Kamakura Corporation

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Impact Analysis
Proposed Modification of 12 Code of Federal Regulations Part 704
National Credit Union Administration

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Dr. Sean Patrick Klein
Mr. David Boldon
Dr. Robert Jarrow
Dr. Donald R. van Deventer

Kamakura Corporation
2222 Kalakaua Avenue, Suite 1400
Honolulu, Hawaii 96815

Executive Summary

Introduction

On November 19, 2009**,** the National Credit Union Administration (NCUA) Board issued a proposed rule to reform the corporate credit union system. In a press release announcing the proposed rules, the Board stated that "the proposed reforms are intended to enhance NCUA regulatory oversight and address deficiencies in the current rule."

In the press release, the Board stated that the revisions to existing rules were intended to strengthen four areas of corporate credit union regulation:

- Capital Standards – requiring retained earnings and Prompt Corrective Action
- Asset/Liability Management – preventing mismatches and preserving liquidity
- Risk Concentration Limits – ensuring diverse investment pools and risk mitigation
- Governance – setting board qualifications

In December, 2009, Kamakura Corporation was retained by the National Credit Union Administration to conduct an "Impact Analysis of the Implementation of the Proposed Rule on the Economic Viability, Risk Exposure and Liquidity of Corporate Credit Unions Operating under the Rule."

Kamakura Corporation recognizes the commitment of the NCUA Board of Directors and staff members to strengthening the entire credit union system, both corporate credit unions and natural person credit unions. Kamakura Corporation shares that commitment and believes that such strengthening is in the best interests of every citizen of the United States.

Summary of Proposed Regulations and Objectives of Analysis

The objectives of the Proposed Regulations are stated clearly on page 3 of the proposed rule:

- To avoid a repeat of the recent problems encountered in the corporate system
- To anticipate new problems that might occur

To achieve these ends, the proposed regulations require corporate credit unions to satisfy a number of new or modified restrictions on the construction, maintenance, and allocation of their investment portfolios. These include limits on capital and leverage ratios, outright prohibitions on certain transactions, limits on the concentration of holdings in particular sectors, limits on the concentration of holdings in particular types of assets within sectors, minimum ratings requirements, and a series of continuing portfolio-level stress test requirements designed to limit the sensitivity of a corporate credit union's portfolio to changes in yields, credit spreads, and changes in prepayment speeds.

A full discussion of the salient features of the proposed rule, including Kamakura's comments on the attractiveness of individual portions of the rule are included in the initial sections of the primary documentation. In general, these regulations appear designed to restrict a corporate credit union's ability to purchase long-maturity assets, assets with sensitivity to rates, credit conditions, or prepayment speeds, limit sectoral concentrations, as well as limit the attractiveness of derivative products.

The request for proposal included the following statement of purpose and deliverables for the project:

Purpose of Analysis
To assess corporate credit unions' economic viability and risk to capital, while maintaining liquidity, based on the parameters of Part 704 notice of proposed rulemaking (NPR) approved by NCUA Board on November 19, 2009.

Deliverables
Analysis will model the following:

1. Overall impact to corporate credit union's asset liability management, including earnings and net economic value, of Part 704 restrictions as described in NPR approved November 19, 2009;
2. Impact on economic viability given stated capital requirements of:
    a. average life limits;
    b. cash flow mismatch limits;
    c. net economic value ratio and volatility limits;
    d. spread and prepayment stress test limits;
    e. obligor and concentration limits.
3. Assessment of risk to capital based on principal losses and economic value:
    a. Going forward;
    b. As if in place mid-2007; and
4. Assessment of prospective corporate credit union liquidity given proposed rule restrictions.

The assumptions for the Impact Analysis that were suggested by the NCUA include the following outlines:

Authority level:
Base-plus

Capital and net economic value (NEV):
4% contributed capital (leverage ratio)
4% starting NEV

Investment Strategies:
Without legacy assets

1. Asset weighted average life
    a. Maximum permitted;
    b. 80% of maximum.
2. Asset liability mismatch
    a. Maximum permitted;
    b. 80% of maximum.
3. Investment in non-government mortgage-related securities
    a. Maximum permitted;
    b. None.

Liability Scenarios:

1. Overnight book as % of total deposits:
    a. 25%;

   b. 50%;
   c. 75%.
2. Liability weighted average life (given overnight book):
   a. 0.25 years;
   b. 0.50 years;
   c. 0.75 years;
   d. 1.00 years.

Liability Pricing:
Indexed on LIBOR, Eurodollar synthetic forward rates, and swap curves as applicable.

Summary of Kamakura's Approach to the Analysis

Analytics

Before discussing the detailed simulation, Kamakura analyzes the impact of the proposed regulations on the fund management line of business, and how the corporate credit unions are likely to be restricted and enhanced by the proposed regulations. This includes a comparative analysis of management expenses across the fund management industry based on two separate sources of data, a discussion of the likely funding costs of corporate credit unions relative to their asset returns under the proposed regulations, a comment on the current structure of the ROA and ROE limits in the proposed rule and their effectiveness under a variety of market conditions, and a discussion of the restrictions that the proposed rule places on mismatching portfolios.

Simulation

To evaluate the proposed rule in accordance with the objectives described above, Kamakura ran two sets of stochastic anaylses: one dated March 31, 2007, and one dated December 31, 2009. Kamakura selected sample universes of securities for these two dates based on the available universe of for sale securities that were 1) likely to be attractive investments due to ratings, weighted average lives, and sectoral/subordination concentration limits in the proposed rule, and 2) likely to be attractive investments due to the total balance outstanding. Portfolios were constructed out of these universes, the portfolios and corresponding macroeconomic factor and default models were loaded into Kamakura's Kamakura Risk Manager software, and the results were discussed and analyzed.

Construction of Asset/Liability Universe and Construction of Portfolios

The purpose of the exercise was to determine if the rule was in place, and if the corporate credit union held a well-balanced and well-diversified portfolio, to determine how would they have fared both through the credit crisis, and how would we expect them to fare going forwards. With this in mind, Kamakura constructed portfolios according to a "maximum diversification" objective. These portfolios essentially purchase as many assets as possible from the universe with equal portfolio weights. This approach accomplishes two key objectives: first, it makes the portfolio allocation problem ex-ante fair and tractable, and second, it ensures that the model corporate credit union is not heavily exposed in any particular way: they will be equally exposed to every security they purchase, and the securities that are held are determined entirely by the stress test results.

To be concrete, for each liability scenario, and for each set of NEV limits, Kamakura employed the following algorithm:

1) Kamakura constructed a portfolio consisting of equal weights by CUSIPs that pass a given stress test threshold combined with 96% funding from given liability strategy.
2) This portfolio's overall performance on the stress tests was analyzed and if necessary, the thresholds for inclusion were adjusted up or down.
3) Finally, the sector and subordination constraints were consulted, and individual CUSIPs were added and removed from the portfolio (for example: removing the worst stress test performers that violate subordination limits and if possible replacing them with non-subordinated securities).

The result was an equal weighted portfolio containing as many securities as possible that still satisfies the stress test limits in the proposed rule. This "maximum diversification" approach helps ensure that the ultimate portfolios are not overly exposed to a particular sector, and that the asset purchase decision is done in an ex-ante fair and replicable way.

Construction of liability scenarios was more straightforward: Kamakura collected information on the actual liability maturity profile of corporate credit unions on three separate dates. These profiles were then averaged to make a "typical maturity profile". Kamakura minimized the sum of squared deviations from the portfolio weights in the typical maturity profile subject to the constraints that: each holding was weakly positive, the weighted average life agrees with the amounts specified in the RFP, and the overnight percentage agrees with the amounts specified in the RFP.

Overview of Simulation in Kamakura Risk Manager

The statistical simulation for this project was completed on Kamakura's Kamakura Risk Manager (KRM) software. A detailed description of the functionality in KRM is included in the main section of the documentation. KRM simulates yield and spread curves forwards, along with key macro economic factors that drive the default rates on structured products and corporate securities. Complete detail on the stochastic processes used to simulate the macro factors is included in the main document, along with details regarding the content of Kamakura's standard KRIS default models. The final simulations include 1000 macroeconomic factor scenarios combined with 1000 default/no-default draws for a total of 1,000,000 scenarios. Cash flows are calculated for each security in each scenario in each accounting period, and then aggregated up by asset class. Asset classes are defined as: auto loans, non-agency residential mortgage backed securities, agency mortgage backed securities, commercial mortgage backed securities, credit cards, private student loans, FFELP student loans, Treasury Securities, Corporate debt, and other forms of asset backed securities. Liabilities are simulated similarly, with the following maturities: overnight, one month, two month, 3 month, 6 month, 9 month, one year, two year, 3 year, 5 year, 7 year, and 10 year.

Conclusions and Recommendations

The most striking conclusions concern the stress tests mandated in the proposed rule. The analysis clearly shows that the NEV stress tests in part 704(d), 704(e), and 704(f) result in a wide swath of the fixed income

securities market being inaccessible to corporate credit unions, regardless of the credit risk of the underlying securities. In many of the portfolios constructed in the 2007 simulations, structured product purchases are essentially non-existent. Additional analysis shows that these limits would have to be expanded between 5 and 10 times even their base plus levels to allow for the purchase of historically realistic levels of structured products. This is the case in spite of the portfolio construction algorithm employed by Kamakura that endeavors to purchase as many securities as possible under the proposed regulations. In addition, the NEV stress tests in part 704(d), 704(e), and 704(f) take a significant amount of time and resources to calculate as the proposed regulations require calculations to be done at the portfolio level. This is particularly relevant as the regulations also explicitly encourage or require short-lived portfolios, which directly leads to more rollover and reinvestment (and more frequent portfolio level stress test calculations). While portfolio level calculation does impart more accuracy than any single-asset calculation, it is much more complicated to calculate. The benefits to the additional accuracy can be assessed by an inspection of the stress test's abilities to identify and exclude assets that perform relatively poorly. With that in mind, Kamakura analyzed the relationship between asset stress test performance on March 31, 2007 and subsequent historical performance throughout the credit crisis. The NEV stress tests in part 704(d), 704(e), and 704(f) seem to eliminate securities in a way that is unrelated to the performance of the security through the credit crisis: correlations between performance on the three stress tests and annualized returns through the credit crisis are essentially zero. This lack of correlation leads Kamakura to believe that with virtually any level of stress test limits, it is likely that credit losses for structured products that a corporate credit union purchased under the proposed regulations would not have performed materially better than securities that they were unable to purchase due to the NEV stress tests in the proposed regulations. Using the best available historical data, the total return (including coupon payments, price changes, and all other forms of risk compensation and loss) for securities that had high stress test performance was essentially unrelated to the stress test performance of that particular asset. This is in contrast to sample macro-factor based stress tests that Kamakura has calculated and presented on the asset universe. In total, the NEV stress tests in the proposed regulations are quite restrictive, relatively difficult to calculate, and do not seem to be able to identify and exclude securities that were the most likely cause of the current issues faced by the corporate credit unions.

In addition to the stress tests, there are several other aspects of the proposed rule that, while well intentioned, may not be ideal once put into practice. The actual weighted average life statistic used in the proposed regulations itself is unknowable, and as such the proposed regulations use calculations based on the simple expected life. This is especially relevant in periods with large changes in prepayment rates (large changes in rates for example), or large changes in default rates (large changes in unemployment and home prices). Kamakura recognizes that this simplification removes many opportunities for the corporate credit union to obfuscate the nature of their balance sheet through erratic simulated option exercise, though this benefit comes at great cost to relevance and realism when it would otherwise be applied. In addition, the reliance on legacy ratings as a credit risk hurdle may not be effective. While Kamakura understands and applauds the NCUA's effort to reduce the credit risk in the portfolios of the corporate credit unions, we believe that agency ratings are an ineffective tool for this purpose. Many securities faced significant downgrades during the crisis, suggesting that the ratings may not be a sufficient statistic for the credit quality of a given security. Regulatory minimums on ratings also may force the sale of securities

immediately upon downgrades, precisely when market conditions are at their worst. This is particularly relevant given the ratings experiences through 2008 and 2009.

The simulations performed in Kamakura Risk Manager yielded mixed results. Both the 2007 deterministic scenario and 2009 Monte Carlo simulation show that a low rate environment and flat yield curves can over-burden corporate credit unions with long-dated liabilities and high funding costs. This is a very dangerous scenario that is not directly addressed by the stress tests mandated by the proposed rule as the stress tests evaluate parallel shifts in the yield curve rather than flattening or steepening of the curve. To the extent that corporate credit unions employ mismatching strategies in the maturity of their assets and liabilities, such tests would be particularly relevant. In contrast, the 2007 monte carlo simulation, which was calibrated to market conditions before the crisis, contains scenarios of moderately high interest rates and steep yield curves that allow short term profits from funding mismatches.[1] In terms of credit losses, there are two substantive conclusions regarding the 2007 and 2009 portfolios respectively. In 2007, the simulated portfolios contain very few structured products and as such have minimal credit losses throughout the crisis. However, the expanded portfolios constructed by relaxing the NEV stress test constraints in the proposed rule show that there was no significant relationship between the return on structured products during the crisis and the performance on the stress tests in the proposed rule (and hence whether or not they were included in the expanded portfolios). That is, Kamakura would not expect the performance of the model corporate credit union to be improved or weakened by any level of stress tests in the proposed regulations. That said, the 2007 structured product universe, on average, has small but positive returns. Recall that this universe was constructed with the weighted average life limits, sector, seniority, and subordination limits of the proposed rule in mind: those limits seemed to generate a subset of structured products with above average, or at least slightly positive, returns during the credit crisis. In 2009, the credit losses appear to be mitigated. After some moderate initial credit losses at the outset of the simulation, the portfolios have fairly limited adjustments to net interest income ($1-$4 million per month in absolute value, roughly 20-50% of net interest income) for the first twelve months.[2] There is quite a bit of heterogeneity in earnings of the model corporate credit union across the twelve liability strategies. There are two reasons for this: certain scenarios admit many more structured products than others, and certain scenarios are more exposed to changes in the slope of the yield curve. The effects of the former can be best seen in the first 6 months to 12 months of the simulation.

Kamakura has several recommendations for the National Credit Union Administration: we organize this section into sections of the regulations that we find particularly appropriate and effective, recommendations for adjustments to other sections that would introduce best practice risk management into the proposed rule, and recommendations that, while less effective, may be easier to implement given the structure and content of the proposed regulations.

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[1] Kamakura notes that such mismatch profits do not represent economic value to the institution, simply compensation for risk. Indeed, even the small interest rate mismatching allowed under the regulations leads to fairly large and fairly stable losses for the 2007 deterministic and 2009 stochastic simulations.
[2] Whether these adjustments are on average gains or losses depends on the liability strategy: it appears that the liability strategies that admit more securities perform better on average than the more restrictive set.

Best Components of the Proposed Regulations and Requested Analysis

- At the heart, the regulations attempt to reduce the ability of corporate credit unions to purchase highly concentrated amounts of risky securities through ratings and sector limits. While Kamakura believes that there may be more effective methods to accomplish this goal, the NCUA should be applauded for their efforts in this regard.

- The proposed regulations recognize the difficulties that corporate credit unions have in raising capital and as such try to ensure that the corporate credit unions are managed to attain certain returns and retained earnings targets. These targets can be improved, but Kamakura agrees with the appeal of these limits given the difficulty the corporate credit union faces when raising additional capital.

- The sector, subordination, and issuer limits in the proposed regulations implicitly limit the macroeconomic factor risks faced by the corporate credit union. Based on the performance of the asset universe constructed with these limits in mind, Kamakura believes that these limits would have mitigated the losses faced by the corporate credit unions.

- The NCUA requested the analysis to be conducted on a variety of liability strategies and with a variety of portfolio targets. In practice, it turned out that many of these portfolio targets were unattainable given the limits in the proposed rule, but the thoroughness of the approach is appealing, particularly when the liability structures have such an impact on the simulations.

- The proposed regulations reward portfolio monitoring and management behavior with more relaxed stress test limits and ratings requirements. While Kamakura has reservations about the effectiveness of ratings requirements and the stress tests in the proposed rule, the linkage between risk management efforts and rewards is very appealing, and all too absent in the marketplace.

- While beyond the scope of the analysis, the prompt corrective action powers granted to the NCUA may be helpful in preventing and controlling risky behavior.

However, Kamakura believes that there are several alterations that can be made to the proposed regulations to greatly increase their effectiveness. This section details changes that can be made that would more accurately reflect what Kamakura calls “best practice” risk management.

Best Practice Recommendations

- Eliminate the calculation of the NEV Stress tests in sections 704 (d), 704 (e) and 704 (f). These tests pose a substantial burden on the corporate credit unions, greatly reduce the number of securities available for investment, and do not appear to identify securities with differences in credit performance meaningfully related to the performance of securities throughout the credit crisis.
- Require use of an internal models approach based on correlated macroeconomic factors. While the precise effects of these factors are subjective, macroeconomic factors are clearly related to the overall performance of securities.

- Require stress testing of economic value of equity with respect to macroeconomic risk factors (such as home prices, real GDP growth, commodities, equities, interest rates, and unemployment rate) and specify limits.
- Require all stress tests of every asset in the portfolio, even derivative securities. Stress tests should assume rational option exercise, with the models underlying option exercise decisions available for view and audit on demand.
- Eliminate the legacy ratings minimum and replace it, if necessary, with a maximum default probability of a given percentage over a specific time horizon using best available techniques.
- Modify the target profitability test, stated as the target for cumulative retained earnings as a percent of assets after three years. The level of interest rates largely determines the degree to which these targets can be met, even without earning a positive spread over funding costs. For example, at the current levels in the proposed regulations, if rates are 4% or above, the 15 basis point ROA target can be met even with zero funding spread. These tests should instead require a minimum spread over funding costs, rather than a simple ROA target.
- Encourage the movement of fund management "off balance sheet" from the corporate credit unions by allowing them to establish investment management affiliates in which they act as agent, not principal, in managing money for natural person credit unions. This would allow corporate credit unions to offer a wider array of investment alternatives at considerably lower operating costs. It would also considerably reduce the capital requirements of corporate credit unions, thereby boosting risk-adjusted profitability.
- Require that structured product investments only be in securities where the underlying collateral is fully disclosed on a transaction by transaction basis on demand, by the investor, in electronic form
- Require limits based on market based assessments of performance, such as a maximum allowable credit swap for the corporate credit union

If these recommendations are difficult to implement for political, legal, or other reasons, Kamakura lists below alternative recommendations that will not change the underlying rule as dramatically.

