, or the Securities Quote Exchange, offers a service in which it solicits dealer (trader) prices and electronically sends a file with those prices to institutional investor clients who use it for marking to market and determining NAV. SQX introduces efficiencies from both the buy-side and sell-side perspective. As an example of a consolidated price application, Markit provides consolidated leveraged loan prices (through its LoanX group) based on dealer submissions. Another example is price quotes accessible through the Bloomberg ALLQ command.

Repo Pricing: There has been a significant growth in asset-backed repurchase and securities lending transactions. With that growth has been the need to value the asset-backed security in those transactions for determination of the “haircut” and thus another use of structured finance valuation. The repo pricing tends to be more conservative and may require relatively less detail (e.g. detailed specific collateral analysis) than transaction pricing.

Risk Management: Structured and securitized finance risk management measurement systems, such as Value at Risk (“VaR”), rely on valuation and price determination under varying sensitivity analysis scenarios to set maximum exposure levels.

NAV Accounting Valuation:¹² A final application is marking-to-market portfolios and obtaining NAV for accounting and reporting purposes. These valuations are typically required on an end-of-the-day basis but also be mandated on a less frequent basis, such as weekly or monthly. Trader price quotes are one source. In addition to dealer quotes, a prominent source is pricing evaluation services (sometimes referred to as “matrix” pricing) including independent third parties such as Reuters, S&P Pricing and FT Interactive Data, as well as dealer-affiliated Bear Stearns Pricing Direct.¹³

¹⁰See ASF “ABS Syndication Best Practices.”

¹¹Consolidated price services involve a vendor calculating a consensus or consolidated market price based on a number of dealer quotes. As noted in the body of the text, examples are Bloomberg’s ALLQ function and Markit’s pricing service.

¹²It is perhaps useful to distinguish between the NAV and mark-to-market terms. Mark-to-Market can be viewed as assigning a value based on the current market price. NAV is the current market value of a fund’s net assets divided by the number of shares outstanding as of the close of each business day. Valuations assigned to specific assets in the portfolio are part of that process.

¹³Evaluated pricing services are not limited to NAV calculations but are tools that may be used across the spectrum of the types of pricing and valuation requirements and needs described in this section.

Leading Securitized and Structured Finance Pricing Sources

(Excluding Platforms)

TABLE 1A

PRICING SOURCES	TYPE OF SOURCE	PRICE TYPE	UPDATE	CONTRIBUTORS
ABX.HE	Index	Indicative	Daily	20
Bloomberg ¹				
Commercial RE Direct	Dealer (Consolidated Spread)	Spread matrix	End of day	10
FT Interactive Data	Evaluated	Evaluated	End of day	Numerous
Lehman Pricing Service	Dealer	Indicative	End of day; 4:30	Single dealer
Markit	Dealer (Composite price)	Consolidated dealer quotes	End of day	13
MIAC	Evaluated/Secondary pricing	Model	Daily/Weekly	N/A (model)
MBS Quoteline	Dealer (Through third party)	Indicative	Intra-day (Every 15 seconds)	Single dealer
Pricing Direct (Bear Stearns)	Evaluated	Evaluated	End of day/intraday	Single dealer
Reuters	Market Data Vendor and Evaluated	Executable/indicative	Real-time	N/A
Reuters (Pricing Service)	Evaluated	Evaluated	End of day	N/A
S&P Pricing	Evaluated	Evaluated	End of day	N/A
Securities Quote Exchange	Dealer (Quote transmission service)	Indicative	End of day	Numerous Dealers
Trepp Pricing	Evaluated	Evaluated	End of day - IG; Less often HY	N/A
Generic Dealer	Dealer	Executable/indicative	Real time	Single dealer
Sector MBS Plus	Evaluated	Evaluated/model	Monthly	N/A

¹Bloomberg is excluded at its request.

Leading Securitized and Structured Finance Pricing Sources

(Excluding Platforms)

TABLE 1B

PRICING SOURCES	COST	HISTORIC PRICES	EXAMPLES: ANALYTICAL NON-PRICE INFO	DISTRIBUTION THROUGH OTHER VENDORS
Bloomberg				
Commercial RE Direct	License depends on service level	Yes	Only spread by rating matrix	Yes
FT Interactive Data	License: level of service, no. of securities	Yes	T&C, Corporate actions, Historical Data	Yes
Lehman Pricing Service	Premium service \$50,000 per year	Yes	Bond characteristics (separate service)	No
Markit	License depends on service	Yes	Reference entity, news/research	Yes
MAIC	License	Yes	Mortgage industry medians, pricing assumptions	No
MBS Quoteline	\$44.95/month	Yes	News reports/economic data analysis	Yes
Pricing Direct (Bear Stearns)	License depends on service	Yes	T&C	No
Reuters	License depends on service	Yes	Yield curve, OAS, duration, WAL, WAM	No
Reuters (Pricing Service)	Per security	Yes	T&C, Corporate actions	Yes
S&P Pricing	Depends on number, complexity, frequency	Yes	T&C, Corporate actions	Yes - Bloomberg
Sector Plus	License	Yes	Pool characteristics terms & conditions	Yes
Securities Quote Exchange	Per security	Yes	No	No
Trepp Pricing	Depends on number, complexity, frequency	Yes	Bond and collateral characteristics	No
Generic Dealer	No separate cost (client relationship)	Yes	Research, spreads, collateral data	Yes - dealer pages on Bloomberg, etc.

Note: T&C refers to bond terms and conditions.

Note: N/A = not applicable

¹Bloomberg is excluded at its request.

Leading Securitized and Structured Products Pricing Sources: Markets Served

TABLE 1C

PRICING SOURCES	ABCP	AGENCY MBS	CMO	MORTGAGE ABS	NON-MORTGAGE ABS	CMBS	CDO/CLO
ABX.HE*				x			
Bloomberg ¹							
Commercial RE Direct						x	
FT Interactive Data	x	x	x	x	x	x	
Lehman Pricing Service		x		x	x	x	
Markit				x (CDS index)			
MBS Quoteline		x					
Pricing Direct (Bear Stearns)		x	x	x	x	x	
Reuters		x					
Reuters Pricing	x	x	x	x	x	x	
S&P Pricing		x	x	x	x	x	
Sector Plus		x					
Securities Quote Exchange	x	x	x	x	x	x	
Trepp Pricing						x	
Generic Dealer	x	x	x	x	x	x	x

Note: Certain of the pricing sources price CDO/CLO collateral e.g. Trepp is a pricing source for CRE (commercial real estate) CDO collateral, Markit for CLO collateral.

*Additional ABX indices to be introduced for CMBS, non-mortgage ABS.

¹Bloomberg is excluded at its request.

Securitized and Structured Finance Products—Electronic Trading Platforms: Characteristics

TABLE 2A

	SECONDARY/ PRIMARY MARKET TRADING	TRADING METHOD	TYPE OF TRADE	LIQUIDITY PROVIDERS	TYPE OF SYSTEM
Autobahn	S	RFQ, Order-Driven, Cross-matching	C	Single-dealer	Single-dealer
Bear Stearns	PrS	RFQ, Order driven	CS	Single-dealer	Inter-dealer, Single dealer
Blackbird	PrS	RFQ, Order Driven, Cross-Matching	CRBS	0	Inter-dealer, Single dealer
Bloomberg ALLQ	PrS	RFQ (5)	CBS	Multiple	B2C
Bloomberg BOOM	PrS	Order driven	CBS	Multiple	B2C
BondDesk	PrS	Cross-matching	S	Multiple	Inter-dealer
BondWeb	PrS	RFQ, Order Driven, Cross-Matching	CBS	Multiple	Inter-dealer, B2C
eSpeed	Pr	Order-Driven	C	0	Inter-dealer
Goldman Sachs	S	Cross-matching, RFQ	C	Single dealer	Single dealer
G.X. Clark & Co.	S	RFQ, Cross-Matching, Order Driven	S	Multiple	B2C
ICAP	S	Order-driven	CR	0	Inter-dealer
J.P. Morgan Express	PrS	Cross-matching, RFQ	C	Single dealer	Single dealer
Merrill Lynch	PrS	Order driven, auction	S	Single dealer	Single dealer
Reuters Trading for Fixed-income	S	RFQ (5)	C	12	B2C, Inter-dealer
TradeWeb	S	RFQ (4)	CS	15 -MBS;12-ABCP	B2C
ValuBond	PrS	RFQ cross-matching	C	Multiple	B2C, Interdealer

Notes:

- Trading method, trade type and service definitions may be found at the end of the Electronic Trading Platform Descriptions in Annex B.
- Under "Primary/Secondary Trading", Pr=Primary Market; S=secondary Market.
- Under "Trading Method", RFQ refers to Request for Quote System; parentheses indicates the maximum number of quotes if there is a limitation.
- Under "Type of Trade": S=spread, C=cash, B=basis, R=repo.
- Under "Type of System," B2C refers to multi-dealer to customer platform.

Securitized and Structured Finance Products—Electronic Trading Platforms: Characteristics

TABLE 2B

PRODUCT	MINIMUM MARKET SIZE	ELIGIBLE PARTICIPANT	NON-PRICE INFORMATION	PRICE/VALUATION RELATED SERVICE
Autobahn	None	I	Yes	
Bear Stearns	None	ID	Yes	E
Blackbird	\$25 million	IDLR	Yes	PRE
Bloomberg ALLQ	None	IDL	Yes	PR
Bloomberg BOOM	None	IDL	Yes	PR
BondDesk	None	EP	Yes	PRE
BondWeb	None	IDL	Yes	PRE
eSpeed	\$1 million	DL	Yes	P
Goldman Sachs	None	IDLR	Yes	EP
G.X. Clark & Co.	None	IDL	Yes	
ICAP	\$1 million	DL	Yes	
J.P. Morgan Express	Depends on Asset class	IDR	Yes	PR
Merill Lynch	None	IDR	Yes	E
Reuters Trading for Fixed-income	Depends on Product	IDLR	Yes	PRE
TradeWeb	Depends on Product	IDL	Yes	PRE
ValuBond	None	DL	Yes	PR

Notes

1. Under "Eligible Participant": I=institutional investors; D=dealers consuming liquidity; L=Dealers providing liquidity; R=retail investors.

2. Under "Non-price Information": "Yes" indicates that the platform offers a number of analytical data elements such as historic spreads, rating, trade history and issuance size in addition to current price quotes.

3. Under "Price/Valuation Services": P=Pre-trade analytics; R=Risk Management; E=Electronic Research.

The entire list of platform services including those related to trade execution may be found in the Electronic Platform description in Annex B.

Source: The Bond Market Association's eCommerce in the Fixed-Income Markets: The 2005 Review of Electronic Transaction Systems, December 2005.

Electronic Trading Platforms: Securitized/Structured Products Traded

TABLE 2C

PRODUCT SECTOR	ABCP	AGENCY MBS	NON-AGENCY ABS	ABS
Autobahn	x			
Bear Stearns		x		
Blackbird		x	x	
Bloomberg ALLQ		x	x	x
Bloomberg BOOM	x			
BondDesk		x	x	x
BondWeb		x	x	
eSpeed		x		
Goldman Sachs			x	
G.X. Clark & Co.		x		
ICAP		x		
J.P. Morgan Express				x
Merrill Lynch	x			
Reuters Trading for Fixed-income		x	x	
TradeWeb	x	x		
ValuBond		x	x	x

Source: The Bond Market Association's eCommerce in the Fixed-Income Markets: The 2005 Review of Electronic Transaction Systems, December 2005.

It is perhaps helpful to specifically address the evaluated pricing sources and distinguish evaluated pricing services from securitization models considering the broad use of evaluated pricing in assigning valuations for NAV. An evaluated price is a price opinion at a certain point in time — at the end of the day generally. As events change such as shifts in prepayment speeds, credit events, and interest rates and yield curves, pricing views will also change. The process generally begins with an evaluation of collateral and involves a cash flow model initially with generic spreads and then adjusted for the specific transaction structure characteristics with prices validated through comparison with dealer quotes and taking into account market “color.” There is a view that there is a trade-off between transparency in judgment-driven pricing evaluation processes (the pricing evaluation sources communicate to their customers the methodologies used) and precision of more purely quantitative pricing models.

EXAMPLES OF THE PRICE DISCOVERY PROCESS

To assist the reader, a few generalized examples of the price discovery process are offered to give a sense of buyer and seller interaction in the price discovery process.

- The institutional investor requests a quote for a TBA agency mortgage trade on an electronic trading platform. On the screen appears indicative quotes from multiple dealers. (The investor may also see the last traded price.) The investor responds and selects a dealer and price. Agreement between buyer and seller is reached electronically on an executable price, and the trade is executed.
- An institutional investor is looking to sell an MBS portfolio and submits a list of MBS and collateral characteristics to 10 dealers receiving bids from five. The investor speaks with each of the dealers to understand the pricing and the assumptions behind the quote and, based on the process, negotiates a price with one of the dealers.
- The dealer submits a “bid list” of CMBS to investors. The investors are given a period of time to submit an offer and respond. The investor negotiates based on a value derived from modeling the transaction.

Price Source Observations

COLLATERAL AND STRUCTURE CHARACTERISTICS DETERMINE MARKET LIQUIDITY AND PRICE AVAILABILITY

Structured product sectors tend to be liquid to the extent the product is commoditized, structures are standardized, credit quality is high with minimal levels of defaults and delinquencies, and collateral is relatively uniform. This is especially the case for conforming mortgage collateral (especially TBA trading) and, to a lesser degree, high investment grade credit enhanced credit card receivable and auto loan ABS. The less liquid markets are characterized by more complex structures and cash flow “waterfall” allocation rules among tranches; less deal structure and collateral uniformity and standardization; and lower credit quality or, in other words, greater credit exposure.

TRADE FLOW DRIVEN PRICING AND MODEL-DERIVED PRICING

Trade flow based pricing is more likely to be found in the more liquid structured finance product sectors. In the TBA market, for example, characterized by higher secondary market trading volume and more frequent trades, pricing is more influenced by supply and demand flows. At the other extreme, pricing in structured finance product sectors that trade less frequently and are less liquid is driven more by valuation models. This is descriptive of CMO and (cash) CDO transactions. As the product sectors develop and the number of market participants expand, over time, trade volume and the influence of supply and demand flow considerations have tended to increase and become more relevant to the price discovery process. In reality, even in the more “trade by appointment” modeled sectors, some trade driven price information is

often available and used in price discovery.¹⁴ Conversely, model based valuations is central to price discovery and determination across all product sectors

ELECTRONIC PLATFORMS ADD TO PRICE DISCOVERY, OPERATE IN COMMODITIZED AND LIQUID PRODUCT MARKETS

The growth and development of electronic trading and especially the multi-dealer trading platform industry has been a powerful force in enhancing liquidity and price discovery and availability in fixed-income markets generally. In multi-dealer trading systems, depending on trading method, dealers offer quotes, and institutional investors see multiple dealer quotes that ultimately can be executed on the platforms. Trading platform activity has proliferated around product sectors whose characteristics are aligned with trade-flow determined pricing rather than model-determined price sectors. Agency RMBS (TBA) and ABCP are the products typically traded through multi-dealer platforms. TradeWeb, probably the most prominent and highest volume platform trading securitized products along with Bloomberg, trades TBA mortgages (15 price contributing dealers) and ABCP (9 price contributing dealers). The average daily TBA trading volume on TradeWeb is \$45 to \$50 billion.¹⁵ While TradeWeb does trade three Freddie Mac CMOs and is looking into specified (non-TBA) agency pool pricing, generally pricing subject to modeling and assumptions as is the case in the non-TBA mortgage sectors are less viable candidates for electronic platform trading. There are no CMBS and CDO platforms due to the unique structures and heterogeneous collateral.

Although there appears to be a trend towards multi-dealer electronic trading platforms, single-dealer platforms are also a prominent trading venue. Based on TBMA's annual electronic trading survey, there are a total of 16 platforms (with Bloomberg Money Markets and ALLQ counted as separate platforms), including single dealer platforms, that offer securitized finance product trading, of which 13 trade agency mortgage securities and 7 trade non-agency mortgage securities and other ABS. All of the structured and securitized product multi-dealer to customer platforms (with the only exception being Bloomberg Money Markets which, by mandate, is limited to commercial paper) trade agency mortgage securities. Non-agency mortgage-related and asset-backed security trading are available on fewer platforms, and most of those trading systems are either single-dealer or inter-dealer platforms.¹⁶

CERTAIN TRENDS FOUND IN TABLE 2 ON PAGE 16 SHOULD BE NOTED:

- Dealer to customer¹⁷ platforms tend to follow the Request for Quote method, which can be seen as an auction-type system that enables dealers to conduct electronic auctions for the sale of securities by posting securities offerings and specific terms with buyers submitting bids for the offered securities, and the offered securities are generally awarded to the highest price or lowest yield. The Request for Quote system enables the buyer, typically based on seeing and selecting from the best indicative quote, to send a request for a bid for a specific trade simultaneously to multiple dealers of which it is a customer. Bids of dealers choosing to respond are firm for a specified period of time. Only the requesting party sees the quotations for the trade provided by the dealers. It should be noted that TradeWeb which follows the Request for Quote method indicates that the executable price is better than the indicated price in over 80 percent of the TBA transactions.
- Cross-matching method is used, especially in inter-dealer systems. Cross-matching methods are where customers are able to enter anonymous buy and sell orders that are automatically executed when another party's sell and buy orders are entered at the same price or when the price is "hit" or "lifted."

¹⁴As an example, equity and debt CDO tranche valuation is driven by default correlation between assets and industries. Market price observation of CDO tranches provides market-implied information in addition to historical data generated from historical correlations. Dominic O'Kane, "Introduction to Credit Derivatives," *The Handbook of Fixed-income Securities* edited by Frank Fabozzi with Steven Mann

¹⁵Market participants noted that platforms such as TradeWeb are commonly used for smaller and odd lot trades.

¹⁶Multi-dealer platforms are looking into adding ABS products to their system.

¹⁷Multi-dealer to customer platforms may be referred to as B2C and interdealer platforms may be referred to as B2B.

- The trading platforms display pre-trade prices to trading participants. They may be executable, indicative or last trade prices.
- Virtually all of the platforms serving the securitized product sectors provide additional data including, for example, trade history, spreads, rating, coupon and maturity.
- Most of the platforms provide services that contribute to developing a valuation opinion relative to price and spread quotes such as electronic research, pre-trade analytics and risk management, as well as services that facilitate trade execution.
- Platforms may distribute price information to platform participants and more broadly by distribution through market vendors. For instance, Reuters shows ICAP and TradeWeb TBA prices.

DEALERS PROVIDE A GREAT DEAL OF INFORMATION; MULTIPLE DEALER RELATIONSHIPS LEAD TO INVESTOR PRICE DISCOVERY KNOWLEDGE

Dealers provide a great deal of information concerning dollar price quotes and spreads, collateral and, in some cases, model access to institutional buy-side customers. Furthermore, dealers are sources of information for evaluated price services as the dealer quotes serve as part of the validation process for the price evaluations. The general view based on the research interviews is that there is effective price knowledge for buy-side customers that have multiple (for example, five) dealer relationships and access to price quotes from multiple dealer sources. Dealer valuation views and price quotes may differ, though, especially in less liquid products based on underlying model assumptions (e.g. collateral default frequency and loss upon default and residential mortgage prepayment speed assumptions) and thus investors are well served by seeing multiple bids.

There are also other sources of dealer market generated price information that contribute to price discovery, including bid and bid-wanted lists and inventory price information on dealer pages of Bloomberg for some sectors. In addition, vendors have developed trade-quality pricing software developed through vendor proprietary models that investors use for price validation, break-even analysis and risk management.

Data Information and Modeling Service Observations

HOW AND WHY MARKET PARTICIPANTS USE MODELS

Models play a necessary and fundamental role in price discovery and valuation across product sectors because of the data intensive calculations and need for sensitivity and risk analysis that incorporates numerous operating environment, collateral and transaction structure assumptions. Securitized and structured market participants on both the buy-side and the sell-side rely on models as analytical and pricing tools at the individual security, trade and portfolio levels.

The model inputs and assumptions are at the discretion of the model user (e.g. trader, analyst, or portfolio manager), and those inputs determine the model output or results. The models are subject to continuous testing and validation to ensure that they accurately reflect current market conditions and the relationships among variables — whether the relationships are continuous or discrete and linear or nonlinear and the range over which the modeled relationships (important considerations, for example, in mortgage prepayment analysis) are valid. Similarly, corporate bond default behavior which is critical in CDO analysis does not necessarily follow a continuous functional relationship but rather discrete “event risk” and the “lumpiness of defaults” must be taken into account.

In general, there are two levels of structured and securitized finance models — (i) modeling the underlying determinants of price and value of the collateral and (ii) modeling the transaction itself. Examples of the first are (1) forecasting prepayment speeds especially critical in mortgage-related securities which incorporate numerous mortgage product, interest rate and consumer behavior variables; (2) collateral default and loss probabilities under varying economic assumptions in ABS, CMBS and CDO structures; and (3) default correlations within and across industry sectors and over time in CDO analysis. Examples

of the second type are (1) spreads by senior/subordinated tranche, (2) IRR and Net Return analysis for equity pieces for CDOs and (3) generating cash flows and cash flow “waterfall” allocation of the cash flow within a (CMO) structured finance transaction.

MODELS ARE TYPICALLY USED FOR:

- Pre-trade analysis and the effect of a hypothetical trade (including effect on rating agency CDO compliance tests)
- Developing dollar price quotes and spreads on a nominal or option adjusted basis for both the new issue primary and secondary markets
- Projecting underlying collateral cash flows and the structured finance “waterfall” allocation by tranche
- Price validation and determination of the breakeven level on a trade
- Rates of return on different senior, subordinate and equity pieces in a structured transaction
- Portfolio attribution and monitoring under different scenarios and over a time horizon
- Optimal transaction structure
- Pricing a loan pool and analyzing collateral performance
- Risk management and maximum exposure measurement, for instance under VaR methodologies
- Development of indicative rating and credit enhancement requirement at the loan and pool level
- Prepayment speed projections based on interest rate and yield curve assumptions,
- Credit risk — default probability and loss upon default and default correlation over time.
- “Reverse engineering” a structured transaction (e.g. CMO) based on issuance and pre-issuance documents and data updated by trustee reports

THE MODELS MEASURE AND EVALUATE:

- Interest rate and yield curve structure and volatility
- Time series and regression analysis, for example, prepayment projection model incorporating interest rates, collateral (e.g. mortgage) product attributes, loan size, coupon, vintage and weighted average life and consumer behavior variables
- Portfolio credit default, loss and correlation over time
- Dynamic cash flow and OAS valuation and Monte Carlo style simulation

VALUATION AND PRICE DETERMINATION IS AFFECTED BY MORE THAN CREDIT MODELING

Pricing and valuation analysis is more complex and involves numerous considerations beyond merely attaching a spread to the generic rating category and credit performance. Market participants differentiate securities based on seasoning — length of time since issuance and collateral origination vintage — and weighted average remaining life (WAL). As examples, the analysis takes into account increased incidence of prepayment as auto loans age and the mortgage prepayment incidence slowing after a certain point (“burn out” effect). Distinctions are also made based on loan size — there is less of an incentive to prepay smaller loans — FICO score, loan to value (“LTV”), price appreciation trends and geographic concentration. Similarly, inter-industry and intra-industry collateral portfolio correlations are an important consideration in CDO valuation. Market participants also make distinctions based on servicer and issuer reputation and performance. Furthermore, distinctions are made based on the amount of information

available about the underlying collateral. Finally, in addition to fundamental analysis, there is also technical analysis — demand and supply factors, product liquidity and trade size.

QUALITY AND QUANTITY OF DATA ON THE RISE, EXPANDING INVESTOR UNIVERSE

The clear consensus across product sectors and regardless of sector complexity is that the quantity and quality of data and information has increased and continues to grow. This is the result of institutional investor demand for information and the competitive responses to that investor demand by market data vendors and model vendors. As an example, the introduction and growth of data and analytical tools for the CDO investor has contributed to an environment today in which institutional investors (who own portfolios of CDOs) exceed the number of dealers. A similar process earlier expanded the market and investor universe in CMBS and CMOs.

LARGE NUMBER OF VENDORS; HIGHER VALUE PLACED ON DATA THAN GENERIC MODELS

Table 3 identifies more than 35 providers of information, including collateral and securitized and structured finance databases and cash flow, risk measurement and valuation models. Although there are some exceptions, most services are marketed to both the buy-side and the sell-side which suggests that, in general, both sets of market participants have access to similar third-party collateral and data sources. The exceptions are those products intended to educate, inform and expand information access to the buy-side institutional investor universe.

Depending on the product and vendor, the cost to the market participant can be minimal to substantial — e.g. well in six figures for an annual subscription license. The cost generally is higher for products that provide specific information about collateral data and deal structures while the least expensive are those that offer generic models in which the user inputs the data. Transaction and collateral data are highly valued, and market participants commented that the decision to participate and invest in certain product types and sectors is based on the availability of data, especially in credit-sensitive product sectors.

FREQUENT UPDATES

The structured and securitization transaction and collateral data vendors update as soon as the information is available from the data sources — for example, trustee reports, GSEs for agency mortgage securities, and proprietary sources such as rating agency data. That information is generally updated at least monthly.

HISTORIC DATA, BROAD COVERAGE

As summarized in Table 3 on page 24, the information providers maintain and capture virtually all of the common structures (for example, virtually all agency CMO structures are modeled as well as most of the leading private-label issuer CMO structures) and the capacity to model those that are not in their database libraries. Historical data on structure and collateral is provided in some cases for as far back as ten years.

Securitized And Structured Finance Model and Data Vendors

TABLE 3A

PRODUCT	DATA/MODEL	UPDATE	SERVICE
ABSnet	Data	Monthly	ABS deal/collateral data
Andrew Davidson & Co.	Model (prepayment)	Weekly/Monthly	Prepayment models/CF valuation/Trading models
AnSer (Black Rock Solutions)	Model/Data	Real time/daily	Trade, security, risk management model calculator
Bloomberg ¹			
Bond Edge	Model	Data from user	Prepayment, ABS/MBS CF analysis, performance attribution
C-Bass RADAR Viewer	Data	Monthly	Credit-sensitive loan level mortgage performance data
Chasen Enterprises	Model/Data	Monthly	CF Model, Deal library
CPR&CDR Technologies	Model(prepayment)/Data	Monthly	Prepayment, delinquencies, mortgage factors
Dominion Bond Rating Service - CDO Tools	Model	Data from user	Credit quality/indicative rating
Dominion Bond Rating Service - RMBS	Model	Data from user	Credit quality/indicative rating
eMBS	Data	Monthly	Agency mortgage data, factors and prepayments
Fitch Ratings - Vector	Model/Data	Monthly	Default risk/loss correlation model, CDO database
Fitch Ratings - Monitoring	Data	Monthly	Data and performance reporting
Fitch Ratings - Credit Card	Data	Quarterly	Reports on credit card trusts
Fitch Ratings - PMM	Data	Monthly	CMBS loan scoring system
Fitch Ratings - Indices	Data	Monthly	Collateral type database
iCDO	Model	Monthly	Hypothetical trading, trade scenarios, compliance
IMAKE	Model/Data	Monthly	CF model, security/portfolio analysis, investor reporting
Intex Solutions	Model/Data	Monthly	CF model, security/portfolio analysis, investor reporting
Loan Performance	Model/Data	Monthly	Loan level data and analytics
Markit	Data	Daily	Reference data for CDS; CLO collateral pricing
MCM (Informa)	Data	Intra-day/ Real time	New issue database
MIAC	Model/Data	Daily/Weekly	Mortgage servicing/strip/derivative/ whole loan valuation
Moody's CDO Edge	Model/Data	Monthly	Credit default and loss model
Moody's ABCP Research Service	Data	Depends on product	Database of ABCP programs and analysis
Moody's Investor Service - Performance Data Services	Data	When Available	ABS and collateral performance data and subprime
Moody's Mortgage Metrics	Model	Quarterly	Stress tests prime non-agency mortgages and risk metrics
Polypaths	Model/Data	Daily	Trading-quality models
Real Point Asset Management	Data	Monthly	CMBS, collateral and property data and research
Reuters	Data/Model	Real time	Electronic trading capabilities, benchmark content, analytics, broker & dealer prices & independent price valuations
Sector	Data	Weekly	Agency mortgage data, factors and prepayments
S&P ABCP	Data	Quarterly	ABCP data, by sector and leading issuer/program sponsor
S&P Credit Card Index	Data	Monthly	Credit performance index
S&P CDO Products	Data	Monthly	Credit performance index, model and CDO synthetic collateral data
S&P RMBS Products	Model/Data	Daily/Monthly	Credit quality, documentation and cash flow model tools
TBMA CDO Library	Data	Real time	Transaction library

¹Bloomberg is excluded at its request.

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Securitized And Structured Finance Model and Data Vendors

TABLE 3A(Continued)

PRODUCT	DATA/MODEL	UPDATE	SERVICE
TBMA Prepayment Survey	Data	Twice a month	Dealer forecast/agency prepayment survey
Trepp	Model/Data	Monthly	CMBS/ collateral analytics, deal library, surveillance, trade-quality data
Wall Street Analytics CDOnet	Model/Data	Daily/Monthly	CF model, security/portfolio analysis, investor reporting
Wall Street Analytics Structured Finance Work Station	Model/Data	Daily/Monthly	CF model, security/portfolio analysis, investor reporting
Yield Book (Citigroup)	Model/Data	Daily	Trade quality model, indices, research, data
Generic Dealer	Model/Data	Real time	Securities and collateral data and research
Generic Trustee	Data	Monthly	Structured finance performance data

Securitized and Structured Finance Model and Data Vendors

TABLE 3B

PRODUCT	METHOD	INFORMATION SOURCE
ABSnet	Trustee reports/issuance document database, etc.	Trustee reports/issuance documents, others
Andrew Davidson & Co.	Deal library, cash flow engine, quasi-Monte Carlo simulation	Structure library, agency and non-agency data
AnSer (Black Rock Solutions)	Proprietary models enhanced with 3rd party data	Internal data, Trepp, Intex,
Bloomberg ¹		
Bond Edge	Prepayment model, reverse engineer deals, scenario analysis	Structured finance deal library
C-Bass RADAR Viewer	Proprietary loan servicing database	Internally developed data
Chasen Enterprises	Model duplicating “waterfall”s” and CF, reverse engineer deals	Internal database
CPR&CDR Technologies	Proprietary database	Agencies, some non-agency issuers
Dominion Bond Rating Service - CDO Tools	Regression based model	User provided
Dominion Bond Rating Service - RMBS	Regression based model	User provided
eMBS	Data from agencies, converted to database	Agencies
Fitch Ratings — Vector	Credit risk/portfolio correlation model	Trustee reports/issuance documents/proprietary, etc.
Fitch Ratings — Indices	Data collected from trustee reports/ internal surveillance, tabulated	Trustee reports/issuance documents/proprietary
Fitch Ratings - Monitoring	Surveillance, monitoring, analytical product	Internal data
Fitch Ratings — PMM	Internal scoring system	Trustee data, public reports
Fitch Ratings — Credit Card Trust	From trustee, proprietary data updated	Trust, proprietary data
iCDO	Template for trade scenarios/compliance testing	Issuance and trustee data
IMAKE	Single model for transaction cash flow/ analytics	Trustee reports/issuance documents/deal library
Intex Solutions	Interest rate, prepayment/default data in deal structure, CF model	Trustee reports/issuance documents/deal library
Loan Performance	Non-agency mortgage database/models	Mortgage origination/issuer data
Markit	Data from shareholder dealers/reference entity data base for CDS	Dealer prices, RED database
MCM (Informa)	Contact dealers, other market participants	Dealers, market contacts
MIAC	Valuation model using loan level/servicing, market contacts	Proprietary valuation model, user’s data
Moody’s CDO Edge	Combine rating/monitoring/data with credit model	Proprietary data, credit portfolio model
Moody’s ABCP Research Service	Spreadsheet database, analysis, and surveillance reports	Internal database, surveillance reports
Moody’s Investor Service - Performance Data Services	Transaction data base	Monitoring data base, include trustee reports
Moody’s Mortgage Metrics	Stress test mortgages to economic scenarios and real estate market	Historical mortgage performance
Polypaths	Three-factor interest rate model	Data supplied by user, model
Real Point Asset Management	Analyst research and database	Multiple - trustee reports, analysts, property financials
Reuters	Aggregate market data	Dealer & platform quotes, proprietary analytical & third party data & models, dealer & issuer contributed cash flows. Trustee reports

¹Bloomberg is excluded at its request.

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Securitized and Structured Finance Model and Data Vendors

TABLE 3B (Continued)

PRODUCT	METHOD	INFORMATION SOURCE
Sector	Agency mortgage database	Agencies
S&P ABCP	Data report from trustee reports, internal data	Internal database
S&P Credit Card Index	Trustee reports and internal data developed index	Credit card trusts
S&P CDO Products	Index; Monte Carlo simulation, CDS database	Markit, trustee data, internal deal surveillance
S&P RMBS Products	Simulation model, data from internal sources, trustee reports	Loan and borrower characteristics, regional economic data
TBMA CDO Library	Submission by dealers	Dealers
TBMA Prepayment Survey	Dealer prepayment survey on current yield curve	TBMA MBS Research, Strategy, and Analysis Committee
Trepp	Database and model engine.	Models/research/data; yield curves, prepayment measures
Wall Street Analytics CDOnet	Collateral performance data, interest rate scenarios, deal structure model	Markit pricing, trustee reports, deal library, Loan Pricing Corp
Wall Street Analytics Structured Finance Work Station	Collateral performance data, interest rate scenarios, deal structure model	Markit pricing, trustee reports, deal library, Loan Pricing Corp
Yield Book (Citigroup)	Citi indices, research and data; trade and risk management models	Citigroup research, data library and third-parties
Generic Dealer	Data, proprietary analytics and models	Internal data, other sources
Generic Trustee	Trustee compiled	Issuer reported data

Securitized and Structured Finance Model and Data Vendors

TABLE 3C

PRODUCT	COST	HISTORIC PRICES	NUMBER
ABSnet	License	Yes-1995	11,000 deals, 80,000 bonds, 15 collateral types
Andrew Davidson & Co.	License based on number of users	Yes-1983	N/A
AnSer (Black Rock Solutions)	User based fee	Yes-mid1980s	\$3 trillion in assets modeled
Bloomberg			
Bond Edge	License	Yes	8,000 deals
C-Bass RADAR Viewer	License	Yes, five years	
Chasen Enterprises	License	Yes	17,000 100% of agency CMOs
CPR&CDR Technologies	License	Yes, 12 month history shown	35 million loans
Dominion Bond Rating Service -CDO Tools	Free	User provided data	N/A
Dominion Bond Rating Service -RMBS	Free	User provided data	N/A
eMBS	License based on types of files, frequency	Yes	\$1,000,000+
Fitch Ratings — Vector	Subscription based on issues/level	Yes	N/A
Fitch Ratings - Monitoring	Subscription based on users/level	Yes	N/A
Fitch Ratings - Indices	Subscription based on users/level	Yes	N/A
Fitch Ratings — PMM	Part of subscription	Yes	N/A
Fitch — Credit card trust	Part of subscription	Yes	4 trusts
iCDO	License subscription based on no. of users	Yes	N/A
IMAKE	Case by case basis	Yes-1993	8,000 transaction structures
Intex Solutions	License	Yes, 1979 (MBS)	10,000+ deals
Loan Performance	License - depends on level of service	Yes-1983	100 million mortgages+
Markit	License - different prices for shareholders /clients	Yes-1993	Depends on sector
MCM (Informa)	License	Yes	Over 50,000 entries
MIAC	License	Yes	\$3 trillion in servicing rights, \$125 billion whole loans
Moody's CDO Edge	License — Customer size and service level	Yes-1990s	N/A
Moody's ABCP Research Service	License	Yes	N/A
Moody's Investor Service - Performance Data Services	License/Subscription	Yes, late 1980	Over 60 data fields
Moody's Mortgage Metrics	License	Yes	1,250 scenarios, 9,000 customer accounts
Polypaths	License	Yes	N/A
Real Point Asset Management	License	Yes	600
Reuters	License — Service and number of users	Yes	\$50 Billion and daily trading
Sector	Part of RatingsDirect Service	Yes, 1994	All agency securities
S&P ABCP	Part of RatingsDirect Service	Yes, 1992	
S&P Credit Card Index	Free/premium charge for data	Yes, 2003	30 trusts
S&P CDO Products	Free; Premium subscription/license	Yes, 1997	2400 reference indices, 3900 deals rated

¹Bloomberg is excluded at its request.

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Securitized and Structured Finance Model and Data Vendors

TABLE 3C (Continued)

PRODUCT	COST	HISTORIC PRICES	NUMBER
S&P RMBS Products	Free; Premium subscription/license	Yes	1,000,000 loans, 18,000 RMBS. 86 in index
TBMA CDO Library	Free/subscription - text file	Yes, 2004	167 deals
TBMA Prepayment Survey	License	Yes, 1992	100 cohorts
Trepp	License	Yes, 10 years	90,000 loans, 900 deals
Wall Street Analytics CDOnet	License	Yes	750 deals
Wall Street Analytics Structured Finance Work Station	License	Yes	N/A
Yield Book (Citigroup)	Tiered pricing	Yes, indices—1980; data—1950	10,000 securities and mortgage pools
Generic Dealer	Part of customer relationship	Yes	N/A
Generic Trustee	Generally free	Yes, for life of the deal	N/A

Securitized and Structured Finance Model and Data Vendors

TABLE 3D

PRODUCT	EXAMPLES: NON-PRICE INFORMATION	3RD PARTY DISTRIBUTION
ABSnet	News retrieval, rating feeds, SEC filings	Yes
Andrew Davidson & Co.	Mortgage convexity/duration, prepayment, OAS	Yes e.g. Intex, Reuters Pricing
AnSer (Black Rock Solutions)	CF/prepayment reporting, convexity/duration	No
Bloomberg ¹		
Bond Edge	CF, duration/convexity, prepayments, performance attribution	No
C-Bass RADAR Viewer	Performance, including delinquency data	No
Chasen Enterprises	Cash flow/prepayment, convexity/duration	Yes
CPR&CDR Technologies	Mortgage data - WAC/WAM, prepayment speeds	Yes - Sector
Dominion Bond Rating Service - CDO Tools	CDO composition, credit characteristics, indicative rating	No
Dominion Bond Rating Service - RMBS	Mortgage loan/pool characteristics, credit enhancement	No
eMBS	Mortgage prepayments and factors	Yes - defined by agencies
Fitch Ratings - Vector	Asset correlation, CDO characteristics, loss/default	No
Fitch Ratings - Indices	Delinquency data	No
Fitch Ratings - Monitoring	Performance reports	No
Fitch Ratings — PMM	Security, collateral data	No
Fitch Ratings — Credit card trusts	Parent and trust description; collateral performance	No
iCDO	Price/yield table, cash flow hypo trade generation	No
IMAKE	CF, price/yield, defaults under scenarios	No
Intex Solutions	Prepayments, default, CF, WAC/WAM/WALA etc	Yes - inquire
Loan Performance	Issuance, delinquencies, prepayments	Yes — e.g. Intex
Markit	Reference entity data, news/research, CDS indices	Yes
MCM (Informa)	Issuer, dealer, deal type, pricing type, size	Yes - Bloomberg, Reuters
MIAC	Servicing valuation	Yes
Moody's CDO Edge	CF, simulated default/loss	No
Moody's ABCP Research Service	Rating, dealer, asset type, program name, volume	No
Moody's Investor Service - Performance Data Services	Credit quality and performance metrics	No
Moody's Mortgage Metrics	Scenario testing, simulated credit/collateralization	No
Polypaths	CF, balances, defaults	No
Real Point Asset Management	Collateral property and security data, rating changes	No
Reuters	Non-price information: terms and conditions, proprietary cash flows, corporate actions, analytics including spreads over the benchmark sovereign, and swap curve, credit rating, maturity, yields, convexity and duration	Yes
Sector	Mortgage: WAC, WAM, WALA, loan balance, servicer	Yes - 20 organizations
S&P ABCP	CP data	No
S&P Credit Card Index	Yield and credit performance	No
S&P CDO Products	CDO portfolio data, model results	No
S&P RMBS Products	Risk Grades, loss estimates, credit enhancement estimate	No
TBMA CDO Library	Deal documents	No
TBMA Prepayment Survey	Average and median response by cohort	Yes - MIAC, CPR&CDR, price evaluators

¹Bloomberg is excluded at its request.

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Securitized and Structured Finance Model and Data Vendors

TABLE 3D (Continued)

PRODUCT	EXAMPLES: NON-PRICE INFORMATION	3RD PARTY DISTRIBUTION
Trepp	Collateral property and security data, rating changes	Yes-numerous
Wall Street Analytics CDOnet	CF, price/yield, defaults under scenarios	Yes
Wall Street Analytics Structured Finance Work Station	CF, price/yield, defaults under scenarios	Yes
Yield Book (Citigroup)	Coupons, rating, indices, yield curves	Yes - Bloomberg
Generic Dealer	Spreads, prepayment, credit performance	Yes - Bloomberg
Generic Trustee	Outstanding, paydown, delinquencies	Yes

NOTES

CF = Cash flow

WAC = Weighted average coupon

WAM = Weighted average maturity

WALA = Weighted average loan age

Securitized and Structured Finance Data and Model Vendors: Product Sectors

TABLE 3E

PRODUCT SECTOR	ABCP	AGENCY MBS	CMO	MORTGAGE ABS	NON MORTGAGE ABS	CMBS	CDO/CLO
ABSnet			X	X	X	X	X
Andrew Davidson & Co.		X	X	X	X		
AnSer (Black Rock Solutions)		X	X	X	X	X	X
Bloomberg ¹							
Bond Edge		X	X	X	X	X	
C-Bass RADAR Viewer			X	X			X
Chasen Enterprises			X	X			
CPR&CDR Technologies		X	X	X			
Dominion Bond Rating Service - CDO Tools							X
Dominion Bond Rating Service - RMBS				X			
eMBS		X					
Fitch Ratings - Vector	X			X	X	X	X
Fitch Ratings - Indices	X			X	X	X	X
Fitch Ratings- Monitoring	X			X	X	X	X
Fitch Ratings - PMM						X	
iCDO							X
IMAKE			X	X	X	X	X
Intex Solutions		X	X	X	X	X	X
Loan Performance			X				
Markit				X			X
MCM (Informa)			X	X	X	X	X
MIAC		X	X	X			
Moody's CDO Edge							X
Moody's ABCP Research Service	X						
Moody's Investor Service - Performance Data Services				X	X	X	
Moody's Mortgage Metrics			X	X			
Polypaths			X	X	X		
Real Point Asset Management						X	
Reuters		X	X	X	X	X	
Sector		X					
S&P ABCP		X					
S&P Credit Card Index					X		
S&P CDO Products							X
S&P RMBS Products			X	X			
TBMA CDO Library							X
TBMA Prepayment Survey		X					
Trepp						X	
Wall Street Analytics CDOnet							X

¹Bloomberg is excluded at its request.

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Securitized and Structured Finance Data and Model Vendors: Product Sectors

TABLE 3E (Continued)

PRODUCT SECTOR	ABCP	AGENCY MBS	CMO	MORTGAGE ABS	NON MORTGAGE ABS	CMBS	CDO/ CLO
Wall Street Analytics Structured Finance Work Station			X	X	X	X	
Yield Book (Citigroup)		X	X	X	X		X
Generic Dealer	X	X	X	X	X	X	X
Generic Trustee	X	X	X	X	X	X	X

STRUCTURED AND SECURITIZED PRODUCT SECTOR SPECIFIC INFORMATION PRODUCTS OFFERED DIRECTLY TO CUSTOMERS, DISTRIBUTED THROUGH THIRD PARTIES AND INCORPORATED IN PRODUCTS THAT CUT ACROSS SECTORS

While some information sources exclusively concentrate on one product, other information providers have developed suites of products that cut across the broader universe of sectors. For instance, Real Point and Trepp have developed information and pricing in the CMBS market, and Loan Performance is a source of data for non-agency mortgages and securities. At the other extreme, Bloomberg as the most prominent market data aggregator, provides data, analytics, dealer and consolidated prices and indicative spreads across product sectors, and the Intex suite of products offers cash flow and modeling solutions across product sectors.

Specialized vendor products are incorporated into price, valuation and risk assessment services that cover the broad structured finance universe — for example, Trepp is incorporated in the BlackRock AnSer calculator and Trepp analytics are available on Bloomberg. As other examples, Andrew Davidson & Co. mortgage prepayment models are incorporated both in the Intex product and in products of several other vendors, and Sector agency mortgage data are distributed through approximately 20 vendor partners.

III. SPECIFIC PRODUCT SECTORS

Having presented broad price and information source and price discovery themes and observations, this section gives for each product sector: (1) an overview of how prices are set and obtained in the secondary market, (2) pricing sources and (3) sources of information on collateral and applicable models.

ABCP

Asset-backed commercial paper is a short-term or short-dated product sector with maturities, by definition, of less than 270 days. There are multiple dealer quotes and this is a trade flow driven rather than model-driven pricing sector. ABCP is considered among the most liquid and transparent sectors perhaps after the TBA mortgage pools. Taking into account its short-term nature, commercial paper historically has tended to be viewed as more of a buy and hold market, though trading activity has increased. ABCP has been a growth sector of the CP market, and more complex products have been developed such as extendibles in which the term can be expanded or contracted based on the structure, market conditions and sponsor goals. There are diverse collateral types supporting ABCP such as mortgages, dealer floor plans, credit cards and autos. Valuation analysis is driven by ABCP program sponsor reputation, program liquidity and credit quality of the collateral, as well as the short-term interest rate environment.

PRICING¹⁸

As with other fixed-income products, ABCP is an over-the-counter market with dealers providing liquidity. While ABCP electronic trading is increasing, the majority of trades — about 60 to 70 percent — are voice trades. The largest share of electronic traded CP is in the shorter maturity sectors, for example, less than 45 days. The reason the majority is voice-traded is that investors indicate that they value the insights and “color” traders impart on particular issues and program sponsors, including views on relative value, as CP is frequently traded based on issuer name and reputation.

CP, including ABCP, tends to be more liquid in the shorter maturity sectors. There are electronic trading CP platforms (four identified in TBMA study referenced earlier) with two multi-dealer platforms particularly significant - TradeWeb which has traded CP since 1999 and trades 2,000 CP programs and Bloomberg’s BOOM or Bloomberg Money Markets which show executable and indicative dealer prices from multiple dealers. Dealers through single dealer platforms will provide similar information on their inventory.

TradeWeb posts at the peak of the trading day a CP yield curve based on participating dealer quotes to provide a comparison to indicative pricing seen on the electronic trading platform. In addition, though it is considered by market participants to have a limited marketplace following, the Federal Reserve on its H-15 report generates a yield curve (as well as market outstanding volume) based on modeling developed from DTC data. FT Interactive Data is considered the dominant source of evaluated CP prices, and buy-side firms also maintain internal evaluated pricing models for market valuation and NAV determination.

The maturity sectors are generally defined as 7 to 30 days and 30-day increments after 30 days. Pricing is considered to be efficient with market participants noting similarity between evaluated and executed prices. This is particularly the case in short maturities — less than 45 days — where trading volume is generally the highest. There is lower trade volume and frequency at the longer end, and thus price interpolation (rather than actual trade generated price quotes) may be required.

DATA/MODEL

ABCP repayment comes from three sources — cash flow, asset sales and guarantor — with valuation analysis determined by data elements such as loss rate, payment rate and interest rates and balance pool

¹⁸As instruments with maturities of less than a year, commercial paper “yields” are quoted as discounts.

trends.¹⁹ Collateral data thus are critical information in credit analysis. Market participants rely on trustee reports and issuer and conduit web sites as the dominant and primary source of collateral data. As noted above, issuer name and reputation is also an important consideration. The investor relations function at the dealer firms also plays a role in accessing ABCP collateral data.

While trustee reports updated monthly are the dominant source of information on ABCP collateral, the extent to which there are centralized and systematic sources of trustee information enhances the efficiency of the collateral evaluation and monitoring process. Fitch Rating Service's ABCP SMART service lists the type of collateral within a conduit without naming the specific collateral, enabling the user to view collateral by asset class, industry and credit quality. In addition, Fitch's portfolio risk evaluation modeling tool VECTORS can also be used for collateral risk analysis. Moody's Performance Data Reports discussed in the ABS section below also has an ABCP module for program monitoring. Moody's also developed with program sponsors a CP Program Index that provides a spreadsheet database which lists (340 as of early 2005) programs. Standard & Poor's US\$ ABCP Market Statistics provides summary data on ABCP performance of leading programs.

The ASF, in order to encourage marketplace transparency and consistency, developed a series of Excel spreadsheet-based template formats for monthly multi-seller ABCP conduit reporting to investors. They include activity, disclosure, transaction, compliance, individual asset distribution, seller distribution and default multiplier report formats.

Agency Residential Mortgage-Backed Security Pass-through (MBS) and CMOs

As noted, the agency mortgage pass-through security sector and especially TBA is considered the most liquid product sector in the securitized and structured finance universe with widest availability of quotes. The reason lies in the relatively uniform and high credit quality nature of agency mortgage collateral supporting the cash flows as well as the agency guarantee and the structural simplicity of the pass-through form. Conforming residential mortgages must meet a set of federal agency criteria regarding loan size limits and underwriting standards. Within the agency sector, MBS typically trades on a TBA generic pool basis — the pools are traded according to standard characteristics (for instance, coupon, agency, face value and settlement date) but the specific collateral not yet identified or delivered — it is in essence like a forward contract. While the TBA market has been dominant, there has been growth of specified pools which may consist of specific mortgage collateral containing favorable characteristics with respect to expected prepayment speeds.

Specified (or stipulated) pools and especially CMOs with unique tranche structure and cash flow allocation "waterfall" rules reduce uniformity and introduce unique characteristics which make direct price comparisons from one security to another subject to more uncertainty and complexity. CMOs originally were developed to meet the specific cash flow and return objectives of different investors and have evolved over time to numerous structures and allocation rules for dividing the underlying mortgage collateral cash flow. CMO structures are derived variations from two basic forms, the planned amortization class (PAC) which have scheduled and relatively predictable cash flows, and sequentials in which bonds are paid based on tranche priority from the underlying cash flows. The CMO structures are affected by and sensitive to prepayment patterns (as are all agency securities), including trust IO (interest only) and PO (principal only) strips and various "exotic" formulations which can be complex.

¹⁹"Extendible ABCP New Force in the market" (updated from "PhD's of ABCP", Moody's Investor Service Everett Roulan, October 27, 2004) presented at the ASF Sunset Seminar in September, 2005

MBS AND CMO VALUATION BRIEFLY SUMMARIZED

Agency MBS pricing and valuation is sensitive to, and driven by, prepayment speeds. With the development of prepayment analytics, changes in prepayment speeds are quickly incorporated into market pricing. Prices, for example, rally or fall based on changes in prepayment speeds.

The imbedded mortgage prepayment option is thus the complicating element in agency mortgage valuation and source of risk and opportunity in agency MBS investing. While perhaps useful as a starting point, the static spread of a mortgage to a similar maturity benchmark such as Treasury does not reflect the prepayment effect and thus refined metrics have been introduced. The WAL (weighted average life) MBS spread to the interpolated Treasury with the same WAL more accurately reflects the MBS spread to the appropriate “time to maturity” sector. However, this measure does not account for the effect of the yield curve. The zero curve or “z” spread takes into account the yield curve shape and the timing of the cash flows. The “z” spread uses a zero coupon rate plus a constant spread to equate the net present value of the cash flows to the current price. The most widely used standard measure is the option adjusted spread, OAS, which uses numerous rate path and prepayment scenario simulations to estimate the portion of the yield of an MBS that is due to the implied call option embedded in the security.

The OAS methodology is applied to CMO analysis but with the additional complication of incorporating the cash flow allocations of the mortgage collateral within the CMO structure and among the CMO tranches. The challenge is to determine how the OAS (or the value) of the mortgage collateral is distributed within the CMO structure. As the OAS is based on numerous simulations of interest rate paths (and the prepayment volume), it is in reality the average spread (based on the simulations) over the Treasury spot rate curve. The results are typically tested for sensitivity to alternative prepayment and volatility scenarios. The analysis is used to identify which CMO tranches are fairly priced, expensive or cheap and where the risks lie within the structure.²⁰

PRICES: PASS-THROUGHS

Transaction Pricing

Agency MBS are quoted as a dollar price, in relation to an index, or benchmark curve - Treasury, LIBOR or swap spread - and specified pools are quoted relative to TBA. As noted above, the spreads are quoted relative to a benchmark, starting from a comparison to a nominal similar maturity Treasury to one based on comparable WAL Treasury, “z” spread, incorporating yield curve shape, and OAS, incorporating the cash flows.

Generic TBA pricing is widely available from a number of sources during the day and publicly posted at the end of day. For instance, TBMA provides Reuters’ end-of-day prices on its publicly accessible web site. The prices are also available over trading platforms (notably TradeWeb) through dealers, data vendors such as Reuters (who publishes TradeWeb and ICAP inter-dealer market prices) and Bloomberg (who provides dealer specific price quotes and (OAS) spreads through dealer pages (available upon dealer approval) and consolidated quotes by cohort, vintage and by various mortgage pool characteristics).

Dealers directly and through dealer pages on Bloomberg provide newly formed and issued agency MBS and secondary market price quotes throughout the day²¹ and also offer robust packages of information to clients in addition to quotes that offer market “color.” Included in the analytical package available to clients may be collateral data characteristics, end of the day spreads to Treasury and LIBOR by coupon and weighted average maturity (WAM) bucket, and market and research commentary. To illustrate, a sample

²⁰The discussion is adapted from *The Handbook of Fixed-income Securities*, edited by Frank Fabozzi and Steven Mann, Chapters 23 and 38. It should be noted that there are a number of OAS measurement issues with respect to the term structure interest rate model in order to accurately reflect risk and value that are beyond the scope of this discussion, including the relationship of the swaps and swaption derivatives instruments to the mortgage market. This is a particularly pertinent issue depending on the extent that they are used to hedge mortgages. Another issue is development of term structure models to accommodate non-fixed rate CMO tranches.

²¹Market participants note that Bloomberg is quite useful for price thoughts, levels and targets. Additional data analysis is undertaken to set a specific transaction price and valuation.

data package provided to clients may be comprised of spreads by coupon and by issue date cohort, as well as supporting mortgage pool data characteristics, including weighted average coupon (WAC), weighted average loan age (WALA), and WAM; TBA spreads for seasoned and on-the-run by agency, coupon, age, maturity and months before settlement characteristics; yields and returns relative to Treasuries and indices; and other pool characteristics such as volatility, convexity, duration measures and outstanding volume by vintage.

Bid lists and “covered bid” prices are useful for market participants to gain additional current market “color.” Another example of the wide availability of generic pricing is MBS Quoteline, which is an inexpensive service (\$44.95 a month) targeted to mortgage industry professionals (e.g. originators and brokers). It shows price quotes and changes in quotes updated every 15 seconds for generic agency MBS products (e.g. 15-year and 30-year) through a regional dealer.

As noted, valuation and pricing become more complicated as we move from generic to specified pools, and the reason involves capturing the specified pool details which affect prepayment expectations and assumptions. Prepayment assumptions explain why specified pools have not been available as TBAs on trading platforms (though TradeWeb is currently working to add specified pools). The challenges also increase as one moves to mortgage pools with limited historical data that may exhibit “unusual” characteristics that affect prepayment patterns, such as low balance mortgages.

Price Evaluations

Pricing evaluators offer opinions in terms of prices and spreads for pools across product types — TBA and specified pools, fixed rate and ARMs (adjustable rate mortgages), standard agency programs and for products that do not fall into standard programs. The analysis typically starts with evaluation of the most liquid sectors. As an example of the process, in general, the fixed-rate mortgage independent price evaluation process is developed by grouping mortgage pools by coupon and delivery date for the different (i.e. 15-year and 30-year) maturities and by program, and organized into stripped “buckets” by WAC and WAM. The valuation and prepayment assumptions are confirmed based on the dealer and inter-dealer broker prices in both the TBA and seasoned markets which reflect trading activity. Prepayment histories and estimates are developed consistent with industry conventions. ARM products are evaluated on a margin basis, mapped and adjusted to reflect the repricing characteristics, index adjustments and caps.

A vendor of mortgage trading models commented, “Specified pass throughs (specified pools) are similar to structured products in the sense that pricing services typically price them using a matrix methodology which may not always capture subtleties,” suggesting great care should be taken to capture collateral in the specified pools. It is important to emphasize that price evaluations are typically a once a day service and prices may move during the course of the day, e.g. mortgage prices rallying relative to prepayment expectations.

PRICES - AGENCY CMO

A CMO structure divides the mortgage principal and interest payments into a series of tranches with different cash flow priorities or “waterfalls.” There are numerous and almost infinite unique structures and cash flow rules. Though the market has become more liquid and spreads tighter with volume growth, liquidity has been constrained by the numerous heterogeneous structures with variations even among the more common, e.g. PAC, forms.²² Given that prepayment assumptions and interest rate term structure complexities drive valuations within the CMO structure, the CMO market pricing is largely model-driven. There are two general valuation approaches — cash flow modeling which incorporates the yield curve term structure, volatilities and prepayment models; and OAS analysis which has a similar dynamic

²²“Collateral Mortgage Obligations”, Alexander Crawford (Deutsche Bank), Fabozzi and Mann, *The Handbook of Fixed-income Securities*.

methodology of incorporating prepayment, the outstanding balances in the various pieces of the CMO structure and interest rate paths, term structure changes and volatility.

Transaction Prices

Distinct from TBA pricing, price determination is largely a negotiated process given the heterogeneous structures inherent in the CMO product sector. Because of the nature of the CMO product, one-sided prices are generally provided, and price discovery is accomplished through multiple dealer relationships and “calling around.”

Price Evaluations

We should once again keep in mind that an evaluation can be considered as much an evaluative process as a specific price. In general, the collateral analysis is the starting point, taking into account the underlying mortgage factors, geography and prepayment speed, and then the “waterfall” structure is modeled. Using derived prepayment speeds and assumptions, the OAS values are then mapped to tranche type and average life calculations (and variance to the average life) which generate a dollar price and yield based on the OAS value matched to the appropriate security. The price is verified based on dealer prices,²³ bid lists, research and discussions with clients. The price is also verified, looking at price targets through, for example, Yield Book and Bloomberg. The OAS calculation may also be confirmed through a nominal spread evaluation. There is a view among some market participants that CMO evaluated (matrix) pricing is more widely used for NAV calculation than in the trading or transactional context.

COLLATERAL DATA

Great Deal of Centralized Agency Pool Level Data

Agency mortgage product analysis benefits from standardized collateral data available from a central source: the agencies. The agencies’ pool data updates are almost immediately disseminated to market participants through data vendors. Agency data have typically been available at the mortgage pool level, rather than the loan level, but Freddie Mac in December 2005 began to publicly disclose loan level data on new ARM and fixed-rate PCs. Freddie Mac will also begin to disclose certain algorithms and business rules used to produce loan level information for each pool in addition to those used to derive pool level disclosures.

The agency mortgage data vendors either obtain the data directly from the agencies or through an industry utility, Sector, which distributes the agency data through about 20 partners. Examples of agency mortgage data vendors who work with Sector are eMBS, Bloomberg and CPR&CDR. Sector also has a service that delivers mortgage data directly to end users (Mortgage on Demand). The data provided by the agencies include coupon, WALA (weighted average loan age), WAL (weighted average life), loan size, WAM (weighted average maturity), LTV, property type and occupancy status.

PREPAYMENT MODELS AND AGENCY PREPAYMENT DATA TOOLS DRIVE VALUATIONS

Prepayment Data and Surveys

Market participants base their prepayment analysis and models on the agency mortgage pool data that are updated monthly. In addition to historic data, dealer prepayment speed projections are also used to provide insights about trends. Bloomberg is used as a source of dealer prepayment projection information and presents dealer median prepayment speeds. In addition, TBMA’s semi-monthly dealer prepayment projection survey measures PSA and CPR (the two major prepay statistical conventions followed by the market) prepayment speeds, with average and median speeds calculated across approximately 100 cohorts. The survey projections are based on the yield curve as of a specific date and measure the effect on mortgage cohorts of yield curve shifts up and down by 50, 100, 200 and 300 basis points.²⁴

²³It was commented that the Lehman trader provided pricing is considered particularly useful as deal, structure and volume data are provided through a companion service separate from the pricing service.

²⁴TBMA dealer survey is based on long-term prepayment speed projections. Cohorts are generally updated every six months. The survey data may be found at <http://www.bondmarkets.com/story.asp?id=1278>.

Prepayment Models

Sophisticated proprietary internal and external explanatory and predictive prepayment forecasting tools drive third-party cash flow, evaluated pricing, and dealer and buy-side mortgage valuation models. For example, Andrew Davidson and Co. has four groups of prepayment models involving 20 classifications of mortgage-backed securities which are incorporated into numerous mortgage valuation systems through vendor partnerships. The prepayment models take into account interest rates, market environment assumptions and a library of mortgage security structures.

Traditionally, interest rates have been considered the dominant variable that drives refinancing and prepayment speed variability.²⁵ Greater data availability and more detailed analysis have led market participants to refine the analysis and gain greater insights into mortgage consumer behavior which has led to more precise pricing and valuation metrics. Numerous additional variables such as the “burn out effect” and loan seasoning, age of the mortgage, geographic differences, FICO score, LTV, price appreciation and equity in the home, loan balance, the impact of media reporting changes in mortgage rates and whether the mortgage is at a discount or premium to market rates have led to more accurate prepayment estimation. For example, data generated from the refinancing and housing price boom in recent years have enabled market participants to draw new insights into customer propensity to refinance a mortgage at higher rates in order to extract equity through cash-out refinancing; and the importance of home sale data relative to price appreciation data in understanding prepayment behavior.²⁶ Furthermore, the transition from a fixed-rate dominated market to a market that includes significant ARM and hybrid mortgage volumes further complicates prepayments analysis. For instance, how does ARM and fixed-rate refinancing behavior differ and what is the impact of rate adjustment caps and the time to the next ARM adjustment on consumer refinancing behavior?²⁷

The quality of the model (and experience of the modeler) is critical to the prepayment estimation and prepayment process, especially for newer types of mortgage collateral for which the data are limited. Models should be able to accurately forecast prepayment speeds under a wide range of economic and interest rate environments and realistically account for linear and nonlinear relationships. For instance, prepayment speeds may be more sensitive to changes in loan size within certain ranges (e.g. less than \$80,000) than others (\$150,000 to \$200,000).