Alternative Approaches

- Remove the portfolio level stress test requirements to ease calculation burdens of corporate credit unions. Instead, specify for a set of target liability maturity schedules, the maximum allowable change in value of an individual asset with respect to particular stress tests. Such a calculation is substantively similar to what is in the proposed regulations, but dramatically lightens the computation required whenever a corporate credit union purchases and sells securities.
- Greatly relax or remove the stress test requirements in sections 704 (d), 704 (e), and 704 (f), even at the single asset level. The spread and prepayment stress test appears somewhat effective, and highlights the joint nature of stress tests. Kamakura also believes that an additional stress test involving the slope of the yield curve should be applied. These stress tests should be conducted on every security in the portfolio, and should accommodate rational option exercise.

- Enhance the sector and issuer concentration limits in the proposed rule with further tightening, and joint sector limits based on common macroeconomic factors: for example, non-agency RMBS is limited to 15% of the portfolio, CMBS is limited to 15% of the portfolio, and non-agency RMBS + CMBS is limited to 25% of the portfolio.
- Relax the reliance on agency ratings, possibly replacing them with additional limits on shared characteristics, such as collateral level FICO scores, information requirements, tranching structure and so on. Such approaches target needlessly complex and difficult to assess securities without a heavy reliance on ratings. The regulations should also explicitly prohibit the use of ratings from firms that are engaged by the issuer of the structured security.
- Greatly relax the agency ratings requirements on corporate firms. If ratings must be used as an investment criterion, the proposed regulations as they are currently written prevent corporate credit unions from investing in the vast majority of corporate issuers. Kamakura believes that alternate ratings thresholds for corporate debt and structured products can achieve these ends, while still recognizing the vast and systematic underestimation of risk by rating agencies on structured products through the credit crisis.
- Require that structured product investments only be in securities where the underlying collateral is fully disclosed on a transaction by transaction basis on demand, by the investor, in electronic form. This sort of information requirement will help prevent investment in needlessly complex securities, or in securities that the corporate credit union cannot easily assess.
- Restrict investment in structured products where the security is tranched by any criteria other than the maturity of interest and principal. Specifically, collateralized debt obligations or any security by any other name where tranches are created by the percentile rank of credit losses should be prohibited or greatly reduced. Subordinated securities of this type faced the largest credit losses through the crisis, and the senior tranches had risks that were systematically under-estimated.
- Prohibit investment in securities of any kind if the corporate credit union's risk management department and investment department, or either department individually, are unable to perform an independent assessment of the valuation and risk sensitivity of the instrument. The models and assumptions used in this assessment must be available on demand and must be re-assessed at least every two years.

Kamakura believes that the proposed regulations can be greatly improved by the above changes.

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Kamakura Impact Analysis –Preliminary Detail

Summary of Proposed Regulations

In this section we briefly summarize the 253 page discussion of the proposed rule released on November 19, 2009. In this section, page references refer to page numbers in the proposed rule.

The objectives of the Proposed Regulations are stated clearly on page 3:

- To avoid a repeat of the recent problems encountered in the corporate system
- To anticipate new problems that might occur

To achieve these ends, the proposed regulations require corporate credit unions to satisfy a number of new or modified restrictions on the construction, maintenance, and allocation of their investment portfolios. These include limits on capital and leverage ratios, outright prohibitions on certain transactions, limits on the concentration of holdings in particular sectors, limits on the concentration of holdings in particular types of assets within sectors, minimum ratings requirements, and a series of continuing portfolio-level stress test requirements designed to limit the sensitivity of a corporate credit union's portfolio to changes in yields, credit spreads, and changes in prepayment speeds.[3]

Below, we list several of the most salient requirements and restrictions along with commentary in footnotes:

704.3 (page 152) requires the following capital ratios:

- Corporate credit unions must have a
  - Leverage ratio of 4.0% or more
  - Tier 1 risk-based capital ratio of 4.0% or more
  - Total risk-based capital ratio of 8.0% or more
- Beginning 3 years after the rule is adopted, the ratio of retained earnings to daily average net assets should be more than 0.45%.[4]

704.5 contains prohibitions on certain transactions :

- H. Prohibitions (page 174)
  1. Purchasing or selling derivatives
  2. Purchasing mortgage servicing rights
  3. Purchasing net interest margin securities

[3] The stringency of these stress tests varies with the leverage and the frequency of the testing regime in place at the corporate credit union. The vast majority of this analysis considers the "base-plus" authority in the proposed rule, defined in the next section.

[4] Note that this is a numerical limit associated with net income simulation. This results in a very demanding calculation, certainly much more difficult than mark to market based stress tests. To be precise, the simulations required to answer this question on the portfolios of 200-300 securities described in this document require 300-600 GB of disk space and 24 hours of computing time. It is Kamakura's view that requirements with this kind of complexity seem very difficult to effectively audit and enforce, and it is not immediately clear that the additional complexity in income simulation will lead to better risk management procedures.

4. Purchasing CDOs

704.6 on credit risk management (page 176) has the following limits:

- **(c)(1)Issuer concentration limits: 25% of capital or $5 million, whichever is greater.** This implies one needs at least 100 counterparties if the capital ratio is 4%.
- **(c)(2) Exceptions**
  - (i) repos limited to 200% of capital for 1 counterparty
  - (ii) non-money market investment company limited to 50% of capital for 1 counterparty.
- **(d)(1) Sector concentration limits**[5]
  - (i) RMBS less than lower of 500% of capital or 25% of assets
  - (ii) CMBS less than lower of 500% of capital or 25% of assets
  - (iii) FFELP student loan backed securities less than lower of 1000% of capital or 50% of assets
  - (iv) Private student loan asset-based securities less than lower of 500% of capital or 25% of assets
  - (v) Auto loan backed securities less than lower of 500% of capital or 25% of assets
  - (vi) Credit card backed securities less than lower of 500% of capital or 25% of assets
  - (vii) Other asset backed securities less than lower of 500% of capital or 25% of assets
  - (viii) Corporate debt obligations-the lower of 1000% of capital or 50% of assets
  - (ix) Municipal securities-lower of 1000% of capital or 50%
  - (d)(2) investment in registered investment companies to lower of 1000% of capital or 50% of assets, and other sector limits apply (see above restriction on "non-money market" investment funds)
  - (d)(3) Other investments limited to lower of 1000% of capital or 50% of assets
  - (d)(4) Excluded from limits are investments in federally insured credit unions, other depository institutions, and investment repurchase agreements
  - (e) Subordinated securities must be less than the lower of 100% of capital or 5 percent of assets in any sector in d(1) and d(2) and must be less than lower of 400% of capital or 20% of assets in all sectors in (d)
  - (f)(1) all investments other than depository institutions must have a rating. 90% of investments must have ratings from at least 2 Nationally Recognized Statistical Ratings Organizations.[6]
  - (f)(2) Must be rated at least AA- by every available NRSRO (long term rating) or A1 (short term)

Section 704.8(c) on asset and liability management imposes a unique constraint:

- (c) Can only redeem share certificates at lesser of par plus accrued dividends or value at a market-based penalty that covers replacement cost.

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[5] In Kamakura's view, sector concentration limits are an easily implementable, and easily verifiable approach to macro factor based stress testing limits. In the absence of full and formal macro-factor based testing, these limits are an acceptable approach.

[6] It is Kamakura's view that reliance on agency ratings is dangerous due to conflicts of interests, the absence of historical reliability, and systemic risks. We are not alone in this view: the Securities and Exchange Commission, among other institutions, is rapidly decreasing the role of NRSROs in securities law.

Section 704.8(d)(e)(f) contain the remaining rules regarding asset and liability management:

(d) interest rate sensitivity analysis

- (d)1(ii) Net Economic Value ratio cannot fall below 2% in response to 300 bp yield curve move.
- (d)1(iii) NEV percentage change with response to 300 bp must be 15% or less[7]
- (d)2 Must assess annually if it should conduct periodic additional tests to address market factors that may materially impact that corporate credit union's NEV

(e) Cash flow mismatch sensitivity analysis

- (e)1(i) 300 bp asset and liability spread analysis assuming no issuer options are exercised.[8]
- (e)1(ii) 300 bp spread shift should not result in NEV ratio less than 2%
- (e)2(iii) NEV decline should not be more than 15%[9]
- (e)2 all investments must be tested excluding derivatives and equity investments.[10]
- (e)3 Must also test for effects of "failed triggers" on its NEV and NEV ratios ("trigger" is defined on page 151)

(f) Cash flow mismatch sensitivity with 50 percent slow down in prepayment speeds

- **(**f)1(i) Spread widening of 300bp on assets and liabilities assuming issuer options will not be exercised and prepayment speeds will slow by 50%.
- (f)1(ii) NEV ratios should not fall below 1% in response to 300 bp shift
- (f)1(iii) NEV should not decline by more than 25% in response[11]
- (f)2 Derivatives and equity investments are excluded
- (f)3 Must test for "failed triggers" ("trigger" defined on page 151)

(h) Weighted average asset life must be less than 2 years, excluding derivative contracts and equity investments. It should be assumed that no issuer options will be exercised.[12]

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[7] At 4% capital (as mandated in this exercise and the minimum required by the regulations), (d)1(iii) will always bind before (d)1(ii). Under the "base-plus" authority, this limit is 20% (and will still bind first).

[8] This explicit requirement to ignore issuer options is very unusual and likely to cause a measurement error. Note that this calculation would indicate no risk in auction rate securities, since the index in that floating rate structure is the short term borrowing cost of the issuer. It is Kamakura's view that the simplification achieved by this assumption is unlikely to outweigh the reduction in realism.

[9] Again, the 15% change will always bind before the 2% requirement. Under base-plus, this limit is 20%.

[10] The requirement to exclude derivatives is very unusual. Kamakura believes that any stress test should apply to all on balance sheet and off balance sheet assets and liabilities. If this rule is designed to limit the confounding effects of esoteric derivatives, those concerns should be addressed clearly separately without detracting from the accuracy of stress tests. Excluding derivatives from these stress calculations greatly reduces the attractiveness of derivative securities designed to hedge or insure risks that the stress tests attempt to expose (such as CDS contracts). Similar comments apply in many other places as well.

[11] The 20% change will bind before the 1% change. The base plus limits ate a 30% change in NEV. Kamakura commends the NCUA for the joint stress test of spreads and prepayment rates. Jointly correlated negative shocks are critical for effective risk management.

[12] Given high prepayment or high default rates, Kamakura finds weighted average life calculations easily misleading, especially with complex structured products. However, given the severity of the stress tests in parts d, e and f, it is likely that this constraint will not further restrict a corporate credit union's flexibility.

(k) may not take any investment from a member credit union or other entity any investment that would exceed 10% of the moving daily average net assets

Section 704.9 is on liquidity risk management (page 184)

- **(**b) May borrow up to the lower of 10 times capital or 50% of capital and shares (excluding shares created by member repurchase agreements)
- (b)1 Secured borrowing maturities cannot exceed 30 days. Can only borrow on a secured basis for non-liquidity purposes if core capital exceeds 5% of daily average net assets in amount of (core capital – 5% x DANA).
- (b)2 Central Liquidity Facility borrowings and member reverse repurchase agreements are excluded from limit.

The interest rate risk measures of 704.8, however, vary by "base plus" authority as summarized from pages 214-215:

		Rule Description		
		704.8(d)	704.8(e)	704.8(f)
Corporate CU Classification	**Minimum Rating**	**300 bp Yield Shift**	**300 bp Spread Shift**	**300 bp Spread Shift with 50% decline in Prepayment Speeds**
Normal	AA-/A1 short term	15%	15%	25%
Base Plus	AA-/A1 short term	20%	20%	30%
Base Plus with Capital over 6%	A-/A2 short term	20%	20%	30%

Appendix C of the Proposed Regulations summarizes the risk-weighted capital calculations that must also be done.

In general, these regulations appear designed to restrict a corporate credit union's ability to purchase long-maturity assets, assets with sensitivity to rates, credit conditions, or prepayment speeds, limit sectoral concentrations, as well as greatly limit the attractiveness of derivative products.

Statement of Objectives and Required Analysis

The request for proposal included the following statement of purpose and deliverables for the project:

> **Purpose of Analysis**
> To assess corporate credit unions' economic viability and risk to capital, while maintaining liquidity, based on the parameters of Part 704 notice of proposed rulemaking (NPR) approved by NCUA Board on November 19, 2009.
>
> **Deliverables**
> Analysis will model the following:
> 5. Overall impact to corporate credit union's asset liability management, including earnings and net economic value, of Part 704 restrictions as described in NPR approved November 19, 2009;
> 6. Impact on economic viability given stated capital requirements of:

    a. average life limits;
    b. cash flow mismatch limits;
    c. net economic value ratio and volatility limits;
    d. spread and prepayment stress test limits;
    e. obligor and concentration limits.
7. Assessment of risk to capital based on principal losses and economic value:
    a. Going forward;
    b. As if in place mid-2007; and
8. Assessment of prospective corporate credit union liquidity given proposed rule restrictions.

Statement of Assumptions

The assumptions for the Impact Analysis that were suggested by the NCUA include the following outlines:

Authority level:
Base-plus

Capital and net economic value (NEV):
4% contributed capital (leverage ratio)
4% starting NEV

Investment Strategies:
Without legacy assets

4. Asset weighted average life
    c. Maximum permitted;
    d. 80% of maximum.
5. Asset liability mismatch
    c. Maximum permitted;
    d. 80% of maximum.
6. Investment in non-government mortgage-related securities
    c. Maximum permitted;
    d. None.

Liability Scenarios:

3. Overnight book as % of total deposits:
    d. 25%;
    e. 50%;
    f. 75%.
4. Liability weighted average life (given overnight book):
    e. 0.25 years;
    f. 0.50 years;
    g. 0.75 years;
    h. 1.00 years.

Liability Pricing:
Indexed on LIBOR, Eurodollar synthetic forward rates, and swap curves as applicable.

To meet these requirements, Kamakura will proceed in several steps. First, Kamakura believes it is prudent to include initial comments on the rule and corporate credit unions, including the effectiveness of ROE and ROA targets, the profitability of interest rate mismatching as an investment strategy, and an analysis of the business model of corporate credit unions as it pertains to this project. Second, Kamakura will construct 24 separate portfolios to be analyzed (the three overnight book percentages and the four liability weighted average lives) and simulate their performance from March 31, 2007 and again from December 31, 2009 using the standard Kamakura modeling suite *as they would have been estimated on those dates*. The analysis is split over the next several sections.

Kamakura Impact Analysis – Part I: Preliminary Analysis

Background and Competitive Landscape for Corporate Credit Unions

In general, corporate credit unions perform four functions for their "member" natural person credit unions:

- They provide investment opportunities in the form of "shares" that would be labeled certificates of deposit in the banking industry
- They provide capital investment opportunities, allowing members to purchase the capital stock of the corporate credit union
- They provide asset and liability management advisory services
- They provide cash management services

The regulations proposed by the NCUA are designed to restrict the risk embedded in the first two services provided by corporate credit unions.

Efficiency

Before turning to the corporate credit unions themselves, we should note that in the financial services business the wholesale banking model-- where both borrowers and depositors are corporations and other financial institutions--is one that is increasingly rare. In the United States, there were many wholesale banking firms in the 20 largest firms in the nation, that no longer exist as independent firms, such as JP Morgan & Company, Bankers Trust Company, and others.[13]

The corporate credit unions in the United States have investment powers that are prohibited to other credit unions by regulation. In Japan, long term credit banks had a similar regulatory niche. The Industrial Bank of Japan, Long Term Credit Bank of Japan, and Nippon Credit Bank of Japan were 3 of only 4 banks in Japan permitted to issue bonds in the domestic market. Like the banks listed above, they were able to invest in the full range of financial instruments available to other financial services firms, yet still decided that their wholesale banking franchise was not viable. After government-aided restructuring, all three banks have either merged with other banks which have a retail presence, or they have attempted to build their own retail banking franchise.

[13] Note also that these institutions have a wider range of investment securities available to them than the list that is permissible under the proposed regulations of securities of the Proposed Regulations.

Therefore as we analyze the business model of the corporate credit unions, the available history indicates that survival as a wholesale financial services organization is very difficult. The failures and conservatorships of these firms described above call into question whether or not the corporate credit union business model can remain viable, particularly when combined with the investment restrictions present in the proposed regulations. In addition, among the 27 corporate credit unions for which Kamakura could determine the year of establishment, the most recent year of establishment is 1984. The wholesale financial services model does not seem to be perceived as attractive enough for new competitors to enter the market using this business model

We now turn to our analysis of the relevant business model of the corporate credit unions. The proposed regulations largely affect a limited and distinct subset of corporate credit union activity. That is, corporate credit unions provide many services, including payment system providers, liquidity providers, and as investment providers. The proposed regulations deal primarily with the provision of investment services. In this arena, there are many firms (other than corporate credit unions) that provide asset and liability management advisory services, including Kamakura Corporation. However, the regulations are not directed at these advisory services, we exclude them from our analysis. Similarly, many firms provide cash management and clearing services. Again, other than the credit exposures that might arise in cash management operations, the regulations ignore this activity and we do not discuss the clearing and cash management business in our analysis.

With respect to investment and capital investment opportunities, we note that a natural person credit union which owns 1% of the corporate credit union's capital and which deposits 1% of its other liabilities indirectly owns 1% of the assets of the corporate union. In this sense, the corporate credit union is a mutual fund. While corporate credit unions provide a great deal of services to natural person credit unions above and beyond investment activities, the proposed regulations are almost exclusively concerned with this aspect of their business. However, one relevant difference between corporate credit unions and mutual funds are the implicit "put options" offered to natural person credit unions by the NCUA, which may rescue the owners of the corporate credit union if the value of assets falls to a certain critical level. If the natural person credit unions were investing in a traditional mutual fund, they would not have this "put option" to protect their holdings in the mutual fund.[14]

Other than this "put option" difference, however, the corporate credit unions compete in the investment management business with the following types of firms

- Traditional mutual funds such as Vanguard and Fidelity
- Large institutional fixed income managers such as BlackRock and Pimco
- Bank-affiliated investment managers
- Securities firm-affiliated investment managers
- Commercial banks, which offer a full line of deposit products
- All thrift institutions, which offer a full line of deposit products

[14] This option is priced as well: It was announced in September, 2009 that a 15 basis point assessment on insured credit union shares will be collected to restore the strength of the National Credit Union Share Insurance Fund.

- The Federal Reserve System itself, which now pays above market interest on deposits

This is an extraordinarily competitive space. With the exception of regulatory niches and restrictions on the investment behavior of natural person credit unions, corporate credit unions will be unable to be viable competitors in the fund management business if the regulations they face handicap their ability to compete. However, if in the absence of these regulations, corporate credit unions acquire too much risk, both systematic and idiosyncratic, then their freedom to invest should be curtailed if they are to receive a regulatory guarantee like the put option mentioned above. In essence, this balance is the key trade off that the NCUA has asked Kamakura to evaluate.