CMO Modeling Tools

After more than a decade, there have been literally thousands of CMO transactions. Market participants use models developed either internally or through third party vendors to understand and value various pieces of a CMO structure. There is now virtually 100 percent coverage of agency CMO structures by vendors such as Intex and Chasen Enterprises.²⁸

The modeling process involves collecting the issuance documents, modeling or “reverse engineering” the deal based generally on either common structures that are in the database library or modeling the deal if the structure is not in the database. Through Monte Carlo type simulation techniques, the model generates a distribution of cash flow reports which form the basis of the valuation, and opinions about relative value.

There are several other CMO valuation and trade price confirmation services. MIAC, or servicing.com, for example, which specializes in mortgage servicing valuation, provides tools to value Trust IO strips

²⁵Note that it has long been recognized that there are other non-interest rate related reasons for prepayments such as upon sale of the house.

²⁶Barclay’s presentation, “Discount Speeds: The Impact of Cash outs” at CPR&CDR’s October 20, 2005, Prepayment and Mortgage Credit Modeling and Strategy Conference.

²⁷A data and valuation challenge throughout the mortgage sector, including agencies, is (1) the development of new mortgage products and (2) mortgages with unique characteristics such as low loan balances for which there has been limited historical data to develop prepayment patterns. Until significant historical data exist for the product, pricing is based on generic spreads to a benchmark with similar characteristics. Analytical insights and pricing refinements are introduced once a substantial data series becomes available for the product.

²⁸Chasen Enterprises has been acquired by Markit (Markit Group, Ltd.). The acquisition was announced August 29, 2006.

and residuals. Citigroup's Yield Book²⁹ analytics for the structured mortgage market are widely followed, including breakeven analysis, and are used as a price verification tool. Reuters makes available cash flows it generates through its price evaluation service.

Non-agency Mortgage-Related Securities: ABS³⁰ and CMO

Similar to the discussion of the agency market, the non-agency mortgage discussion combines mortgage ABS/private-label MBS (which includes home equity loans, low and no documentation, subprime, A and Alt-A and high LTV mortgage-backed securities) and non-agency CMO. This has been an increasingly important and significant sector, largely based on the growth of (1) home equity-backed issuance which has set new volume records annually for the last several years through 2005 and (2) "private label" or non-agency mortgage issuance as new hybrid and affordable products such as option ARMs now represent a significant share of the market. Based on TBMA data, HEL ABS over the last ten years has grown from 10.5 to 26.7 percent of total ABS outstanding and a substantial portion of ABS issuance.

Non-agency mortgage related securities are distinguished from the agency sector by the nature of the collateral that generates the underlying cash flows. The wider range of non-agency loan sizes results in more divergent prepayment speeds than in the agency sector — the economics favor refinancing of larger balance loans. Another distinction in the non-agency market is the greater portion of ARM and hybrid products, typically with a fixed rate for the initial two or three years and then periodic resets with rate adjustment caps. While agency security valuation is prepayment driven, the non-agency sector is affected and incorporates both credit analysis and credit enhancement levels as well as prepayment analysis with the credit metrics becoming more important as we move down the credit curve and to more subordinate pieces of the securitization structure.³¹

Pricing: Mortgage ABS

Quotes are generally considered to be widely available in the secondary market from numerous dealers, although there may be distinctions based on product and issuer. Mortgage ABS is quoted as a swap spread and spread to LIBOR. Secondary market dealer quotes are available, for example, directly through customer relationships, through the dealers' Bloomberg pages, and the consolidated price services such as Bloomberg. For more credit sensitive collateralized issues, additional data and modeling sources, including Intex, will be typically consulted and used to determine pricing.

In recent years, there has been a great deal of new affordable and credit sensitive products in the non-agency mortgage sector — for example, interest-only mortgage and option ARMs. Experienced analysts can develop prepayment and valuation models for new products that are relatively accurate even when there is minimal history or data. As new products develop, pricing is typically based on spreads of comparable generic securities and, as data becomes available and experience is gained with the product, valuation methodologies specifically address the product characteristic data.

For most securities and market participants, based on interviews, the view is that information about collateral and the prepayment speeds on Bloomberg is sufficient for identifying a broadly comparable security spread and price. As credit quality issues become more significant, there is an increased need for specialized analyses and third-party modeling tools such as Intex.

Another new source of price information is available through the emergence of ABS CDS (credit default swaps) which are primarily mortgage ABS based. The ABS CDS market seems to generally track the cash market subject to some variation due to technical factors, according to at least one interview, and serves as a credit risk hedging tool. Still a relatively new instrument, the ABS CDS sector has grown dramatically in a short period of time following publication of ISDA documentation standards and the pay-as-you-go protocol, which are intended to be similar to the cash market payment streams. Markit introduced in

²⁹Black Rock's AnSer calculator based on internally developed modeling tools and data is similarly used.

³⁰The term mortgage ABS will be used to refer to private label pass through (non-CMO) and HEL backed securities.

³¹Another difference is that agency MBS servicers are subject to meeting agency seller/servicer criteria.

early 2006 the first ABS CDS index, ABX.HE, a home equity loan CDS index. These indices should further drive ABS credit derivative liquidity and volume. (See markit.com for details of the index.)

Pricing: Non-agency CMO

The price discovery issues for non-agency CMOs are comparable to those discussed in the agency section, with the obvious distinction that, as the collateral is non-agency rather than agency mortgages, credit analysis becomes more relevant especially for the more subordinated tranches, and thus credit enhancement and subordination levels must be considered. In general, the independent model vendors that serve the agency CMO market such as Intex, IMAKE and Chasen also serve the non-agency CMO product sector. They have in their database library non-agency structures for most and certainly the largest private label or non-agency CMO issuers.

Evaluated Prices

Mortgage ABS price evaluations are similar to those for other non-mortgage ABS discussed in the next section. Nominal spreads generated from the dealer community are compared based on transaction structure (e.g. senior/subordinated structure, level of subordination), collateral characteristics (e.g. type, WAM, coupon) and issuer (e.g. reputation, event risk exposure, track record). This spread is adjusted for prepayment speeds, differentiating as appropriate for issuer.

The CMO evaluation methodology generally follows the description in the agency sector. CMO tranches (senior, mezzanine, junior tranches) are initially evaluated on a nominal basis and then on an OAS basis. The modeled evaluations are compared to dealer and other contributing firm quotes.

PREPAYMENT BEHAVIOR AND VALUATION³²

Interest Rate Sensitivity

As noted, included within the non-agency market are the larger than agency conforming loan limit jumbo mortgages and the home equity (HEL) and subprime loans which tend to have smaller balances than typical conforming first mortgages. Smaller loans have less financial incentive to prepay as rates move. The lower non-agency credit quality mortgage products prepay but the refinancing is driven more by the borrower's improved credit status and tends to be less sensitive to interest rate movements compared to agency collateral. Larger loans are more likely to be prepaid and refinanced in a declining rate environment and thus jumbo mortgage prepayment speeds tend to exhibit greater interest rate sensitivity than agency mortgage collateral.

The greater financial incentive to prepay jumbo mortgages as rates decline results in a tendency towards greater negative convexity (i.e. greater effect on prepayment speeds as rates decline which limit price appreciation in a declining rate environment) compared to agency mortgages. Conversely, HEL and credit sensitive mortgage prepayment speeds, as noted earlier, tend to be more stable in relation to interest rates which can be a favorable performance characteristic relative to agency securities in a declining rate environment.

The shifting interest structure concept as it affects cash flow in an ABS structure should also be mentioned. Initially, any prepayments result in a shifting of cash to the senior tranche to maintain the required subordination level. The result is that, during the initial periods, cash flows are paid out to senior debt holders and subordinate tranches are "locked out." At some point, there is a "step down," or a reduction in the required subordination level, leading to cash flow to subordinated tranche investors being subject to delinquency and loss triggers.

³²With the obvious exception of different collateral characteristics, the discussion of valuation methodology in the agency MBS discussion holds for the non-agency MBS discussion as well. See Frank Fabozzi and Steven Mann edited, *The Handbook of Fixed-income Securities*, Frank Fabozzi and Steven Mann, Chapters 24, 25 and 38

DATA/MODELS

Non-agency and Agency Data Compared

Although non-agency mortgage collateral data are not as widely available and are less centralized compared to the agency sector, data sources do exist and there has been an increase in data being provided to vendors for dissemination by private label mortgage originators and issuers. While agencies generally provide mortgage pool level data, non-agency data are available at the individual loan level. Loan level data enable more precise valuation and pricing. The specific loan level data are more critical in the private label or non-agency sector as the collateral is more heterogeneous and credit sensitive. As the non-agency market has grown at a more rapid rate in recent years, though, there is a shorter history of prepayment and credit performance patterns in many products than in the agency sector.

There are at least two underlying collateral product distinctions compared to the agency market: a higher proportion of ARM products and their terms, including period to reset and rate caps, must be incorporated in the analysis; and the effect of subprime mortgage prepayment penalty provisions which have to be incorporated in any prepayment analysis.

The prepayment data and model vendors that have developed agency products have also begun to develop prepayment analytics for the non-agency market as a result of data provided by major private label and subprime originator/issuers. For instance, Andrew Davidson & Co. in November 2005 introduced a revised prepayment model based on home equity loans originated by RFC (Residential Funding Mortgage Securities).³³ As another example, Intex notes that it models all of the major issuer non-agency CMOs.

Proprietary Non-agency Mortgage Data Bases

A prominent non-agency transaction and collateral data source, Loan Performance,³⁴ collects and provides to market participants, including issuers, rating agencies, and traders, loan level data for over 85 percent of private label securitized collateral through relationships with nine of the ten leading originators. The databases show levels of credit risk, such as delinquencies and defaults, and prepayment patterns. The Loan Performance data include the variables noted as critical to evaluating prepayment and credit performance — LTV, FICO scores, coupon, vintage, geographic distribution, and product mix data — and are used for risk management, pricing analysis, portfolio evaluation and to compare the price of similar collateral securities and to bid and price new securitized pools. Traders will use the data to price securitization issuance and for decisions whether to buy or sell a security.

C-Bass, a leading investor, issuer, arranger and servicer of extremely credit-sensitive and impaired mortgage related securities, provides investors access to its data. Its RADAR viewer product is a specialized database developed from due diligence and servicing experience.

Trustee and Issuance Data Products

Trustee reports, along with issuance documents, are the core non-agency mortgage sector information sources. Vendors have developed searchable databases that include trustee data and new issue documentation. As examples, ABSNet has compiled within its database mortgage ABS trustee report and issuance documents for deal monitoring and MCM (McCarthy, Crisanti, Miller) offers a database of new issues and primary market prices.

Rating Agency Information Products

The rating agencies make available publicly both data and models to evaluate non-agency mortgage securities. The information generally is the same information that is used internally by the rating analysts. Moody's Performance Data Reports are searchable databases that enable the user to compare performance of mortgage ABS to similar transactions and develop performance based indices. Fitch's BondCompare

³³Press Release "Andrew Davidson & Co. Releases New Prepayment Model for Sub Prime Loans", November 2005.

³⁴CPR&CDR also have developed a non-agency performance database for a limited number of private-label mortgage clients.

enables comparison of up to ten transactions, and Standard & Poor's (S&P) publishes an index of high CLTV (combined LTV) mortgage ABS.

The rating agency's publicly disseminated models enable issuers, underwriters and investors to approximate a probable rating, estimate the probable credit enhancement to achieve a given rating for a new issue and monitor performance of existing issues. For instance, Moody's Mortgage Metrics is a tool to stress test a pool of prime (A or Alt A) mortgages based on different economic and interest rate scenarios. S&P offers three models: LEVELS to estimate a loan level rating and the amount of credit enhancement required to obtain a given rating; DACCS which shows rating eligibility of low-documentation loans and the rating and enhancement level for the low-documentation mortgage loans; and SPIRES which is a model that generates cash flows based on security structure, credit support and collateral payment streams. Dominion Bond Rating Service RMBS Model is a regression model that enables approximation of rating level and credit enhancement requirements for non-agency mortgage loan collateral.

Consumer and Commercial ABS

Consumer ABS are securities whose cash flows, performance and returns are based on non-mortgage consumer loans including auto loans, credit card receivables, and student loans. Commercial ABS include securities backed by business inventory, receivables and equipment leases. The consumer sector is larger than the commercial sector, but, because of analytical similarities, they are discussed together.

ABS is generally priced in the secondary market to a swap curve except for shorter maturities when it is a spread to the Eurodollar benchmark.³⁵ The general price discovery process is similar to that described in mortgage ABS. The difference, of course, lies in the collateral attributes and collateral data availability. Price discovery and valuations are developed based on identifying a comparable and similar attribute benchmark security, making adjustments to account for differences to that security and then arriving at a spread and price for the security.

A distinction between non-mortgage ABS and mortgage ABS analytics is the importance and determinants of prepayment speeds. Relative to mortgages, cash flows tend to be relatively predictable. While prepayment speeds affect ABS valuation, they are a less prominent consideration than in the mortgage sector. Furthermore, non-mortgage ABS prepayments are less interest rate driven, since they typically have shorter dated maturities, and the collateral loan balances are smaller, thus reducing the interest rate driven incentives to refinance.³⁶

Non-mortgage ABS cash flows are affected by voluntary prepayments and credit quality — loss, default and delinquency patterns - as well as the credit enhancement structure in the deal. In the non-mortgage ABS sectors, prepayments or early redemptions can come from credit quality deterioration as well as servicer related concerns or problems, as well as from voluntary prepayments. Collateral prepayment speeds, though less interest rate sensitive, occur and are influenced by other variables such as auto sales in the case of auto ABS (including auto manufacturer incentives) and early amortization through defaults. As another example of differences in prepayment patterns between the mortgage and non-mortgage sectors, in the case of auto loans, unlike mortgages, prepayments increase as the loan ages, e.g. when the auto is sold.

Distinct from mortgage ABS, analysis is typically at pool level rather than loan level since consumer and commercial ABS collateral involves analysis of a large number of relatively small loans (for example, credit cards) and thus a single loan is unlikely to affect the characteristics of the pool, though some ABS products (auto loans) may be evaluated on a loan level basis. The focus on pool level data also reflects the fact that trustee data are often pool level data.³⁷

³⁵Correct choice of a pricing benchmark is critical to proper valuation of ABS.

³⁶ABS issues, though, may carry call provisions which require imbedded option-type analysis.

³⁷Another distinction, depending on ABS product, can be structure. For instance, credit card ABS can be structured as Master Trusts or Master Owner Trusts.

PRICING

As with other fixed-income markets, ABS are traded through an over-the-counter market with dealers providing liquidity. Except for some older securities, quotes are generally considered to be widely available in the secondary market from numerous dealers and are considered liquid markets, although there may be distinctions based on product and issuer. For the great majority of issues, especially highly rated and senior investment grade securities in which the price is driven by voluntary prepayments, market participants will refer to Bloomberg screens for secondary market quotes and for new issue information, while Intex-type models are used for developing pricing of the more credit sensitive issues.

Independent evaluated pricing services begin with nominal spread information from dealers and issuance documents. Cash flows, spreads, average life, speeds, and volatility are modeled based on issuer, collateral, coupon, average maturity, credit enhancement and security type, with an adjustment made for projected prepayment speeds. Dealer quotes and dealer research information is used for price evaluation validation.

DATA AND MODELS

Data

The ultimate source of collateral data is trustee and servicer reports. Some of the same third-party data vendors referenced in the non-agency mortgage ABS discussion also provide information for other ABS collateral types. While market participants will typically go directly to a trustee website for data, third-party vendors aggregate the data and provide trustee data services to track and monitor the securities and collateral. Leading third-party providers of aggregated trustee data are ABSNet and Bloomberg. The data are generally updated monthly with each trustee report.

Rating agencies provide indices that enable comparison of collateral credit quality to a peer aggregate. They include user-customized indices in the Moody's Performance Data Service report database and rating agency developed index measures in Fitch's BondCompare and Credit Card Trust product and the S&P ABS credit card index. In addition, the MCM database provides information on new ABS issues. Specialized data sources for specific ABS products are also used, for instance, student loan issuer web sites are accessible to monitor collateral, especially for non-government student loans that are credit sensitive.³⁸

Models

The same vendors addressed earlier in the mortgage discussion have ABS prepayment, valuation and transaction price modeling applications. In this research, market participants most commonly referred to the Intex products but also other pricing and modeling tools such as Wall Street Analytics Workstation, Yield Book and Black Rock's AnSer calculator are also widely used. The modeling process is similar to that described in the mortgage ABS discussion: "waterfall" cash flow rules, credit enhancements, issuance and trustee documents, economic conditions and interest rate term structure scenario are inputs for the model to generate the ABS cash flow distribution, modeled price and yield and spread values. Prepayment model vendors who have served the mortgage product sectors such as Andrew Davidson & Co. have also developed ABS prepayment models based on specific issuer data.

CMBS

Following a period of substantial volume growth, rising investor demand for commercial real estate related securities and favorable commercial real estate mortgage primary market conditions, as well as evolving rating standards, the CMBS product sector has become a more liquid market for senior high investment grade bonds and, concurrently, spreads have tightened. For instance, from March 1998 to March 2005, 10-year AAA CMBS spreads to the comparable Treasury narrowed from 81 to 64 basis points for 10-year AAA and 105 to 81 for A-rated bonds.³⁹ Subordinated and lower rated tranches are a good deal

³⁸8(k) filings are considered an important source of information for credit card ABS.

³⁹Nomura Fixed-income Research, "CMBS is no Exception — Positive Credit Performance and Abundance of Capital Lead to Easing of Credit Protection and Structural Standards," March 15, 2005. The study also showed similar CMBS to corporate bond spread trends.

less liquid. Diverse and non-standardized collateral and the heterogeneous CMBS structures combined with less frequent trades (and often a longer period of time to negotiate a trade) compared to the ABS and residential MBS sectors create an analytical environment in which market quotes and valuations are largely model-driven.

Diverse Property Types

Each CMBS transaction consists of unique commercial mortgage collateral pools that may consist of a number of different commercial property types - multi-family apartment, industrial, office, retail, or franchise loan for example. Each commercial mortgage type has its own set of metrics which include occupancy, rent, appraisal, tenant characteristic and property price analytics. CMBS collateral, for example, may be conduit; single or multiple borrowers and loans; and seasoned loan or new origination.

Prepayment Protected, Credit Sensitive

An advantageous product attribute is the presence of prepayment protection (typically through defeasance) during an initial lockout period which eliminates or minimizes prepayment exposure in the early years. Once the prepayment lockout period ends, there is a likelihood of pay off.

Especially during the initial years during the prepayment lockout period (typically up to several months before the balloon payment is due), CMBS pricing is more credit sensitive than interest rate or prepayment sensitive. CMBS subordinate pieces are generally presold to ensure subordinated credit support of senior pieces funded at issuance.⁴⁰

The collateral analysis is data driven and typically provided at the loan level on the largest commercial properties in the CMBS transaction and those that are troubled and nonperforming. A small number of large mortgages typically make up a substantial percentage of the total principal in the transaction and have the most significant effect on credit performance.

The convention is “0,0” pricing to high grade CMBS securities which refers to zero prepayment, zero default assumption. Investment grade CMBS is priced off of spreads to Treasury and to indices (e.g. AAA).

Two bond structure characteristics should be mentioned: CMBS typically have a sequential payment structure with senior tranches paid off first leaving the higher default risk subordinate tranches; and provide cross collateralization among the underlying commercial mortgages.

PRICING

Transaction

Secondary market quotes on a CMBS bond are typically provided by dealers and, especially for senior pieces, multiple dealer. With increased high investment grade sector trade activity, the difference between secondary market quotes on a CMBS issue has narrowed to a few basis points. The spreads, though, differ by deal type and collateral performance even within the high grade sector. Another distinguishing variable is the absence of the same degree of loan underwriting standardization found in the agency residential mortgage market. In addition to dealer quotes, bid lists and new issue prices are useful in the price discovery process in the secondary market and for understanding the general price environment in the market.

Considering the distinction between investment grade and below-investment grade, the rating agencies play a significant role in this market at both the primary and secondary pricing. Market participants, though, pay attention to differences among similarly rated CMBS, and pricing reflects such distinctions. Similarly rated CMBS spreads may differ based on differences in the type of commercial mortgage collateral. Another reason for distinctions within investment grade is an expressed view by at least one observer that there may be a tendency to more quickly downgrade than upgrade an issue.

⁴⁰The subordinated debt class buyers have some latitude in the loans that are included in the deal which potentially provides for additional credit protection.

Price Evaluation

In addition to the leading price evaluation services that evaluate the entire spectrum of securitized product sectors including CMBS (such as FT Interactive Data, Reuters and S&P Pricing) Trepp (the CMBS data and model specialist) has a CMBS pricing service. Daily pricing is provided on investment grade and less frequently on below investment grade CMBS bonds. Considering the unique attributes from one CMBS deal to another, pricing evaluation tends to be more “hand priced” generally than matrix priced found in other ABS and mortgage sectors. Price evaluation procedures start with collection of deal issuance documents, review of the structure, collection of dealer price data, bid lists, “color” from market participants, and updated rating actions. Cash flows are then generated off of a model.

Using a Trepp Pricing description as an example, there is a separate process for investment grade and below-investment grade CMBS bonds. The investment grade bonds are run through an initial pricing and market perception process of assigning each high grade CMBS a grade or a tier with the more credit sensitive issues grouped and analyzed on a bond-by-bond basis.⁴¹ The process begins with data gathering of generic spreads and bid lists from numerous buy-side and sell-side sources, corporate rating changes and other events that could affect commercial property tenants. The deals are differentiated by type and performance, including delinquency percentage, collateral property type concentrations, and at-risk tenants. Information is updated based on bid list, “color,” rating actions, new issue pricing and new secondary marks, and then the spreads are updated. The Treasury and swap curves are pulled in the afternoon and cash flows are discounted off of a spread. The strong performing bonds are priced on a matrix basis and weaker bonds are priced on an adjusted basis.

Because it is less liquid with fewer and more volatile quotes, a separate process is used for below-investment grade. Below-investment grade bonds are grouped by those that take first and second loss positions and other sub-investment grade bonds and analyzed based on collateral loan quality. Each group is then divided by nonperforming, performing and those subject to special servicing due to concerns or unique characteristics of the collateral. The first two categories are modeled according to a set of assumptions. The third category is placed in a performing or nonperforming category based on additional review. Further analysis is done on those loans with lower debt service coverage.

Additional Pricing Information

Large deals and indices serve as pricing benchmarks. An additional source of pricing information is available from Commercial Real Estate Direct who offers spread estimates based on an investment rating matrix through information provided by ten contributing dealers.

Finally, CMBS credit derivatives are emerging as a hedging tool and another source of pricing insights. Similar to the ABS CDS, CMBS credit default swap growth is driven by the development of ISDA documentation and settlement conventions. Also, similar to the ABX (ABS credit derivative index), a CMBS credit default index, CMBX, has been introduced.

VALUATION⁴²

Valuation analysis starts with the cash flow — principal, interest, prepayment, extension and default penalties. CMBS collateral interest payment characteristics are also relevant: variable rate or fixed rate; interest only or amortizing; and dispersion of coupons within the commercial mortgage pool. Transaction structure must also be incorporated in the valuation — a pass-through or structure that incorporates various levels of credit enhancement, loss absorption rules between senior and subordination classes and cash flow allocation among classes of debt.

As noted, the CMBS product is more credit quality than interest rate sensitive and thus valuation is focused on credit issues. The key credit valuation metrics are:

⁴¹This discussion is largely based on Trepp’s pricing methodology, “Trepp CMBS Pricing Service.”

⁴²Trepp LLC materials and Nomura “CMBS Bond Structure and Its Impact on Performance,” April 1, 2005

- Debt service coverage ratios (DSCR) and DSCR stress tests
- LTV ratios and changes in appraisals of the collateral which provide information about the likelihood of default
- Subordination which is rating agency set and differs by debt class in the transactions
- Amortization — commercial mortgages that amortize bear less credit risk than those that are interest-only. Balloon payments are characteristic of commercial mortgages. Typically, there are disincentives (such as interest step-up) to extending the term of the loan.
- Loan diversification and concentration — whether there are a number of mortgages in the pool or the transaction is made up of a small number or one commercial mortgage. In addition to the number of mortgages, geographic, tenant and property type diversification and concentrations are analyzed.
- Property characteristics: leasing occupancy/vacancy levels and financial statements of the commercial tenants
- Commercial mortgage performance — delinquency statistics, financial performance of mortgage collateral and loan modifications
- Definition of default
- Reputation and track record of the servicer and originator

DATA/MODELS

Market participants place a reliance on trustee and servicing reports updated monthly. Many of the same collateral database products used in other securitized sectors are used in the CMBS market as well, such as ABSNet and Moody's Performance Data Reports. There are also two specialized sources of information. Trepp is an important source of CMBS data and, in fact, their data are incorporated in other analytical packages such as BlackRock's AnSer calculator and are the source of CMBS cash flows for Bloomberg. Trepp has generic spread history going back to 2000, collateral data to the mid-1990s, and the Trepp Watch product provides information at the property, loan and deal level.

RealPoint, an affiliate of GMAC, is used by market participants for in-depth collateral analysis, including data on commercial real estate geographic markets, CMBS, collateral loan level data, and commercial property tenant-specific information. RealPoint maintains analyst coverage of CMBS and generates research reports from the credit perspective. The analytical reports are used by some investors in forming credit quality opinions and monitoring CMBS credit quality.

As a model-driven pricing sector, models play an important role in valuations and pricing. Based on interviews, the Intex and Trepp models are the most prominent products. Correct interpretation of deal structure and terms is especially critical.

Finally, rating agencies provide ongoing monitoring of transactions and servicers. Fitch's PMM (Property Market Matrix) is a publicly available tool to analyze and grade CMBS bonds and is used by the rating agency to determine credit enhancement levels.

CDO/CLO

CLASSIFICATION AND DEFINITIONS

In general, a CDO (Collateralized Debt Obligation) is issued by a special purpose vehicle that issues multiple classes of debt and equity and invests in a pool of debt obligations, either bonds or loans. Synthetic CDOs achieve credit exposures to debt instruments through credit derivatives. CDO and CLO products are discussed together as the mechanics and methodology are similar — the difference lies in the collateral:

CLO underlying assets are leveraged loans (and increasingly middle market loans as well), and CDO is the more generic term for structures that hold collateral across asset classes. The more general term CDO is used throughout the discussion.

In addition to cash and synthetic CDOs, there is a trend towards hybrids which combine cash and synthetic instruments in the same transaction.

There are two types of motivation for a CDO sponsor. The balance sheet CDO is motivated by removing assets or credit exposure from one of the party's balance sheet. An arbitrage CDO is motivated by earning fees and a spread between yield or return on the invested assets and the cost of the CDO debt or borrowed funds.

The cash CDO may be classified as a cash flow CDO where the principal, interest and default recoveries from invested assets provide the primary sources of repayment for CDO debt holders; or it may be classified as market value CDO where debt payments are supported by proceeds from selling assets that support the CDO. Synthetic CDOs involve investment in pools of specific reference name credit default swap (CDS) exposures or CDS indices. The synthetic bespoke model is becoming increasingly common and refers to transactions which are customized structures arranged to meet specific investor objectives.

The CDO may be part of a full structure that includes a super senior (in the case of synthetic CDOs), senior, mezzanine and subordinated rated tranches and an equity piece; or there may only be one tranche issued, an increasingly common synthetic CDO transaction. Senior and mezzanine are differentiated by their priority of risk within the issued structure and typically by differences in rating that reflect the differences in risk. Depending on the structure and type, excess cash flows or return goes to the equity holder after making scheduled payments to debt investors and all expenses. In the synthetic CDO, the equity piece has first loss exposure compensated by a larger portion of the premium or excess spreads.

Especially in cash CDOs (there is typically less discretionary collateral trading in synthetic CDOs depending on structure), the collateral or asset manager has some discretion to buy and sell collateral subject to the terms of the CDO transaction which distinguishes the product from other structured and securitized product sectors. As the volumes and new products have grown, there has been a substantial increase in the number of asset or collateral managers. Cash CDO analysis in particular thus takes into account asset manager evaluation and asset manager investment decisions and motivations as well as underlying asset and collateral type, specific assets or investments, structure and "waterfall" allocations.

In the initial stage of CDO market development, corporate, emerging market and high-yield bond supported cash CDOs were dominant products or CDO collateral types. Synthetic products have emerged and have been the rapid growth sector over the last few years. Along with the synthetic product growth and CLO volume growth, the other important product trend has been expansion of collateral types, including resecuritizations or CDOs of CDOs ("CDO squared"), trust preferred, commercial real estate based (CRE) and, in particular, ABS CDO products, principally mortgage ABS. Both cash and synthetic CDOs invest in ABS instruments.⁴³

⁴³Synthetic ABS growth is enabled by ISDA documentation and the Pay-As-You-Go method which generally requires synthetic payments to mimic the cash market.

TABLE 4 CASH CDO VS. SYNTHETIC CDO COMPARISON

ITEM	CASH	SYNTHETIC
Collateral	High yield corporate Trust preferred ABS/MBS Commercial Real Estate Leveraged Loans	Credit default swap linked to a pool of assets (corporate bond, loans, CRE, ABS) or to an index
Size	\$200 million to \$800 million	\$1 billion plus
Collateral quality	Investment grade or below investment grade (high and mezzanine) and distressed assets	Primarily investment grade, increasingly high-yield as well
Management	Typically managed	Typically static, increasingly managed
Expected maturity	Generally 7 to 12 years for transactions tied to corporate credits but up to 30 years for ABS	For balance sheet or arbitrage linked to corporates, 3 to 5 years; SF, approximately 8 years senior debt and 15 years sub debt
Payment frequency	Quarterly or semiannually	Quarterly
Ramp up period	Up to six months	Generally shorter - up to one month; longer for SF
Prepayment risk	Yes	Generally no
Reinvestment risk	Yes, for transactions with reinvestment periods	Generally no due to static nature
Interest rate risk	Managed with swaps and other derivatives	No in unfunded form; for credit linked notes, floating rate assets and liabilities create a hedge
Equity leverage	8-12 times due to quality of assets	Often 30 times and up to 100 times for investment grade corporate and highly rated structured securities

Source: Adapted from Wachovia Securities (Frank J. Fabozzi with Steven V. Mann, *The Handbook of Fixed-income Securities*, Chapter 31, Synthetic CDOs by Jeffrey T. Prince, Arturo Cifunetes, Nichol Bakalar), 2005

Cash CDOs⁴⁴

Cash flow

The objective of the cash flow CDO is to generate cash principally from income from the collateral and asset appreciation to pay interest when due, pay off senior and mezzanine debt holders and minimize the necessity of sales and trades of assets. Asset sales are limited to maintain credit quality. The cash flow CDO is divided into three periods, the ramp up period of assembling assets, the reinvestment period when principal proceeds are reinvested and the final period when assets are sold and debt holders paid off. The income from the invested assets first goes to pay administrative expenses and then interest on the senior debt. Other payments are subject to coverage tests. Depending on structure, if the tests are failed, senior tranches are paid down or additional collateral assets must be purchased. If the initial tests are passed, the mezzanine interest is paid and, if a subsequent set of tests is passed and interest and any principal due to senior and mezzanine debt is paid, then subordinate/equity interest is paid. After the reinvestment period or if coverage tests are failed, principal cash flow is used to pay off senior debt. After the senior debt, then

⁴⁴This section is adapted from Frank J. Fabozzi with Steven V. Mann, *The Handbook of Fixed-income Securities*, Chapter 30, Cash Collateralized Debt Obligations by Laurie S. Goodman, Frank J. Fabozzi, Douglas J. Lucas. The discussion focuses on the more numerically significant type, arbitrage CDO.

the mezzanine debt is paid and then subordinate/equity. As senior tranches are paid off, there is more subordination available for more junior tranches. There is generally a target equity return. Once that has been achieved, then management may be allowed to share in the returns.