In order to compare the efficiency of corporate credit unions in providing investment management services, we need to compare the target return on assets specified in the Proposed Regulations, plus corporate credit union non-interest operating expenses, with the management fees charged by large and efficient fund management firms. The return on assets/retained earnings as a percentage of assets requirement in the proposed rule requires the corporate credit unions to retain 15 basis points on assets, above and beyond non-interest operating expenses.

Throughout this section, we note that the proposed regulations limit the corporate credit unions' ability to offer the following types of products to any investor, including natural person credit unions, while many of the competitors in this space are not as restricted:

- Any investment fund with a weighted average life of more than 2 years in any asset class
- Any investment fund of any credit risk above a certain level of interest rate sensitivity
- Any investment fund of any type with legacy ratings below AA-

Kamakura begins with an analysis of non-interest operating expenses for US Central, Wescorp, and Southwest Corporate Federal Credit Union. We calculate annualized non-interest operating expenses as a percent of assets by annualizing the monthly operating expenses reported in the 5310 reports on www.ncua.gov. NOTE: "Total Assets" represents the fair market value.

Non-interest operating expenses at U.S. Central have ranged from 11 basis points to 37 basis points with an average of 16 basis points over the 2007-2009 period.

Organization:	US Central			
Data Source:	www.ncua.gov, 5310 reports			
Month Ended	Monthly Operating Expenses	Total Assets	Unannualized Ratio of Monthly Expenses to Assets	US Central Annualized Operating Expenses as Percent of Assets
11/30/2009	3,592,411	35,485,412,586	0.01%	0.12%
9/30/2009	3,754,381	27,974,946,602	0.01%	0.16%
6/30/2009	4,175,669	31,490,039,358	0.01%	0.16%
3/31/2009	4,404,499	32,444,505,820	0.01%	0.16%
12/31/2008	8,359,848	27,116,929,693	0.03%	0.37%
9/30/2008	5,448,827	37,958,753,148	0.01%	0.17%
6/30/2008	5,471,836	41,265,676,720	0.01%	0.16%
3/31/2008	5,244,100	45,929,014,707	0.01%	0.14%
12/31/2007	4,962,150	44,733,691,582	0.01%	0.13%
9/30/2007	4,934,460	51,808,134,365	0.01%	0.11%
6/30/2007	5,186,448	54,485,961,298	0.01%	0.11%
3/31/2007	4,846,199	53,756,709,231	0.01%	0.11%
Average				0.16%
Maximum				0.37%
Minimum				0.11%

Non-interest operating expenses for Wescorp over the same period have averaged 34 basis points and ranged from 20 basis points to 82 basis points. Note: on the charts in this section, the "Total Assets" figure represents the market value.

Organization:	Wescorp			
Data Source:	www.ncua.gov, 5310 reports			
Month Ended	Monthly Operating Expenses	Total Assets	Unannualized Ratio of Expenses to Assets	Wescorp Annualized Operating Expenses as Percent of Assets
11/30/2009	5,505,574	21,461,715,155	0.03%	0.31%
9/30/2009	5,379,893	18,326,698,284	0.03%	0.35%
6/30/2009	6,381,001	19,003,841,521	0.03%	0.40%
3/31/2009	7,428,209	20,351,920,126	0.04%	0.44%
12/31/2008	9,653,761	14,099,635,919	0.07%	0.82%
9/30/2008	4,283,853	25,234,118,629	0.02%	0.20%
6/30/2008	6,567,575	28,154,455,424	0.02%	0.28%
3/31/2008	5,660,072	29,887,733,477	0.02%	0.23%
12/31/2007	8,231,496	32,517,008,547	0.03%	0.30%
9/30/2007	7,474,902	33,256,328,361	0.02%	0.27%
6/30/2007	6,541,639	32,096,221,602	0.02%	0.24%
3/31/2007	7,175,151	31,263,380,276	0.02%	0.28%
Average				0.34%
Maximum				0.82%
Minimum				0.20%

For Southwest Corporate Federal Credit Union, from 2007 to 2009 the annualized non-interest operating expenses as a percent of assets have averaged 41 basis points and ranged from 27 to 57 basis points.

Organization:	Southwest Corporate Federal Credit Union			
Data Source:	www.ncua.gov, 5310 reports			
Month Ended	Monthly Operating Expenses	Total Assets	Unannualized Ratio of Monthly Expenses to Assets	Southwest Corporate Annualized Operating Expenses as Percent of Assets
11/30/2009	2,831,454	8,018,221,289	0.04%	0.42%
9/30/2009	3,091,273	7,012,348,362	0.04%	0.53%
6/30/2009	3,087,417	7,785,846,044	0.04%	0.48%
3/31/2009	4,633,146	9,763,060,682	0.05%	0.57%
12/31/2008	2,765,337	7,532,036,645	0.04%	0.44%
9/30/2008	3,655,772	9,238,393,433	0.04%	0.47%
6/30/2008	3,871,229	10,557,313,020	0.04%	0.44%
3/31/2008	3,222,787	12,822,870,569	0.03%	0.30%
12/31/2007	4,306,625	12,713,605,125	0.03%	0.41%
9/30/2007	3,001,454	12,563,606,331	0.02%	0.29%
6/30/2007	2,924,164	12,699,255,157	0.02%	0.28%
3/31/2007	3,031,780	13,485,071,929	0.02%	0.27%
Average				0.41%
Maximum				0.57%
Minimum				0.27%

Next we compare the average expense ratios for US Central, Wescorp and Southwest Corporate, plus the 0.15% return on asset target, with the expense ratios for 24 fixed income funds managed by Fidelity and Vanguard.

Comparison of Expense Ratios versus Fidelity and Vanguard Fixed Income Funds

Rank	Fund Manager	Fund Name	Expense Ratio
1	Vanguard	Total bond market index, Institutional plus	0.05%
2	Vanguard	Total bond market II index, Institutional	0.07%
3	Vanguard	Extended duration Treasury index, Institutional plus	0.08%
4	Vanguard	Short term government bond index, Institutional	0.09%
5	Vanguard	Inflation Protected Securities	0.09%
6	Vanguard	Intermediate term bond index, Institutional	0.09%
7	Vanguard	Intermediate term government bond index, institutional	0.09%
8	Vanguard	Mortgage-backed securities index, Institutional	0.09%
9	Vanguard	Long term bond index, institutional	0.09%
10	Vanguard	Short term Federal, Admiral	0.12%
11	Vanguard	Short term treasury	0.12%
12	Vanguard	Intermediate term Treasury, Admiral	0.12%
13	Vanguard	Long term Treasury, Admiral	0.12%
14	Vanguard	GNMA, Admiral	0.13%
15	Vanguard	Short term bond index, Signal	0.14%
16	Fidelity	Fidelity Institutional Money Market-Money Market Portfolio, Institutional Class	0.20%
17	Fidelity	Fidelity Institutional Money Market Prime Money Market Portfolio	0.23%
18	Fidelity	Fidelity Institutional Money Market-Money Market Portfolio, Class I	0.23%
19	Fidelity	Fidelity Institutional Money Market-Government Portfolio, Class I	0.23%
20	**US Central**	**Expenses plus ROA Target**	**0.31%**
21	Fidelity	Fidelity GNMA	0.45%
22	Fidelity	Fidelity Government Income	0.45%
23	Fidelity	Fidelity Intermediate Bond	0.45%
24	Fidelity	Fidelity Intermediate Government Income	0.45%
25	Fidelity	Fidelity Total Bond	0.45%
26	**Wescorp**	**Expenses plus ROA Target**	**0.49%**
27	**Southwest Corporate**	**Expenses plus ROA Target**	**0.56%**

The chart shows that all 24 funds had lower total costs to investors than the sum of the Wescorp and Southwest expense and target ROA ratios. Nineteen of the 24 funds had lower expense ratios than the sum of expenses and the ROA target for U.S. Central. This relationship is somewhat limited by two factors: first, a natural person credit union could recover all or part of the 0.15% ROA target by owning the capital of the corporate credit union, but this is mitigated as the natural person credit union risks losing the full amount of that investment as well if the value of the corporate credit union's assets fall below the amount of liabilities; second, there are substantial regulatory advantages that corporate credit unions enjoy that a natural person credit union would not receive from a mutual fund. However, in the absence of such regulated advantages, a corporate credit union would find it very difficult to compete in the fund management space.

We can take an alternative look at the same analysis by looking at other sources of cash flow that impact the ability of a corporate credit union to manage funds for members with maximum efficiency. Some of the non-interest operating expenses above may well be associated with the generation of non-interest operating income. In that regard, we concentrate on fee income and exclude gains and losses on investments from the analysis.

For U.S. Central non-interest fee income averaged 5 basis points as a percentage of assets and seemed nearly invariant with asset size:

Organization:	US Central			
Data Source:	www.ncua.gov, 5310 reports			
Month Ended	Monthly Fee Income	Total Assets	Unannualized Ratio of Monthly Fee Income to Assets	US Central Annualized Fee Income as Percent of Assets
3/31/2007	1,546,559	53,756,709,231	0.00%	0.03%
6/30/2007	1,645,077	54,485,961,298	0.00%	0.04%
9/30/2007	1,755,590	51,808,134,365	0.00%	0.04%
12/31/2007	1,620,152	44,733,691,582	0.00%	0.04%
3/31/2008	1,919,318	45,929,014,707	0.00%	0.05%
6/30/2008	1,719,306	41,265,676,720	0.00%	0.05%
9/30/2008	1,485,076	37,958,753,148	0.00%	0.05%
12/31/2008	1,418,231	27,116,929,693	0.01%	0.06%
3/31/2009	1,913,693	32,444,505,820	0.01%	0.07%
6/30/2009	1,733,243	31,490,039,358	0.01%	0.07%
9/30/2009	1,779,852	27,974,946,602	0.01%	0.08%
11/30/2009	1,736,250	35,485,412,586	0.00%	0.06%
Average				0.05%
Maximum				0.08%
Minimum				0.03%

For Wescorp, non-interest fee income averaged 12 basis points as a percentage of assets and again seemed to be unrelated to asset size. Wescorp alone among the 3 corporate credit unions analyzed here reported miscellaneous operating income ranging between $100,000 to $200,000 in most months. This miscellaneous income item, which was zero at Southwest and U.S. Central, has been ignored.

Organization:	Wescorp			
Data Source:	www.ncua.gov, 5310 reports			
Month Ended	Monthly Fee Income	Total Assets	Unannualized Ratio of Monthly Fee Income to Assets	Wescorp Annualized Fee Income as Percent of Assets
3/31/2007	2,507,840	31,263,380,276	0.01%	0.10%
6/30/2007	2,532,650	32,096,221,602	0.01%	0.09%
9/30/2007	2,255,271	33,256,328,361	0.01%	0.08%
12/31/2007	2,556,267	32,517,008,547	0.01%	0.09%
3/31/2008	2,375,798	29,887,733,477	0.01%	0.10%
6/30/2008	2,428,627	28,154,455,424	0.01%	0.10%
9/30/2008	2,515,371	25,234,118,629	0.01%	0.12%
12/31/2008	2,504,064	14,099,635,919	0.02%	0.21%
3/31/2009	2,430,971	20,351,920,126	0.01%	0.14%
6/30/2009	2,362,280	19,003,841,521	0.01%	0.15%
9/30/2009	2,458,738	18,326,698,284	0.01%	0.16%
11/30/2009	2,130,946	21,461,715,155	0.01%	0.12%
Average				0.12%
Maximum				0.21%
Minimum				0.08%

For Southwest Corporate, non-interest fee income averaged 29 basis points and seemed to actually rise as asset volumes declined in response to the credit crisis.

Organization:		Southwest Corporate Federal Credit Union			
Data Source:		www.ncua.gov, 5310 reports			
Month Ended	Date	Monthly Fee Income	Total Assets	Unannualized Ratio of Monthly Fee Income to Assets	Southwest Corporate Annualized Fee Income as Percent of Assets
3/31/2007	20070331	2,023,174	13,485,071,929	0.02%	0.18%
6/30/2007	20070630	1,876,441	12,699,255,157	0.01%	0.18%
9/30/2007	20070930	1,890,879	12,563,606,331	0.02%	0.18%
12/31/2007	20071231	2,947,800	12,713,605,125	0.02%	0.28%
3/31/2008	20080331	2,271,892	12,822,870,569	0.02%	0.21%
6/30/2008	20080630	2,585,202	10,557,313,020	0.02%	0.29%
9/30/2008	20080930	2,989,618	9,238,393,433	0.03%	0.39%
12/31/2008	20081231	2,278,794	7,532,036,645	0.03%	0.36%
3/31/2009	20090331	2,399,391	9,763,060,682	0.02%	0.29%
6/30/2009	20090630	2,384,808	7,785,846,044	0.03%	0.37%
9/30/2009	20090930	2,503,524	7,012,348,362	0.04%	0.43%
11/30/2009	20091130	2,310,745	8,018,221,289	0.03%	0.35%
Average					0.29%
Maximum					0.43%
Minimum					0.18%

The 5310 financial reports for the corporate credit unions do not provide a detailed breakdown of fee income and non-interest expense. If we can make the assumption that fee income stems from non-investment businesses of the corporate credit unions and if we assume that these businesses are on average break-even, then the non-interest expenses less fee income, all expressed as a percentage of assets, will be a better estimate of the efficiency of the corporate credit unions as fund managers. As before, we have added the annualized 15 basis point earnings target to net expenses. We again compare U.S. Central, Wescorp and Southwest to the 24 fixed income funds managed by Fidelity and Vanguard:

Comparison of Expense Ratios versus Fidelity and Vanguard Fixed Income Funds

Rank	Fund Manager	Fund Name	Expense Ratio	Less Non-Interest Income	Net Expense Ratio
1	Vanguard	Total bond market index, Institutional plus	0.05%		0.05%
2	Vanguard	Total bond market II index, Institutional	0.07%		0.07%
3	Vanguard	Extended duration Treasury index, Institutional plus	0.08%		0.08%
4	Vanguard	Short term government bond index, Institutional	0.09%		0.09%
5	Vanguard	Inflation Protected Securities	0.09%		0.09%
6	Vanguard	Intermediate term bond index, Institutional	0.09%		0.09%
7	Vanguard	Intermediate term government bond index, institutional	0.09%		0.09%
8	Vanguard	Mortgage-backed securities index, Institutional	0.09%		0.09%
9	Vanguard	Long term bond index, institutional	0.09%		0.09%
10	Vanguard	Short term Federal, Admiral	0.12%		0.12%
11	Vanguard	Short term treasury	0.12%		0.12%
12	Vanguard	Intermediate term Treasury, Admiral	0.12%		0.12%
13	Vanguard	Long term Treasury, Admiral	0.12%		0.12%
14	Vanguard	GNMA, Admiral	0.13%		0.13%
15	Vanguard	Short term bond index, Signal	0.14%		0.14%
16	Fidelity	Fidelity Institutional Money Market-Money Market Portfolio, Institutional Class	0.20%		0.20%
17	Fidelity	Fidelity Institutional Money Market Prime Money Market Portfolio	0.23%		0.23%
18	Fidelity	Fidelity Institutional Money Market-Money Market Portfolio, Class I	0.23%		0.23%
19	Fidelity	Fidelity Institutional Money Market-Government Portfolio, Class I	0.23%		0.23%
20	**US Central**	**Expenses plus ROA Target**	**0.31%**	**0.05%**	**0.26%**
21	**Southwest Corporate**	**Expenses plus ROA Target**	**0.56%**	**0.29%**	**0.27%**
22	**Wescorp**	**Expenses plus ROA Target**	**0.49%**	**0.12%**	**0.37%**
23	Fidelity	Fidelity GNMA	0.45%		0.45%
24	Fidelity	Fidelity Government Income	0.45%		0.45%
25	Fidelity	Fidelity Intermediate Bond	0.45%		0.45%
26	Fidelity	Fidelity Intermediate Government Income	0.45%		0.45%
27	Fidelity	Fidelity Total Bond	0.45%		0.45%

With the earnings target imposed, all three of these corporate credit unions appear to offer more expensive fund management services than 19 out of 24 funds managed by Fidelity and Vanguard.

These discrepancies lead to another cautionary note: if the business model of a corporate credit union is very difficult to maintain, and the corporate credit union is required to meet certain regulatory minimum for profits, said minimums may actually lead to more risk taking behavior in equilibrium. That is, if the only choices of a corporate credit union are to invest in unusual, high risk (but permissible by existing regulations) and high yielding securities, or to "fail" a regulatory requirement, the corporate credit union has an incentive to find loopholes that allow it to take more risk to maximize the probability that it hits a target that on average it is unlikely to meet.

Funding Costs and Likely Asset Returns

Another important by product of the Proposed Regulations is the imposition of a minimum level of legacy agency ratings of AA-. According to the Kamakura database, only 109 of 7,000 public firms in the United States were rated this highly on March 31, 2007. Not only is this quite a severe restriction on corporate investment, but the credit quality of firms above the ratings threshold actually exceeds the credit quality of many of the corporate credit unions themselves. In general, financial intermediation is profitable due two key activities:

- Financial intermediaries generally pool short term funds from deposits and lend longer term to borrowers.
- Financial intermediaries generally lend to borrowers whose credit quality is nowhere near as good as the financial institution itself.

This puts a corporate credit union that is forced to lend to corporations with better credit quality in a difficult position, since many of its potential investments would have a negative funding spread. To illustrate how pervasive this problem is in the corporate credit sector, Kamakura used its research data basis of credit default swap quotes from Markit Partners to compare the 1 year credit default swap quotes with the 1 year interest rate swap spread as a proxy for corporate credit union funding costs.[15] Kamakura averaged all quotes on a given day regardless of the restructuring language ("modified," "modified modified," etc.). Only U.S. dollar denominated quotations were used. This table summarizes the findings for the March 31, 2007 to March 31, 2009 period:

[15] This term was chosen as it is consistent with the weighted average life constraint in the proposed regulations.