The previous paragraph refers to coverage tests to which the CDO and CDO manager are subject and imposed by rating agencies. The purpose of the tests is to ensure payment of the various classes of debt holders. The overcollateralization (OC) test in general is based on the ratio of the principal of the collateral portfolio to the tranche principal and principal of all tranches senior to that tranche. The interest coverage (IC) ratio in general is the scheduled interest on the collateral portfolio to the interest on the tranche and all tranches senior to that tranche. In addition, rating agencies subject CDOs to certain management tests, including an asset diversity score, minimum weighted average weighting rating factor of the collateral, maximum maturity and weighted average coupon and spread.

Market Value

The market value transaction depends on the ability of the CDO manager to improve or at least maintain the market value of the collateral assets. Market value CDOs are used when cash flows are volatile and hard to predict, when managers and investors desire more trading flexibility and for assets that mature beyond the life of the CDO transaction. Funds to pay debt come from the liquidation of assets.

Synthetic CDOs

Synthetic CDOs combine the risk transfer technologies of the cash CDO with credit derivatives, and have become grown dramatically over the last several years for several reasons. The growth is the result of investor education, development of ISDA documentation for credit derivatives and settlement protocols, and credit derivative and index product volume growth. The synthetic CDO may be unfunded, that is, funds are only transferred in the case of CDS premium or a credit event, funded with notes, or, increasingly, a combination of funded and unfunded tranches.

A synthetic CDO (in reality, the CDO investors) in essence sells credit protection on a pool of reference credit exposures with the terms under which losses are absorbed defined or bracketed by “tranche width” (which is the range from the attachment point when the tranche begins to absorb losses to the detachment point when the cumulative losses have eliminated or exhausted the value of the position or reduced the value to “0”) according to the underlying CDS. The fixed spreads are distributed within the CDO structure based on risk exposure. As losses occur, payment is made in reverse order of seniority (i.e., beginning with the most junior pieces).⁴⁵

Synthetic CDOs possess these advantages: cost of funds; efficiency — more efficient and less complex structures without the necessity of cash flow allocations; generally less need to consider manager discretion; easier to source as CDO collateral do not depend on the supply of assets issued in the cash market; and separation of default and interest rate risk which enables the investor to more explicitly have an opinion on default and spread trends.⁴⁶

Two additional distinctions between cash and synthetic CDOs should be noted. First, synthetic transactions do not have the same prepayment risk as cash CDOs. In addition, because the underlying credit derivatives of the synthetic CDO may reference hundreds of entities, there is naturally more diversity in a synthetic portfolio than cash CDO portfolio.

Synthetic transactions do not have the same required coverage ratios as in the cash CDOs. For those with OC tests, the ratio is cash collateral account to notional amount of notes plus notes senior to those notes excluding super senior tranche. Should the OC test fail, the effect is an allocation of excess spread to a

⁴⁵Junior tranches are more affected by default risk and more senior pieces by general market credit spread risk due to the higher level of subordination of the senior portions of the structure. The description above was that of an unfunded synthetic CDO for simplicity. (See TBMA, *Synthetic CDO Primer*.)

⁴⁶The Bond Market Association, *Synthetic CDO Primer*

cash account and out of subordinate/equity tranche. As with cash CDOs, synthetic CDOs can be subject to portfolio tests such as diversity and weighted average rating factor.⁴⁷

Buy-side Demand Drives Increases Transparency

It should be emphasized that CDOs are exclusively an institutional and private market investment vehicle. Initially, the market was a buy-and-hold market with prices quoted by the dealer that underwrote the transaction. The dealer community has consciously developed mechanisms to increase transparency in order to expand buy-side interest, committed resources and opened up some of their models to investor clients. Today, there is stronger buy-side demand with institutional investors owning substantial portfolios of CDOs. Rather than one dealer offering quotes as was the case several years ago, there can be now multiple dealer quotes leading to increased market liquidity.⁴⁸ This is the case to a greater extent for the more senior tranches. The CDO equity market is not yet well developed and without a common source of equity prices because of its complexity. Thus CDO equity returns are estimated over the life of the investment based on scenario analysis.

In addition to multiple dealers trading and providing CDO quotes, market participant growth and liquidity has been driven by the development and availability of independent vendor provided data, modeling, analytical and risk management tools. Furthermore, expanded trading activity facilitates assessment of risk. One buy-side participant interviewed in this study compared the current stage of development to where the CMO market was at the outset of its development with the expectation that similar liquidity gains are likely to occur.

It has been reported that JP Morgan through DataQuery provided closing indicative prices on 34 synthetic CDO tranches as a step and an example of increased transparency. A CDO arranged by Goldman Sachs and Calyon and managed by Prudential is another example, providing a guarantee of screen-based pricing.⁴⁹ Some CDO price quotes may be found on Bloomberg dealer pages.

Secondary Market Trading

Over the last three years, there has been a substantial increase in cash CDO bid lists, indicative of expanded investor interest. Bid lists include the names of CDOs the holder is willing to sell with bidders or investors given a period of time to submit a bid. Cash CDO secondary market investors indeed can have an information advantage of knowing more about the specific collateral assets once assembled. In addition, there is more information about manager performance in a post-issuance CDO which has operated for a period of time.

It has been reported that secondary trading in well performing cash CDOs has resulted in some cases in tighter spreads than the primary market over the last few years, based on the view that shorter maturities reduce credit risk. With spread tightening in the senior tranches, some investors searching for wider spreads moved to mezzanine and subordinate tranches in the favorable credit quality environment of the last few years.

CDS index-linked tranches are considered to be relatively liquid based on the increased volume, standardization and price availability of CDS indices, contributing to synthetic CDO growth. The index-linked tranche trend is likely to increase with the continued expansion of credit derivative indices, for example, the introduction of CMBS and ABS credit derivative indices.

Synthetic CDO trading is facilitated by the simplicity of the structure relative to cash CDOs. Synthetic secondary trading has increased, including trades with dealers who were not the original banker.⁵⁰ Due to its specialized structure, bespoke synthetic CDOs, though, can be less liquid.

⁴⁷Frank J. Fabozzi with Steven V. Mann, *The Handbook of Fixed-income Securities*, Chapter 31, Synthetic CDOs by Jeffrey T. Prince, Arturo Cifunetes, Nichol Bakalar

⁴⁸Some products such as general tranche (CDS index based) synthetic CDOs are becoming increasingly commoditized

⁴⁹"The ABC of CDO, The Credo it Guide to Collateralised Debt Obligations", Wall Street Analytics, page 25

PRICING

As with other fixed-income markets, CDOs trade in a dealer market and dealers are the pricing source and provide indicative prices and spreads. The complexity of the products, heterogeneous structures, and diversity of valuation methods do not lend itself to the type of centralized third party, electronic pricing or third-party price evaluations found in the older and more commoditized securitization sectors. The CDO/CLO market is model-driven pricing, though supply and demand dynamics are becoming more relevant to the market as trading volume increases. Traders are expected to provide the buy-side not only with information and quotes on the CDO tranches themselves but also offer valuation insights on the underlying assets and collateral.⁵¹ Dealers through their research departments provide clients information on indicative spreads by product type, tranche and rating and spread trends over time as well as views on equity IRR (internal rate of return) and Net Return values and methodological approaches taken.⁵²

VALUATION

The CDO product sector generally is characterized by multiple valuation techniques and approaches owing to product complexity, the rapid development of new products and the fact that the CDO product sector is relatively new compared to securitized products. The general process is to value the underlying collateral pool and then distribute the resulting collateral cash flow and returns among the classes of debt and equity. The CDO collateral valuations are based on models, cash flow projections and market values, which may use multiple asset bid quotes and price evaluations.

In general, cash CDO valuations are based on modeling the underlying collateral cash flows (including consideration of the credit quality of the collateral) available to pay debt holders and generate a return to equity holders with the allocation of the modeled value or cash flow to debt and equity tranches according to the terms of the transaction structure. The modeling takes into account portfolio, reinvestment and the transaction structure characteristics and assumptions. There are two general cash CDO valuation approaches. Discounted cash flow (DCF) with the projected cash flows⁵³ assigned to the various debt classes is the more common approach, especially for cash flow CDOs. The discount rate in the DCF calculation reflects current interest rates and the credit risk in the portfolio, including asset manager track record, transaction performance and credit quality. A second approach is the net asset value (NAV) technique which is particularly useful when asset liquidation is a possibility. The NAV approach is based on the value of the portfolio today were it liquidated and distributed to investors. NAV is particularly useful in market value CDO valuations.⁵⁴ In addition, a third approach is to infer a price based on comparable bonds traded in the second market. One should take great care in selecting appropriate securities in applying this comparable valuation method.

Synthetic CDO valuation is ultimately based on probability of default (i.e. defined credit event), loss upon default and default correlation within the portfolio of credit exposures. As noted, the credit exposure is distributed based on tranche seniority. Correlation is directly related to volatility — high correlation means high volatility. A synthetic CDO can thus be considered within the context of option valuation — the equity tranche investor is long a put option; and senior tranche can be seen as short a call spread on the loss rate of the underlying index with a lower strike on the attachment point and upper strike at the exhaustion point.⁵⁵ High correlation (volatility) increases the value of equity and is thus a favorable characteristic and is unfavorable for senior tranches (though senior tranches are more correlation sensitive

⁵⁰Frank J. Fabozzi with Steven V. Mann, *The Handbook of Fixed-income Securities*, Chapter 30, Cash Collateralized Debt Obligations by Laurie S. Goodman, Frank J. Fabozzi, Douglas J. Lucas.

⁵¹Dealer research has published equity and debt CDO valuation methodologies.

⁵²During 2006, rating agencies have begun to provide data to estimate equity tranche values.

⁵³There are three common cash flow-type analyses, re-rating methods, deterministic (scenario based) methods, and probabilistic (using Monte Carlo simulation) methods which differ primarily in how the CDO collateral is valued.

⁵⁴The Bond Market Association, CDO Primer Chapter 6, "A Survey of CDO Valuation Methodologies."

while subordinated more default and recovery sensitive). The sensitivities and directional effect on prices and spreads are summarized in the table below.

TABLE 5: SYNTHETIC CDO VALUATION VARIABLES

TRANCHE	EQUITY	MEZZANINE	SENIOR
Loss Rate Increase	Unfavorable	Unfavorable	Unfavorable
Correlation Increase	Favorable	Depends on structure and correlation	Unfavorable
Time Decay	Unfavorable	Neutral	Favorable
Interest Rate Increase	Unfavorable	Unfavorable	Unfavorable

Source: Adapted from TBMA Synthetic CDO Primer (Bank of America Securities)

DATA/MODEL

CDO Level Analysis

As CDOs are essentially portfolios of assets, portfolio correlation risk and credit portfolio analytics are fundamental to CDO analysis. Correlation does not measure default but the likelihood that an instrument defaults given a default of another instrument. High correlation suggests greater volatility, that is, defaults will occur close together while lower correlation suggests more independence and more portfolio diversity.

Independent or third-party vendor trade level models and tools (e.g. Intex) have been developed for the CDO market, and involve modeling of the deal with collateral data updated based on the most recent trustee reports. Such models are used to evaluate CDO portfolios and estimate pricing.

The Bond Market Association has developed two initiatives through its CDO committee to increase data access and consistency for market participants. In response to the need for uniformity in the trustee reports to increase transparency, the Association established a standardized set of trustee reports at the beginning of 2004. The guidelines set a minimum level of content that should be in each report comprised of 15 components which include a current overview of the results of the coverage and collateral quality tests, the asset positions, principal asset balances and the collateral ratings statistics; chronological records of collateral that was sold, purchased, reduced, or exchanged both in the current period and since the beginning of the deal; a list of all the securities that defaulted while in the portfolio; and lists of those securities that are on upgrade or downgrade watch lists. The Association has also developed a standard format for data files.

Similarly, to increase transparency with respect to deals at issuance and enhance capacity to accurately model deals, The Bond Market Association established an independent repository or library of CDO structures that market participants may incorporate in cash flow and valuation models. Established in 2004, the deal library has 13 dealers contributing deal documents with an aggregate value of over \$50 billion and over 260 transactions. The library contains information on specific CDO transactions (mostly cash deals) including swap agreements, offering memoranda, indenture documents, and monthly trustee reports and is available to QIBs. Adding updates such as amendments to the original documents is required. Transaction information is supplied by investment banks on a voluntary basis, and is searchable by deal name, underwriter, collateral manager, and/or deal date.

⁵⁵TBMA Synthetic CDO Primer

Asset/Collateral Level Analysis

The independent model and data vendors such as Intex and Wall Street Analytics, as well as others, provide CDO deal libraries, information on collateral and issuance prospectus as part of their cash flow and valuation model tools. The modeling product methodology is similar to that described for other product sectors. In general, the vendor's CDO database and deal structure library are combined with prepayment, interest rate and credit quality environment assumptions in the model to generate cash flows, modeled prices, spreads and returns.

Examples of collateral evaluation tools include Markit's RED (Reference Entity Database) and its CLIPS codes derived from RED used to identify CDS reference entity relationships and are incorporated in some synthetic CDO tools; Markit's LoanX used as a valuation and pricing tool for CLO collateral; and Trepp pricing has been used to value CRE CDO collateral.

Rating Agency Products

As valuations and spreads are rating sensitive, CDO rating agency actions and rating migrations of CDO debt are an important analytical consideration. In addition to CDO transaction surveillance and asset manager monitoring, rating agencies provide data on CDO deal performance and underlying collateral as well as portfolio credit risk evaluation software.

Rating agencies offer to investors tools used internally to assess risk. In some cases, the model is provided at no charge; in other cases, especially when data are part of the service, there will be a licensing fee. Moody's Performance Data Services referenced earlier in the ABS discussion also has a module for CDOs enabling users to develop customized indices and screen for comparable deals to monitor trend and historical performance over time. In addition, the product enables a "look through" function to review and analyze the collateral — top industries and holdings — and review performance data. The Fitch SMART product provides deal, asset manager and structure data and Bond Compare permits comparison for up to ten deals at a time. S&P's CDS Express is a database of common reference indices for synthetic CDO analysis and modeling.

The rating agencies also make available default risk and evaluation modeling tools for both the cash and synthetic products. For example, S&P makes available its CDO Evaluator which is used to evaluate default probability distribution based on collateral characteristics and correlation measures to derive default rate scenarios leading to determination of rating levels. The rating agency has introduced synthetic CDO tools — CDS Accelerator is a spreadsheet program to quantify and analyze synthetic CDOs through its CDS Express product. The S&P synthetic CDO tools generate an indicative structure, credit risk and credit rating parameters, including correlations, loss and default and default variance given varying scenarios and rating sensitivity.

CDO portfolio asset and industry correlation measurement, of course, is a component of the rating agency CDO risk assessment models. The CDO risk models are essentially portfolio risk models adapted to CDO technologies, and they are dynamic — that is, they estimate the probability of default and loss over time. Fitch's VECTOR model is a Monte Carlo portfolio risk model simulation for both cash and synthetic CDOs using the Fitch VECTOR model defined inputs including default, loss and recovery assumptions, user defined portfolio composition and characteristics, and correlation relationships from which a simulation is run with the user defining the number of simulation runs. In addition, Dominion Bond Rating Service offers its CDO Tools product. CDO Tools is a regression driven CDO risk and indicative rating model which also provides for rating migration over time.

Moody's CDO Edge provides for cash and synthetic CDO risk monitoring using both the rating agency analytics — the structuring tool used in the Moody's rating process and the deal structure and collateral database — and market risk pricing analytics. The CDO Edge product generates three cash flow models: indicative ratings module (Binomial), scenario analysis with user defined default and recovery expectations and expected distributions, to stress test portfolios; a multi-step simulation model; and its expected

default model. The third model incorporates Moody's expected default model, which includes expected default frequency and distance to default (likelihood of default over time) and risk and return measures.

Asset Manager Tools

The asset or collateral manager has at its disposal tools for CDO compliance testing and evaluating the effect of hypothetical trades and communicating results to participants, including trustees, in the CDO transaction. The Intex CDOTool, for example, is used for asset manager evaluation of hypothetical trades and re-run compliance tests — IC/OC tests and diversity tests. Lewtan's iCDO product is a product for asset managers to test compliance under hypothetical trade scenarios through the collateral level and across deals, including the impact of prospective trades on compliance and cash flows. Reuters Loan Pricing Corporation's CDOi includes a tool to evaluate collateral trade execution efficiency.

CONCLUSION

Structured and securitized product sectors have grown in response to issuer and institutional investor demand. The objective of the TBMA/ASF Pricing and Information Source study was to (a) identify and describe sources of pricing and information across the structured and securitized product universe and (b) offer some insights on the price discovery and valuation process. The study covered the broad structured and securitized product universe — ABCP, agency MBS pass throughs, agency and non-agency CMO, mortgage, consumer and commercial ABS, CMBS and synthetic and cash CDO/CLO.

As with all fixed-income markets, price information is provided, derived, or verified through dealers — whether they are trade level prices, repo collateral valuation, marking positions or portfolios, independent price evaluations or NAV accounting. Institutional investors with multiple dealer relationships are seen to have effective price information access. In addition, there are independent vendor trade quality price verification models. Furthermore, the growth of the buy-side has led to a more prominent role of large institutional investors in market liquidity and price discovery processes.

There are diverse reasons and contexts for obtaining prices and value determination. The most prominent reason is price quotes for negotiating and ultimately executing trades. In addition, repo and securities lending require valuation of securitized and structured finance instruments that are collateral for the transactions. Third, prices and value inputs are also necessary for risk management. Finally, there is portfolio valuation and NAV accounting.

The price identification and discovery process varies across sectors though there are some broadly applicable observations. At its essence, price discovery, valuation and investment decision making involves identifying the most recent price quote and comparing the quote to the investor's view of intrinsic value taking into account risk exposure, economic and interest rate environments and term structure volatility. That process is complex as it involves numerous considerations beyond the generic rating category and credit performance, including the transaction's cash flow characteristics, type of collateral, the effect of the imbedded prepayment option, the track record of originators, issuers and servicers and technical analysis — e.g. supply and demand and trade size.

The growth and development of multi-dealer electronic trading platforms have been a powerful force in enhancing liquidity and price discovery as investors are able to simultaneously access multiple dealer quotes. Electronic trading has proliferated around product sectors whose characteristics are aligned with trade flow determined prices. Most of the platforms trade in TBA mortgage securities. Conversely, products characterized by heterogeneous structure and collateral are not well suited for trading on electronic platform trading.

Models play a necessary and fundamental role in investment decision making across all product sectors because of the data intensive calculations and need for sensitivity and risk analysis that incorporates numerous operating environment, collateral and transaction structure assumptions. Structured market participants on both the buy-side and the sell-side rely on models as analytical and pricing tools at the individual security, trade and portfolio levels.

Structured transaction and collateral databases and models have thus become critical tools in the price discovery and valuation process. With the exception of agency mortgage securities in which case agencies provide pool level data, trustee reports are a primary source of security and collateral data. In addition, vendors, often in conjunction with issuers and originators, have developed proprietary data bases.

The clear consensus is that the quality and quantity of vendor generated collateral data and modeling products are on the rise with over 35 data and model products identified in this study. Though larger institutional investor and dealers rely on internal models that may be populated with data from external sources, data and third party vendor models are generally promoted to and available to both the buy-side

and the sell-side. The products are characterized by frequent updates, retention of historical data and distribution directly to end-users or through partnerships.

Depending on the product, the cost may be minimal or substantial. The cost and value of the product generally rises based on how much specific collateral data and deal structure is provided. The growth of the market data and modeling industry has been driven by three trends: structured product complexity; competition for investor clients and increasing emphasis on risk management; performance and performance attribution.

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¹ The list of pricing and information sources used in structured and securitized product sectors in the United States herein is believed to be complete based on information at the time of the report and interviews conducted in the research. However, there may be additional platforms of which we were not aware at the time of the study.

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ABSNET

Parent: Lewtan Technologies

Summary: Source data on ABS deals and collateral for surveillance. ABSNet Deal Summaries provide a snapshot of deal information including deal participants, pool characteristics and credit support. In addition, you can view deal-related documents including Servicer Reports, Deal Prospectuses, and related news and research.

Contact information: George Henman, george.henman@lewtan.com, 781.672.1230

Website: www.ABSNet.net

Type of information provider: ABS deal and collateral performance data

Market sector: Consumer, commercial and mortgage ABS, CDO/CLO

Service provided: Database tool in deal surveillance and monitoring — “one stop” for securitized deal data and collateral performance data and analytics. The information is used in risk management and credit analysis. An affiliated product, ABSDiscloser, provides hosted websites to enable issuers to make the required data disclosures as required by investors and by SEC regulation.

Brief description: ABSNet includes Performance Data that enables investors and other market participants to monitor a large number of securities without manipulating remittance reports; a Deal Summary that summarizes ABS transactions and is automatically updated; Deal Comparisons and Benchmarks compare one deal against comparable deals as well as issuer or asset class aggregates, either graphically or in a tabular format; Deal Alerts alert users when performance data thresholds are met for specified deals; a Document Alert monitors news and research; ABSNet Excel Add-in integrates performance data directly into your spreadsheets; Scheduled Export feeds ABSNet performance data directly to your internal database or data warehouse.

Frequency of update: Monthly to account for changes in factors, new deals are added when documents are available.

Methodology: Issuance documents and trustee/remittance reports are formatted into a database augmented by news and research report information.

Sources of information: Multiple data sources — trustee reports, remittance data, dealers, rating agencies, news sources and SEC documents.

Number of price contributors: N/A.

Who has access to the data: Any market participant. Dealers, investors, issuers, servicers and rating agencies for trading, risk management and surveillance.

Cost: Annual subscription.

Historical prices/data: Yes, since 1995.

Number: 11,000 deals, 80,000 bonds, 15 collateral types, 100,000 servicer reports, 100+ performance variables for each deal in database — 9,000 mortgage, 900 auto, 750 CDO, 1,000 credit card, 300 manufactured housing, 375 equipment leases and 180 student loan deals.

Presentation of data: Data is available from inception of the deal to present for the majority of the deals. CUSIP upload feature to search for transactions and load them into a custom portfolio. Presented in graph and chart format, with e-mail alerts also provided.

Non-price information: News retrieval and research database, rating agency feeds, SEC filings. Delinquency, prepayments and defaults reported.

Distribution through third parties: Yes.

ABX.HE

Organization: Markit, CDS IndexCo

Summary: CDS IndexCo maintains the well-established DJ CDX family of credit default indices based on reference entities through liquidity commitments from 21 dealer institutions that trade \$25 to \$50 billion daily. Beginning with the ABX.HE referencing home equity CDS, it is creating a family of benchmark indices for CDS of ABS, referencing a standard basket of obligations of the relevant ABS sector. Similar indices referencing other ABS sectors will be developed with the CMBX (CDO of CMBS indices), expected to be operational in March, 2007. Other ABS sector indices to be launched later include credit card, student loans, auto loans and an “other” category. Markit is the administration, marketing and calculation agent of the DJ CDX programs, including the ABX.HE. (See Markit description.)

Contact information: Ben Logan, Ben.Logan@markit.com, 212.931.4900

Website: markit.com/abx.jsp

Type of information provider: Price

Market sector: ABS

Service provided: The ABX index, starting with the home equity sector (ABX.HE), serves as a reference benchmark for ABS pricing that should influence the cash market spreads as well as the credit derivatives market. Five indices will be created based on rating: AAA, AA, A, BBB and BBB-. The application of defined rules will construct a portfolio representative of each sector’s current market, starting with home equity.

Description: The ABX contains the following features: track record in the CDS flow market based on the experience of CDS IndexCo and Markit and likely increased flow with ABS products; transparency as a result of clear rules for portfolio construction and standardization and experience of Markit as index agent; index will roll every six months; structure will include ISDA Pay-As-You-Go template and standard documentation with static portfolio.

Frequency of update: Daily (end of day)

Methodology: Index created from qualifying constituent issues of 20 of the largest subprime programs for the six months prior to the roll. Diversification is obtained by limiting a single originator to four deals and a master servicer to six deals. Trades will confirm over DTCC with both customer and inter-dealer trades included; trades documented with two-page confirms. Markit will publish monthly fixed and floating payments for each contract. Valuation analytics are publicly available on Markit website. Licensed dealers will provide daily closes for the most recent index series and monthly pricing on previously issued outstanding series.

Sources of information: Dealer and inter-dealer broker trades on the index constituent issues.

Number of price contributors: 20 dealers and inter-dealer brokers

Who has access to the data: Any market participant, including asset managers, hedge funds, trading desks, asset originators, corporate treasury departments and dealers.

Cost: License depends on level of service and whether the firm is a dealer-shareholder or buy-side firm.

Historical prices/data: Yes, as the index rolls every six months.

Number: Each sub-index made up of 20 issues.

Presentation of data: Internet web-browser-based system that reads Java script, and via FTP, downloadable into Excel.

Non-price information: Includes index constituents' CPR, spread, end date, factor, PV and average life. Total index PV, CPR, spread, change in value for one-basis-point move, trade date, coupon, notional, recovery rate, trade date and effective date.

Redistribution: Yes, based on licensing agreement.

ANDREW DAVIDSON & CO., INC.

Summary: Andrew Davidson & Co. is a leading source of mortgage prepayment models for fixed-rate and adjustable-rate mortgages; prepayment models for asset-backed securities; option-adjusted valuation and risk management tools for MBS, ABS and CMOs; and interest rate processes. The company also offers consulting services in fixed-income analysis and strategy.

Contact information: Andrew Davidson, andy@ad-co.com, 212.274.9075

Website: www.ad-co.com

Type of information provider: (prepayment) models and fixed-income consulting

Market sector: Pass-through MBS, CMO, OAS, HEL, manufactured housing, auto loan ABS.

Service provided: The AD&Co. Vectors(tm) Prepayment & Valuation Model Suite consists of sophisticated, universally accepted proprietary models that provide prepayment forecasting and OAS engines for mortgage- and asset-backed securities.

Frequency of update: Monthly data file updates containing current coupon information; model updated quarterly.

Methodology: MBS Prepayment Model calculates a vector of monthly SMM forecasts based on over 15 years of empirical data. The model takes into account seven key factors that affect prepayments on fixed-rate mortgages: turnover, refinance incentive, loan age, burnout, seasonality, spread at origination and home price effect. Users can adjust model outputs with tuning parameters that control refinance incentive, burnout, aging and turnover. The model covers the full suite of single-family residential mortgage types.

MBS Enhanced Prepayment Model uses data through June of 2005 and adds two new factors, vintage-based loan size effect and yield curve spread, to their classic model to improve the fit between actual and forecasted prepayments. The enhanced model adjusts the refi and turnover tuning parameters into unique risk multipliers that capture the impact the extended disclosure data have on prepayments. In addition, the enhanced version includes a true loan level model for 30yr and 15yr Jumbo Prime loans utilizing such specific loan level characteristics as loan size, state of origination and original and current LTV to more accurately forecast each loan's propensity to prepay.

ABS Prepayment Model provides issuer-specific models for 15yr and 30yr fixed and ARM home equity (subprime) loans. This model was refit using loan-level data through December 2004 to incorporate the prepayment experience from the current dominant originators of these loans. Other ABS types covered include auto and manufactured housing loans.

Valuation Routines combine our proprietary term-structure models and prepayment models with internal or third-party cash-flow engines to provide a turnkey OAS solution. Our term-structure library includes one-factor lognormal, normal and squared Gaussian models and a two-factor nor-

mal model. The volatility and mean reversion on all the term-structure models can be calibrated to a matrix of ATM swaption volatilities. Either a term-structure or static volatility may be employed. Valuation outputs include OAS or a measure reflecting the prepay model risk called prepayment risk-and-option-adjusted spread (prOAS), effective duration and convexity, key rate duration, prepayment durations, total return, scenario analyses, static and forward curve results. Their OAS Spreadsheet provides a full range of static and OAS-based analytics for fixed, ARM and hybrid ARM pass-throughs as well as CMOs and ABS via a seamless link to Intex or Chasen in an easy-to-use Excel format that automatically imports required market-level data and security-specific information for fixed- and adjustable-rate specified pools directly from Bloomberg.

Number of price contributors: N/A

Sources of information: Various data providers of agency and non-agency loan information as well as Intex, Chasen, Bloomberg.

Who has access to the data: Any market participant. Originators, issuers, investors and traders — both buy-side (including hedge funds and asset managers) and sell-side.

Cost: License subscription depends on level of service, and number of users.

Historical prices/data: Yes, data, prepayment data through June 2005

Number: Three groups of prepayment models, three groups of valuation models. MBS prepayment models more than 20 loan type classifications. Loan level information. ABS loans through 12/04.

Presentation of data: Stand-alone Excel model interface, subroutines for integration into proprietary system. Integrated for use through a variety of enterprise-wide vendor systems. See http://www.ad-co.com/business_partners/complete.htm for complete listing.

Model outputs are:

For Prepayment Models: SMMs, CPR

For OAS Models: Price/OAS, sampling accuracy, duration, convexity, key rate duration, prepayment durations scenario analysis.

Performance Reports: By coupon, vintage

Distributed by third parties: Yes, incorporated such as Reuters Pricing, Polypaths, Chasen, Intex and Wall Street Analytics. See http://www.ad-co.com/business_partners/complete.htm for complete listing.

ANSER®

Organization: BlackRock Solutions

Summary: BlackRock provides the risk analytics and valuation tools developed to support its asset management business to other large financial institutions. BlackRock's interactive risk calculator, AnSer, allows users to perform full option-adjusted and static analyses for the global universe of fixed-income securities and many types of derivatives.

Contact information: Larry Schwarz, larry.schwarz@blackrock.com, 212.810.3509

Website: www.blackrocksolutions.com

Type of information provider: Financial modeling, risk analytics, reporting

Market sector: Agency and non-agency MBS, CMO, ABS, CDO, CMO, CMBS. AnSer also supports derivatives pricing and valuation.

Service provided: AnSer is a web-based calculator that provides access to BlackRock's internally developed interest rate and prepayment models and allows users to perform a variety of security- and portfolio-level analysis including security valuation, scenario analysis, and what-if trading analysis. Other products offered include the Green Package suite of risk analytics reports; Aladdin Enterprise Investment System, which combines AnSer and the Green Package with a full portfolio management and trading system; and stand-alone interest rate and prepayment models.

Brief description: AnSer is the front end of the BlackRock Solutions risk analytics package. It enables clients to perform interactive OAS and static analysis and provides real-time access to the same data used by BlackRock analysts; and includes pre-trade, risk management and portfolio management tools.

Frequency of update: BlackRock is continually focused on enhancing its models, analytics and technology. BRS provides clients with detailed documentation and training on all new system or model features.

Methodology: AnSer provides users with direct access to BlackRock's models and users can modify assumptions as needed, including structure and prepayment assumptions. Users can then perform calculations on individual securities, trades or portfolios. AnSer uses real-time market economy and market prices from third-party vendors to analyze securities values.

Sources of information: Models-internally developed; curves and economic data — Reuters; structuring files — Trepp and Intex; security indicative data — Reuters/EJV; market prices-Reuters Pricing, FT Interactive, index providers.

Number of price contributors: Dealers and pricing services

Number: \$3 trillion of assets analyzed through the models

Who has access to the data: BlackRock Solutions clients. This includes insurance companies, asset managers, hedge funds, broker dealers, corporations and pension funds.

Cost: User-based fee

Historical prices/data: Yes, from 1980s

Presentation of data: Data is presented through AnSer web-based user interface. Certain data is presented in tabular or graphical formats. A variety of output reports can be created in AnSer and exported in several formats. Output reports include OAS, nominal spreads, price/yield tables, cash flows, duration/convexity, horizon and scenario analysis.

Non-price information: Cash-flow reporting and prepayment data

Distribution through third parties: No

BLOOMBERG²

Summary: Bloomberg is considered the dominant market aggregator of data and information for the securitized and structured finance market sectors. Bloomberg information is widely used to develop price quotes for most securitized and structured products, especially for the conventional and higher credit quality transactions in which prepayments are a critical valuation metric. Bloomberg also provides trading platform for CP (BOOM or Bloomberg Money Markets) and ABS/MBS quotes (ALLQ function).

Website: Bloomberg.com

² A description of Bloomberg is omitted at the request of Bloomberg.

BOND EDGE

Organization: FT Interactive Data

Summary: Bond Edge is an interactive analytical system that allows users to model and analyze portfolios and specific securities and sensitivity to different environments, time horizons and scenarios. While most product modules can be used for the range of fixed-income credit markets, several of the Bond Edge modules are specifically directed to the securitized products markets — its prepayment module and the CMO/ABS Analyzer.

Contact information: Tony Armedilla, Tony.Armedilla@interactivedata.com, 310.479.9715

Website: bondedge.com

Type of information provider: Collateral data, model

Market sector: CMO, CMBS, ABS

Service provided: Structured finance portfolio management tools including scenario analysis to measure effect of yield curve shifts and changes in the shape of the yield curve. The following modules are available and relevant to the securitized/structured finance markets: performance attribution, benchmark analysis, cash-flow testing prepayment models and CMO/ABS Analyzer.

Brief description: Cash-flow testing module generates scenario-dependent cash flows subject to the effect of embedded options. CMO/ABS Analyzer provides descriptive, analytical cash-flow information on different deal structures. The performance and attribution modules enable users to compare their portfolio to market peers, identify sources and levels of risk and return, duration exposure and factor exposure, identifying the securities in the portfolio that affect the return at points along the yield curve.

Frequency of update: Real time

Methodology: Cash-flow testing incorporates embedded options, including MBS/CMO prepayments based on the Bond Edge prepayment model, which includes seasoning, “burn out,” and time to reset (in the case of ARMs and hybrids). The users can measure prepayment risk through stress testing, express prepayment views. The CMO/ABS Analyzer provides access to reverse-engineered deals by Bond Edge. The users can incorporate their own assumptions about price, settlement data and face value as well as prepayments.

Number: Reverse-engineered 8,000 CMBS/CMO/ABS deals.

Sources of information: Mortgage data across agency, coupon and maturity

Number of price contributors: N/A

Who has access to the data: Unlimited access on a subscription basis. Range of institutional buy-side and dealers subscribe.

Cost: Based on annual subscription.

Historical prices/data: Yes

Presentation of data: Web-based desktop, tables and graphs, downloadable into Excel.

Non-price information: Durations/convexity, prepayment speeds, MBS factor, average life and yield, projected monthly cash flows (for CMO/ABS), OAS. Prepayment speeds are attributed to refinancing, relocation, burnout variables.

Distribution through third parties: None, accessible to end users only.

C-BASS (CREDIT-BASED ASSET SERVICING AND SECURITIZATION) AND RADAR VIEWER

Summary: C-BASS is a leading issuer, servicer and investor specializing in credit-sensitive residential mortgage assets. These assets include performing subprime and Alt A, seasoned subprime, nonperforming, reperforming, and government-guaranteed loans, as well as subordinated and mezzanine RMBs with prime, subprime, Alt A and high LTV collateral. C-BASS is a long-term investor in this sector of the residential mortgage market and generally holds purchased assets in its portfolio or securitizes them, retaining the most subordinate tranches.

Contact information: Jim Schneider, Jim.Schneider@c-bass.com, 212.850.7790

Website: www.c-bass.com

Type of information provider: Collateral and loan performance data

Market sector: Residential Mortgage ABS; non-agency CMO, CDO

Service provided: RADAR Viewer is an advanced web-based reporting tool that provides investors in C-BASS-issued and Litton-serviced deals with access to the C-BASS proprietary servicing system, RADAR to allow users to track delinquent loan level data on a monthly basis, monitor projected vs. actual performance and adjust cash-flow assumptions if necessary.

Brief description: The RADAR Viewer application provides updated loan and bond level information on the RMBS portfolio serviced by Litton, as well as the RMBS collateral included in the CDOs issued by C-BASS. Data ties back to the trustee remittance reports for third-party verification of data.

Frequency of update: Monthly

Methodology: Data is sourced directly from Litton's servicing system, RADAR, and tied back to trustee remittance reports.

Number of deals in the database: 107

Sources of information: C-BASS internal data, Litton Loan Servicing performance data, trustee remittance reports

Number of price contributors: N/A

Who has access to the data: Unlimited, free access to investors. Registration is required. 144-A deals available to QIBs with registration.

Cost: Free to investors with registration.

Historical prices/data: Data available from date of deal issuance.

Non-price information:

Loan Level Data available includes:

- * Delinquency summary by loan
- * Origination data
- * Property value
- * Bankruptcy data
- * Cutoff month data

CBO Studies include:

* Current resolution data

Delinquency Studies include:

- * Roll rate analysis
- * Loan characteristics
- * Loss analysis
- * Delinquency trends/matrix
- * Liquidation and prepayment rates

Credit Support Studies include:

- * Credit support
- * Overcollateralization
- * “My Bond” Analysis
- * Analysis of underlying collateral, including Rating Groups and Rating Changes
- * Bond Balance and Credit Support Tables and Graphs
- * Documents including Remittance Reports, Issuance Documents and Documents on the underlying assets

Presentation of data: Web-based, downloadable to Microsoft Excel

Distribution through third parties: No

CHASEN ENGINE/CMODATABASE³

Parent: Chasen Enterprises

Summary: Models CMO cash flows and maintains a CMO structure library.

Contact information: Andrew Chasen, andy@chasen.com, 914.734.1888

Website: chasen.com

Type of information provider: Collateral, structure data, cash-flow/valuation models

Market sector: CMO (agency and non-agency), mortgage ABS

Service provided: Models mortgage structures, both agency and non-agency CMOs, also models subprime deals.

Brief description: Maintains searchable databases of bonds listed by owner and quantity. The database can be downloaded into a spreadsheet. It then calls on the Chasen Engine and database to fill in tranche information and calculate average lives based on prepayment assumptions. The Chasen Engine enables the user to model, evaluate CMOs and ABS, providing the ability to evaluate cash flows. The Chasen CMO Database is a library of agency-issued CMOs. Chasen Reverser re-engineers deal structures.

Frequency of update: Monthly to account for changes in factors.

Methodology: A live modeling system, replicating structure and “waterfall”s and pay-downs based on coupons. The products are modeled on CMO++, allowing full access to underlying variables of the Chasen Engine. Those deals not in the library can also be modeled. Reverser provides a matrix screen

³Markit (Markit Group, Ltd) announced the acquisition of Chasen Enterprise on August 29, 2006.

to evaluate a bond with reports generated for specific prepayment assumptions and price scenarios. Bond Check is a portfolio tool using databases to fill in tranche information and a prepayment specification tool with maturity, coupon and loan age assumptions to calculate average lives. Reverser models cash flow, PAC schedules and reports from model-generated results based on prepayment and price assumptions.

Sources of information: Multiple data sources-trustee reports, prospectus, internal deal library (Chasen CMO Database), third-party prepayment models.

Number of price contributors: N/A

Who has access to the data: Any market participant. Regional dealers, investors, issuers, servicers, and rating agencies for trading, risk management and surveillance.

Cost: Purchase or lease basis.

Historical prices/data: Yes, since 1997.

Number: 17,000; 100% coverage of agency CMOs, leading private CMO issuers, selected subprime issuers; 18 whole loan issuers, 33 subprime issuers.

Presentation of data: Through web-based desktop application or through FTP.

Non-price information: WAC, WALA, WAM, deal library. Reverser includes scenario calculation of WAL, yield, principal payments. Bond Check fills in portfolio tranche information and enables WAL calculation through other Chasen tools. Reverser report includes principal payments, WAL and yields.

Distribution through third parties: Yes, various vendors have incorporated the Chasen analytics by vendors that offer functionality, such as OAS, VaR, Asset/Liability Management.

COMMERCIAL REAL ESTATE DIRECT (PRICING MATRIX)

Summary: Commercial Real Estate Direct is a seven-year-old news and information publisher specializing in the industry's capital markets. A key component of its coverage is the domestic CMBS market.

Contact information: Orest Mandzy, orest.mandzy@crenews.com, 215.504.2860

Website: www.crenews.com

Type of information provider: Pricing, news and industry information

Market sector: CMBS, commercial real estate and finance

Service provided: Online news and information service, including a matrix pricing service

Brief description: Commercial Real Estate Direct provides news and information on commercial real estate and CMBS. The pricing matrix is based on input from ten (10) dealers. The price information is segmented by rating from B to AAA and, for AAA, for 5-year and 10-year maturities.

Frequency of update: In general, daily; weekly for the pricing service

Methodology: Pricing matrix is compiled and calculated from submissions of ten dealers. Spreads are for generic conduit paper backed by newly originated, call-protected, balloon mortgages.

Number: 10 dealers

Who has access to the data: All market participants, by subscription

Cost: License subscription; minimum of \$1,650/year, which provides for a three-user license, with price increasing with additional licenses.

Presentation of data and analysis: The information is presented as swap spreads and spreads to Treasury and can be downloaded to an Excel spreadsheet.

Non-price information: The pricing matrix service provides the spread information. In addition and within the Commercial Real Estate Direct suite of products, additional data are available, including CMBS issuance and commercial mortgage property data, a property sales data base, news reports and distressed asset reports for commercial mortgages more than 60 days past due, and information on commercial mortgages eligible for refinancing.

Distribution through third parties: Yes

CPR & CDR TECHNOLOGIES

Summary: CPR& CDR provides prepayment data on agency MBS collateral. It will also, on a consulting basis, analyze and develop databases on non-agency MBS data and prepayment and default models.

Contact information: Paul C. Wang, pcwang@cprcdr.com, 917.584.4175, 201.714.9958

Website: cprcdr.com

Type of information provider: MBS & real estate ABS collateral data, prepayment, mortgage credit quality modeling.

Market sector: Primarily agency MBS though covers non-agency as well, based on client data.

Service provided: Agency mortgage prepayment histories, with data-centric consulting on other MBS/ABS product sector pricing. Database includes mortgage collateral loan size, geography, FICO, LTV selected through query tool.

Brief description: Real-time analysis of prepayment speeds focused on agency securities. Developed prepayment and default data, models and projections based on non-agency data provided by clients. Extracts information from loan-level data, primarily agency mortgages, but can provide similar consulting services across mortgage ABS sectors. That knowledge can be applied to pricing loans. The consulting services go beyond prepayment histories to develop analytics to model OAS, defaults, losses and delinquencies.

Frequency of update: Monthly, as data are made available by the agencies, on a same-day basis.

Methodology: A hosted solution, with analytics provided through proprietary database management technology, UB Platform. Data are stratified by a number of variables, including loan size, issuer and geography and group by issuer and coupon, and can also be grouped by coupon, age, origination and issuance year. ARM as well as agency fixed-rate prepayment speeds are provided.

Sources of information: GSE mortgage agencies and three non-agency/private-label issuers: Jumbo, Alt-A and subprime.

Number of price contributors: N/A

Number: Over 2,000 prepayment and issuance reports; agency pool factor information since 1990.

Who has access to the data: Any market participant. Range of institutional market participants subscribe — buy-side, sell-side and rating agencies. It is an outsourced prepayment data analytic function for portfolio managers, traders and research departments.

Cost: Call for pricing information.

Historical prices/data: Yes

Presentation of data: Through web application generating customized and standard reports. Standard reports include agency reports for each product (30yr, 15yr, 7yr balloon) by origination year and coupon with 12-month history, or with any user-defined cohorts.

Non-price information: WAC, WAM, loan balance, coupon, CPR prepayment speeds, stratified by loan size, geography, issuer and historic speeds; static pool data.

Distribution through third parties: Sector will distribute the agency prepayment speeds through its Data Distribution Service.

DOMINION BOND RATING SERVICE CDO TOOLBOX

Summary: Dominion Rating Service, based in Canada, is a leading rating agency whose coverage includes securitized and structured finance products. CDO Toolbox is a modeling tool for assessing and evaluating flat, squared and other complex synthetic structures. The model goes beyond determining a rating at a point in time but also to analyze risk exposure and credit sensitivity in the transaction over time.

Contact information: Sean O'Connor, soconnor@dbrs.com, 212.806.3252

Website: www.dbrs.com

Type of information provider: Model

Market sector: CDO/CLO

Service provided: Dominion Bond Rating Service provides a regression-based model used internally by analysts to rate and evaluate CDO deals. The models provide the user with an understanding of credit analytics on deals and the capacity for a good approximation of the probable rating. The model generates results that may be subjected to a range of scenarios involving the migration of and/or default of migrations and/or default of Reference Obligations industries and credits throughout the life of the transaction.

Frequency of update: N/A — collateral data provided by the user. The models may be updated periodically.

Methodology: CDO Toolbox is programmed through an open architecture, thus enabling users to change almost any of the variables, including specification of default curves, inter-industry and intra-industry correlations, credit groupings and recovery values. The product permits sensitivity testing on trades. CDO Toolbox provides the analytical model; the user provides and inputs the data, which may be pasted from an Excel spreadsheet. Data items include obligor name, whether it is a short or long position, corporate or ABS, ticker, industry and country, CDS spread and rating.

Sources of information: DBRS provides the model architecture. The data are provided by user.

Number of price contributors: N/A—an analytical model rather than a pricing source.

Cost: Free

Historical prices/data: Yes. Historical factors, indicative data, calculated data and collateral are available.

Number: N/A—as the model is provided broadly to market participants, including issuers, investors and dealer/investment banks, the number of users cannot be tracked.

Presentation of data: Available on CD and desktop. Charts and tables generated including rating distribution, industry breakdown, for example.

Non-price information: Model simulation generates a number of metrics for the base case and additional scenarios—full capital structure and attachment points; names on the default list; rating distribution; CDS spread breakdown.

Redistribution: Not redistributed. Only available directly from Dominion Bond Rating Service.

DOMINION BOND RATING SERVICE RMBS MODEL

Summary: Dominion Rating Service, headquartered in Canada, is a leading rating agency whose coverage includes securitized and structured finance products. RMBS Model is a modeling tool for assessing and evaluating non-agency RMBS structures and generating indicative ratings and collateralization based on mortgage/pool characteristics. The model is also used internally.

Contact information: Darren Davies, ddavies@dbrs.com, 212.806.3264

Website: www.dbrs.com

Type of information provider: Model

Market sector: Non-agency MBS (Auto ABS pending)

Service provided: Dominion Bond Rating Service provides a regression-based model used to rate and evaluate RMBS deals. Model generates collateralization/credit enhancement level information to achieve a rating based on input of loan or pool level mortgage characteristics. Output generates an indicative and good approximation of a rating. The model is based on the same analytics used internally by rating analysts. The range of fixed-rate and ARM/hybrid products are covered by the product.

Frequency of update: N/A — collateral data provided by the user. The models updated periodically — the most recent version is January 2005.

Methodology: DBRS provides the model architecture—user inputs data. Elements include loan, originator, servicing, credit score, FICO, LTV and property value, mortgage documentation, borrower ratios, lien origination date, monthly P&I, property location. Model permits loan-level or pool-level analysis.

Sources of information: DBRS provides the model architecture. The data are provided by user.

Number of price contributors: N/A—an analytical model rather than a pricing source.

Cost: Free

Historical prices/data: Yes.

Number: N/A — as the model is provided broadly to market participants, including issuers, investors and dealer/investment banks, the number of users cannot be tracked.

Presentation of data: Web-based product. Charts and tables generated, including distribution of pool by various data categories—FICO, for example.

Non-price information: Model simulation generates pool and loan characteristics and collateralization/enhancement factor to achieve a given rating.

Redistribution: Not redistributed. Only available directly from Dominion Bond Rating Service.

eMBS: MORTGAGE-BACKED SECURITIES ONLINE AND DATA FILES

Summary: eMBS provides a database of agency MBS, pools and collateral.

Contact information: Larry Goia, support@embs.com, 813.971.8982

Website: www.embs.com

Type of information provider: Data

Market sector: Agency MBS pass-through/CMO collateral.

Service provided: eMBS provides factor and indicative information and calculated analytics for agency mortgage securities. It provides static and dynamic information about a mortgage pool, including prepayments, geographic composition, collateral, WAC, WAM, WALA, and origination year. Creates a portfolio to keep track of a group of securities and their quantities.

Frequency of update: Monthly; factor and indicative information seen via eMBS website via browser by all clients, and files provided when made available by the agencies.

Methodology: Obtains data from the agency and provides pool and collateral data, descriptive data and analytics through a database.

Sources of information: Mortgage agencies

Number of price contributors: N/A

Who has access to the data: Dealer and institutional buy-side.

Cost: Depends on the types and frequency of files required.

Historical prices/data: Yes. Historical factors, indicative data, calculated data and collateral are available.

Number: Over a million loans.

Presentation of data: Searches available via online system at www.embs.com; searches can be done qualifying by typical mortgage data elements. Online website, and data files via ftp. Includes a look-up function.

Non-price information: Factors, indicative data, collateral averages (WAC/WAM/WALA, etc.), historical prepayments, collateral for Megapools/Giants/Platinums/CMOs/Strips, market aggregations of prepayments and issuance, many slices. Price calculators are provided, allowing client entry of price or yield, prepayment rate and related mortgage data.

Redistribution: Redistribution is defined and controlled by the mortgage agencies; eMBS does provide data to agency-recognized redistributors.

FITCH CREDIT CARD ISSUANCE TRUST

Summary: Fitch Ratings is one of the leading rating agencies. In addition to surveillance and monitoring securities after issuance, Fitch provides default and loss exposure analysis under varying scenario environments.

Contact information: Jayme Laurash, jayme.laurash@fitchratings.com, 212.908.0751, 1.800.753.4824

Website: fitchratings.com

Type of information provider: Data

Market Sector: Credit card ABS

Service Provided: Monthly reports on four credit card trusts

Brief Description: Data from four credit card trusts are compiled and updated on a quarterly basis, available on the Fitch website. The report provides a compilation of parent company, trust descriptions and data.

Frequency of update: Quarterly

Methodology: The report is developed from trustee reports and proprietary data updated monthly. The data include collateral performance measures, trust capital structures, maturity schedules and break-even stress scenarios.

Sources of information: Trustee reports, public and proprietary data, and analysts.

Number of price contributors: N/A

Who has access to the data: Unlimited access on a subscription basis. Range of institutional market participants, including dealers, issuers, and investors, subscribe.

Cost: Part of the rating subscription product based on number of users and level of service.

Historical prices/data: Yes

Presentation of data: Accessible from Fitch Research website in Excel format.

Non-price information: Parent and trust description; collateral performance; trust capital structure; maturity schedules; and stress scenarios.

Distribution through third parties: No

FITCH RATINGS MONITORING DATABASES

FASTracker (Fitch Alert Surveillance Tracker)/BondCompare and SMART (Surveillance, Metrics, Analytics, Ratings and Tools)

Summary: Fitch Ratings is one of the leading rating agencies. In addition to surveillance and monitoring securities after issuance, Fitch provides default and loss exposure analysis under varying scenario environments.

Contact information: Jayme Laurash, jayme.laurash@fitchratings.com, 212.908.0751, 1.800.753.4824

Website: fitchratings.com

Type of information provider: Data

Market sector: Non-agency RMBS (prime, subprime, Alt-A), ABS (credit cards, auto, student loans, equipment lease, home equity ABS), CMBS CDO, ABCP

Service provided: FASTracker is a tool that monitors bond performance to optimize portfolio performance and provides access to the Fitch research database. Bond Compare enables comparison of up to 10 user-identified structured finance/secured bonds in a sector to the target bond. SMART provides metrics and analytics to compare securitized assets of the same asset class and ongoing tracking of deals in a searchable database.

Brief Description: FASTracker is available through the Fitch website, which is structured to provide performance and research alerts for selected securities to efficiently monitor performance. Bond Compare enables comparison of bonds by customizing data fields for purposes of comparing collat-

eral characteristics and performance measures, develop insights and risk and value. The SMART for CDO data include historical compliance test results (e.g., IC/OC). SMART for ABCP demonstrates the type of collateral within the conduit program without identifying conduit name. SMART for ABS and RMBS provides ongoing surveillance and performance measurement of ABS and RMBS available in a downloadable format. (Also note Deal Tracker shows RMBS collateral data at the time of securitization since 2000 for prime and higher credit risk exposed RMBS). SMART for CMBS is a surveillance system that provides investors with loan-level data compiled by Trepp combined with Fitch analyst commentary. Loans are scored based on debt service coverage, LTV and the Fitch internal scoring system. Frequency of update: As information becomes available — monthly.

Methodology: Database of Fitch surveillance and research. Searchable by bond or CUSIP. FASTracker includes all deal collateral characteristics. Bond Compare operates by clicking on the appropriate securitized/structured finance sector, identify bonds to compare. The bonds and their performance characteristics are then downloaded onto a spreadsheet. The data and characteristics are either pre-selected or customized by the users. SMART presents historical data in a searchable database.

Sources of information: Trustee reports, public and proprietary data, and analysts.

Number of price contributors: N/A

Who has access to the data: Unlimited access on a subscription basis. Range of institutional market participants, including dealers, issuers and investors, subscribe.

Cost: Part of the rating subscription product, based on number of users and level of service.

Historical prices/data: Yes

Presentation of data: Accessible from Fitch Research website in Excel format.

Non-price information: FASTracker provides new information set up through an alert system. Performance reports and comparison in BondCompare.

Distribution through third parties: No

FITCH RATINGS PERFORMANCE INDICES

Summary: Fitch Ratings is one of the leading rating agencies. In addition to surveillance and monitoring securities after issuance, Fitch provides default and loss exposure analysis under varying scenario environments.

Contact information: Jayme Laurash, jayme.laurash@fitchratings.com, 212.908.0751, 1.800.753.4824

Website: fitchratings.com

Type of information provider: Data.

Market sector: Non-agency RMBS(prime, subprime, Alt-A), ABS (Credit cards, auto, student loans, equipment lease, home equity ABS), CMBS, CDO, ABCP

Service provided: A sector specific family of performance indices by securitized/structured finance sector.

Brief Description: Performance indices are delinquency indices on Fitch rates deals by vintage, industry and product sector. RMBS is broken down by collateral credit quality (prime, subprime, Alt-A).

Frequency of update: Monthly, as information becomes available.

Methodology: Performance data by sector, product and vintage are updated quarterly from proprietary sources and trustee reports. The data are then organized and tabulated in the form of customized indices.

Sources of information: Trustee reports, public and proprietary data, and analysts.

Number of price contributors: N/A

Who has access to the data: Unlimited access on a subscription basis. Range of institutional market participants, including dealers, issuers, and investors, subscribe.

Cost: Part of the rating subscription product based on number of users and level of service

Historical prices/data: Yes, since 2000

Presentation of data: Accessible from Fitch Research website in Excel format.

Non-price information: Delinquency data

Distribution through third parties: No

FITCH RATINGS - PMM (PROPERTY MARKET METRIC)

Summary: Fitch is one of the leading rating agencies. In addition to surveillance and monitoring securities after issuance, Fitch provides a number of data products on 26 securitized product sectors for investors.

Contact information: Jayme Laurash, jayme.laurash@fitchratings.com, 212.908.0751, 1.800.753.4824

Website: fitchratings.com

Type of information provider: Ratings and collateral data

Market sector: CMBS

Service provided: Access to internal CMBS loan scoring system on a loan-level basis.

Brief Description: PMM is the Fitch-derived tool to analyze and grade CMBS bonds. It is used to determine credit enhancement levels.

Frequency of update: Monthly, as information becomes available.

Methodology: The internal scoring system for every loan within each CMBS pool that combines property type with MSA and assigns a score of 1-6 that is included to determine levels of credit enhancement on deals

Sources of information: Trustee reports, public and proprietary data, and model.

Number of price contributors: N/A

Who has access to the data: Unlimited access on a subscription basis. Range of institutional market participants subscribe. Data may be downloaded to spreadsheets.

Cost: Part of the basic subscription

Historical prices/data: Yes

Presentation of data: Accessible from Fitch Research website in Excel format

Non-price information: Security and collateral performance reports

Distribution through third parties: No

FITCH RATINGS – VECTOR

Summary: Fitch Ratings is one of the leading rating agencies. In addition to surveillance and monitoring securities after issuance, Fitch provides default and loss exposure analysis under varying scenario environments.

Contact information: Richard Hravatin, Richard.Hravatin@fitchratings.com, 212.908.0690

Website: fitchratings.com

Type of information provider: Model

Market sector: CDOs-synthetic and cash, ABS, ABCP

Service provided: VECTOR is the proprietary model used internally by Fitch to stress-test CDOs, looking at default, loss and correlation assumptions. It is in essence a portfolio credit analysis tool especially used in CDO credit analysis but also ABCP.

Brief description: Fitch Default VECTOR is the main quantitative tool for evaluating default risk in CDO credit portfolios and can be used in ABS portfolios and ABCP as well. It is used by Fitch analysts to stress-test the deals. VECTOR enables “look through” of CDO synthetic collateral. VECTOR enables inter-industry correlation of collateral assets as well. The main outputs are a Fitch default, loss and recovery ratings. It is important to note that the model measure credit exposure but is not a cash-flow model and does not account for structural issues such as “waterfalls” and excess spreads. VECTOR, though, can be used with such cash-flow models.

Frequency of update: Monthly, as information becomes available.

Methodology: Data collected from trustee reports and internal sources. VECTOR uses Monte Carlo multi-period simulation to model individual defaults and also incorporates correlation assumptions.

Sources of information: Trustee reports, public and proprietary data, and analysts

Number of price contributors: N/A

Who has access to the data: Unlimited access on a subscription basis. Range of institutional market participants subscribe. Data may be downloaded to spreadsheets.

Cost: Part of the rating subscription product based on number of users and level of service

Historical prices/data: Yes

Presentation of data: Excel presentation through web or CD model delivery

Non-price information: Asset correlations, CDO characteristics, and output — default and loss distribution and default timing distribution.

Distribution through third parties: No

FT INTERACTIVE DATA

Summary: FT Interactive Data (an Interactive Data business) is a leading provider of financial information to global markets. They supply global securities pricing, evaluations, and reference data (including income and corporate actions) for more than 3.5 million securities, including daily evaluations for approximately 2.5 million fixed-income and international equity issues. They specialize in “hard-to-value” unlisted fixed-income instruments and “hard-to-get” information from emerging markets. Evaluated pricing is provided in the U.S. through FT Interactive Data Corporation and internationally through Interactive Data (Europe) Ltd. and Interactive Data (Australia) Pty Ltd.

Contact Information: Bill Ward at william.ward@interactivedata.com or 212 771-6827

Website: www.ftinteractivedata.com

Type of information provider: FT Interactive Data provides pricing, evaluations, reference data, and factor and prepayment information.

Structured market sectors: MBS, CMO, ABS, CMBS, ABS Commercial Paper

Services provided: FT Interactive Data delivers prices, evaluations, reference data, factor and prepayment information via bulk or web-based services (in universe or request-based files) or via over 250 third-party service providers.

Brief Description: FT Interactive Data provides evaluated pricing for U.S. MBS, CMO, ABS and CMBS securities as well as European ABS and MBS securities. Their evaluations represent their good faith opinion as to what a buyer in the marketplace would pay for a security (typically in an institutional round lot position) in a current sale. FT Interactive will provide broker quotes (and may utilize ratings and certain other market information when available) for securities when they cannot obtain cash flow or other security structure information or cash flows are not currently predictable.

Frequency of update: Each business day.

Methodology: FT Interactive Data's fixed-income evaluation methodologies combine in-house modeling techniques and information from market sources, with an evaluation staff whose experience enables them to understand and analyze the various characteristics of complex instruments. Methodologies are available on FT Interactive Data's web site at www.ftinteractivedata.com/products/data_type/evaluated/bond_evaluation.shtml.

US-Based Evaluation Coverage: Approximations as of August 2006: 1,000,000+ pass-throughs, including 100,000+ specified pools, 106,000 CMOs, 22,000 ABSs, 7,000 IO/PO Trusts, 9,300 CMBSs, and 5,500 SBA pools.

Sources of information: FT Interactive Data sources include, but are not limited to, macro and micro economic data, proprietary volatility models, published prepayment information, primary and secondary market offerings, benchmark interest rate curves, various industry research and analysis sources, and buy and sell-side contributors.

Number of contributors: Clients may contribute market color and trade information to the evaluation process. (Verified information is reflected in their evaluations to the extent that they deem it formative of their good faith opinion.)

Who has access to the data: FT Interactive Data's service subscriptions are open to anyone, and are used by those institutions requiring independent price valuation; e.g., mutual funds.

Cost: FT Interactive Data's fees vary based on variables such as services taken, data volume/usage, method of delivery, and delivery frequency.

Historical prices/data: Yes.

Presentation of data: FT Interactive Data delivers data directly to clients or via third-party vendors/redistributors.

Nonprice information: FT Interactive Data provides reference data (including income, terms and conditions, and corporate actions) as well as historical data for fixed-income instruments.

Distribution through third-parties: Yes, data is incorporated in other vendors' products/services.

iCDO

Parent: Lewtan Technologies, Inc. (in conjunction with Deutsche Bank)

Summary: A web-based Portfolio Management System specifically tailored to facilitate front, middle and back-office processing for Collateralized Debt Obligations (CDO's), iCDO facilitates work-flow collaboration between the portfolio manager, trustee and other parties involved in a CDO deal. The system supports bonds, loans and factoring instruments.

Contact information: Paul Arvidson, paul.arvidson@lewtan.com; 781.672.1216

Website: www.lewtan.com

Type of information provider: Deal and collateral data

Market sector: CDO collateral managers and other market participants

Service provided: Functionality includes compliance testing, hypothetical trading, cash-flow projections and collateral analysis. Compliance test shows pass/fail, results, values and triggers down to the asset level. Hypothetical testing: electronically request confirmation of "hypo trade" from trustee, post executed trade to system; post trade functionality creates post-trade accounting records for trade effect on actual portfolio.