Comparison of 1 Year Credit Default Swap Rates and 1 Year Interest Rate Swap Spread
Source: Kamakura Corporation, Markit Partners, Board of Governors of the Federal Reserve System

Counterparty	Average Spread Advantage vs Swap Curve (Percent)	Maximum Spread Advantage (Percent)	Minimum Spread Advantage (Percent)	Number of Observations	Number of Observations with Positive Spread	Percent of Observations with Positive Spread
Merrill Lynch & Co Inc	1.38	7.54	-0.50	489	353	72.2%
Citigroup Inc	0.71	8.55	-1.00	495	269	54.3%
Wachovia Corp	0.46	20.80	-0.95	486	262	53.9%
Citibank N A	0.15	5.07	-1.10	460	162	35.2%
Wachovia Bk Natl Assn	0.13	6.28	-1.49	481	165	34.3%
Wells Fargo & Co	-0.12	3.28	-1.26	489	102	20.9%
JPMorgan Chase & Co	-0.21	2.19	-1.27	492	91	18.5%
Procter & Gamble Co	-0.39	0.65	-1.44	489	89	18.2%
Wells Fargo Bk NA	-0.26	2.69	-1.51	414	72	17.4%
Medtronic Inc	-0.43	0.75	-1.72	490	83	16.9%
U S Bancorp	-0.32	1.06	-1.10	489	75	15.3%
Unocal Corp	-0.52	0.54	-1.69	489	66	13.5%
Chevron Corp	-0.51	0.50	-1.49	494	60	12.1%
3M Co	-0.55	0.47	-1.71	489	57	11.7%
Pfizer Inc	-0.57	0.53	-1.72	489	49	10.0%
JPMorgan Chase Bk Natl Assn	-0.45	1.03	-1.50	470	31	6.6%
Exxon Mobil Corp	-0.60	0.31	-1.69	489	9	1.8%
Mobil Corp	-0.62	0.07	-1.77	442	7	1.6%
Genentech Inc	-0.52	0.04	-1.45	478	2	0.4%
Becton Dickinson & Co	-0.67	-0.01	-1.79	309	0	0.0%
Becton Dickinson & Co Inc	-0.56	-0.27	-1.19	185	0	0.0%
Johnson & Johnson	-0.62	-0.03	-1.66	492	0	0.0%
Microsoft Corp	-0.68	-0.29	-1.86	443	0	0.0%
PACCAR Finl CORP	-0.64	-0.07	-1.91	476	0	0.0%
Sysco Corp	-0.59	-0.02	-1.66	489	0	0.0%

Only three firms allow for a positive funding spread more than half of the time, and six firms have no observations with a positive funding spread. Note also that the only quotes where a positive spread was obtainable more than 30% of the time were those credits that were ultimately rescued in some form or another (suggesting that their appearance beyond the ratings threshold may have been in error): Merrill Lynch, Citigroup, Citibank NA, Wachovia Corporation, and Wachovia Bank.

ROA and ROE Targets

Kamakura believes that ROA and ROE targets are often outside of the control of the financial institution. That is, for any given level of leverage, a financial institution's ability to meet or exceed a given funding target can be entirely determined by prevailing interest rates, even when the institution achieves a zero (or negative) funding spread. The following section explains these issues in detail.

The chart below assumes a flat liability cost curve and shows ROA on an annualized basis as the funding spread on assets stays constant but liability costs rise or fall:

Assumptions:	Asset Totals	10,000 million
	Capital	400 million

Annualized Return on Assets for Various Rate Levels and Spreads

	Spread versus Liability Costs on Assets Funded							
Level of Liability Costs	**0.00%**	**0.05%**	**0.10%**	**0.15%**	**0.20%**	**0.25%**	**0.50%**	**1.00%**
0.00%	0.00%	0.05%	0.10%	0.15%	0.20%	0.25%	0.50%	1.00%
1.00%	0.04%	0.09%	0.14%	0.19%	0.24%	0.29%	0.54%	1.04%
2.00%	0.08%	0.13%	0.18%	0.23%	0.28%	0.33%	0.58%	1.08%
3.00%	0.12%	0.17%	0.22%	0.27%	0.32%	0.37%	0.62%	1.12%
4.00%	0.16%	0.21%	0.26%	0.31%	0.36%	0.41%	0.66%	1.16%
5.00%	0.20%	0.25%	0.30%	0.35%	0.40%	0.45%	0.70%	1.20%
6.00%	0.24%	0.29%	0.34%	0.39%	0.44%	0.49%	0.74%	1.24%
7.00%	0.28%	0.33%	0.38%	0.43%	0.48%	0.53%	0.78%	1.28%
8.00%	0.32%	0.37%	0.42%	0.47%	0.52%	0.57%	0.82%	1.32%
9.00%	0.36%	0.41%	0.46%	0.51%	0.56%	0.61%	0.86%	1.36%
10.00%	0.40%	0.45%	0.50%	0.55%	0.60%	0.65%	0.90%	1.40%
11.00%	0.44%	0.49%	0.54%	0.59%	0.64%	0.69%	0.94%	1.44%
12.00%	0.48%	0.53%	0.58%	0.63%	0.68%	0.73%	0.98%	1.48%
13.00%	0.52%	0.57%	0.62%	0.67%	0.72%	0.77%	1.02%	1.52%
14.00%	0.56%	0.61%	0.66%	0.71%	0.76%	0.81%	1.06%	1.56%
15.00%	0.60%	0.65%	0.70%	0.75%	0.80%	0.85%	1.10%	1.60%

If A is the amount of assets, C is the amount of capital, *r* is the liability cost, and *s* is the spread on assets, then ROA is given by

$$ROA = \frac{(A(r+s) - r(A-C))}{A}$$

As the table shows, once rates are above 4%, a model corporate credit union can meet a mandated 0.15% annualized earnings target with zero spread.[16] That is, the level of interest rates in the economy can entirely dictate the corporate credit union's ability to meet the mandated retained earnings and return on assets targets. For this reason, Kamakura believes that a required minimum funding spread may be more appropriate here.

[16] This can be extended to any target with any level of rates: given the target and prevailing rates, one can determine the funding spread required to achieve the target. This minimum spread can easily be negative.

Interest Rate Mismatching

In this section we delineate the degree to which interest rate mismatching can contribute to the retained earnings target of the Proposed Regulations, both with and without the interest rate risk management constraints of 704.8(d)(e)(f) of the Proposed Regulations.

We start by analyzing a simple model corporate credit union that has no competitive advantage and both borrows and invests at market prices, say at the interest rate swap curve. This simplifying assumption appears fairly accurate based on funding rates posted on its website in January 2010 by Southwest Corporate Federal Credit Union. We also assume that this model credit union can either borrow or lend at the standard "on the run" maturities of 1 month, 2 months, 3 months, 6 months, 1 year, 2 years, 3 years or 4 years.[17]

We assume for simplicity that all interest paid or received is paid or received at the maturity of the instrument. "Sustainable" strategies are defined as strategies of constant investing or borrowing at the same maturities. These are the strategies available to a model corporate credit union with assets of $10 billion and capital at the required 4% level ($400 million):

	Moving Average Maturity Strategy Assumed							
Plus Alpha Analysis	1 month	2 month	3 month	6 month	1 year	2 years	3 years	4 years
Assumed Moving Average Rate	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Assumed Number of Days	30	61	91	182	365	730	1095	1461
Principal Maturing Per Day	333.333	163.934	109.890	54.945	27.397	13.699	9.132	6.845
Interest Per Day	1.370	1.370	1.370	1.370	1.370	1.370	1.370	1.370
Total Daily Cash Flow	334.703	165.304	111.260	56.315	28.767	15.068	10.502	8.214

We assume the simplest possible structure—nothing but fixed rate assets and liabilities and with all "legacy" assets and liabilities at the same 5% coupon level. We will answer this question: if yields rise from the base case of 5% flat zero coupon yield by 300 basis points or fall by 300 basis points, what combinations of asset and liability strategies would be ruled out by the test in section 704.8(d) of the Proposed Regulations?[18]

We calculate the net present value of moving average portfolios with a book value of $10 billion at the on the run maturities at a 5% zero coupon yield:

	Net Present Value of 10,000 Par Value Zero Coupon Yield Level										
Maturity	**0.00%**	**0.50%**	**1.00%**	**1.50%**	**2.00%**	**2.50%**	**3.00%**	**3.50%**	**4.00%**	**4.50%**	**5.00%**
1 month	10,041	10,039	10,037	10,035	10,033	10,030	10,028	10,026	10,024	10,022	10,020
2 month	10,084	10,079	10,075	10,071	10,066	10,062	10,058	10,054	10,049	10,045	10,041
3 month	10,125	10,118	10,112	10,106	10,099	10,093	10,086	10,080	10,074	10,067	10,061
6 month	10,249	10,236	10,224	10,211	10,198	10,185	10,173	10,160	10,147	10,135	10,122
1 year	10,500	10,474	10,448	10,421	10,395	10,369	10,344	10,318	10,292	10,267	10,241
2 years	11,000	10,945	10,891	10,836	10,783	10,729	10,676	10,623	10,571	10,519	10,467
3 years	11,500	11,414	11,329	11,245	11,161	11,079	10,997	10,916	10,836	10,757	10,678
4 years	12,001	11,882	11,764	11,648	11,533	11,420	11,308	11,198	11,089	10,982	10,876

[17] Maturities longer than 4 years because an on-going investment strategy at a longer maturity would violate the 2 year weighted average life requirement in the Proposed Regulations.

[18] This section discusses the baseline authority of the test. The base-plus authority allows 3 additional portfolios out of the 56 as the stress test limit in 704.8(d) increases from 15% to 20%

Note that the results are not equal to 10,000 at a 5% discount rate because the interest payments are not compounded (following market convention). We then assume that our model corporate credit union "buys in" to these moving average portfolios by borrowing $9.6 billion market value (a slightly different par value amount) and investing $10 billion, including the proceeds from the $400 million in capital. Note that the net economic value at this starting point will be $400 million for any combination of asset and liability maturities as everything thus far has been constructed at market prices.

We then shift the yield curve up and down by 300 basis points as required by Proposed Regulation 704.8(d). The resulting net economic values are shown below:

Upward Shift of Yields by 3%

Capital Ratio:	4.00%	Asset Strategy (Maturity)							
Interest Rate Levels:	8.00%	1 month	2 month	3 month	6 month	1 year	2 years	3 years	4 years
Liability Strategy (Maturity)	Strategy Number	1	2	3	4	5	6	7	8
1 month	1	399	387	375	338	265	123	-14	-146
2 month	2	412	399	387	350	277	135	-2	-134
3 month	3	423	411	398	362	288	146	10	-122
6 month	4	459	446	434	397	324	182	45	-87
1 year	5	529	516	504	467	394	252	115	-17
2 years	6	665	653	640	604	530	388	252	119
3 years	7	797	784	772	735	662	520	383	251
4 years	8	924	911	899	862	789	647	510	378

When stated in terms of percentage changes, the results are as follows:

Percentage Change in Net Economic Value If Yields Shift Up 3%

Capital Ratio:	4.00%	Asset Strategy (Maturity)							
Interest Rate Levels:	8.00%	1 month	2 month	3 month	6 month	1 year	2 years	3 years	4 years
Liability Strategy (Maturity)	Strategy Number	1	2	3	4	5	6	7	8
1 month	1	-0.13%	-3.30%	-6.36%	-15.58%	-33.87%	-69.36%	-103.56%	-136.60%
2 month	2	2.92%	-0.25%	-3.31%	-12.53%	-30.82%	-66.31%	-100.51%	-133.56%
3 month	3	5.85%	2.68%	-0.38%	-9.60%	-27.89%	-63.38%	-97.58%	-130.62%
6 month	4	14.71%	11.53%	8.48%	-0.75%	-19.04%	-54.52%	-88.72%	-121.77%
1 year	5	32.26%	29.09%	26.04%	16.81%	-1.48%	-36.96%	-71.16%	-104.21%
2 years	6	66.33%	63.16%	60.10%	50.88%	32.59%	-2.90%	-37.10%	-70.14%
3 years	7	99.16%	95.99%	92.94%	83.71%	65.42%	29.94%	-4.26%	-37.31%
4 years	8	130.89%	127.72%	124.66%	115.44%	97.14%	61.66%	27.46%	-5.59%

The combinations of asset and liability maturity strategies that are shaded in light red are prohibited by the base levels of Proposed Regulation 704.8(d). If we shift interest rates down by 300 basis points to a zero coupon yield level of 2%, we get the following net economic values relative to the starting level of $400 million:

Downward Shift of Yields by 3%

Capital Ratio:	4.00%	Asset Strategy (Maturity)							
Interest Rate Levels:	2.00%	1 month	2 month	3 month	6 month	1 year	2 years	3 years	4 years
Liability Strategy (Maturity)	Strategy Number	1	2	3	4	5	6	7	8
1 month	1	401	413	426	463	538	689	840	992
2 month	2	388	401	413	451	526	677	828	980
3 month	3	376	389	402	439	514	665	816	968
6 month	4	340	353	366	403	478	629	780	932
1 year	5	268	281	293	331	406	557	708	860
2 years	6	123	136	149	186	261	412	563	715
3 years	7	-22	-9	3	41	116	267	418	570
4 years	8	-167	-155	-142	-105	-30	121	272	424

In percentage change terms, the light red shading shows the asset and liability maturity combinations that would be prohibited under a down shift in rates:

Percentage Change in Net Economic Value If Yields Shift Down 3%

Capital Ratio:	4.00%	Asset Strategy (Maturity)							
Interest Rate Levels:	2.00%	1 month	2 month	3 month	6 month	1 year	2 years	3 years	4 years
Liability Strategy (Maturity)	Strategy Number	1	2	3	4	5	6	7	8
1 month	1	0.13%	3.31%	6.40%	15.76%	34.61%	72.28%	110.06%	148.03%
2 month	2	-2.93%	0.25%	3.34%	12.70%	31.55%	69.22%	107.00%	144.97%
3 month	3	-5.89%	-2.71%	0.38%	9.74%	28.59%	66.26%	104.04%	142.01%
6 month	4	-14.88%	-11.69%	-8.61%	0.75%	19.60%	57.28%	95.05%	133.03%
1 year	5	-32.97%	-29.79%	-26.70%	-17.34%	1.51%	39.18%	76.96%	114.93%
2 years	6	-69.14%	-65.96%	-62.87%	-53.51%	-34.66%	3.01%	40.79%	78.76%
3 years	7	-105.41%	-102.22%	-99.14%	-89.78%	-70.93%	-33.25%	4.52%	42.50%
4 years	8	-141.86%	-138.68%	-135.59%	-126.23%	-107.38%	-69.71%	-31.93%	6.04%

If we combine both up and down scenarios, we can see what combinations of asset and liability maturity combinations are allowed under the regulations:

Strategies Prohibited by 15% Limit in NEV Change on 3% Yield Shift

Capital Ratio:	4.00%	Asset Strategy (Maturity)							
Interest Rate Levels:	8.00%	1 month	2 month	3 month	6 month	1 year	2 years	3 years	4 years
Liability Strategy (Maturity)	Strategy Number	1	2	3	4	5	6	7	8
1 month	1	OK	OK	OK	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited
2 month	2	OK	OK	OK	OK	Prohibited	Prohibited	Prohibited	Prohibited
3 month	3	OK	OK	OK	OK	Prohibited	Prohibited	Prohibited	Prohibited
6 month	4	OK	OK	OK	OK	Prohibited	Prohibited	Prohibited	Prohibited
1 year	5	Prohibited	Prohibited	Prohibited	Prohibited	OK	Prohibited	Prohibited	Prohibited
2 years	6	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited	OK	Prohibited	Prohibited
3 years	7	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited	OK	Prohibited
4 years	8	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited	OK

The only mismatching that is a realistic option under Proposed Regulation 704.8(d) at common "on the run" maturities is for maturities of six months or less. At 1 year and longer maturities, the incremental interest rate risk from moving to the adjacent on the run maturity would violate the Proposed Regulations.[19]

A model corporate credit union has very limited opportunities to achieve the retained earnings target of 0.45% of assets after three years by interest rate mismatching: borrowing short and lending long. While this is often described as the fundamental process of financial intermediation, it is not the means by which a model corporate credit union can meet the retained earnings target in the Proposed Regulations. In terms of a corporate credit unions investment options, that ability will come only by one of three methods:[20]

- By purchasing assets that yield more than their "risk adjusted" market price. Since the model corporate credit unions will rely primarily on traded securities for their investment strategies, this is unlikely.
- By funding themselves at "below market rates." While Kamakura did not have access to day-to-day funding rates of corporate credit unions, evidence reported in the next section indicates that the model corporate credit unions will only be able to finance themselves at costs very close "to market," as measured by the swap curve.
- By being more efficient in their operations than competitors in the fund management business. However, as discussed in the previous section, 19 of 24 funds examined were more efficient than U.S. Central (if the 15 basis point return on assets target is added) and all 24 were more efficient than Wescorp and Southwest Corporation on the same basis.

We can examine interest rate mismatching by asking another question: if we have the expenses and retained earnings hurdle imposed on a model corporate credit union in the Proposed Regulations, what percentage of the time from 1990-1992 (depending on the swap maturity) to the present would U.S. Central, Wescorp and Southwest Corporate been able to meet (or fail to meet) proposed earnings targets?

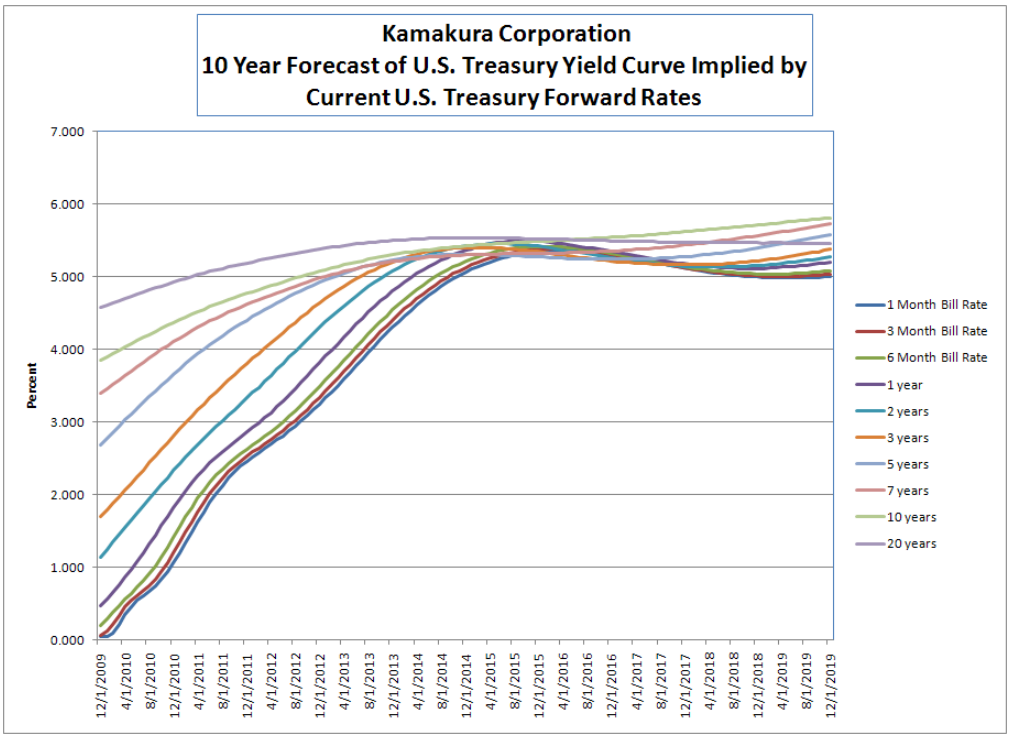
The answer to that question depends on which expense level over the 2007-2009 period is assumed:

[19] The "base-plus" authority in the proposed rule allows three additional cells in this matrix.
[20] Kamakura ignores changes in an MCCU's expenses, or changes in the fees associated with non-investment services and products as dynamic expenses and fees are beyond the scope of this analysis.

Spread Analysis	Daily Spread, 2 Year Swap Rate vs 30 Day Funding Cost and 4% Capital	Daily Spread, 3 Year Swap Rate vs 30 Day Funding Cost and 4% Capital	Daily Spread, 4 Year Swap Rate vs 30 Day Funding Cost and 4% Capital
Average	1.162	1.538	1.724
Maximum	3.760	4.436	4.979
Minimum	-0.942	-1.309	-1.396
Standard Deviation	1.231	1.640	1.746
Observations	5031	4771	4512
Observations above			
a. US Central target	3621	3495	3644
b. Wescorp target	3370	3407	3400
c. Southwest target	3235	3371	3289
Percent above			
a. US Central target	71.97%	73.26%	80.76%
b. Wescorp target	66.98%	71.41%	75.35%
c. Southwest target	64.30%	70.66%	72.89%
Percent in Which Regulations Violated			
a. US Central target	28.03%	26.74%	19.24%
b. Wescorp target	33.02%	28.59%	24.65%
c. Southwest target	35.70%	29.34%	27.11%

At the US Central 2007-2009 expense level and 0.15% earnings target, interest rate mismatching would have resulted in the regulations (ROA of at least 0.15% above expenses) being violated 28.03% of the 5,301 business days starting October 31, 1990 with a 1 month-2 year mismatching strategy. If the mismatching strategy were 1 month-3 years, the regulations at the U.S. Central expenses levels would have been violated 26.74% of the time. With a 1 month-4 year mismatching strategy, at U.S. Central expenses levels, the regulations would have been violated 19.25% of the time. At the Wescorp expense levels with the 0.15% ROA target, the Proposed Regulations would not have been met on 33.02%, 28.59%, and 24.65% of the business days for the three mismatching strategies respectively. For Southwest Corporate, the Proposed Regulations would have been violated on 35.70%, 29.34%, and 27.11% of the business days for the three mismatching strategies. A 2 year mismatching strategy produced negative spreads 22% of the business days from October 31, 1990. 25% of the business days do not produce the target ROA of 0.15%, even if expenses were assumed to be zero. For a three year mismatching strategy,, 20% of the business days produced a negative spread and 23% of days failed to produce the target ROA of 0.15%. For the four year mismatching strategy, 17% of business days produced a negative spread and 18% of business days failed to meet the target ROA of 0.15%.

This issue of mis-matching is even more serious than these historical examples indicate for two reasons. First is the lack of diversification among corporate credit union strategies; if one corporate credit union has a negative spread or is failing to meet target profits after expenses, it is likely that all other corporate credit unions have the same problem at the same time. The second issue is the forward yield curves embedded in the U.S. Treasury yield curve on December 31, 2009. Using implied forward rates to extract the market expectations for the future, one can see that the projection is for a very substantial flattening of the yield curve (depicted below). A flattening of the yield curve makes it even less likely that a mismatching strategy can succeed to meet the profit targets in the Proposed Regulations than we observed in the October, 1990 to February 2010 period.



Conclusions of Preliminary Analysis

The proposed regulations largely affect the lines of business where the corporate credit unions have intense competition. Even without the additional restrictions in the proposed regulation, corporate credit unions appear much less efficient than other financial services firms with which they compete. Indeed, the extent of the inefficiencies are so large that without the regulatory advantages and other services that corporate credit unions offer to natural person credit unions, Kamakura believes it is unlikely that they would be successful in this space.

The ratings requirements in the proposed regulations remove roughly 98.5% of the publicly traded firms from potential investments. In fact, the remaining firms in which corporate credit unions are eligible to invest appear to have had higher credit quality than the corporate credit unions, and as such would be unattractive investments that were unlikely to produce a positive funding spread. Return on earnings targets in general seem attainable in large part due to general market conditions that corporate credit unions cannot control. A preliminary analysis of the rate mismatching abilities of corporate credit unions

suggest that the targets in the proposed regulations seem particularly difficult to attain given the limits on interest mismatching in the proposed rule, and the market's expectation of a much flatter yield curve.

Kamakura Impact Analysis- Part II: Constructing the Simulations

Mandated Scenarios

NCUA instructions for this project were clear that the simulations be done without the legacy assets that have been adversely affected by the credit crisis.[21] The project instructions with respect to weighted average life, asset and liability mismatch, and investment in non-government mortgage-related securities be done both at the maximum permitted limits and at 80% of the permitted limits.[22]

Asset weighted average life

- Maximum permitted;
- 80% of maximum.

Asset liability mismatch

- Maximum permitted;
- 80% of maximum.

Investment in non-government mortgage-related securities

- Maximum permitted;
- None.
-

The NCUA has specified 12 liability structures with 3 different levels of overnight funding and 4 different weighted average lives in its instructions for the Impact Analysis. For any given combination of overnight funding and weighted average life, the liability structure is not unique. From the infinite number of potential liability structures for each combination of overnight funding and WAL, Kamakura endeavored to choose the structure that was closest to "normal" for a representative corporate credit union. This procedure will be discussed in detail later in the document.

This next section discusses the construction of the "asset universe" from which both the 2007 and 2009 portfolios were constructed.

Construction of Candidate Asset Universe(s)

Asset Class 1: U.S. Treasuries

Kamakura's modeling team randomly selected 100 U.S. Treasury issues of various maturities as candidate assets. Kamakura and NCUA staff acknowledge that U.S. Treasuries are suboptimal from a spread point of view but they provide a liquidity management benefit, presumably zero credit losses, and have the

[21] Kamakura believes then that any interpretation of the results should be not as applied to the corporate credit unions as they exist today, but as they will exist once they are appropriately recapitalized and have thus recovered from the credit crisis.

[22] The ultimate portfolios that can be produced under the base plus authority of the proposed regulations substantially limit the usefulness of many of these scenarios.

potential of lowering funding costs once potential holders of the model corporate credit union's liabilities see the low degree of credit risk on the asset side of the organization. In the limit, funding costs should decline to repurchase agreement levels for Treasury collateral as the asset side approaches 100% in U.S. Treasuries. Kamakura believes a reasonable interpretation of Treasury holdings by the model corporate credit union to be "liquid, extremely low risk holdings" rather than United States Treasury Securities in particular.

Asset Class 2: U.S. Corporate Candidates for Investment

In the Proposed Regulations, 704.6 (f) requires all investments to be rated AA- or better. For purposes of the March 31, 2007 and December 31, 2009 simulations, we imposed two constraints on candidate corporate debt instruments:

- The issuer had to have been rated AA- or better on the relevant date
- Markit Partners credit default swap data base had to contain a quotation for that particular issuer on the relevant date

It is Kamakura's judgment that a corporation whose CDS is not traded would not present a regular and realistic investment opportunity for a model corporate credit union and as such should not be included in the universe available for purchase. Since the Credit Default Swap quote represents the intersection of supply and demand for credit and is not itself a default probability, we require the availability of default probabilities. Kamakura employs their KRIS service for corporate default probabilities. We assume that the MCCU can at least yield the CDS quote plus the matched maturity US Treasury yield for that credit. Actual bonds would generally yield more, so this yield assumption is conservative but still realistic.

We assume that exposure to each corporate name is split evenly between the 4 maturities for which CDS quotes are available:

- 1 year
- 3 years
- 5 years
- 10 years

As of March 31, 2007, the following corporations were rated AAA according to the Kamakura Risk Information Services corporate default probability service:

Kamakura Corporation KRIS

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Ticker	Company	Country	Rating	1 Mo (%)	3 Mo (%)	6 Mo (%)	1 Yr (%)	2 Yr (%)	3 Yr (%)	5 Yr (%)
MSFT	MICROSOFT CORP	USA	AAA	0.00	0.00	0.00	0.04	0.19	0.41	0.65
ADP	AUTOMATIC DATA PROCESSING	USA	AAA	0.00	0.00	0.00	0.02	0.09	0.19	0.30
XOM	EXXON MOBIL CORP	USA	AAA	0.00	0.00	0.00	0.00	0.02	0.06	0.12
BRK.A	BERKSHIRE HATHAWAY	USA	AAA	0.00	0.00	0.00	0.00	0.01	0.03	0.06
FNM	FANNIE MAE	USA	AAA	0.00	0.00	0.00	0.01	0.06	0.10	0.11
FRE	FEDERAL HOME LOAN MORTG CORP	USA	AAA	0.00	0.00	0.00	0.01	0.05	0.08	0.08
JNJ	JOHNSON & JOHNSON	USA	AAA	0.00	0.00	0.00	0.00	0.04	0.09	0.14

Only two firms were rated AA+ on March 31, 2007:

Kamakura Corporation KRIS

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Ticker	Company	Country	Rating	1 Mo (%)	3 Mo (%)	6 Mo (%)	1 Yr (%)	2 Yr (%)	3 Yr (%)	5 Yr (%)
GE	GENERAL ELECTRIC CO	USA	AA+	0.00	0.00	0.01	0.04	0.17	0.32	0.45
GWW	GRAINGER (W W) INC	USA	AA+	0.00	0.00	0.00	0.00	0.03	0.08	0.16

8 firms were rated AA on that date:

Kamakura Corporation KRIS

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Ticker	Company	Country	Rating	1 Mo (%)	3 Mo (%)	6 Mo (%)	1 Yr (%)	2 Yr (%)	3 Yr (%)	5 Yr (%)
GAS	NICOR INC	USA	AA	0.00	0.00	0.01	0.02	0.08	0.20	0.35
ABT	ABBOTT LABORATORIES	USA	AA	0.00	0.00	0.00	0.01	0.04	0.12	0.21
CVX	CHEVRON CORP	USA	AA	0.00	0.00	0.00	0.00	0.02	0.06	0.13
PFE	PFIZER INC	USA	AA	0.00	0.00	0.01	0.05	0.19	0.32	0.45
CME	CME GROUP INC	USA	AA	0.00	0.00	0.00	0.00	0.01	0.04	0.07
NYX	NYSE EURONEXT	USA	AA	0.00	0.00	0.00	0.00	0.02	0.05	0.09
WMT	WAL-MART STORES INC	USA	AA	0.00	0.00	0.00	0.01	0.07	0.13	0.21
LLY	LILLY (ELI) & CO	USA	AA	0.00	0.00	0.00	0.00	0.03	0.06	0.09

An additional 21 firms were rated AA- on March 31, 2007:

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Ticker	Company	Country	Rating	1 Mo (%)	3 Mo (%)	6 Mo (%)	1 Yr (%)	2 Yr (%)	3 Yr (%)	5 Yr (%)
NWN	NORTHWEST NATURAL GAS CO	USA	AA-	0.00	0.00	0.01	0.02	0.08	0.19	0.35
WFC	WELLS FARGO & CO	USA	AA-	0.00	0.01	0.02	0.05	0.13	0.21	0.28
BK.Z	BANK OF NEW YORK MELLON CORP	USA	AA-	0.00	0.00	0.01	0.02	0.06	0.12	0.19
WGL	WGL HOLDINGS INC	USA	AA-	0.00	0.00	0.01	0.05	0.20	0.39	0.58
GBBK	GREATER BAY BANCORP	USA	AA-	0.00	0.00	0.01	0.07	0.17	0.24	0.29
NTRS	NORTHERN TRUST CORP	USA	AA-	0.00	0.00	0.00	0.01	0.03	0.06	0.11
MGEE	MGE ENERGY INC	USA	AA-	0.00	0.00	0.00	0.02	0.12	0.27	0.42
ANAT	AMERICAN NATIONAL INSURANCE	USA	AA-	0.00	0.00	0.00	0.00	0.02	0.04	0.07
MRK	MERCK & CO	USA	AA-	0.00	0.00	0.00	0.01	0.06	0.15	0.26
PCAR	PACCAR INC	USA	AA-	0.00	0.00	0.00	0.00	0.03	0.10	0.18
BDX	BECTON DICKINSON & CO	USA	AA-	0.00	0.00	0.00	0.00	0.02	0.07	0.15
CL	COLGATE-PALMOLIVE CO	USA	AA-	0.00	0.00	0.00	0.00	0.03	0.10	0.25
SYY	SYSCO CORP	USA	AA-	0.00	0.00	0.00	0.03	0.16	0.31	0.53
PG	PROCTER & GAMBLE CO	USA	AA-	0.00	0.00	0.00	0.01	0.05	0.11	0.24
AB	ALLIANCEBERNSTEIN HOLDING LP	USA	AA-	0.00	0.00	0.00	0.00	0.01	0.05	0.09
BEN	FRANKLIN RESOURCES INC	USA	AA-	0.00	0.00	0.00	0.00	0.01	0.04	0.07
BNK	TD BANKNORTH INC	USA	AA-	0.00	0.00	0.00	0.03	0.11	0.14	0.16
DNA	GENENTECH INC	USA	AA-	0.00	0.00	0.00	0.00	0.03	0.08	0.13
MDT	MEDTRONIC INC	USA	AA-	0.00	0.00	0.00	0.01	0.05	0.11	0.16
MMM	3M CO	USA	AA-	0.00	0.00	0.00	0.00	0.03	0.06	0.10
UPS	UNITED PARCEL SERVICE INC	USA	AA-	0.00	0.00	0.00	0.00	0.03	0.06	0.09

Of the 109 public and privately held firms with ratings of AA- or better on March 31, 2007, only 17 had available credit default swap quotes.

				Markit CDS quotes in percent as of 3/31/2007			
Ticker	GVKEY	Name	Rating as of 3/31/2007	1 year	3 year	5 year	10 year
BAC2	007267	MERRILL LYNCH & CO INC	AA-	0.1	0.16	0.27	0.39
UCL	011038	UNOCAL CORP	AA	0.02	0.09	0.16	0.24
JPM	002968	JPMORGAN CHASE & CO	AA-	0.05	0.08	0.15	0.22
SYY	010247	SYSCO CORP	AA-		0.04	0.13	0.21
WB	004739	WACHOVIA CORP	AA-	0.03	0.07	0.11	0.17
C	003243	CITIGROUP INC	AA	0.05	0.06	0.1	0.16
WFC	008007	WELLS FARGO & CO	AA+	0.03	0.06	0.1	0.16
USB	004723	U S BANCORP	AA	0.02	0.05	0.09	0.16
DNA	005020	GENENTECH INC	AA		0.04	0.08	0.15
MDT	007228	MEDTRONIC INC	AA-	0.02	0.04	0.08	0.14
PG	008762	PROCTER & GAMBLE CO	AA-	0.02	0.03	0.08	0.13
MMM	007435	3M CO	AA	0.01	0.03	0.06	0.11
CVX	002991	CHEVRON CORP	AA		0.03	0.05	0.09
PFE	008530	PFIZER INC	AAA	0.01	0.02	0.04	0.07
XOM	004503	EXXON MOBIL CORP	AAA		0.02	0.03	0.05
JNJ	006266	JOHNSON & JOHNSON	AAA		0.02	0.03	0.05
MOB.	007475	MOBIL CORP	AAA		0.02	0.03	0.04

We now repeat this process for the December 31, 2009 valuation date. On that date, only five U.S. corporates were rated AAA:

Kamakura Corporation
KRIS

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Ticker	Company	Country	Rating	1 Mo (%)	3 Mo (%)	6 Mo (%)	1 Yr (%)	2 Yr (%)	3 Yr (%)	5 Yr (%)
MSFT	MICROSOFT CORP	USA	AAA	0.00	0.00	0.00	0.01	0.10	0.24	0.36
ADP	AUTOMATIC DATA PROCESSING	USA	AAA	0.00	0.00	0.00	0.01	0.10	0.18	0.23
JNJ	JOHNSON & JOHNSON	USA	AAA	0.00	0.00	0.00	0.00	0.03	0.08	0.12
BRK.A	BERKSHIRE HATHAWAY	USA	AAA	0.00	0.00	0.00	0.00	0.02	0.04	0.05
XOM	EXXON MOBIL CORP	USA	AAA	0.00	0.00	0.00	0.00	0.03	0.05	0.06

Two companies were rated AA+ on that date:

Kamakura Corporation
KRIS

Kamakura | Contact

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Ticker	Company	Country	Rating	1 Mo (%)	3 Mo (%)	6 Mo (%)	1 Yr (%)	2 Yr (%)	3 Yr (%)	5 Yr (%)
GE	GENERAL ELECTRIC CO	USA	AA+	0.00	0.01	0.06	0.31	0.87	1.06	1.10
GWW	GRAINGER (W W) INC	USA	AA+	0.00	0.00	0.00	0.00	0.03	0.08	0.16

8 companies were rated AA on December 31, 2009:

Kamakura Corporation
KRIS

Kamakura | Contact

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Ticker	Company	Country	Rating	1 Mo (%)	3 Mo (%)	6 Mo (%)	1 Yr (%)	2 Yr (%)	3 Yr (%)	5 Yr (%)
PFE	PFIZER INC	USA	AA	0.00	0.00	0.01	0.06	0.25	0.41	0.54
GAS	NICOR INC	USA	AA	0.00	0.00	0.00	0.01	0.10	0.19	0.25
NYX	NYSE EURONEXT	USA	AA	0.00	0.00	0.00	0.04	0.16	0.20	0.20
ABT	ABBOTT LABORATORIES	USA	AA	0.00	0.00	0.00	0.00	0.04	0.09	0.14
WMT	WAL-MART STORES INC	USA	AA	0.00	0.00	0.00	0.01	0.06	0.12	0.16
LLY	LILLY (ELI) & CO	USA	AA	0.00	0.00	0.00	0.01	0.08	0.13	0.17
CME	CME GROUP INC	USA	AA	0.00	0.00	0.00	0.00	0.02	0.03	0.04
CVX	CHEVRON CORP	USA	AA	0.00	0.00	0.00	0.00	0.03	0.06	0.08

18 companies were rated AA- on December 31, 2009:

Kamakura Corporation
KRIS

Kamakura | Contact

CREDIT NAME | CREDIT PORTFOLIO | PORTFOLIO ANALYSIS

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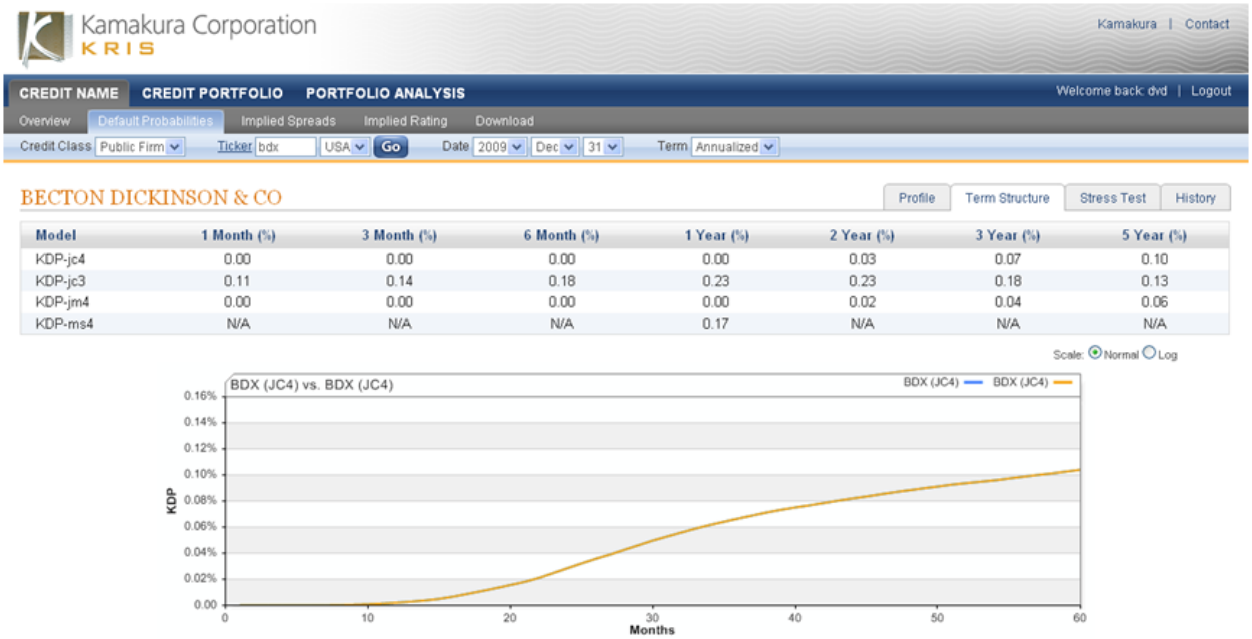
Ticker	Company	Country	Rating	1 Mo (%)	3 Mo (%)	6 Mo (%)	1 Yr (%)	2 Yr (%)	3 Yr (%)	5 Yr (%)
WFC	WELLS FARGO & CO	USA	AA-	0.00	0.01	0.02	0.08	0.25	0.33	0.34
WGL	WGL HOLDINGS INC	USA	AA-	0.00	0.00	0.01	0.03	0.16	0.29	0.39
MGEE	MGE ENERGY INC	USA	AA-	0.00	0.00	0.00	0.02	0.11	0.22	0.31
BK.Z	BANK OF NEW YORK MELLON CORP	USA	AA-	0.00	0.00	0.00	0.03	0.12	0.17	0.19
SYY	SYSCO CORP	USA	AA-	0.00	0.00	0.00	0.02	0.16	0.27	0.37
CL	COLGATE-PALMOLIVE CO	USA	AA-	0.00	0.00	0.00	0.00	0.04	0.09	0.17
ANAT	AMERICAN NATIONAL INSURANCE	USA	AA-	0.00	0.00	0.00	0.00	0.03	0.06	0.08
MDT	MEDTRONIC INC	USA	AA-	0.00	0.00	0.00	0.01	0.06	0.12	0.18
MMM	3M CO	USA	AA-	0.00	0.00	0.00	0.00	0.03	0.09	0.15
NWN	NORTHWEST NATURAL GAS CO	USA	AA-	0.00	0.00	0.00	0.01	0.08	0.15	0.19
PCAR	PACCAR INC	USA	AA-	0.00	0.00	0.00	0.01	0.11	0.20	0.27
PG	PROCTER & GAMBLE CO	USA	AA-	0.00	0.00	0.00	0.00	0.05	0.10	0.14
UPS	UNITED PARCEL SERVICE INC	USA	AA-	0.00	0.00	0.00	0.00	0.05	0.10	0.15
AB	ALLIANCEBERNSTEIN HOLDING LP	USA	AA-	0.00	0.00	0.00	0.01	0.06	0.10	0.13
BDX	BECTON DICKINSON & CO	USA	AA-	0.00	0.00	0.00	0.00	0.03	0.07	0.10
MRK	MERCK & CO	USA	AA-	0.00	0.00	0.00	0.01	0.05	0.11	0.17
NTRS	NORTHERN TRUST CORP	USA	AA-	0.00	0.00	0.00	0.01	0.04	0.07	0.08
BEN	FRANKLIN RESOURCES INC	USA	AA-	0.00	0.00	0.00	0.00	0.02	0.04	0.07

Fifteen names are rated AA- or better on 12/31/2009 with available CDS quotes. Note that four of these fifteen companies are in the oil industry: the restriction on corporate investment based on ratings seems to leave a universe of firms to invest in that are likely to be heavily exposed to particular, identifiable macro economic factors.

				Markit CDS quotes in percent as of			
Ticker	GVKEY	Name	Rating as of 12/31/2009	1 year	3 year	5 year	10 year
WFC	008007	WELLS FARGO & CO	AA-	0.594	0.7176	0.8689	0.9225
BDX	002111	BECTON DICKINSON & CO	AA-	0.3527	0.4554	0.6599	0.76
MDT	007228	MEDTRONIC INC	AA-	0.2738	0.3741	0.49	0.5516
PFE	008530	PFIZER INC	AA	0.1571	0.2609	0.3874	0.4971
DNA	005020	GENENTECH INC	AA-	0.2714	0.2696	0.3698	0.481
PG	008762	PROCTER & GAMBLE CO	AA-	0.1536	0.2546	0.3508	0.4492
JNJ	006266	JOHNSON & JOHNSON	AAA	0.1631	0.2339	0.3305	0.3935
SYY	010247	SYSCO CORP	AA-	0.071	0.1799	0.3205	0.4123
MMM	007435	3M CO	AA-	0.0982	0.1969	0.3193	0.4503
UCL	011038	UNOCAL CORP	AA	0.1887	0.2221	0.3053	0.357
MSFT	012141	MICROSOFT CORP	AAA	0.1751	0.267	0.2926	0.3849
CVX	002991	CHEVRON CORP	AA	0.0631	0.2106	0.2761	0.3809
PCAR	008253	PACCAR INC	AA-		0.215	0.2625	0.295
XOM	004503	EXXON MOBIL CORP	AAA	0.1555	0.1931	0.2438	0.2842
MOB.	007475	MOBIL CORP	AAA	0.1542	0.1883	0.2404	0.3579

For the U.S. corporate credits which met the criterion for inclusion in the investment universe, KRIS default probabilities and KRIS linkages to macro economic factors were used. In what follows, we report on the December 31, 2009 term structures of default risk for each corporation in the candidate universe. March 31, 2007 default term structures are available on request.

Becton Dickinson & Co.

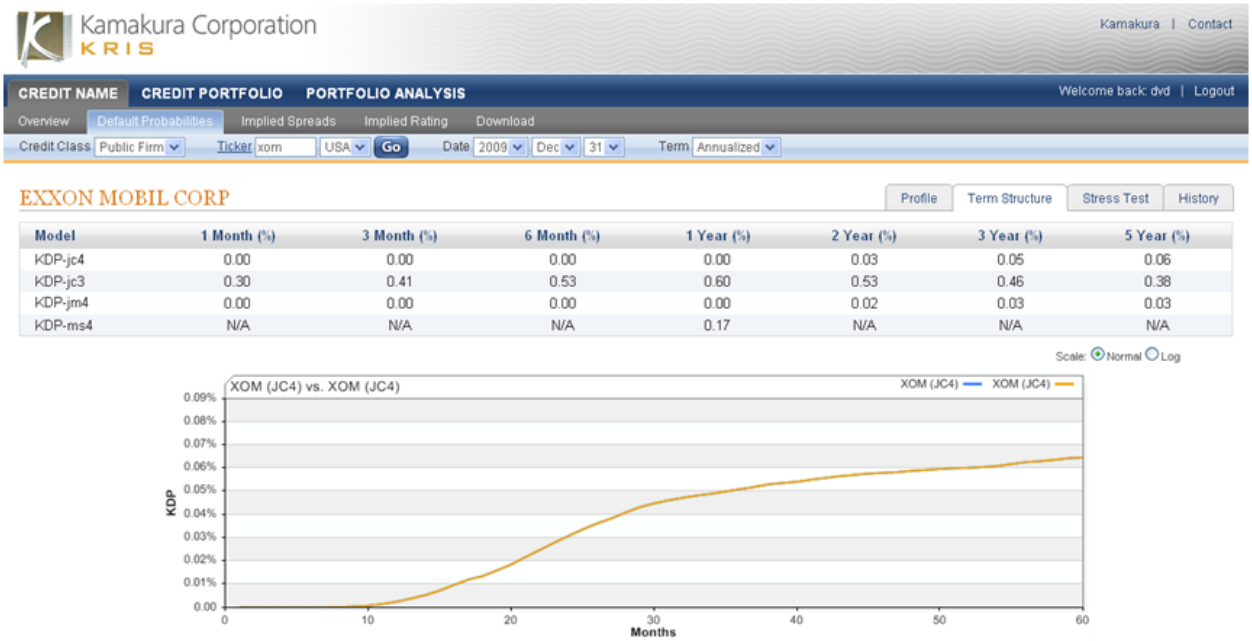


Model	1 Month (%)	3 Month (%)	6 Month (%)	1 Year (%)	2 Year (%)	3 Year (%)	5 Year (%)
KDP-jc4	0.00	0.00	0.00	0.00	0.03	0.07	0.10
KDP-jc3	0.11	0.14	0.18	0.23	0.23	0.18	0.13
KDP-jm4	0.00	0.00	0.00	0.00	0.02	0.04	0.06
KDP-ms4	N/A	N/A	N/A	0.17	N/A	N/A	N/A

Chevron

Model	1 Month (%)	3 Month (%)	6 Month (%)	1 Year (%)	2 Year (%)	3 Year (%)	5 Year (%)
KDP-jc4	0.00	0.00	0.00	0.00	0.03	0.06	0.08
KDP-jc3	0.10	0.14	0.19	0.25	0.28	0.27	0.27
KDP-jm4	0.00	0.00	0.00	0.00	0.02	0.03	0.05
KDP-ms4	N/A	N/A	N/A	0.17	N/A	N/A	N/A

Exxon Mobil

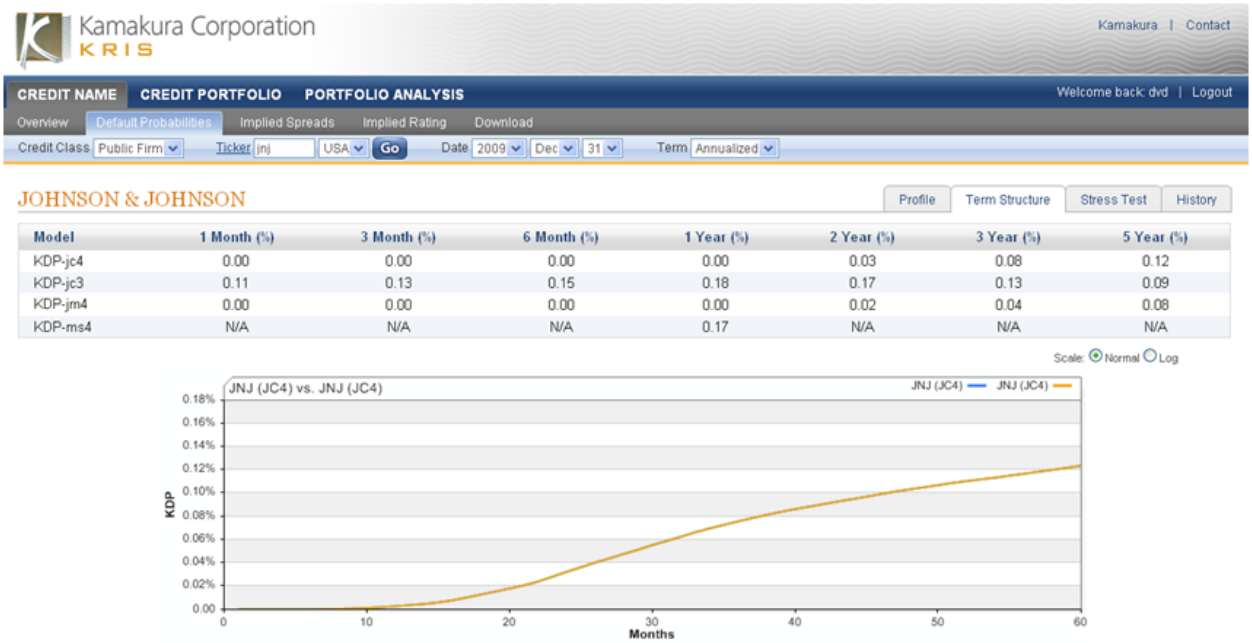


Model	1 Month (%)	3 Month (%)	6 Month (%)	1 Year (%)	2 Year (%)	3 Year (%)	5 Year (%)
KDP-jc4	0.00	0.00	0.00	0.00	0.03	0.05	0.06
KDP-jc3	0.30	0.41	0.53	0.60	0.53	0.46	0.38
KDP-jm4	0.00	0.00	0.00	0.00	0.02	0.03	0.03
KDP-ms4	N/A	N/A	N/A	0.17	N/A	N/A	N/A

Genentech

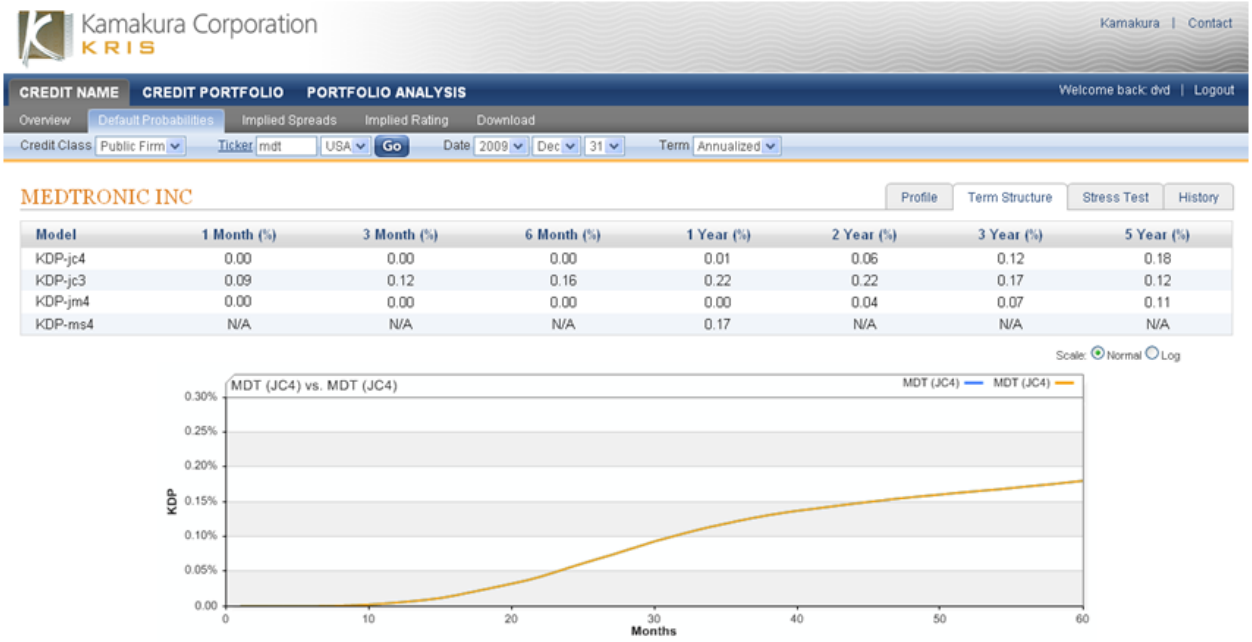
Model	1 Month (%)	3 Month (%)	6 Month (%)	1 Year (%)	2 Year (%)	3 Year (%)	5 Year (%)
KDP-jc4	0.00	0.00	0.00	0.00	0.09	0.16	0.17
KDP-jc3	0.03	0.04	0.06	0.09	0.11	0.08	0.06
KDP-jm4	0.00	0.00	0.00	0.00	0.04	0.06	0.07
KDP-ms4	N/A	N/A	N/A	0.17	N/A	N/A	N/A

Johnson & Johnson



Model	1 Month (%)	3 Month (%)	6 Month (%)	1 Year (%)	2 Year (%)	3 Year (%)	5 Year (%)
KDP-jc4	0.00	0.00	0.00	0.00	0.03	0.08	0.12
KDP-jc3	0.11	0.13	0.15	0.18	0.17	0.13	0.09
KDP-jm4	0.00	0.00	0.00	0.00	0.02	0.04	0.08
KDP-ms4	N/A	N/A	N/A	0.17	N/A	N/A	N/A

Medtronic

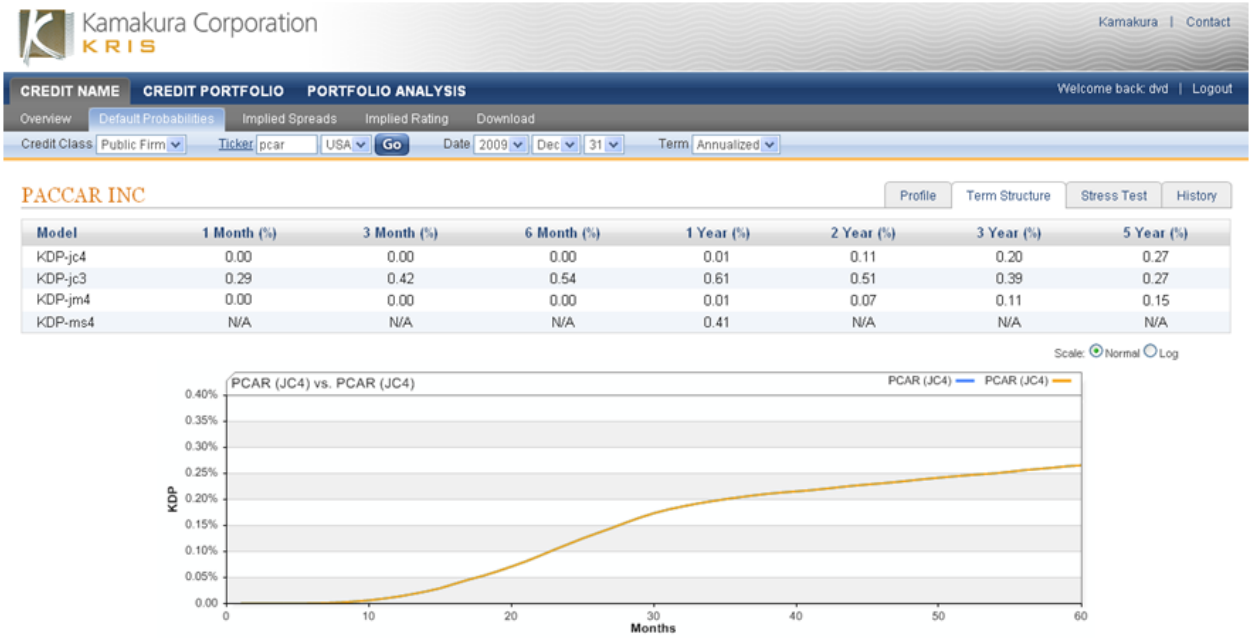


Model	1 Month (%)	3 Month (%)	6 Month (%)	1 Year (%)	2 Year (%)	3 Year (%)	5 Year (%)
KDP-jc4	0.00	0.00	0.00	0.01	0.06	0.12	0.18
KDP-jc3	0.09	0.12	0.16	0.22	0.22	0.17	0.12
KDP-jm4	0.00	0.00	0.00	0.00	0.04	0.07	0.11
KDP-ms4	N/A	N/A	N/A	0.17	N/A	N/A	N/A