Frequency of update: Users can update data at any time. The system has daily information feeds from a variety of sources for ratings, factors, etc.

Methodology: Template for building trade scenarios for pre-testing compliance results prior to execution, maintains current market data (pricing, ratings changes, etc.) to assist in trading and maintenance of the deal, buys and sells can be analyzed simultaneously to evaluate compliance. Unlimited number of trades that can be entered, multiple "what if" scenarios, adjusts cash balances automatically, multiple assumptions applied to the entire deal or a specific subset of assets, run the cash flow on base portfolio or base portfolio plus "hypo trades," store unlimited user-specific assumptions and scenarios. Generates cash flows through capital structure. iCDO supports collateral types including loans, bonds and factoring instruments.

Sources of information: Rating agency feeds, third-party vendor feeds

Number of price contributors: N/A

Who has access to the data: The user of iCDO has access to the data. Certain parties can be permitted to receive some data elements.

Cost: Annual license fee plus implementation fee-unlimited users

Historical prices/data: Yes. iCDO will store data historically.

Number: N/A; affiliated product — ABSnet — has 5,000 deals, 50,000 bonds, 20 collateral types, 20,000 servicer reports, 100 performance variables in database.

Presentation of data: iCDO is a web-based tool. Data is available both in tabular and graphical form. iCDO comes with a flexible report engine, with multiple sort and filter options on both the deal and asset level; data can be displayed in HTML or Excel format; users can look at data for one deal or multiple deals. "Slice and dice" a subset of a deal or an entire portfolio using different data points and views.

Non-price information: Price/yield tables, class cash flows and collateral cash flows.

IMAKE ANALYTICS ON-DEMAND AND STRUCTURED TRANSACTION DATABASE

Summary: Analytics On-Demand is an Internet-based and integrated analytical tool providing an end-to-end solution for the structured finance market using an open technology framework. The integrated platform can be used across structured/secured finance sectors and generates a series of calculators. Used for ratings analysis, loan-level analysis, cash-flow modeling and tax analysis. The Transaction Database provides indicative data on structured finance transactions for performance measurement and analyzes new transactions/trades.

Contact information: Trani Tran, Trani@imake.com, 301.896.9202

Website: imake.com

Type of information provider: Data and third-party model

Market sector: CDO/CLO, ABS, CMO

Service provided: Used in bond administration, investor and tax reporting, portfolio and individual issue analysis and modeling. Calculates structured/secured finance cash flows, price/yield, duration and average life. Divided into the following modules: loan analysis, analytics, bond administration and investor reporting, tax reporting, accounting and investor web information. The bond calculator is used for pre-purchase analytics for CMO and ABS transactions, or post-issuance with updated monthly factor information. The economic calculator permits analysis of individual tranches on varying prepayment speeds, delinquency and default/loss analysis and static/floating interest rates. Performance calculator analyzes underlying collateral performance.

Frequency of update: Monthly

Methodology: Data are set up from prospectus and the cash-flow “waterfall” is coded to the model, using IMAKE’s Interpreted Scripted Modeling Language, which translates the prospectus into a descriptive file. The cash-flow valuation analytic model module stress-tests security structures, generates statistical and financial information from the prospectus, analyzes ongoing credit and prepayment performance at the loan level, performs default analysis, analyzes prepayment lockout provisions, and imports cash flows or generates amortization schedules.

Sources of information: Trustee reports, prospectus

Number of price contributors: N/A

Who has access to the data: Any market participant; includes trustees, rating agencies, dealers, institutional investors/fund managers and issuers.

Cost: Case-by-case; depends on client size

Historical prices/data: Yes, since 1993

Number: 8,000 transaction structures.

Presentation of data: Online or to a downloadable spreadsheet that can be loaded directly to accounting systems. Generates cash-flow, price/yield, and performance history reports and graphs. In addition, analytics module generates collateral and cash-flow reports.

Non-price information: Price/yield tables, cap/swap analysis, delinquency/loss analysis, cash flows, balances, defaults, changes in cash flows under varying scenarios, and price changes between dates and attribution of those price changes.

Distributed by third parties: No

INTEX SOLUTIONS

Summary: Intex is the most widely used provider of securitized and structured-transaction data and model solutions. Its systems enable rigorous deal and portfolio analysis and deal structuring. Intex is especially used in more complex and credit-sensitive security structures.

Contact information: James Wilner, jim@intex.com, 781.449.6222

Website: www.intex.com

Type of information provider: Deal Cashflow Model Files and Deal Performance Data.

Market sector: U.S./Canadian, European and Japanese RMBS, ABS, CMBS and CDO.

Service provided and description: Deal/Portfolio Analysis: INTEXnet is a web-based tool that provides single security and portfolio analytics, including cash-flow generation and analytics, prepayment, credit stress-testing and collateral performance analysis. INTEXdesktop is a client-resident version of INTEXnet. The INTEX Subroutines is the leading cash-flow engine used, especially by system builders to construct proprietary trading and risk management systems. All of these applications are used with Intex-modeled deals and with user-supplied or third-party prepayment scenarios or models. Serves ABS, CDO, CMBS and CMO transactions, and coverage includes pre-priced and “red” deals as well as post-issuance deals.

Deal structuring: INTEX DealMaker is used by issuers and underwriter to develop new deal structures. DealMaker supports most asset types supported by Intex, imports collateral data from Excel and can re-securitize transactions in the INTEX deal database.

Frequency of update: New deals are added daily, and updates to existing deals are made available daily based on the latest monthly trustee report and loan-level data when available.

Methodology: Interest rate, prepayment and default scenarios are specified by users; the Intex cash-flow engine then generates cash-flow projections and price-yield analytics including weighted average life, duration, convexity, etc. Intex provides collateral data and deal structure and should be viewed as a tool. The user has complete control over assumptions and how inputs are used—prepayments, defaults and interest rate environment. Historical performance is provided by deal and issuer, as well as loan data (and property information for CMBS). The ABS deal database includes auto, credit card, equipment lease, home equity, manufactured housing and other related sub-sectors. Complete coverage of agency and non-agency CMO structures.

CDO: The CDO module includes ratings agency models and covers CBO, CLO, CDO of ABS and “CDO squared” structures.

Sources of information: Proprietary database, deal structure library and trustee/servicer information.

Number of price contributors: N/A

Who has access to the data: Any market participant. Sell-side, buy-side investors, rating agencies, insurers and back-office subscribers.

Cost: Annual license

Historical prices/data: Yes, back to 1979 for MBS

Number: Over 16,000 deals modeled; nearly complete coverage of US RMBS, ABS, CMBS and CDO sectors, and rapidly growing coverage in Europe and Japan. Presentation of data: Internet web-browser-based system that can run Javascript, downloadable into Excel and Yield Book formats.

Non-price information: Descriptive data include prepayments, defaults, collateral balance, credit enhancements, yields, WAC, WAM, WALA, duration/convexity, spreads, price/yield and internal rate of return. For CMBS, collateral property financial data are available. Loan-level and property-level data for CMBS collateral; auto- and credit-pool-level data; CDOs by asset classification; equipment lease data at pool level. In addition to cash flow, Intex generates other analytics including spread, duration, convexity spreads, IRR and horizon analysis. Residential mortgages-factors provided, Mega, Giant, platinum pools included.

Redistribution: Please inquire.

LEHMAN PRICES

Summary: The Lehman family of indices — the most widely followed index — includes securitized products. Lehman provides prices on the underlying securities that make up the U.S. Aggregate Index (investment grade).

Contact information: Nick Gendron, ngendron@lehman.com, 212.526.6758

Website: lehmanlive.com

Type of information provider: Pricing

Market sector: Agency and non-agency MBS, ABS, CMBS

Service provided: Underlying index bond prices. As a premium service, Lehman will provide the prices daily at 4:30 p.m. Prices used by investors to mark portfolios and for risk management.

Frequency of update: Daily

Methodology: Lehman generates prices based on trading desk input with some matrix pricing used to develop and calculate the indices including ABS, MBS, CMBS.

Sources of information: Lehman trader quotes

Number of price contributors: Lehman traders

Who has access to the data: Any investor client

Cost: Premium-priced service for 4:30 pricing — \$50,000 a year

Historical prices/data: Yes

Number: 413 MBS, 223 CMBS, 179 ABS

Presentation of data: ftp

Non-price information: N/A

Distribution by third parties: No

LOAN PERFORMANCE

Parent: First American Real Estate Solutions

Summary: Databases of non-agency residential MBS and mortgage-backed ABS collateral. Largest repository of non-agency mortgage data with loan-level data. Used for risk management and pricing analysis, portfolio evaluation, to compare relative price of securities with similar collateral, bid and price loans and securitized pools.

Contact information: Bob Visini, bob.visini@loanperformance.com, 415.536.3526

Website: loanperformance.com

Type of information provider: Deal and collateral data

Market sector: Non-agency MBS (mortgage ABS, CMO), includes prime, Alt-A, subprime, and seconds/home equity line of credit (HELOC)

Service provided: Data repository down to the loan level. Loan Performance is the data repository for prime, Alt-A and subprime prepayment rates, and also provides a credit risk-forecasting tool showing distribution of prepayment, loss and default. Database enables analysis of mortgages through 32 performance drivers/variables and comparison of portfolios by criteria such as product and geography. The Loan Performance RiskModel forecasts prepayments and defaults across economic scenarios. Applications include risk management, credit policy, relative value and securitization execution.

Description: Products include Servicing ScoreCard to evaluate servicing; PreTell, a loan-level prepayment scoring tool, to forecast whether the loan will be prepaid due to a refinancing or a move; and TrueStandings Securities, a web-access tool, to analyze and benchmark pools to the ABS/MBS markets. The Loan Performance data are used to build predictive models and determine mortgage-backed security value. Traders use Loan Performance to price securitization issuance, and to make decisions of whether or not to sell a security.

Frequency of update: Monthly, to account for changes in factors.

Methodology: The database is developed in conjunction with the largest originators/servicers. Risk-Model uses loan-level data, house-price assumptions and interest rate assumptions to generate loan scores, cash flows, delinquency, prepayment and loss assumptions, and loan-level pool events.

Sources of information: Mortgage originator/issuer data

Number of price contributors: N/A

Who has access to the data: Any market participant. Originators, issuers, investors, rating agencies and traders are customers.

Cost: License subscription depends on level of service, and number of users.

Historical prices/data: Yes, since 1983

Number: Servicing Database of 100 million mortgages active and paid off for delinquency, prepayment and foreclosure; 38 million prime, 4.3 million subprime, 6.7 million second and HELOC. Securities Database contains over 10,000 non-agency securitized pools, of which 7,000 are active. Covers over 85-90% of non-agency volume.

Presentation of data: Web delivery. Flexible report engine with multiple sort and filter options on both the deal and loan level. Reporting includes by vintage, delinquency, FICO/LTV, against benchmark, geographic distribution and product mix. User defines the report parameters, available pool and loan level.

Non-price information: Issuance data, delinquencies, prepayments, geographic breakdown as examples.

Distribution to third party: Yes, with signed NDA to other information providers such as Intex , 1010 Data, CPR/CDR, and others who incorporate data in their products.

MARKIT (Markit Group Limited)

Summary: Industry source for asset valuation data and services supporting independent price verification and risk management. Provides an integrated range of mark-to-market credit pricing and price analytics across credit products including cash bonds, loans and CDS. Its data are used in pricing CDS and loan collateral in CDO structures and recently introduced an ABS (home equity) CDS index, ABSX.HE (see ABX.HE description). In addition, the CMBX index, an index for CMBS credit default swaps, is expected to be operational in March 2006. The Markit objective is to develop a market standard for pricing from the trader perspective.

Contact information: Kevin Gould, Kevin.gould@markit.com, 212.931.4901

Website: markit.com

Type of information provider: Price, data

Market sector: CDO/CLO, ABS

Service provided: Provides prices for CDS and loans (the major source of collateral pricing for CLO collateral) used in CDO structures and recently introduced an ABS CDS index, ABX.HE, which will include up to five sub-indices. Markit through RED (Reference Entity Data) provides terms and conditions information and identifies organizational relationships in the CDS market that are used in synthetic CDO analytics.

Frequency of update: Daily (end of day)

Methodology: The consolidated prices are generated through data supplied by 13 dealer firms. The RED (reference entity database) provides organizational/entity relationship confirmation and identification for CDS used in synthetic CDOs. See ABX description for details on the ABX index.

Sources of information: 13 dealer pricing, 45 data vendors

Number of price contributors: 13

Who has access to the data: Any market participant. Sell-side, buy-side investors (mutual funds and hedge funds) and back-office.

Cost: License depends on level of service and whether the firm is a dealer-shareholder or buy-side firm.

Historical prices/data: Yes, loan and corporate bond data back to 2001

Number: Loans (5,000), 13,000 bond prices/spreads, 3,000 CDS curves, all iTRAXX and DJCDX credit indices. RED includes 1,800 organizations and 2,500 reference entities.

Presentation of data: Internet web-browser-based system that reads Java script, and via FTP, downloadable into Excel. Search function by RED, ISIN/CUSIP, Loan X.

Non-price information: Organizational identification (RED), news on credit names; the Markit portal, which packages pricing, business news and research at a single site by issuer/reference entity and indicates unusual price volatility.

Redistribution: RED data and to identify organizational relationships of CDS entities used is integrated into data vendors, trading platforms and rating agency information products; for example, S&P, TradeWeb, Bloomberg. CDS prices also carried by third parties.

MBSQUOTELINE

Summary: Provides MBS quotes based on relationship with a dealer. Target audience is mortgage industry professionals

Contact information: Joe Farr, joe.farr@mbsquoteline.com, Jessica Orrick, Jessica@MBSQuoteline.com, or Scott Sanderson, Scott@MBSQuoteline.com, 1.800.627.1077

Website: MBSQuoteline.com

Type of information provider: Intra-day MBS price changes

Market sector: Agency MBS pass-through

Service provided: Provides streaming agency MBS prices on a real-time basis, updates of economic news that affects mortgage pricing, alerts as to investor re-pricings.

Brief Description: Keep mortgage professionals informed about intra-day MBS prices changes so they can make more informed lock/float decisions and give their customers better advice.

Frequency of update: Every 15 seconds throughout the day while the market is open.

Methodology: Prices provided by a regional dealer.

Number: N/A

Sources of information: Dealer provides Ginnie Mae, Fannie Mae and Freddie Mac prices.

Number of price contributors: One

Who has access to the data: Subscribers, primarily used by mortgage originators.

Cost: Monthly subscription of \$44.95 per month.

Historical prices/data: Yes

Presentation of data: Available via website, email, PDA, cell phone.

Non-price information: Yes; news and analysis that affect mortgage pricing on an intra-day basis, archives of market commentary, economic events calendar with descriptions of economic events, charting of ARM indexes, economic measures, and money rates, and mortgage-focused weekly newsletter .

Distribution through third parties: Yes.

MCM CORPORATE WATCH DATABASE

Organization: Informa

Summary: MCM maintains a database of new securitized/structured finance issues, which is the product described here. The data are also used in a number of Informa information products, including a weekly newsletter on the structured finance market and real-time updates including new-issue pipelines, pricing and secondary market activity through Bloomberg, Reuters, Telerate and Informa website, www.informagm.com. The product described here is a new-issue ABS database. The information in the database is found also in its weekly Structured Finance Monitor.

Contact information: Ken Martin, ken.martin@informagm.com, 212.907.5882

Website: informagm.com

Type of information provider: Data-new issuance

Market sector: Non-agency CMO, ABS, CMBS, CDO

Service provided: New securitized issue database

Brief Description: Database of new ABS issues. Information includes rating, issue size, guidance on spreads based on what is being communicated in the market; information includes size and weighted average life (WAL), terms, lead underwriter, servicer benchmark used to price the deal. Indicative pricing also included.

Frequency of update: Real time

Methodology: Using issuance documents and relationships with market, information is collected on new issues and put in the database.

Number: Over 50,000 entries globally

Sources of information: Relationships and contacts with market participants; in particular, dealer community

Number of price contributors: Various sources, including the major investment banks, brokers and buy-side firms

Who has access to the data: Unlimited access on a subscription basis. Range of institutional buy-side and dealers subscribe.

Cost: Subscription

Historical prices/data: Yes, six years

Presentation of data: Web-based database

Non-price information: Deal size, rating, WAL, maturity, pricing guidance/indicative levels, prepayment speeds, collateral type

Distribution through third parties: Yes, Bloomberg, Reuters and in Informa newsletters such as Structured Finance Monitor.

MIAC — MORTGAGE INDUSTRY ADVISORY COMPANY (www.servicing.com)

Summary: MIAC - Mortgage Industry Advisory Company is the leading provider of mortgage pricing, hedging, accounting and risk management solutions to the mortgage industry. Since 1989, MIAC has been at the forefront in providing:

- * secondary pricing and risk management software and advisory solutions
- * MSR, whole loan, residual and illiquid mortgage pricing, hedging, and accounting software and advisory solutions
- * MSR and whole loan brokerage services
- * interest rate derivative pricing software and pricing services

MIAC Analytics(tm) is used to value over \$3 trillion in mortgage whole loans, MSR (mortgage servicing rights), residuals, and interest rate derivatives on a monthly basis by the majority of the largest mortgage companies in the industry.

Contact information: Paul Van Valkenburg, paul.vanvalkenburg@servicing.com, 212.233.1250 x228

Website: www.servicing.com

Type of information provider: Software models and data

Market sector: RMBS, CMBS-servicing, whole loans (new and seasoned), residuals, and their hedges.

Service provided:

Pricing

Provides independent third-party pricing for:

- * MSRs - Mortgage Servicing Rights — residential and commercial
- * Newly Originated Whole Loans — conventional, jumbo, hybrid, Alt-A, subprime, commercial, etc.
- * Seasoned Whole Loans — credit pricing models, prepayment models, etc.
- * Residual Interests — Alt-A, subprime and commercial
- * Illiquid CMOs/REMICs and IOetts
- * Trust IOs - daily pricing on Reuters
- * Interest Rate Derivative Instruments - swaps, swaptions, caps, floors, options, amortizing swaps, EuroDollar Strips, POs, InverseIOs, etc.

Licenses: MIAC Analytics(tm)-Industry-leading software for the pricing, hedging and accounting of mortgage servicing rights (MSRs), pipelines, seasoned whole loans, trust IOs, interest rate derivatives, etc. for complete and integrated mortgage banking risk management and accounting.

Brokerage: With large installed software and third-party valuation and risk management client base, MIAC is an industry-leading MSR, whole-loan and residual-interest broker.

Frequency of update: Daily and weekly pricing.

Methodology: Develops price discovery through its industry contacts and proprietary models, including:

- * Generic Servicing Assets - GSAs
- * Dynamic MIMs - mortgage industry medians
- * 3-factor HJM Libor market model
- * Proprietary residual model

Sources of information: Bloomberg, Reuters, The Bond Market Association, mortgage conduits, mortgage mega-servicers and Wall Street dealers

Number of price contributors: N/A

Who has access to the data: Market participants including: originators, securitizers, servicers, whole-loan investors and mortgage derivative investors.

Cost: License depends on service.

Historical prices/data: Yes

Number: Over \$3 trillion in MSR and \$125 billion whole loans priced monthly

Presentation of data: Windows-based product. All pricing assumptions — e.g., prepayments, delinquencies, foreclosures, vectored costs, escrow floats, etc. — can be copied and pasted into any spreadsheet for additional analysis.

Non-price information: see Methodology

MOODY'S INVESTORS SERVICE - PERFORMANCE DATA SERVICES (PDS)

Summary: Moody's Investors Service is among the world's most respected, widely utilized sources for credit ratings, research and risk analysis. In addition to our core ratings business, Moody's produces market-leading credit opinions, deal research, commentary, data and analytics, serving more than 9,000 customer accounts at some 2,400 institutions around the globe. Through Performance Data Services (PDS), a web-based application, clients can access the database used by Moody's analysts in monitoring deals' performance after issuance. PDS provides access to performance data on the pool of assets supporting each US ABS/RMBS/cash CDO (also has Australian RMBS) structured security.

Contact information: David Little, david.little@moodys.com, 212.553.1627; Berrak Dogruer, berrak.dogruer@moodys.com, 212.553.2859

Website: www.moodys.com/pds

Type of information provider: Rating Agency

Market sector: ABS, RMBS & CDO/CLO

Service provided: Performance Data Services provides access to Moody's structured finance database, containing rated deal performance data, through Moody's website. The users can monitor the deals they own or are interested in, assess deals either in the primary or secondary market or look for trends such as how an issuer or asset class is performing. The users have the flexibility to develop study specific securities and compare peer securities according to user-determined criteria for monitoring and benchmarking. PDS permits customized indices that enable the user not only to select issues to be included in the index but also how those issues will be weighted in the index. US ABS/RMBS/cash CDO (also has Australian RMBS) securities are currently covered.

Brief Description: PDS's search function enables user screen out particular assets by name, CUSIP, LoanX number, etc., and analyze the collateral performance. PDS includes more than 60 performance statistics fields, such as delinquencies, losses, credit support and excess spread. The user can define customized indices by any criteria and weighting or view Moody's indices and used for benchmarking reasons. The platform can be used to compare characteristics of deals and assess credit quality, performance measures and trends. Tabular and graphical analyses are possible. The user can set data alerts for key performance measures and rating alerts for more efficient monitoring. PDS for CDOs has two additional features: 1) CDO Lookthrough Report: for creating summary level report on one's CDO portfolio and 2) CDO Collateral Search: for searching for CDOs that have particular collateral.

Frequency of update: As trustee information becomes available daily, Moody's updates the data on an ongoing basis.

Methodology: Data is collected and scrubbed for accuracy and comparability. PDS is updated with new data.

Sources of information: Investor reports created by the trustee or servicers and Moody's internal databases.

Number of price contributors: N/A

Who has access to the data: Unlimited access on a subscription basis. Range of structured finance market participants, including investors, issuers and intermediaries, subscribe.

Cost: Based on an annual subscription for customized PDS package.

Number: N/A

Historical prices/data: Yes, since late 1980s.

Presentation of data: Data can be viewed by deal type, vintage, performance metric in graph or spreadsheet format. Indices can be viewed with the underlying deals making up the index. Data can be downloaded or shown on the website as tables or graphs.

Non-price information: See above

Distribution through third parties: No

MOODY'S CDO EDGE

Organization: Moody's Investors Service

Summary: Moody's is one of the leading rating agencies and, in addition to surveillance and monitoring securities after issuance, provides investor information and data products.

Contact information: Mark McKenna, mark.mckenna@moodys.com, 212.553.4829; David Little, david.little@moodys.com, 212-553-1627

Website: www.moodys.com

Type of information provider: Ratings, model and data

Market sector: CDO/CLO

Service provided: CDO Edge-allows monitoring of risk and return of cash CDOs using the same approach Moody's analysts use to rate and monitor the deals. The tool enables market participants to reassess the expected loss and the Moody's rating and to forecast cash flows to the tranches of the CDO. The service includes binomial rating methodology, a structuring tool and default and credit risk analysis. CDOEdge uses Moody's rating expertise, Moody's monitoring data and a deal library that includes over 650 structures.

Brief Description: CDOEdge combines Moody's ratings methodology and its CDO Monitoring Database to offer a solution to assess and monitor the value and risk of CDOs. CDOEdge is the tool that Moody's analysts use to rate cash CDOs. The product consists of: 1. a structuring tool, 2. the Moody's binomial model and 3. a library of nearly 700 deals. The structuring tool is a desktop application that allows user to capture all of the details of a cash CDO "waterfall." To date, Moody's analysts have coded the "waterfalls" of nearly 700 deals for initial rating, for monitoring and upon special request from Moody's clients. Once the structures are saved, they can be used with a cash-flow model to determine expected loss, NPV and IRR. Each month, Moody's contributes data on collateral assets from EMS (the Moody's monitoring service), rating analysis and cash-flow modeling from its library.

Frequency of update: As trustee information becomes available, Moody's updates the data within five days, re-rates the collateral pool and recalculates fields like the Moody's Adjusted OC and the Moody's WARE.

Methodology: CDOEdge combines Moody's credit risk and cash-flow modeling with data collected from trustee reports, Moody's Enhanced Monitoring Service database and third-party sources. The cash-flow models in CDOEdge are compliant with Moody's rating methodology for each deal type.

Sources of information: Trustee reports, ratings, Reuters and Enhanced Monitoring Database, Moody's Market Implied Ratings Database, Markit reference data.

Number of price contributors: N/A

Who has access to the data: Unlimited access on a subscription basis. Range of institutional buy-side participants, dealers subscribe.

Cost: Depends on the customer size and service level.

Historical prices/data: Enhanced Monitoring Service data to 2000.

Presentation of data: Price, cash flow, default and loss through a web-based model. EMS delivered by PDF, Excel, FTP.

Non-price information: Cash flow, simulated expected loss and default frequency, “waterfall” characteristics.

Distribution through third parties: No

MOODY’S INVESTORS SERVICE – MOODY’S MORTGAGE METRICS™

Summary: Moody’s Investors Service is among the world’s most respected, widely utilized sources for credit ratings, research and risk analysis. In addition to our core ratings business, Moody’s produces market-leading credit opinions, deal research, commentary, data and analytics, serving more than 9,000 customer accounts at some 2,400 institutions around the globe. Moody’s provides research, monitoring platforms, data and analytical tools for all structured finance market participants. Moody’s Mortgage Metrics is a powerful analytic tool to quickly and accurately assess the risks and credit enhancement levels of residential mortgage loan pools. Moody’s Mortgage Metrics - Prime Module and the recently launched Moody’s Mortgage Metrics - Subprime Module complement each other to cover the whole spectrum of residential mortgage-backed securities (“RMBS”), although the two models are distinct.

Contact information: Berrak Dogruer, Berrak.Dogruer@Moody.com, 212.553.2859; Jody Rasch, Jody.Rasch@Moody.com, 212.553.3797

Website: www.Moody.com

Type of information provider: Rating Agency

Market sector: RMBS

Service provided: The models provide valuable risk metrics at the loan level, including expected loss and Aaa enhancement levels on a loan-by-loan basis as well as full credit enhancement tranching on a pool level. More than simply ranking loans by risk, Moody’s Mortgage Metrics modules account for the complex interaction of economic stresses, market dynamics and loan performance by modeling links between local economic shifts, loan- and pool-level defaults, and loan loss severity. They give you the ability to model the full range of assets, including newly originated loans, first liens, FRMs, ARMs and Hybrids.

Brief Description: Models are based on advanced performance analytics and used by Moody’s analysts to evaluate risks of residential mortgage-backed pools.

Frequency of update: Updated quarterly with updated economic data and new functionality.

Methodology: Both modules simulate macro interest rate and state-level economic, unemployment and real estate market movements and incorporate a wide array of in-depth variables involving millions of calculations per loan pool. The models simulate the performance of each loan, by quarter for 10 years, through 1,250 state-specific economic scenarios. The models capture the distribution pattern of defaults over time and assess the continuing performance of “survivors” (loans not allocated as prepaid or defaulted). Risk movements across states are incorporated to better reflect the stability of geographic diversification. Rich experience of loss levels and volatility, versus a static, uniform “worst possible” scenario is used.

Number: N/A

Sources of information: The models are built on in-depth historic performance of about 2 million subprime loans and 500,000 prime loans spanning ten years.

Number of price contributors: N/A

Who has access to the data: Access is on a subscription basis.

Number: N/A

Cost: Annual license

Historical prices/data: Models built on quarterly data for ten years

Presentation of data: Desktop modules with Microsoft Excel output reports. Both models are downloadable from Moodys.com and feature error flagging, detailed chart outputs, and easy integration on desktops.

Non-price information: N/A

Distribution through third parties: No

MOODY'S INVESTORS SERVICE ABCP RESEARCH SERVICE

Summary: Moody's is a leading rating agency and provider of data and information for investors. The ABCP Program index provides data on single and multi-seller ABCP programs.

Contact information: Alan Siegler, alan.siegler@moodys.com, 212.553.3791

Website: moodys.com

Type of information provider: ABCP program data

Market sector: ABCP

Service provided: Along with its ABCP Market Multiseller Snapshot and Credit Arbitrage Snapshot publications, this spreadsheet database presents ABCP data to monitor the programs and their characteristics. In chart form, the product provides comparative statistics about each program and a macro-level view of credit arbitrage ABCP market. The data may be ranked by program name, asset type, administrator, partially and fully supported programs, rating and dealer.

Frequency of update: Monthly.

Methodology: The data generated off of trustee reports presented by number of securities and outstanding volume. Moody's worked with project sponsors to standardize the presentation and criteria. Moody's reviews the data to build the surveillance database.

Number: 340 programs

Sources of information: Project sponsor surveillance reports, conduit reports

Number of price contributors: N/A

Who has access to the data: Unlimited access on a subscription basis. Range of institutional buy-side participants subscribe.

Cost: Based on annual subscription

Historical prices/data: Yes

Presentation of data: Spreadsheet format through a query system

Non-price information: Descriptive information on the programs

Distribution through third parties: No

POLYPATHS

Summary: Polypaths provides third-party structured-finance modeling and analytical tools. Modeling to manage volatility-sensitive interest rate positions and pre-trade price analytics provided.

Contact information: Stanley Diller, sdiller@polypaths.com, 212-332-6298

Website: polypaths.com

Type of information provider: Model

Market sector: Mortgages-MBS/CMO; ABS product sectors analytics also provided

Service provided and brief description: The tools are intended to manage yield- and volatility-sensitive positions, including trading-quality models for MBS, option-embedded securities and securities with caps and collars. PolyCMO is a calculator for pre-trade analysis of a single CMO bond. It can also be used to value other mortgage securities. BatchCal is an overnight batch-processed calculation service. AppPort is a system for creating, updating and viewing portfolio cash flows. Products include pricing, transactions and hedge analysis in the Trading module, portfolio evaluation and cash flow analysis in the Post-trade portfolio analysis module. Risk management and scenario analysis provided.

Frequency of update: N/A

Methodology: Three-factor interest rate process model, including volatility-dependent current coupon model. Trades are entered through a browser, with information on trading positions saved and calculated. A risk-return profile is provided through its Pre-Trade analysis. The price/yield table analytics include yield spreads, cash flow, price spread under varying prepayment assumptions; hedge ratio and reference bond pricing; break-even prepay; and calculations including offering price, OAS, yield spreads. Risk measures include static, OAS and key rate duration calculations. Scenario analysis includes yield curve shifts and change in shape, coupon shifts, volatility measures.

Sources of information: Provides model calculations-securities data supplied by user.

Number of price contributors: N/A

Who has access to the data: Any market participant. Buy-side and sell-side investors.

Cost: Licensing agreement terms.

Historical prices/data: Yes, historical data retained in relationship data base; trading history retained in Enterprise solution.

Number: N/A-modeling product.

Presentation of data: Desktop, distributed processing and enterprise solutions: reports viewed over web browser via XML and CSV formats, descriptive and calculated data saved through a relationship database.

Non-price information: Price/yield tables, cap/swap analysis, delinquency/loss analysis. Cash flows-balances, defaults, changes in cash flows under varying scenarios, and price changes between dates and attribution of those changes.

Distributed by third parties: No

PRICING DIRECT

Organization: Bear Stearns Pricing Direct

Summary: Pricing Direct, an affiliate of Bear Stearns, is the only evaluated pricing service affiliated with a primary dealer. Prices determined through pricing models that are calibrated by Bear Stearns pricing evaluators who work with the trading desk.

Contact information: Unmesh Bhide, ubhide@bear.com, 212.272.8703

Website: pricing-direct.com

Type of information provider: Pricing

Market sector: MBS, ABS, CMBS, mortgage pass-throughs, agency and non-agency CMOs

Service provided: Portfolio pricing, master file pricing, intra-day pricing, contingency/back-up pricing, price validations

Frequency of update: Daily at 4 p.m. (to coincide with NYSE close) or intra-day, 3 p.m. (to coincide with futures market close)

Methodology: Cash-flow generation and option-adjusted spread (OAS) typically used. The pricing spreads are based on new-issue and secondary market transactions. The accuracy is monitored through comparison of transacted prices and analytical valuations. Prices monitored daily to see that they are not stale. Securities are re-priced when spread changes are observed.

Sources of information: Prices validated through the Bear Stearns Pricing Direct pricing desk and service provides access to Bear Stearns research, structuring and technology.

Number of price contributors: Bear Stearns

Who has access to the data: Any market participant — mutual funds, risk managers, fund administrators

Cost: On a per-security priced basis

Historical prices/data: Yes.

Number: 1,100,000 total securities

Presentation of data: FTP and web-delivered. Pricing Studio is an Internet-accessible pricing system to obtain evaluations directly from PricingDirect's database with a security look-up function. Data may be imported to spreadsheets.

Non-price information: N/A

REALPOINT

Entity: A Division of GMAC Institutional Advisers, LP

Summary: Realpoint provides a one-stop source of commercial real estate information, including CMBS research, CDO Analysis, Loan Surveillance, Property Market Analysis and Credit Risk Analytics for commercial real estate debt.

Contact information: Joe Petro, Joe_Petro@GMACCM.com, 1.800.299.1665, 215.328.3302

Website: www.realpoint.com

Type of information provider: Provides research, surveillance and analytical tools for commercial real estate investors

Market sector: CMBS, real estate CDO's, whole loans

Service provided: Realpoint provides research, analytical solutions and expert analysis of commercial real estate debt, property markets and real estate securities. They help institutional firms evaluate, quantify and monitor portfolio risk.

Brief Description: Realpoint for CMBS is a research and analytics service designed for portfolio managers, analysts and traders who participate in the commercial mortgage-backed securities (CMBS) market. Realpoint has assembled the industry's brightest team of real estate analysts to produce in-depth monthly research reports for over 600 CMBS transactions, providing clients with forward-looking analysis of real estate securities, properties, loans and markets. Realpoint's CMBS Workstation is a state-of-the-art surveillance tool for tracking portfolio, bond and collateral level performance. The workstation also provides access to market data, proprietary research and current market news.

Realpoint's CDO workstation helps investors monitor and analyze their CDO holdings. The CDO Workstation is offered to collateral managers for the purpose of reporting CDO performance and compliance information to their investor clients. The CDO service includes Realpoint's independent analysis on the performance of the CDO. The CDO Workstation can manage various types of collateral, including CMBS, REIT debt, ABS and all types of loan products.

Realpoint's Private Client Services group provides investors with in-depth, cutting-edge surveillance programs tailored to meet the specific demands of investors across the entire credit spectrum. Private Client Services provides investors with a complete solution for analysis of all types of CMBS and commercial loan portfolios.

Frequency of update: Realpoint provides monthly analysis of more than 600 CMBS transactions and CDO's.

Number: Over 600 CMBS deals

Who has access to the data: Range of institutional market participants subscribe to various services—banks, insurance companies, hedge funds, mutual funds, servicers, pension funds, investment advisers and asset managers.

Cost: Based on number of users and level of service

Presentation of data and Analysis: Analyst reports, web-based user interface; database services

Non-price information: CMBS and property market research reports, collateral data, news, rating changes

Distribution through third parties: No

REUTERS

Summary: Reuters is a global information company providing information tailored for professionals in the financial services, media and corporate markets. The information drives decision making by market participants. The core strengths lie in providing the content, analytics, trading and messaging capabilities needed by financial professionals. The open technology, based on industry standards, enables customers to search, store and integrate information with content from other sources, facilitating the way they work. Reuters provides financial institutions with specially designed tools to help them reduce risk and distribute and manage increasing volumes of market data. The electronic trading

services connect financial communities, helping them to gain access to prices and to trade efficiently and effectively.

Contact information: Send inquiry to www.reuters.com/salesenquiry and find out how to contact the local office at www.reuters.com/contacts.

Website: www.reuters.com

Type of information provider: Terms and conditions, collateral holdings, contributor and evaluated pricing, real-time news and analytical tools

Market sector: Mortgage pools, agency CMO, non-agency RMBS, ABS, CMBS, SBA, DUS, loans, CDS, CLO and CDO

Service provided: Reuters is a provider of global terms and conditions, electronic trading capabilities, benchmark content, analytics, broker and dealer prices, including unbiased pricing of 1.2 million MBS and structured products worldwide. Reuters Datascope offers a solution to meet fixed-income pricing and reference data needs, including premium evaluated pricing used to monitor portfolios, report values and calculate Net Asset Values. In addition, Reuters provides CDO, CMO and agency pass-through quotes/prices using vendor/platform data in Reuters Terminal.

Brief description: Price evaluations leverage the strength of bond terms and conditions, proprietary pricing models, real-time quotes from dealers, experienced evaluations staff, and quality assurance procedures.

Frequency of update: Real-time premium pricing as of 3 p.m. and 4 p.m. EST and end-of-day pricing as of 7 p.m. EST daily. Full valuation content, which includes end-of-day pricing and analytics is available approximately 9 p.m. EST.

Methodology: The majority of Reuters' evaluations staff have over 20 years experience as traders and brokers. This experience provides access to a major network of market makers providing information on spreads, credit rating changes, market activity and trends. The evaluations desk uses industry and proprietary bond models that incorporate both nominal spread and OAS (Option Adjusted Spread). Evaluators price on an issuer or individual bond basis and verify accuracy by obtaining actual dealer/broker quotes. Loans, CDS, and CDO composite prices aggregated from dealer quotes are also available. Reuters Support Center can be reached by <https://customers.reuters.com/Default.aspx> or dialing 1.800.REUTERS. Methodology documents are available at <http://about.reuters.com/productinfo/datascope/>.

Number priced: As of March 2006, Reuters offers 90,000 mortgage pools; 78,500 agency CMO tranches; 27,300 non-agency RMBS; 20,700 ABS; 8,400 CMBS, 5,000 loans.

Sources of information: Dealer and platform quotes from dealers, agency feeds for MBS, proprietary analytical and third-party data and models, market participant research, dealer and issuer contributed cash flows, Reuters own collection for terms and conditions. Reuters Loan Pricing Corporation provides terms and conditions and valuations for loans and CDOs.

Number of price contributors: Numerous dealers

Who has access to the data: Range of institutional market participants (banks, brokers, mutual funds, insurance companies, hedge funds, retail brokers) and sell-side. Used across front office, middle office and back office.

Cost: Enterprise subscription license is based on institution size, level of service or content usage and number of users. Desktop and terminal users are subject to terminal fees.

Historical prices/data: Yes

Presentation of data: Over Reuters Datascope or Reuters 3000 Xtra terminal. Also ftp and Reuters LPC desktop applications for loan data.

Non-price information: Yes, Reuters content and analytics include terms and conditions, proprietary cash flows, contributed cash flows, corporate actions, as well as analytics including spreads over the benchmark sovereign, swap curves, credit ratings and analytics (yields, convexity and duration)

Number of terms and conditions data: As of March 2006, Reuters offers 90,000 mortgage pools; 87,800 Agency CMO tranches; 42,300 non-agency RMBS; 26,500 ABS; 10,000 CMBS tranches, 150,000 loans, 450 CDOs.

Distribution through third parties: Yes. Reuters has created partnerships to sell content and prices to third parties.

SECTOR

Organization: SIAC

Summary: Sector generally provides communications and outsourcing solutions to technology needs. The mortgage market is one application-directly to end users or market participants or through other mortgage market data providers. Considered the predominant source of monthly prepayment factors and indicative MBS information. Viewed as a utility rather than a vendor.

Contact information: Adlai Corrasco, acorrasco@sectorinc.com, 212.383.2200

Website: sectormbs.com, sectorinc.com

Type of information provider: Collateral and prepayment data

Market sector: Agency MBS

Service provided: Bulk data feeds of monthly pay-down factors of MBS issued by the federal agencies, and prepayment speeds that mortgagors pay off ahead of schedules. Mortgage-on-Demand is an analytical tool that provides prepayments on mortgage pools.

Brief Description: Mortgage Information Service bulk data feeds include monthly factors update, WAC/WAM updates, new issues, geographic information and prepayment speeds. The Mortgage-on-Demand product permits pool-by-pool level prepayment speeds. Clients have the ability to view prepayment distribution and general descriptive data with the ability to upload specific pools for analysis.

Frequency of update: Monthly, as data are made available by the agencies, on a same-day basis.

Methodology: Mortgage-on-Demand provides MBS data combined with analytics (from CPR & CDR). Agency pools by origination year, geography, fixed rate/ARM, issuer.

Sources of information: Multiple data sources

Number of price contributors: N/A

Who has access to the data: Any market participant. Range of institutional market participants subscribe. It is an outsourced data function for traders and research departments.

Cost: License subscription depends on level of service, institution's size and number of users.

Historical prices/data: Yes, since 1994

Presentation of data: Through web-based desktop application generating customized and standard reports. Standard reports include agency reports for each product (e.g., 30yr, 15yr, 7yr balloon) by origination year and coupon with 12-month history.

Non-price information: Mortgage-on-Demand: WAC, WAM, WALA, loan balance, coupon, CPR, stratified by loan size, geography, issuer and historic speeds. Bulk data feed for loans and MBS: pool number, CUSIP, original and current balance, factor, coupon and pass-through rate, original and current WAC and WAM, issue and maturity date, servicer name, fixed-rate quartiles, WALA. Supplemental data include credit score, LTV, loan count, refinancing and purchase data, distinguishing between single-family and 2-4 units.

Distribution through third parties: Sector will distribute the agency prepayment speeds through its Data Distribution Service. Sector has alliances with 20 organizations to be the distribution vehicle of corporate and GSE securities as well as ratings, dividends and corporate actions. Source of agency mortgage data for Bloomberg, FT Interactive Data, Reuters.

SECTOR MBS PLUS

Organization: SIAC

Summary: Joint project of Sector and Andrew Kalotay and Associates. Sector generally provides communications and outsourcing solutions to technology needs. The mortgage market is one application—directly to end users or market participants or through other mortgage market data providers. Considered a predominant source of monthly prepayment factors and indicative MBS information. Viewed as a utility rather than a vendor. Andrew Kalotay and Associates provides analytics for the fixed-income markets.

Contact information: Adlai Corrasco, acorrasco@sectorinc.com, 212.383.2200; Andrew Kalotay, 212.482.0900, andy@kalotay.com

Website: sectormbs.com, sectorinc.com

Type of information provider: Pricing

Market sector: Agency MBS

Service provided: Agency mortgage pool pricing source for primary, secondary market. Provides agency mortgage pool pricing, analytics and risk measures; connectivity through a simple download.

Brief Description: Normalizes MBS terms and conditions from Fannie Mae, Freddie Mac and Ginnie Mae, calculates pricing analytics and risk measures and delivered in one file. Focused on fixed-coupon mortgage pools.

Frequency of update: Monthly, as data is made available by the agencies, on a same-day basis.

Methodology: Extracts fields from Sector MBS Data Product — raw MBS Pool data files from Fannie Mae, Freddie Mac and Ginnie Mae in their original file formats. Values each mortgage pool and calculates analytics and risk measures.

Sources of information: Sector mortgage data through Fannie Mae, Freddie Mac and Ginnie Mae GSE data; and Kalotay analytics.

Number of price contributors: N/A; over 1 million mortgage pools

Who has access to the data: Any market participant. Range of institutional market participants subscribe.

Cost: License subscription depends on number of users.

Historical prices/data: Yes

Presentation of data: Excel and other databases. Month-end file in ASCII text format. Available through any of Sector's current data delivery mechanisms.

Non-price information: Security Identification: Issuer; Pool Type; Pool Number; CUSIP

Terms and Conditions: Original Amount, WAC, WAM; Coupon; Factor. Collateral - Amount, WAC, WALA, WAM, WAL

Calculates: Yield (fair value); expected life; CPR - constant prepayment speed; actual CPR; price (fair value); effective duration and convexity; modified duration and convexity.

Distribution through third parties: Same distribution as other Sector products.

SECURITIES QUOTE EXCHANGE (SQX)

Summary: SQX provides a cost savings service for obtaining end-of-day pricing for difficult-to-price securities obtained from broker/dealers. The system streamlines the delivery of hard-to price security quotes and automates the sending and receiving of this data. Pricing files can be downloaded into FTP or Excel spreadsheets. SQX offers a secure web-based environment. The service also provides access to our historical pricing database for audit purposes. The SQX system eliminates miscommunication and transcription errors, speeds up the collection of end-of-day quotes and creates an audit trail.

Contact information: James K. Blinn, jimbl@sqx.com, 630.778.2333

Website: www.sqx.com

Type of information provider: Pricing

Market sector: All securitized/structured-finance markets

Service provided: Investors are provided end-of-day price quotes from designated broker-dealers and is used for NAV reconciliation.

Frequency of update: Daily, weekly and monthly

Methodology: The pricing analyst is provided a user name and password to log on to SQX. The pricing analyst will upload their requests for quotes into the SQX system. This would include additions and deletions for the day. The user can request other (see below) attributes or non-price information of the security. At the end of the day, the user client can then download the prices, which can be linked directly into their accounting system.

Sources of information: Dealers and pricing vendors supply these prices.

Number of price contributors: 140 dealers

Who has access to the data: Any buy-side SQX client and their custodian. Buy-side managers, principally back-office pricing analysts that require prices from dealers to value securities, portfolios and mutual funds.

Cost: Fees are charged by the quote, depending on the frequency and quantity.

Historical prices/data: Yes. We provide the original pricing file, including the SQX price.

Number: 6,000

Presentation of data: Web-based product/FTP and Excel-downloadable spreadsheet that can be loaded directly to accounting systems.

Non price information: Duration, yield, average life, speed, currency code and benchmark

Distributed by third parties: Custodian banks

STANDARD & POOR'S RESIDENTIAL PRODUCTS (LEVELS, DACSS, SPIRE)

Summary: Standard and Poor's is a leading credit rating agency and provider of information and data to investors, offering residential mortgage market products intended to provide information to the investor community, in addition to its ongoing rating, surveillance and monitoring services.

Contact information: Henry Carrier, Henry_Carrier@standardandpoors.com, 212.438.6635

Website: www.standardandpoors.com

Type of information provider: Securities and collateral data

Market sector: Non-agency MBS, both new and seasoned loans

Brief Description:

Standard & Poor's LEVELS® (Loan Evaluation, & Estimate of Loss System) is a dynamic risk analytics system that encompasses residential mortgage loan characteristics, regional economic data and borrower data. The model analyzes a loan, or pool of loans, and then determines foreclosure frequency, loss severity and required credit enhancement pursuant to Standard & Poor's ratings criteria.

DACSS (Documentation & Collateral Scoring System) evaluates the credit risk of reduced income documentation and/or collateral appraisal for non-conforming residential mortgage loans, and then assigns alternative income and collateral requirements in accordance with Standard & Poor's ratings criteria without assigning a corresponding increase to foreclosure frequency or loss severity expectations.

SPIRE™ (S&P Interest Rate Evaluation) is the same cash-flow model used by S&P RMBS analysts. The model allows the user to evaluate potential securitization structures with Standard & Poor's ratings criteria, as well as analyze alternative scenarios using subjective assumptions. Seamlessly integrated with Standard & Poor's LEVELS, the model analyzes the effects of variable interest rates on both assets and liabilities associated with RMBS securitization. Using Standard & Poor's collateral and cash-flow modeling criteria, the model can ascertain whether the available funds derived each month from a loan or pool of loans are sufficient to satisfy a capital structure's bond liabilities.

Frequency of update: Standard & Poor's models are updated several times a year, based on ratings criteria changes.

Sources of information: Each model has a file format with required data points. For example, LEVELS requires a FICO score or letter-grade ranking, and uses loan-level characteristics, regional economic and borrower data in its analysis.

Number of price contributors: N/A

Who has access to the data: Unlimited; originators, purchasers and investors of securitized loan pools

Cost: License subscription depends on level of service.

Historical prices/data: Yes

Non-price information: See above

Distribution through third parties: On a select basis

STANDARD & POOR'S HIGH CLTV QUALITY PERFORMANCE MATRIX

Summary: Standard and Poor's is a leading credit rating agency and provider of information and data to investors, offering residential mortgage market products intended to provide information to the investor community, in addition to its ongoing rating, surveillance and monitoring services. Residential mortgage performance index (Residential Mortgage High Combined Loan to Value - CLTV - Matrix) enables market participants to compare a security against peers based on transaction performance, including prepayment, delinquency and default characteristics and trends.

Contact information: Ernestine Warner, Ernestine_warner@standardandpoors.com, 212.438.2633

Website: standardandpoors.com

Type of information provider: Data-index

Market sector: Non-agency MBS-both new and seasoned loans

Service provided: The High CLTV matrix provides aggregate averages for similar vintage high loan to value non-agency mortgage securitization transactions.

Brief Description: High CLTV matrix statistics include, by vintage issue date groups: loan size and debt ratio/LTV characteristics; cumulative charge-offs; weighted average prepayment speed; delinquency groupings from 30 to 59 days to more than 90 days; excess spreads. Cumulative performance, benchmark delinquency performance and characteristic tables provided. New issues and retired issues are indicated.

Frequency of update: Quarterly

Methodology: The High CLTV matrix includes S&P-rated securitizations since 1997, which are placed into issue groups based on the six-month issue period (first half or second half of the year) with similar underwriting characteristics. Within those vintage issue groups, credit quality and prepayment aggregate statistics are generated.

Sources of information: High CLTV matrix uses trustee data and internal S&P proprietary data.

Number: 85 transactions

Number of price contributors: N/A

Who has access to the data: Unlimited; originators, purchasers and investors of securitized loan pools

Cost: High CLTV matrix is part of the Ratings Direct subscription.

Historical prices/data: Yes. High CLTV matrix includes data on securitizations from 1997.

Presentation of data: High CLTV matrix data is provided in tables by vintage issue data.

Non-price information: See above.

Distribution through third parties: On a select basis.

STANDARD & POOR'S CDO PRODUCTS (CDO INTERFACE, CDS ACCELERATOR, CDS XPRESS, CDO EVALUATOR)

Summary: Standard and Poor's is a leading provider of investment ratings and investor data and information. It offers several products targeted to the CDO sector, developed to provide information

to the investor community in addition to its ongoing rating, surveillance and monitoring services, including report of CDO asset managers.

Contact information: Arthur Carmichael, Arthur_Carmichael@standardandpoors.com, 212.438.6529; Henry Carrier, henry_carrier@standardandpoors.com, 212.438.6635

Website: standardandpoors.com

Type of information provider: Model and securities and collateral data

Market sector: CDO/CLO

Service provided: CDO/CLO performance index. CDS Accelerator (CDSa) enables analysis of synthetic CDO obligations to determine indicative structures, assess risk profiles, create reports and present performance. CDS Xpress is a data feed of entities traded in the CDS market. CDO Evaluator is a set of tools to evaluate a CDO transaction.

Brief Description: The S&P CDO indices are designed to assist market participants to compare performance with peers, and calculates two indices, arbitrage CBO performance and arbitrage CLO. Each index comprises a fixed pool of Standard & Poor's-rated CDO transactions that closed 1997 through 2001. CDO Interface provides one-stop access to CDO criteria, methodology and indexes and deal-specific data and ratings, and CDO Evaluator. The CDSa is the customized version of the CDO Evaluator for synthetic transactions, allowing the development of indicative CDO synthetic structures. Although CDS Xpress is a database of common reference indexes, is not necessary to run it with CDOa, though using the two together is more efficient. Using CDSa and CDS Xpress together enables linkage to S&P's CDO analytics, criteria and ratings data. Users are able to model deals and monitor performance using data feeds, classification and asset identifiers used by S&P analysts to rate deals. CDSa and CDS Xpress provides for calculation of benchmarks and recovery rates, cresting portfolios that include both corporate and non-corporate assets, using indicator parameters of specific names and indices. CDO Evaluator provides asset-specific default and recovery rates and may be used for cash-flow, synthetic, hybrid and CDO "squared and cubed" transactions.

Frequency of update: Indices updated monthly.

Methodology: Indices from data collected from trustee reports and internal data. The indices reflect a number of risk parameters, including purchases, sales, collateral security defaults, overcollateralization. The CBO performance index aggregates historical performance statistics across rated CBO transactions (primary high-yield corporate bond collateral) and CLO (leveraged loan collateral). Examples of areas covered include average principle balance of CDS, average monthly default percentage, purchase and sales percentage, average price and par loss of credit risk sales, discretionary sales percentage, and senior and subordinate collateralization spread.

CDOa provides for the same methods used by S&P analysts to facilitate comparisons between transactions including measures such as Synthetic Rated Over-collateralization (sensitivity to a rating change), Scenario Loss Rate, Default Measure, Variability Measure (standard deviation) and Correlation Measure.

Once a portfolio is created, CDS Xpress populates CDSa with information fields to run the CDSa program.

CDO Evaluator uses Monte Carlo simulation to model defaults with correlation to estimate default rates. Correlation assumptions assigned within and across industry and regional classifications, which is used for correlations between each pair of assets.

Number: CDS Xpress provides 2,400 reference indices. S&P rates 3,900 CDOs.

Sources of information: Trustee reports, public and proprietary data and analysts. CDS Express uses Mark-it's CLIPS from Markit's RED identifier data base as well as CUSIP.

Number of price contributors: N/A

Who has access to the data: Range of institutional market participants (organizational entities, not individuals) subscribe.

Cost: CDO Interface, including CDO Evaluator, is free with registration, although there is a charge for the deal library. CDS Accelerator and CDS Xpress price depends on number of users, locations and frequency of use.

Historical prices/data: Deals beginning in 1997

Presentation of data: Web-enabled database that generates a series of reports as described above. Portfolio summaries break down portfolio assets by industry and ABS sector, maturity and region by rating. CDS Xpress includes country codes, ratings. CDS Xpress and CDOa permit creation of portfolios using identifiers (e.g., CUSIP) representing CDS names.

Non-price information: Performance of CDO transactions and underlying assets

Distribution through third parties: No

STANDARD & POOR'S CREDIT CARD INDEX

Summary: Standard and Poor's is a leading rating agency and provider of information and data to investors, offering products to the structured finance marketplace intended to provide information to the investor community in addition to its ongoing rating, surveillance and monitoring services. Standard & Poor's Ratings Services' Bank Card Credit Card Quality Index (CCQI) monitors the performance of nearly \$400 billion in receivables held in trusts of rated credit-card-backed securities, which make up nearly two-thirds of the total U.S. bankcard market.

Contact information: Patrick Coyne, Patrick_Coyne@standardandpoors.com, 212.438.2435

Website: standardandpoors.com

Type of information provider: Data

Market sector: Credit card ABS

Service provided: The CCQI is a monthly performance index that aggregates performance information across Standard & Poor's rated bankcard transactions in the following key risk areas: principal receivables outstanding, yield, payment rate, charge-off rate, delinquencies, base rate, and excess spread rate.

Brief Description: The following data points are covered: principal receivables outstanding — aggregate outstanding eligible principal receivables of credit card accounts backing each master trust at the end of the collection period; yield — the weighted average total trust income for the collection period, as a percentage of eligible principal receivables (annualized); total payment rate — the weighted average total monthly collections (obligor principal and finance charge payments), as a percentage of total outstandings; charge-off rate — the weighted average losses on principal receivables for the collection period, as a percentage of eligible principal receivables (annualized); delinquencies — the weighted average past-due amount for the collection period, as a percentage of the current month's eligible principal receivables; base rate — the weighted average cost of funding (sum of the certificate rate on a securitization and the corresponding transaction servicing fee) for the collection period; and excess

spread rate-the weighted average surplus of cash inflow (yield minus charge-offs minus base rate) for the collection period. Credit card trust rating actions indicated.

Frequency of update: Indices updated monthly as data becomes available.

Methodology: Indices from trustee report data. The indices reflect a number of risk parameters as identified above. Top 3 trusts make up nearly half of the index and top 10 comprise 87%.

Sources of information: Trustee reports and S&P internal data

Number: 29 trusts

Number of price contributors: N/A

Who has access to the data: Unlimited; originators, purchasers and investors of securitized loan pools.

Cost: Free (website, distribution list, Ratings Direct subscribers)

Historical prices/data: Yes, from 2000

Presentation of data: Monthly report, both tables and graphical

Non-price information: Data, as described above

Distribution through third parties: No

STANDARD & POOR'S US\$ ABCP MARKET STATISTICS⁴

Summary: Standard and Poor's is a leading rating agency and provider of information and data to investors, offering products to the structured finance marketplace intended to provide information to the investor community in addition to its ongoing rating, surveillance and monitoring services. Standard & Poor's Ratings Services' US\$ ABCP Market Statistics ("Market Statistics") summarizes key product statistics, including issuance and outstanding volume growth and collateral-type trends in the U.S.- dollar-denominated ABCP market globally and lists rating actions and assignments as well as leading administrators and liquidity providers during the previous quarter.

Contact information: Aaron Jones, Aaron_Jones@standardandpoors.com, 212.438.1113

Website: standardandpoors.com

Type of information provider: Data

Market sector: U.S.-Dollar-Denominated ABCP

Service and Brief Description: Market Statistics is a quarterly publication that aggregates performance information across Standard & Poor's ABCP program, which issue predominantly U.S. dollar ABCP. The data provided include: market growth, outstanding, entering and exiting programs, number of programs segmented by issuance range, utilization rate, all programs with over \$1 billion outstanding and the top programs segmented by type (multi-seller, arbitrage, single-seller and loan-backed). The report also provides an overview of trends within underlying collateral as well as program administrators and liquidity providers and all rating actions.

Frequency of update: Updated quarterly

⁴ In addition to the S&P information sources profiled, S&P publishes a structured-finance surveillance report, "Structured Finance Global Ratings Roundup Quarterly," which summarizes rating trends, performance and related data in each of the structured and securitized product sectors. Similarly "NIMS Quarterly Highlights" analyzes Net Interest Margin Securities ratings and performance trends and "CMBS Quarterly Insights" analyzes the CMBS product sector during the previous quarter. All are available through Ratings Direct.

Methodology: Data from trustee reports, conduit administrators, and internal sources and surveillance. S&P standardizes data representation so that conduit data can be compared easily. The report is generated from S&P's ABCP Explorer, an internal tool web-based tool for the research and analysis of ABCP conduit programs.

Sources of information: Trustee reports and S&P internal data

Number: 186

Number of price contributors: N/A

Who has access to the data: Unlimited; originators, purchasers and investors in ABCP

Cost: Free (website, distribution list, Ratings Direct subscribers)

Historical prices/data: Yes, from 1992

Presentation of data: Quarterly tables and graphical

Non-price information: Data as described above

STANDARD & POOR'S SECURITIES EVALUATIONS

Summary: Independent evaluations provided for securitized and structured products. Standard & Poor's Securities Evaluations, Inc., a wholly owned subsidiary of The McGraw-Hill Companies, provides independent fixed-income evaluations and equity pricing services for more than four million global securities.

Contact information: J.R. Rieger, james_rieger@sandp.com, 212.438.5261

Website: standardandpoors.com/pricing

Type of information provider: Securities pricing

Market sector: CMO, RMBS pass-through, ABS, CMBS

Service provided: Provides independent price evaluations and price opinions used by clients to monitor portfolios, report values and analyze holdings.

Brief Description: The evaluations and opinions are representations of opinions on the price level. The price opinions are "bid side" (sell-side and medium available as well) based on a round lot position traded at the end of the day.

Frequency of update: End of day as of 4 p.m. (daily). Delivered any time in the day.

Methodology: The prices are evaluated based on established policy and quality-control procedures for each product sector. Price evaluations are compared to bond prices and market conditions.

Number: Total of 1.5 million-985,000 RMBS pools, 95,500 CMO/CMBS

Sources of information: Dealer quotes, internal and third-party data and models, market participant research. Other vendor (Sector mortgage factors, for example) included.

Number of price contributors: Numerous dealers

Who has access to the data: Range of institutional market participants (banks, brokers, mutual funds, insurance companies). Used across front-office, middle-office and back-office.

Cost: Based on number of securities, complexity of security and frequency

Historical prices/data: Yes

Presentation of data: Fixed and delimited formats containing pricing data elements; leased lines and dial-up.

Non-price information: Yes, content and analytics include terms and conditions, corporate actions. Distribution through third parties: Incorporated into business partner/vendor products.

THE BOND MARKET ASSOCIATION'S CDO LIBRARY

Summary: The Bond Market Association is the trade association that represents dealers and asset managers that underwrite, trade and invest in fixed-income securities. It maintains an independent CDO library of deals and, in addition, has developed a standard format for CDO trustee reports.

Contact information: Chris Killian, ckillian@bondmarkets.com, 646.637.9200

Website: cdolibrary.com

Type of information provider: Data

Market sector: CDO/CLO

Service provided: The CDO Library was created by The Bond Market Association's CDO Committee as part of its effort to improve the transparency of the CDO market. It is an online repository containing a compilation of CDO deal documents that were previously unavailable to anyone outside a particular deal.

Brief description: For each deal posted, the CDO Library contains the indenture, the offering memorandum, the interest rate swap agreement or hedge agreement (if applicable), monthly trustee reports and any amending documents.

Frequency of update: Continuous

Methodology: Posting dealers post documents from CDO deals in which they are lead underwriter. The library contains the offering memorandum, indenture, applicable interest rate swap agreements, any supplemental or amended documents, and monthly trustee reports for each posted deal.

Number: 260+ deals, provided by 13 underwriters

Sources of information: Posting dealers

Number of contributors: 13

Who has access to the data: Access to the library is granted on a firm-by-firm basis. There are three categories of access: subscriber, non-posting dealers and posting dealers. Posting dealers are registered U.S. broker/dealers, and able to refer subscribers and post new deals to the Library. Non-posting dealers are also registered U.S. broker/dealers and allowed to refer subscribers, but they may not post new deals. Any other entity that is a Qualified Institutional Buyer pursuant to Rule 144A under the Securities Act of 1933 may access the library as a Subscriber. Subscribers must be able to prove that they are QIBs, and must be referred by a dealer who has gained access to the site.

Cost: Free

Historical prices/data: Yes, from 1999.

Presentation of data: Password protected, web delivered

Non-price information: Deal documents

Distribution through third parties: No

THE BOND MARKET ASSOCIATION'S PREPAYMENT PROJECTION SURVEY

Summary: The Bond Market Association is the trade association that represents dealers and asset managers that underwrite, trade and invest in fixed-income securities. It conducts a semi-monthly survey of dealers about long-term mortgage prepayment projections.