Microsoft

Model	1 Month (%)	3 Month (%)	6 Month (%)	1 Year (%)	2 Year (%)	3 Year (%)	5 Year (%)
KDP-jc4	0.00	0.00	0.00	0.01	0.10	0.24	0.36
KDP-jc3	0.03	0.05	0.07	0.10	0.11	0.09	0.07
KDP-jm4	0.00	0.00	0.00	0.01	0.07	0.13	0.20
KDP-ms4	N/A	N/A	N/A	0.17	N/A	N/A	N/A

Paccar



Model	1 Month (%)	3 Month (%)	6 Month (%)	1 Year (%)	2 Year (%)	3 Year (%)	5 Year (%)
KDP-jc4	0.00	0.00	0.00	0.01	0.11	0.20	0.27
KDP-jc3	0.29	0.42	0.54	0.61	0.51	0.39	0.27
KDP-jm4	0.00	0.00	0.00	0.01	0.07	0.11	0.15
KDP-ms4	N/A	N/A	N/A	0.41	N/A	N/A	N/A

Pfizer

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CREDIT NAME | CREDIT PORTFOLIO | PORTFOLIO ANALYSIS

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Overview | Default Probabilities | Implied Spreads | Implied Rating | Download

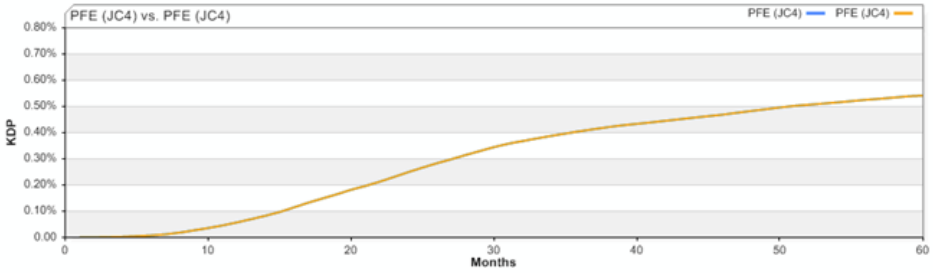
Credit Class: Public Firm | Ticker: pfe | USA | Go | Date: 2009 Dec 31 | Term: Annualized

PFIZER INC

Profile | Term Structure | Stress Test | History

Model	1 Month (%)	3 Month (%)	6 Month (%)	1 Year (%)	2 Year (%)	3 Year (%)	5 Year (%)
KDP-jc4	0.00	0.00	0.01	0.06	0.25	0.41	0.54
KDP-jc3	0.54	0.65	0.73	0.73	0.54	0.39	0.25
KDP-jm4	0.00	0.00	0.01	0.04	0.15	0.24	0.32
KDP-ms4	N/A	N/A	N/A	0.17	N/A	N/A	N/A

Scale: Normal Log



Procter & Gamble

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CREDIT NAME | CREDIT PORTFOLIO | PORTFOLIO ANALYSIS

Welcome back: dvd | Logout

Overview | Default Probabilities | Implied Spreads | Implied Rating | Download

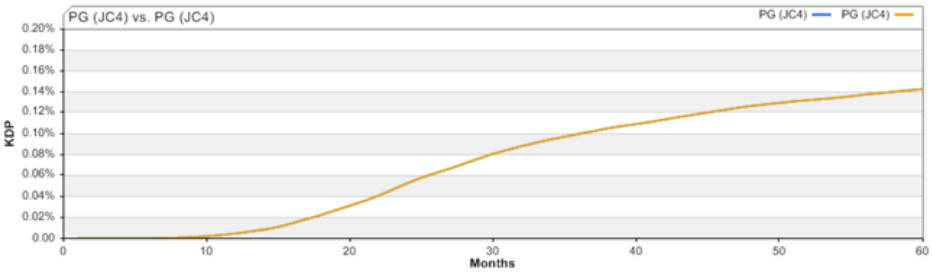
Credit Class: Public Firm | Ticker: pg | USA | Go | Date: 2009 Dec 31 | Term: Annualized

PROCTER & GAMBLE CO

Profile | Term Structure | Stress Test | History

Model	1 Month (%)	3 Month (%)	6 Month (%)	1 Year (%)	2 Year (%)	3 Year (%)	5 Year (%)
KDP-jc4	0.00	0.00	0.00	0.00	0.05	0.10	0.14
KDP-jc3	0.12	0.15	0.19	0.24	0.25	0.24	0.26
KDP-jm4	0.00	0.00	0.00	0.00	0.03	0.06	0.08
KDP-ms4	N/A	N/A	N/A	0.17	N/A	N/A	N/A

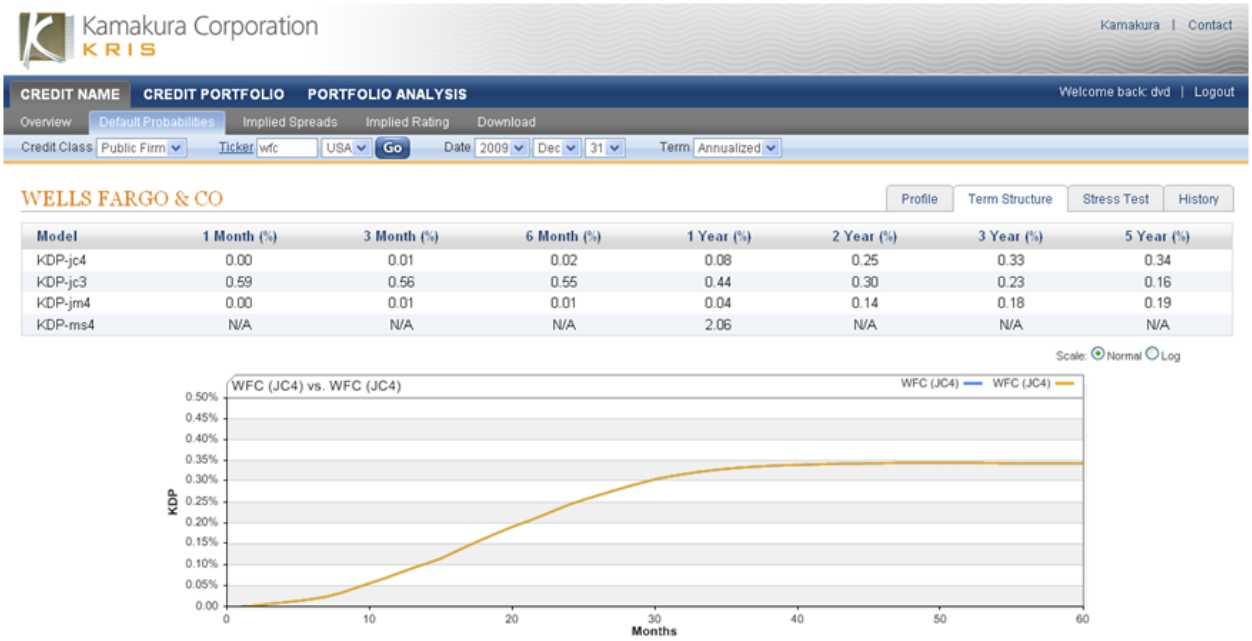
Scale: Normal Log



Sysco

Model	1 Month (%)	3 Month (%)	6 Month (%)	1 Year (%)	2 Year (%)	3 Year (%)	5 Year (%)
KDP-jc4	0.00	0.00	0.00	0.02	0.16	0.27	0.37
KDP-jc3	0.07	0.10	0.14	0.21	0.27	0.28	0.31
KDP-jm4	0.00	0.00	0.00	0.02	0.10	0.15	0.21
KDP-ms4	N/A	N/A	N/A	0.17	N/A	N/A	N/A

Wells Fargo



Model	1 Month (%)	3 Month (%)	6 Month (%)	1 Year (%)	2 Year (%)	3 Year (%)	5 Year (%)
KDP-jc4	0.00	0.01	0.02	0.08	0.25	0.33	0.34
KDP-jc3	0.59	0.56	0.55	0.44	0.30	0.23	0.16
KDP-jm4	0.00	0.01	0.01	0.04	0.14	0.18	0.19
KDP-ms4	N/A	N/A	N/A	2.06	N/A	N/A	N/A

Asset Class 3: U.S. Asset Backed Securities

Kamakura Corporation included various types of asset backed securities in the simulation. The first step in selecting candidate assets for the Asset Back Securities universe was to search all CUSIPs available in the Intex libraries for auto loans, securitized charge card loans, student loans and other collateral. Markit Partners did not have sufficient libraries for these collateral types. Intex models about 12,000 U.S. auto loan ABS CUSIPs, about 10,000 credit card ABS CUSIPs, and about 7,000 U.S. student loan ABS CUSIPs.

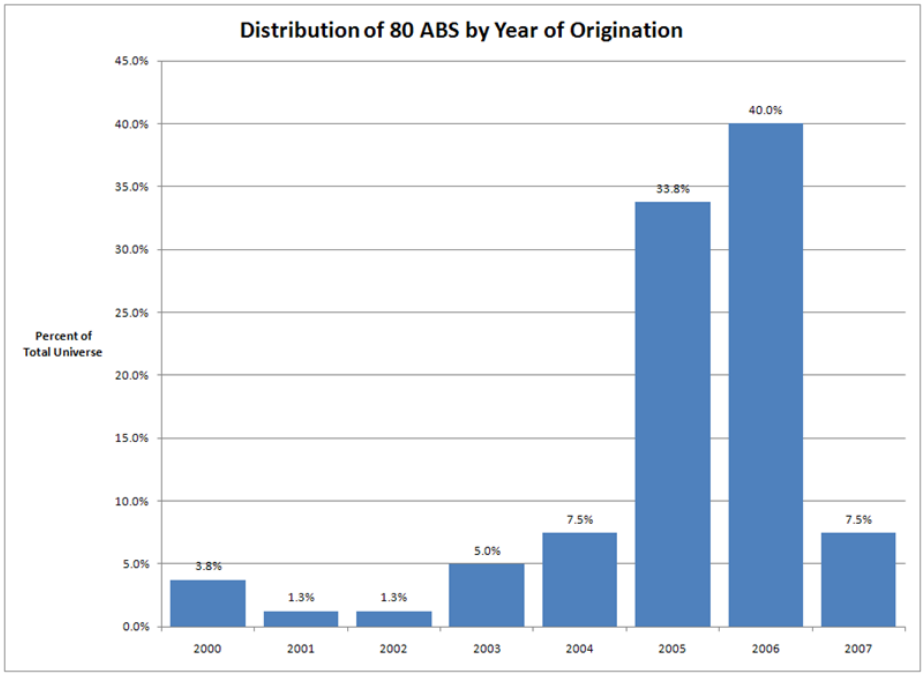
Kamakura considered only deals issued before 3/31/2007 for the 3/31/2007 portfolio and only deals issued before 12/31/2009 for the 12/31/2009 portfolio. All issues had a rating, as required by the Proposed Regulations, of AA- or higher on the valuation date. To narrow this universe down to a smaller number of securities that can be simulated in this exercise, Kamakura also restricted its search for candidate assets to those with an original balance greater than $100,000,000 and to those with a current outstanding balance greater than zero.

After applying the above criteria, Kamakura was able to narrow the universe down to a few hundred CUSIPs in each of the four asset sub-classes. Kamakura again screened through all the CUSIPs and selected only those issued by well known financial institutions with relatively shorter maturities and larger outstanding balances.[23] This further reduced the pool in each asset class to about 70 to 80 CUSIPs.

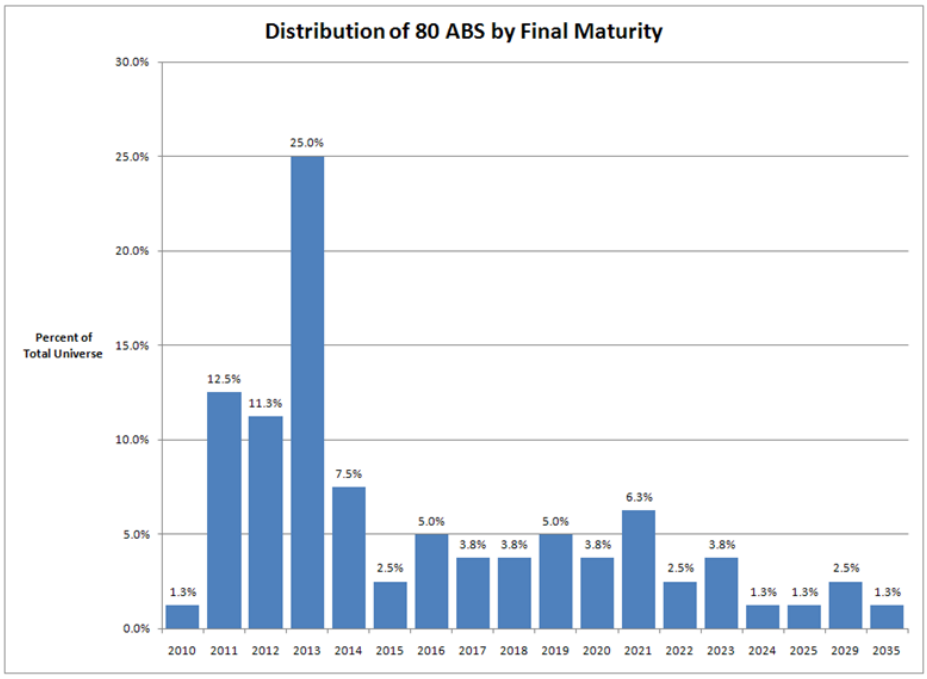
Finally Kamakura confirmed the Standard & Poor's rating for all of these 70 to 80 CUSIPs on 3/31/2007 and 12/31/2009. Kamakura then randomly selected 20 with an AA- or above rating on 3/31/2007 and another 20 with an AA- or above rating on 12/31/2009 in each asset class.

The distribution of March 31, 2007 candidate ABS assets by origination year is shown below:

[23] Recall the ultimate goal: to construct a universe that represented what was available for purchase (the large balance filters), and that the model corporate credit union would be more likely to be able to purchase under the proposed rule (the shorter maturities and ratings restrictions).



The distribution of March 31, 2007 candidate ABS assets by final maturity are given as follows:



At the end of this process, all of the candidate ABS assets on March 31, 2007 had a rating at that time of AAA. By December 31, 2009, ratings changed as shown in the following chart:[24]

[24] Of course, this information could not be used to bias the construction of the 2007 asset universe.

Distribution of ABS Ratings as of March 31, 2007 and December 31, 2009

	Rating on December 31, 2009																
Rating on 3/31/2007	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	Total	Percent of Total
AAA	62		3	1	1		1	3	4	1	2				2	80	100.0%
Total	62	0	3	1	1	0	1	3	4	1	2	0	0	0	2	80	100.0%
Percent of Total	77.5%	0.0%	3.8%	1.3%	1.3%	0.0%	1.3%	3.8%	5.0%	1.3%	2.5%	0.0%	0.0%	0.0%	2.5%	100.0%	

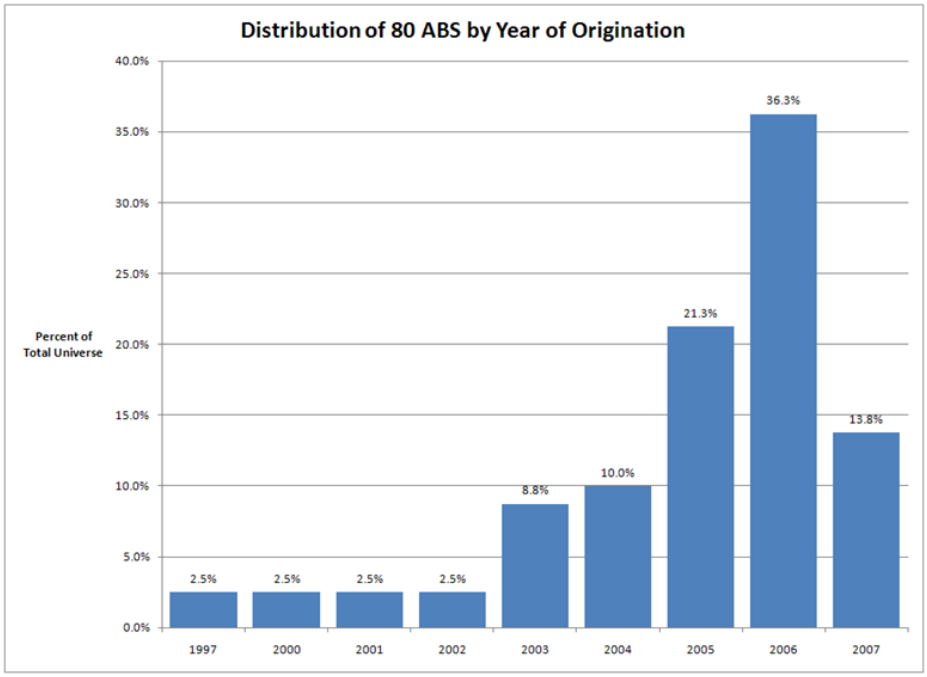
Rating Transition Probability on December 31, 2009 Conditional on March 31, 2007 Rating

Rating on 3/31/2007	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	Total
AAA	77.5%	0.0%	3.8%	1.3%	1.3%	0.0%	1.3%	3.8%	5.0%	1.3%	2.5%	0.0%	0.0%	0.0%	2.5%	100.0%

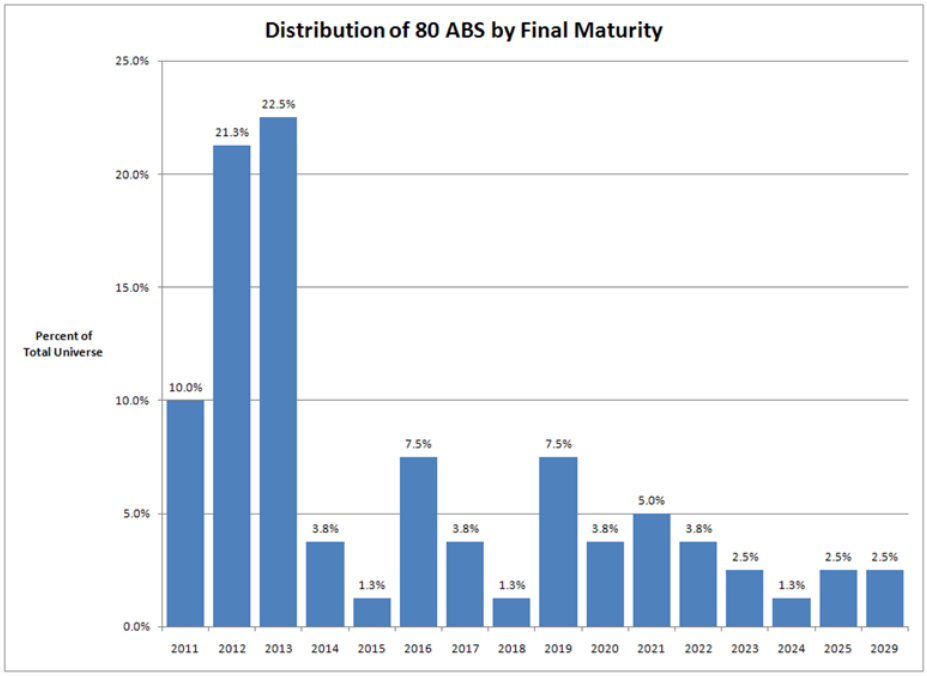
Probability of Falling Below AA- Rating on December 31, 2009 Conditional on March 31, 2007 Rating

Rating on 3/31/2007	
AAA	17.5%

Because of the large drop in asset-backed securities origination volume in 2007 and 2008, most of the candidate ABS issues considered for the December 31, 2009 portfolio were originated in 2005-2006.