Contact information: Chris Killian, ckillian@bondmarkets.com, 646.637.9200

Website: bondmarkets.com

Type of information provider: Mortgage prepayment data

Market sector: Agency MBS

Service provided: The dealer prepayment survey is conducted twice a month.

Brief Description: TBMA surveys participating dealers twice a month. The service provides median and average prepayment speeds, where each dealer submits projections based off of the same yield curve. The premium service provides prepayment speeds submitted by each dealer, as well as high and low responses for the "base case" scenario.

Frequency of update: Twice a month

Methodology: Through its Agency MBS Research, Strategy and Analysis Committee, TBMA updates a set of cohorts quarterly across vintage, coupon and agency sectors. Dealers are asked to project prepayment speeds based on the current yield curve for the cohorts on a PSA and CPR basis for the base case and +/- 50, 100, 200 and 300 basis points. TBMA calculates and reports medians and averages. "CPR" refers to the annualized prepayment rate defined in the equation and is based on the SMM. The SMM (Single Monthly Mortality) rate of a mortgage pool is the percentage of the mortgage loans outstanding at the beginning of a month assumed to terminate during the month. The PSA specifies a prepayment percentage for each month in the life of the underlying mortgages, expressed on an annualized basis. Thus, 100% PSA (Prepayment Speed Assumptions) assumes prepayment rates of 0.2% CPR in the first month following origination of the mortgage loans (not the pool) and an additional 0.2% CPR in each succeeding month until the 30th month. In the 30th month and beyond, 100% PSA assumes a fixed annual prepayment rate of 6.0% CPR. To calculate the prepayment rate for any specific multiple of PSA, adjust the annual prepayment rate at 100% PSA by that multiple.

Number: Approximately 100 cohorts

Sources of information: Dealer responses to the survey

Number of contributors: 12

Who has access to the data: Unlimited access on a subscription basis

Cost: Free on the website and on a subscription basis to text file recipients.

Historical prices/data: Yes, from 1998

Presentation of data: Available on the bondmarkets.com website and sent to subscribers as a text file. Website shows participating dealers and median and average CPR/PSA speeds by cohorts for the base case and + and - 300 basis points. The subscription project shows the base case for each dealer and the high and low for each cohort.

Non-price information: Prepayment median and average forecasts by cohort, and dealers participating in the survey as described above.

Distribution through third parties: Yes, vendors may subscribe and do — including, for example, MIAC, FT Interactive Data and Reuters Pricing.

TREPP, LLC

Summary: Trepp, through its suite of products, is the leading CMBS market specialist, providing data, models and pricing information.

Contact information: Andy Leibman, aleibman@trepp.com, 212.329.6132; and Tom Fink, tfink@trepp.com, 212.329.6110

Website: www.trepp.com

Type of information provider: Collateral data, cash-flow models, pricing

Market sector: CMBS

Service provided: The Trepp suite is a series of screen-based products, including Trepp Watch (a surveillance tool at deal, bond, loan and property levels), Analytics (a trading-quality set of CMBS market analytics), Loan (for real estate market research), Structuring (to reverse-engineer a deal), Data Feed (for database creation and research), Engine (for integration into proprietary trading and risk management systems) and Pricing. The TREPP tools are used for surveillance, risk management, credit analysis, pricing and to develop default and prepayment models. TREPP models are used to generate CMBS cash flows.

Brief Description: Trepp Watch provides detailed information on CMBS deals and the underlying collateral. It includes Deal Snapshot, Bond Finder, servicer files and remittance reports, loan and property level detail, watch-list summary, disposed loan information, delinquency and prepayment histories, and a portfolio reporting capability. Analytics provides the ability to measure the impact of collateral performance on the payments and value of CMBS bonds. Trepp Structuring is designed to handle a wide range of deals for verifying and analyzing cash flows, calculating bond profitability, and performing bond and collateral analysis. Pricing based on Trepp's library of deals, and prices investment grades, IO and floaters. The Pricing Service provides daily prices for actively traded investment-grade CMBS, subordinate/sub-investment grade tranches available on a less frequent basis, and prices entire institutional portfolios.

Frequency of update: Monthly, following the trustee reports, for deal, bond and collateral data; end of day for investment-grade prices and end of month for institutional portfolio pricing.

Methodology: All of the products are driven by the Trepp analytical and modeling engine using a common data feed and software infrastructure. Trepp uses internal systems to generate the subroutine libraries to generate cash flows, analytics and report output. Most of the data come from the Trepp CMBS Deal library, updated daily. The library takes into account property type diversity, financial performance of the collateral, tenant exposure, delinquency, appraisals and loan modifications. The pricing begins with generic spreads, bid lists and bond marks, then incorporates rating actions and credit actions, identifies deal types and collateral performance and tiers by credit performance for investment grade. For non-investment grade, procedure is different because of the difficulty of getting accurate prices or marks. Uses input from buyers of sub-investment-grade CMBS, first loss and second loss bonds grouped, and if a group does not fit in either category, then groups each of the categories between performing and non-performing.

Sources of information: Multiple data sources — trustee reports, dealers, rating agencies as examples, CUSIP-level history.

Number of price contributors: N/A

Who has access to the data: Any market participant. Dealers, investors, issuers, servicers and rating agencies for trading, risk management and surveillance. Sells data to the sell-side, the product to the

buy-side. Traders use Trepp products to develop prices. Trepp Loan is used by originators/issuers and mortgage brokers as well as investors.

Cost: License subscription depends on level of service, institution's size and number of users.

Historical prices/data: Yes, 10 years

Number: 900 deals and 90,000 loans

Presentation of data: Through web-based desktop application or through FTP.

Non-price information: Loan-level collateral data, CMBS performance metrics, surveillance reports and prospectus, servicer/trustee contacts.

Distribution through third parties: Various data vendors and third-party models incorporate data in their products, such as Trepp CMBS Analytics on Bloomberg, Yield Book and BlackRock Solutions.

WALL STREET ANALYTICS — CDONET FOR INVESTORS, TRUSTEES, ASSET MANAGERS, STRUCTURES AND CDOCALC

Summary: Wall Street Analytics is a third-party independent structured finance-modeling provider for CDO and ABS products for new deals and monitoring. CDOnet is the CDO product.

Contact information: Tom Geraghty, tom@wsainc.com, 212-575-1249

Website: wsainc.com

Type of information provider: Collateral data, models, pricing

Market sector: CDO

Service provided: CDOnet and CDOcalc link to the Wall Street Analytics CDO database, from which investors can use the Wall Street Analytics model to generate cash flows on a single deal or portfolio. Generates cash-flow projections and optimal structures.

Brief Description: CDOnet covers the wide spectrum of asset types in CDOs-high yield and investment grade, emerging market, loans, ABS and CDO squared. CDOnet is used by inventors primarily for cash-flow analytics and pricing. Asset Managers utilize the model to run compliance tests and review hypothetical trades. The Structuring module permits rearranging the cash flows to arrive at the optimal structure. The Trustee module is an independent platform for compliance calculation and investor reporting. CDOcalc provides analytics and supports CDOnet at the single tranche or portfolio level. CDOnet also includes reporting and tracking modules.

Frequency of update: Monthly for CDO Library data; end of day for interest rates and asset prices and terms.

Methodology: Users perform cash-flow analysis subjecting CDO models to interest-rate and default variations under deterministic or Monte Carlo simulations. The model generates asset- and tranche-level cash-flow analytics such as current and historical returns, first loss, break-even analysis, equity IRR calculation and rating agency type analysis. It also generates collateral analytics including cross-deal exposures, compliance testing, and reinvestment and collateral assumptions.

Sources of information: Multiple data sources — trustee reports, Markit pricing, Loan Pricing Corporation, CUSIP level history as examples, CDO deal library.

Number of price contributors: N/A

Who has access to the data: Any market participant. Dealers, investors, issuers, servicers, and rating agencies for trading, risk management and surveillance.

Cost: License subscription depends on level of service, institution's size and number of users.

Historical prices/data: Yes

Number: 750 deal models

Presentation of data: Through web-based or desktop application.

Non-price information: Default, user default, asset rating default recovery rate assumption.

WALL STREET ANALYTICS — STRUCTURED FINANCE WORKSTATION FOR ISSUERS, UNDERWRITERS AND INVESTORS

Summary: Wall Street Analytics is a third-party independent structured finance-modeling concern involved in the ABS, MBS and CMBS transactions. Wall Street Analytics products are used for the analysis, structuring and management of structured and securitized credit instruments.

Contact information: Tom Geraghty, tom@wsainc.com, 212.575.1249

Website: wsainc.com

Type of information provider: models, pricing

Market sector: MBS, ABS, CMBS

Service provided: Structured Finance Workstation provides the modeling capabilities to understand cash flows and structure and monitor transactions, providing analytical, structuring and reporting tools. The investor module provides the capacity for investors to analyze transactions on an ongoing basis. The Bond Administration module provides monthly bond calculation and investor reporting functionality.

Brief description: The Structured Finance Workstation covers the wide spectrum of ABS, MBS and CMBS products. The SFW for Investors tool kit includes prepayment and default rates, horizon and sensitivity analysis, residual cash flows and pricing, property-level analysis and static pool analysis reporting. Investor and servicer reports generated.

Frequency of update: Monthly trustee data update.

Methodology: Users perform cash-flow analysis applying interest rate, default analysis to structures in the deal library. User-determined assumptions include interest rate scenarios and loan-specific assumptions.

Sources of information: Multiple data sources — trustee reports, deal structure library, servicing loan or pool level data, etc.

Number of price contributors: N/A

Who has access to the data: Any market participant. Dealers, investors, issuers, servicers and rating agencies for trading, risk management and surveillance.

Cost: License subscription depends on level of service, institution's size and number of users.

Historical prices/data: Yes, loan-level and monthly pool history.

Number: N/A

Presentation of data: Through web-based or desktop application.

Non-price information: Default, user default, asset rating default recovery rate assumption.

THE YIELD BOOK ANALYTIC SYSTEM

Organization: Citigroup

Summary: Yield Book is Citigroup's fixed-income analytical system enabling relative value assessment, comparison of risks across asset classes, compare portfolios to benchmarks and perform scenario analysis. Customers have access to indices, models, calculations and data through Yield Book.

Contact information: Thomas Klaffky, Thomas.e.klaffky@citigroup.com, 212.816.8174

Website: yieldbook.com

Type of information provider: Pricing, model and data

Market sector: RMBS, CMO, ABS, CMBS

Service provided: Provides price validation, indices, reference yield curves (for Treasury, swaps, agency credit curves, alternative spreads), mortgage IO/PO, new-issue spreads, CMO break-even levels, and is generally used as a reference. Yield Book creates residential mortgage pricing tools, the same ones that are used internally at Citigroup. Applications include securities analysis, portfolio attribution as rates change, and sensitivity to market events. Yield Book service also includes Citigroup data library.

Brief description: Financial models, data and model structure database, prices and indices. Models calculate risk and return for all asset classes intended to execute computationally intensive calculations. Products include Yield Book calculators and indices. Application examples are portfolio (pricing, risk and scenario analysis, historical returns and attribution), trade analysis (price-yield and OAS values, risk and scenario analysis, comparison to market closes, historical data), index (creation and analysis comparison to benchmark), reporting and research.

Frequency of update: Depends on the application; can range from real time to monthly.

Methodology: Models are updated based on testing Citigroup research and traders. Involve mortgage- and ABS-specific prepayment models, yield curves and volatility measures. Indices measure total return performance with time to maturities of at least one year. For monthly returns, Citi bid-side prices are used as of the last day of the month.

Number: 10,000 securities and mortgage pools

Sources of information: Citigroup research, data library and indices, and third-party vendor information such as Intex.

Number of price contributors: Citigroup

Who has access to the data: Buy-side and sell-side. About half of the clients are money managers. Buy-side uses Yield Book to analyze relative value and improve performance, price discovery to improve trade performance, driven by competition, increased security structure complexity and increased emphasis on performance.

Cost: \$300 per month buy-side plus user fee; \$2,000 per month and \$1,000 per month for each additional user-sell-side.

Historical prices/data: Yes, to 1950 for some data, indices to 1980

Presentation of data: Chart and graph, customized performance reporting

Non-price information: Coupons, rating, Citigroup indices, yield curves

Distribution through third parties: Yes; for example, Bloomberg

GENERIC DEALER

Summary: This profile provides a composite and description of information and pricing provided by dealers. The package of information includes price quotes, collateral data and research.

Contact information: N/A

Type of information provider: Pricing, model and data

Market sector: Agency pass-throughs, agency and non-agency CMO, ABS, CMBS, CDO

Service provided and brief description: The dealer will provide prices and spreads by vintage, product and maturity sector, information about collateral and research. The collateral information will be collateral broken down by vintage and coupon, with prepayment speeds, delinquency history.

Frequency of Update: Prices-real time, research reports, generally weekly.

Number of price contributors: The dealer trading desk

Methodology: Depends on the product sector. For liquid sectors such as pass-through, pricing information is based on trading desk live quotes. For less liquid sectors, price is model-determined using tools such as Intex, Trepp and Bloomberg. Dealers may provide clients access to the model. Collateral data includes prepayment speeds and changes in speeds, and static analysis and implied volatility.

Who has access to the data: Buy-side clients.

Cost: Generally no cost-part of the relationship

Historical prices/data: Yes

Presentation of data: Password-protected websites, trader/sales/research communications with clients.

Non-price information: Research reports, collateral information

Distribution through third parties: Yes; for instance, through Bloomberg dealer pages for approved buy-side. Prices incorporated in consolidated price calculations and independent evaluated price analysis.

ANNEX B Electronic Trading Platforms⁵

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ELECTRONIC PLATFORMS**AUTOBAHN (DEUTSCHE BANK)**

Telephone: 212.272.2000

Website: autobahn.db.com

Sectors: ABCP

Platform supports: Secondary trading

Type of system: Single dealer

Trading method: Order-driven; cross-matching; Request for Quote, with no limit on the number of quotes a customer can request.

Pre-trade prices: Executable

Information available: Real time

Types of trade: Cash

Liquidity providers/market makers: Single-dealer platform

Minimum trade size: None

⁵ The descriptions are based on *e-Commerce in the Fixed-Income Markets: The 2005 Review of Electronic Transaction Systems*, December 2005. The list of electronic trading systems trading structured and securitized products in the United States herein is believed to be complete, based on information available at the time of the report. However, there may be additional platforms of which we were not aware at the time of the study.

Eligible participants: Institutional investors and dealers as liquidity consumer

Analytical information/non-price data: Yes — including maturity, rating, spread.

Services: Direct feed from dealer inventory to buy-side, order management, confirmation allocation.

BEAR STEARNS & CO.

Telephone: 212.272.2000

Website: Bearstearns.com

Sectors: Agency MBS

Platform supports: Primary market new-issues, secondary market

Type of System: Single dealer

Trading Method: Order-driven; Request for Quote, with no limit on the number of quotes a customer can request.

Pre-trade prices: Executable, indicative

Information available: Real time

Types of trade: Cash and spread

Liquidity providers/market makers: Single-dealer platform

Minimum trade size: None

Eligible participants: Institutional investors and dealers as liquidity consumer

Analytical information/non-price data: Yes — including yield, spread, issue size rating, coupon, historical trades

Services: Electronic research delivery, order management, confirmation allocation.

BLACKBIRD

Telephone: 212.609.4750

Website: Blackbird.net

Sectors: Agency and non-agency MBS

Platform supports: Primary market new-issues, secondary market

Type of system: Single-dealer platform

Trading method: Order-driven; cross-matching; Request for Quote, with no limit on the number of quotes a customer can request.

Pre-trade prices: Executable, indicative, last available trade

Information available: Real time

Types of trade: Cash, repo, basis and spread

Liquidity providers/market makers: None

Minimum trade size: \$25 million

Eligible participants: Institutional investors, dealers as providers of liquidity and dealers as liquidity consumer

Analytical information/non-price data: Yes — including trade size, historical trades, executed at the bid or ask

Services: Electronic research delivery, order management, confirmation allocation, order management, pre-trade analytics, identity management, risk monitoring and management, direct feed to dealer inventory.

BLOOMBERG, LP (ALLO AND BOOM OR MONEY MARKETS PLATFORM)

Telephone: 212.318.2000

Website: Bloomberg.com

Sectors: Agency and non-agency MBS; ABS, ABCP

Type of system: Multi-dealer to customer, issuer to customer, interdealer

Trading method: Order-driven, Request for Quotes (up to 5 quotes per trade), auction

Pre-trade prices: Executable, indicative, last available trade.

Information available: Real time

Types of trade: Spread, cash, repo

Liquidity providers/market makers: Multiple

Minimum trade size: None

Eligible participants: Dealers as liquidity providers and dealers as liquidity consumers.

Analytical information/non-price data: Yes — including historical trades, issue size and name, rating, maturity, coupon.

Services: Electronic research delivery, order management, confirmation allocation, order management, pre-trade analytics, identity management, risk monitoring and management, direct feed to dealer inventory.

BONDDESK

Telephone: 877.266.3922

Website: Bonddeskgroup.com

Sectors: Agency and non-agency MBS; ABS

Type of system: Inter-dealer

Trading method: Cross-matching

Pre-trade prices: Executable, indicative, last available trade

Information available: Delayed

Types of trade: Spread

Liquidity providers/market makers: Multiple

Minimum trade size: None (focus on retail-size trades)

Eligible participants: Dealers as liquidity providers and dealers as liquidity consumers

Analytical information/non-price data: Yes — including trade, historical trades, issue size and name, rating, maturity, coupon.

Services: Electronic research delivery, order management, confirmation allocation, order management, pre-trade analytics, identity management, risk monitoring and management, direct feed to dealer inventory.

BONDWEB

Telephone: 206.548.0071

Website: bondweb.com

Sectors: Agency and non-agency MBS

Type of system: Multi-dealer to customer, interdealer

Trading method: Cross-matching; Request for Quote, with no limit on the number of quotes a customer can request

Pre-trade prices: Executable, indicative

Information available: Real time

Types of trade: Cash, basis, spread

Minimum trade size: None

Liquidity providers/market makers: Multiple

Minimum trade size: \$1 million

Eligible participants: Institutional investor, dealers as liquidity provider; dealer as liquidity consumer

Analytical information/non-price data: Yes — including issue and trade size, historical trades, rating

Services: Confirmation allocation, pre-trade analytics

eSPEED, INC.

Telephone: 212.610.2200

Website: espeed.com

Sectors: Agency MBS

Type of system: Inter-dealer

Trading method: Order driven

Pre-trade prices: Executable, indicative, last traded price

Information available: Real time

Types of trade: Repo

Minimum trade size: None

Liquidity providers/market makers: None

Minimum size: \$1 million

Eligible participants: Dealer as liquidity provider; dealer as liquidity consumer

Analytical information/non-price data: Yes — including trade size, historical trades, executed at the bid or ask, coupon

Services: Order management, confirmation allocation, pre-trade analytics, identity management.

GOLDMAN SACHS & CO.

Telephone: 212.902.1000

Website: portal.gs.com

Sectors: Non-agency MBS

Type of system: Single dealer (inter-dealer, multi-dealer to customer)

Trading method: Order driven, cross matching, Request for Quote.

Pre-trade prices: Executable, indicative, last traded price.

Information available: Real time with a delay.

Types of trade: Cash

Minimum trade size: None

Liquidity providers/market makers: Yes, single dealer

Minimum size: \$1 million

Eligible participants: Institutional investor, dealer as liquidity provider; dealer as liquidity consumer, retail investor.

Analytical information/non-price data: Yes — including issue size and name, historical trades, rating, spread, coupon, maturity

Services: Electronic research, confirmation allocation, pre-trade analytics, identity management, regulatory compliance

G.X. CLARKE & CO.

Telephone: 201.200.3600

Website: gexecute.com

Sectors: Agency MBS

Type of system: Multi-dealer to customer (and single-dealer)

Trading method: Request for quote; cross-matching; order-driven

Pre-trade prices: Executable

Information available: Real time

Types of trade: Spread

Liquidity providers/market makers: Multiple

Minimum trade size: None

Eligible participants: Institutional investors, dealers as liquidity providers and dealers as liquidity consumer

Analytical information/non-price data: Yes — including spread to benchmark, trade size, issue size and name, maturity, coupon, executed to bid or ask

Services: Order management, confirmation allocation

ICAP ELECTRONIC BANKING

Telephone: 201.209.7800

Website: icap.com

Sectors: Agency MBS

Type of system: Inter-dealer

Trading method: Order-driven

Pre-trade prices: Executable

Information available: Real time

Types of trade: Cash and repo

Liquidity providers/market makers: Multiple

Minimum trade size: \$1 million

Eligible participants: Dealers as liquidity providers and dealers as liquidity consumer

Analytical information/non-price data: Yes — including whether trade executed at bid or ask, historical trades, issue size and name, rating, maturity, coupon

Services: Order management, confirmation allocation, pre-trade analytics, risk monitoring and management

JP MORGAN EXPRESS (JPEX)

Telephone: 212.762.7559

Website: jpmorganexpress.com

Sectors: Agency and non-agency MBS; ABS; ABCP

Type of system: Single-dealer platform

Trading method: Cross-matching, request for quote

Pre-trade prices: Executable and indicative

Information available: Real time

Types of trade: Spread

Liquidity providers/market makers: Yes, single dealer

Minimum trade size: None

Eligible participants: Institutional investors, dealers as liquidity consumers, retail investors

Analytical information/non-price data: Yes — including trade size, historical trades, issue size and name, rating, maturity, coupon, rating

Services: Electronic research delivery, confirmation allocation, pre-trade analytics, identity management, regulatory/compliance

MERRILL LYNCH

Telephone: 212.236.2200

Website: ml.com

Sectors: ABCP

Type of system: Single-dealer platform

Trading method: Order-driven, auction

Pre-trade prices: Executable, indicative

Information available: Real time

Types of trade: Spread

Liquidity providers/market makers: Yes

Minimum trade size: None

Eligible participants: Institutional investors, dealers as liquidity consumers, retail investors

Analytical information/non-price data: Yes — including trade size, issuer name and size, rating, maturity, rating, historical trades

Services: Electronic research delivery, confirmation allocation, pre-trade analytics, direct feed to inventory, regulatory/compliance

REUTERS TRADING FOR FIXED-INCOME

Telephone: 646.223.4400

Website: reuters.com

Sectors: ABCP, agency and non-agency MBS. ABS

Type of system: Multi-dealer to customer (single-dealer)

Trading method: Request for quote (maximum of five quotes)

Pre-trade prices: Executable

Information available: Real time

Types of trade: Cash, basis

Liquidity providers/market makers: Yes

Minimum trade size: Depends on product

Eligible participants: Institutional investors, dealers as producers of liquidity, dealers as liquidity consumers, retail investors.

Analytical information/non-price data: Yes — including trade size, issuer name and size, rating, maturity, rating, historical trades, whether trade was executed at bid or ask

Services: Electronic research delivery, confirmation allocation, pre-trade analytics, direct feed to inventory, regulatory/compliance, risk monitoring and management, order management

TRADEWEB

Telephone: 800.541.2268

Website: tradeweb.com

Sectors: ABCP, agency MBS, CMO

Type of system: Multi-dealer to customer

Trading method: Request for quote (maximum of five quotes). Trade volume record day, \$222.7 billion, \$45-50 billion on an average day; daily record \$31.7 billion-2,000 CP programs, about 35% of total CP volume.

Pre-trade prices: Indicative

Information available: Real time

Types of trade: Cash, basis and butterfly (agency MBS), Repo (agency MBS)

Liquidity providers/market makers: 15 - agency MBS; 9 - ABCP

Minimum trade size: Depends on product

Eligible participants: Institutional investors, dealers as producers of liquidity, dealers as liquidity consumers.

Analytical information/non-price data: Yes — CP yield curve at most active time of the day; historical quotes for two months. Price information distributed through Reuters and Moneyline.

Services: Electronic research delivery, confirmation allocation, pre-trade analytics, direct feed to inventory, regulatory/compliance, risk monitoring and management, order management

VALUBOND

Telephone: 877.392.8258

Website: valubond.com

Sectors: Agency and non-agency MBS, ABS

Type of system: Inter-dealer

Trading method: Cross-matching; Request for Quote

Pre-trade prices: Executable, indicative, last traded price

Information available: Real time

Types of trade: Cash

Liquidity providers/market makers: Yes

Minimum trade size: None (specialize in retail-size trades)

Eligible participants: Dealers as producers of liquidity, dealers as liquidity consumers

Analytical information/non-price data: Yes, including coupon, issue size, trade size, rating
Services: Confirmation allocation, pre-trade analytics, direct feed to inventory, regulatory/compliance, risk monitoring and management, order management, identity management

Electronic Platform - Definitions

DEFINITIONS OF TRADING METHODS

Order-driven Market refers to a market where orders are entered by participants into a central order book of the trading system and these may be accessed by any participant on the market. Normally, the matched trades will be cleared through a central counterparty or through a particular settlement institution.

Market Making or Cross-matching means a market where an institution must make consistent buy and sell quotations at maximum spread, for a certain period of time, in a selection of instruments traded, and thereby may be “hit” or “lifted” at any time where two market makers’ bid and ask price on the same instrument cross.

Request for Quote refers to a system in which an institution, usually a buy-side firm, requests a buy or sell quote from a limited number of other institutions, typically dealers. Upon receipt of the quote, the requesting institution may enter into a trade.

Auction refers to a market in which the prevailing price is determined by prospective buyers entering competitive bids simultaneously for a newly issued instrument offered to the market by an issuer.

DEFINITIONS OF “BASIS” AND “SPREAD” TRADES

Basis trade refers to a simultaneous trade of either a purchase or sale of an instrument (the cash leg) and the corresponding sale or purchase of its future equivalent (the futures leg). The tradable price is based on the differential between the spot price and the futures price of the underlying instrument.

Spread trade refers a simultaneous purchase and sale of one instrument and the corresponding purchase or sale of another instrument whereby the tradable price is formed based on the differential between the spot prices of the underlying instruments.

DEFINITIONS OF VALUE-ADDED SERVICES

Confirmation and allocation services Users can obtain electronic trade confirmations and/or use the platform to allocate trades among several accounts.

Order management system (OMS) Users can view and manage orders and positions on a real-time basis, in some cases across all traders within a firm or group.

Direct feed of dealer inventory into buy-side portfolio Automatic placement of purchased dealer inventory-for example, corporate bonds-into the buy-side portfolio or OMS system after the transaction takes place.

Pre-trade analytics Users can access research, data and analytical functions to develop or test trade ideas before actual execution.

^A The list of pricing and information sources used in structured and securitized product sectors in the United States herein is believed to be complete based on information at the time of the report and interviews conducted in the research. However, there may be additional platforms of which we were not aware at the time of the study.

^B A description of Bloomberg is omitted at the request of Bloomberg.

^C In addition to the S&P information sources profiled, S&P publishes a structured-finance surveillance report, “Structured Finance Global Ratings Roundup Quarterly,” which summarizes rating trends, performance and related data in each of the structured and securitized product sectors. Similarly “NIMS Quarterly Highlights” analyzes Net Interest Margin Securities ratings and performance trends and “CMBS Quarterly Insights” analyzes the CMBS product sector during the previous quarter. All are available through Ratings Direct.

^D The descriptions are based on *e-Commerce in the Fixed-Income Markets: The 2005 Review of Electronic Transaction Systems*, December 2005. The list of electronic trading systems trading structured and securitized products in the United States herein is believed to be complete, based on information available at the time of the report. However, there may be additional platforms of which we were not aware at the time of the study.

Electronic research delivery Users can obtain research products produced by dealers or third-party providers.

Regulatory compliance services Assists users in complying with certain regulatory requirements such as record-keeping or due diligence in price discovery.

Risk monitoring or management services Allows users to apply risk assessment functions or models to portfolio holdings or monitor and control portfolio risk for the individual traders or across a group or firm.

Identity management services Advanced log-in features that allow users to monitor or control access to certain functions or services.

APPENDIX A: METHODOLOGY

The research was conducted from June through December of 2005 and based on a set of questions and issues found in Appendix A. The information was collected through a two-phase interview process.

In Phase I, interviews were conducted with market participants to identify the price and information source topics that should be addressed in the study and to understand broadly the price discovery process in each of the product sectors. In Phase I, interviews were held with a broad cross-section of the buy-side and the sell side, including traders, research analysts, portfolio managers, and interdealer brokers. We spoke to approximately 25 firms in Phase I. Their views are incorporated in the observations but, as a condition of the interviews, the comments are not attributed to specific market participants or their firms.

In Phase II, the core of the research interviews were conducted with pricing and information providers, including price evaluators, trading desks, electronic trading platforms, underlying collateral data and market data vendors, rating agencies, and third-party valuation, cash flow and prepayment model vendors. Approximately 50 such firms were interviewed in Phase II and they are listed in Appendix B. In addition to the interviews, the firms provided access to their web sites, additional materials and, in some cases, product demos. Information on electronic platforms that trade structured and securitized finance products developed through The Bond Market Association's "eCommerce in the Fixed-Income Markets: The 2005 Review of Electronic Transaction Systems" is incorporated into this analysis.

We gratefully acknowledge the contributions to the firms that agreed to assist us in the research in both research phases, as well as their assistance in reviewing this report. We especially wish to thank members of The Bond Market Association's Structured Products Division and The American Securitization Forum members and staff for their insights and direction.

APPENDIX B: ISSUES/QUESTIONS USED IN INTERVIEWS

1. Name of pricing source, product, web site and contact information.
2. Pricing Source type: Dealer, data vendor or trading system, platform, others
3. Distinguish between (a) market data vendor or (b) trading system/platform. If (a), sources of the price information. If (b) whether interdealer, single dealer or multiple dealer-to-customer system, trading methodology (cross-matching, auction-type system or request for quote) measure of trading volume, and electronic or voice trading.
4. Pricing Methodology: Pre-trade quotes (indicative, consolidated price, matrix, executable - one-side firm quote or two-sided quote); post-trade (actual price); evaluated price/modeling; other.
5. Sector coverage and number of securities priced from each sector
6. Number of price contributors
7. Frequency of update — real time, on delayed basis (and how delayed), intraday, end of day
8. Who has access to the data — trading participants only; and/or non-participant customers
 - Dealers
 - Institutional buy-side: Bank, Hedge Fund, Insurance/Reinsurance Company Mutual Fund, Investment Advisor, Pension Fund, other Asset Managers
 - Retail

⁵⁶The descriptions are based on *e-Commerce in the Fixed-income Markets: The 2005 Review of Electronic Transaction Systems*, December 2005. The list of electronic trading systems trading structured and securitized products in the United States herein is believed to be complete based on information at the time of the report. However, there may be additional platforms of which we were not aware at the time of the study.

- 9.** Are the prices seen continuously by all market participants or only on request
- 10.** Analytical information available beyond prices such as deal structure, collateral description and performance, models, trading volume, WAC/WAM, prepayment assumptions (describe), ratings, other analytics (including collateral and bond details)
- 11.** Availability of historical prices
- 12.** Presentation of price information, for example, spreads, prices, yields, benchmarks, indices
- 13.** Approximate cost to customer
- 14.** Redistribution by third-party vendors
- 15.** Sell data and if so, what is the cost
- 16.** Data base search capabilities