The chart below shows the distribution by final maturity of the candidate ABS assets for the December 31, 2009 portfolio:



The candidate ABS assets for the December 31, 2009 portfolio had these ratings as of that date:

Distribution of ABS Ratings as of December 31, 2009

Rating on 12/31/2009		Percent of Total
AAA	75	93.8%
AA+	1	1.3%
AA	2	2.5%
AA-	2	2.5%
Total	80	100.0%

U.S. Commercial Mortgage-Backed Securities

Kamakura used a similar process to identify 300 reasonable commercial mortgage-backed securities candidates from the Bloomberg information service. From the set of 300 securities on each valuation date, Kamakura credit risk advisory staff randomly selected 50 on each date. After eliminating those securities which could not be accessed using the Intex CMBS libraries, there were 46 and 44 candidate Commercial Mortgage-Backed Securities candidates for the March 31, 2007 and December 31, 2009 portfolios.

U.S. Residential Mortgage-Backed Securities

Of the complete universe of RMBS securities, Kamakura restricted itself to consideration of the more than 600 CUSIPS most commonly held by US financial institutions for which Kamakura does frequent valuation and risk processing. By virtue of this ownership, Kamakura believes that these securities were both liquid and logical purchases as of March 31, 2007.

Of the 600 commonly held CUSIPs, 498 met the AA- rating hurdle on March 31, 2007. Of these, 464 CUSIPs were covered by the Markit Partners RMBS tranche libraries. Kamakura selected 250 representative CUSIPS from this group as candidate assets for the March 31, 2007 portfolio. Kamakura then updated ratings for

the 464 CUSIPs on 12/31/2009 (based on Bloomberg's S&P rating history) and found that there were only 192 CUSIPs meeting the AA- or above rating hurdle on December 31, 2009.

Below, we present a ratings transition matrix between 03/31/2007 and 12/31/2009 for the full group of 250 CUSIPs. Again, this knowledge was not allowed to bias asset selection.

Distribution of MBS Ratings as of March 31, 2007 and December 31, 2009

	Rating on December 31, 2009																			
Rating on 3/31/2007	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC	CC	D	Total	Percent of Total
AAA	90	3	2		1		1	2	1		7		3	1	4	2	44	12	14	187	74.5%
AA+		6			1							2	1			3	14	2	6	35	13.9%
AA			8	1							1					3	7	2	4	26	10.4%
AA-																	3			3	1.2%
Total	90	9	10	1	2	0	1	2	1	0	8	2	4	1	4	8	68	16	24	251	100.0%
Percent of Total	35.9%	3.6%	4.0%	0.4%	0.8%	0.0%	0.4%	0.8%	0.4%	0.0%	3.2%	0.8%	1.6%	0.4%	1.6%	3.2%	27.1%	6.4%	9.6%	100.0%	

Rating Transition Probability on December 31, 2009 Conditional on March 31, 2007 Rating

Rating on 3/31/2007	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC	CC	D	Total
AAA	48.1%	1.6%	1.1%	0.0%	0.5%	0.0%	0.5%	1.1%	0.5%	0.0%	3.7%	0.0%	1.6%	0.5%	2.1%	1.1%	23.5%	6.4%	7.5%	100.0%
AA+	0.0%	17.1%	0.0%	0.0%	2.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.7%	2.9%	0.0%	0.0%	8.6%	40.0%	5.7%	17.1%	100.0%
AA	0.0%	0.0%	30.8%	3.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.8%	0.0%	0.0%	0.0%	0.0%	11.5%	26.9%	7.7%	15.4%	100.0%
AA-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%

Probability of Falling Below AA- Rating on December 31, 2009 Conditional on March 31, 2007 Rating

Rating on 3/31/2007	
AAA	49.2%
AA+	82.9%
AA	65.4%
AA-	100.0%

A similar procedure was followed to construct the RMBS universe for 2009.

Summary of 2007 Asset Universe

The entire universe in 2007 consists of 534 securities from ten distinct asset classes in 2007. This includes eight asset classes devoted entirely to structured products (379 CUSIPs). The overall weighted average life of the 2007 universe was 4.676 years, and the average annualized return based on the historical cash flows from 03/31/2007-12/31/2009 was 2.0%.[25] The full distribution of assets, as well as the subordinated concentration, is depicted in the table below.

[25] Note that this number is positive—the securities in our universe were on average fairly well rated, senior tranches. This is by design—the goal of the initial exercise and this extension is to simulate how a corporate credit union would perform under these regulations provided a prudent asset allocation and provided that the model corporate credit union could have considered them candidates for investment given the additional requirements in the proposed rule. These securities were **not** meant to reflect what a corporate credit union actually held on their balance sheet in 2007, but what they would be likely to be able to buy under the proposed regulations: the annualized returns on the securities actually held by the corporate credit unions on March 31, 2007 are likely negative.

Sector	Port Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	3.75%	0.0000	3.0565	20
RMBS	37.45%	0.1217	5.5573	200
MBS Agency	9.36%	0.0000	4.1793	50
CMBS	9.36%	0.0000	4.7682	50
Credit Card	3.75%	0.0000	4.4483	20
Student Loan Private	1.87%	0.0000	8.2092	10
Student Loan FFELP	1.69%	0.0000	5.6515	9
Treasury Security	18.73%	0.0000	2.8599	100
Corporate	10.30%	0.0000	5.0328	55
ABS Other	3.75%	0.0000	4.6030	20

Below, we can also see that taken as a single portfolio, the entire universe would have performed quite poorly on the stress tests mandated by the regulations: the base plus limits in the regulations require no more than a 30% decline in Net Economic Value when spreads widen by 300 basis points and prepayment speeds slow by 50%: the universe has roughly a 310% change in value under that scenario.[26]

0706 ALL		Stress Test Outcomes		
Test		YC300	SPR300	SPR300+
Change NEV		-116.60%	-239.73%	-310.32%
NEV Constraint		20.00%	20.00%	30.00%
In-Portfolio Return	0.020		Count	534
			Structured	379
			WAL	4.676

Summary of Structured Products in 2007 Universe

As stated above, the 2007 asset universe contains 379 structured product CUSIPs from eight distinct asset classes, including Auto Loans, Agency and Non Agency RMBS, CMBS, Credit Cards, Private and FFELP Student Loans, Corporate Debt, Treasury Securities, and finally other Asset Backed Securities. The full list of CUSIPs can be seen in the section devoted to stress test output. There are 20 securities each from Auto Loans, Credit Cards, Student Loans, and Other ABS. There are 250 securities from residential

[26] This is approximate as this table represents the stress test outcomes for a portfolio of the entire universe combined with liability scenario six (50% Overnight and 0.50Y weighted average life). Construction of the liability profiles is discussed in the next section.

mortgages, which is further disaggregated into agency (50) and non agency (200), and non-agency includes senior and subordinated prime and subprime loans at both fixed and floating rates. There are 50 CMBS CUSIPs, and 55 different securities representing corporate debt from fourteen different issuers[27] at several different maturities per issuer. Finally, to represent secure liquid holdings, the universe contains one hundred different United States Treasury issues at a variety of maturities.

On average, the annualized returns were equal to 2.0%, but the distribution is quite wide. The worst performing CUSIP in the universe is a subordinated subprime adjustable non-agency residential mortgage backed security with annualized returns equal to -60.35%, while the best performing CUSIP is a senior tranche of a Credit Card asset backed security, with annualized returns of 7.39%. Overall, the standard deviation of returns is 8.18%.[28] The weighted average lives of the structured products ranged from 0.18 years to 25.63 years, with an average of 5.1 years and a standard deviation of 3.61 years. Based on weighted average lives, this universe looks quite similar to the holdings of corporate credit unions in 2007, though Kamakura's universe seems to contain fewer subordinated and mezzanine securities (see "All Corporates Combined API Mar, 2007 Summarized.xls" sent to Kamakura May 5th, 2010 by NCUA staff).

Summary of 2009 Asset Universe

The entire universe for 2009 has 422 securities, 291 of which are structured products. As before, the universe is predominately composed of non-agency RMBS[29] and Treasury Securities. The full list of 2009 CUSIPs can be found in the section discussing stress test output. The other asset weights are substantively similar, with the possible exception of corporate debt: recall that there were many fewer eligible corporate investments in 2009 than in 2007 due to widespread ratings downgrades.

Sector	Port Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	4.50%	0.0000	0.5429	19
RMBS	28.91%	0.0664	4.0686	122
MBS Agency	11.85%	0.0000	3.2175	50
CMBS	10.66%	0.0000	2.3019	45
Credit Card	4.74%	0.0024	1.8330	20
Student Loan Private	2.13%	0.0000	1.8010	9
Student Loan FFELP	2.37%	0.0000	1.4315	10
Treasury Security	23.70%	0.0000	2.8381	100
Corporate	7.35%	0.0000	4.8121	31
ABS Other	3.79%	0.0000	2.5711	16

[27] The eligible corporate securities are essentially fixed by the ratings requirements in the proposed rule.
[28] If one is willing to assume a law of large numbers exists on annualized asset returns, this means that the 2.0% return is statistically indistinguishable from zero by quite some margin
[29] Though the fraction has dropped when compared to 2007—as found in the market at large.

Once again, when taken as single portfolio, the 2009 asset universe fails to meet the base-plus stress test limits under the proposed regulations by some margin:

0706 ALL	Stress Test Outcomes		
Test	YC300	SPR300	SPR300+
Change NEV	-95.46%	-154.23%	-180.44%
NEV Constraint	20.00%	20.00%	30.00%

Count	422
Structured	291
WAL	3.110060175

The portfolio (when combined with liability strategy 6: 50% overnight and 0.50Y weighted average life) exceeds the base-plus yield curve stress test limits by roughly five times, the spread limits by almost eight times, and the spread and prepayment limits by six times.

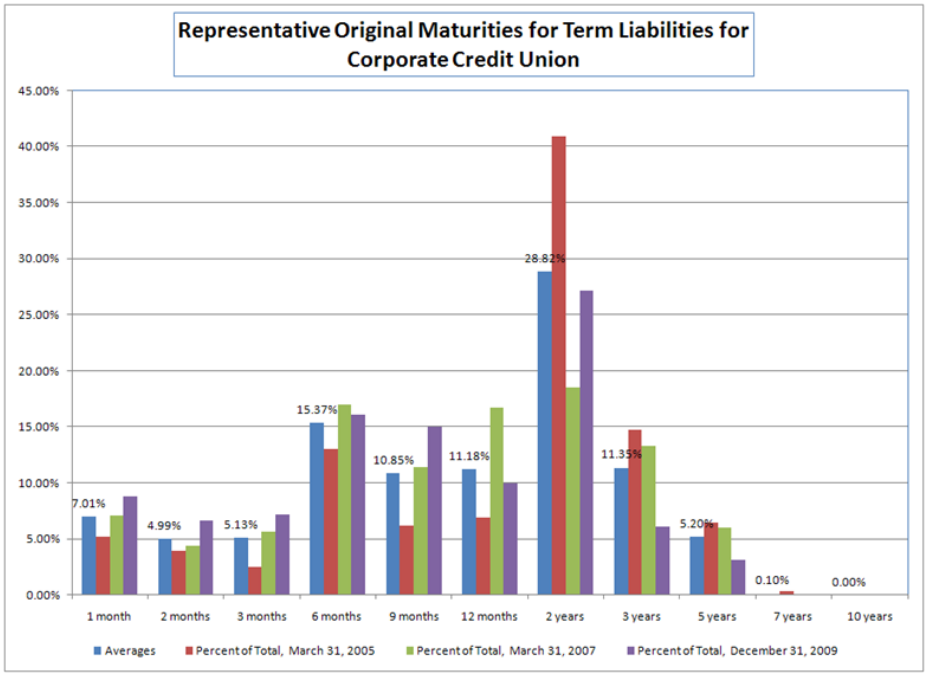
Summary of Structured Products in 2009 Universe

The 2009 asset universe contains 291 structured products (69% of the total of 422 CUSIPs). These securities came from the same asset classes as in the 2007 universe, though they appear slightly different from the 2007 securities based on their observable characteristics. First, due primarily to the lack of new structured product issuance through the credit crisis, the weighted average life of the 2009 universe is roughly 18 months lower than the 2007 universe at 3.11 years. Second, as a percentage, there are slightly fewer non-agency RMBS securities in 2009, and slightly fewer corporate securities. This again is due to changes in the marketplace during the credit crisis: as a percentage, non-agency RMBS were less prevalent in December of 2009 than in March of 2007, and the number of distinct corporate securities whose parent firms meet the ratings thresholds in the proposed rule declined during the same period.

Construction of Liability Portfolios

In order to have a reasonable basis for the "normal" profile of term liabilities for a corporate credit union, Kamakura was able to obtain the following breakdown of term liabilities by original maturity for a major corporate credit union on three dates: March 31, 2005, March 31, 2007 and December 31, 2009.

The following graph contains the percentage distribution of term liabilities for three different points in time for this typical corporate credit union:

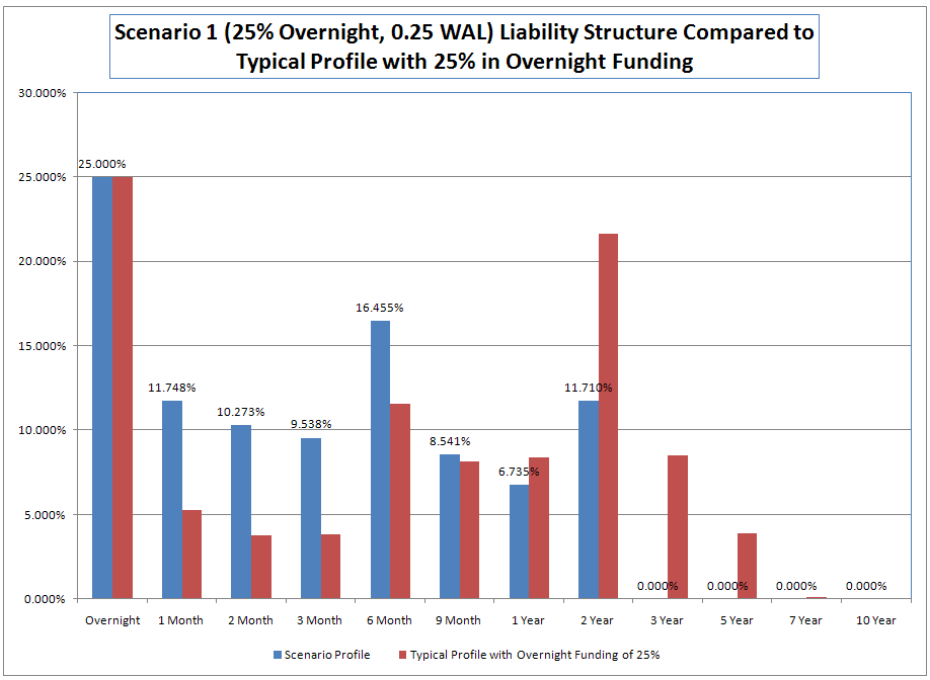


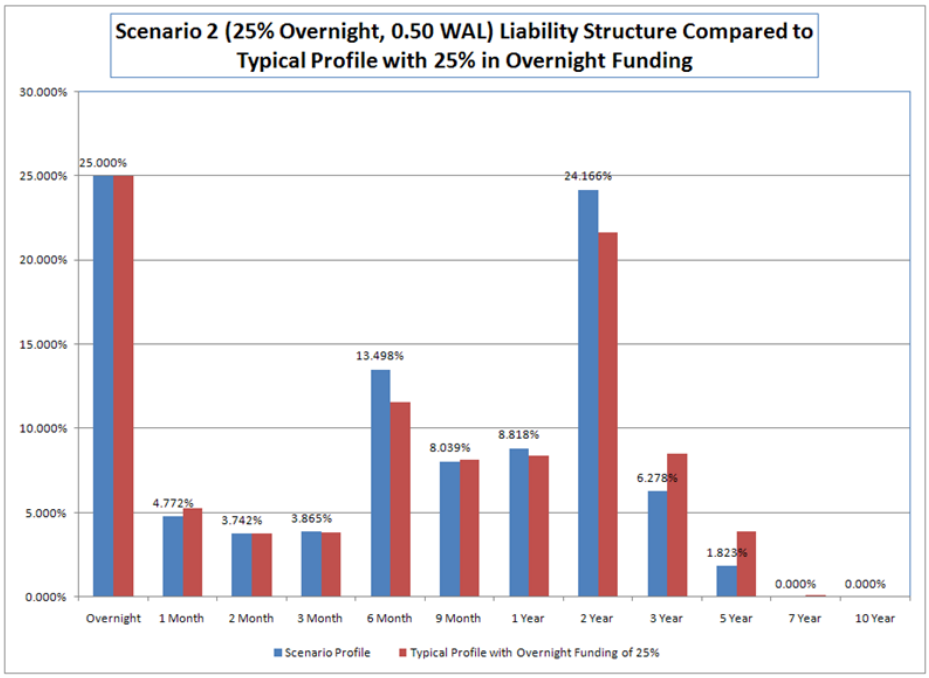
From these three observations, Kamakura used the average weightings for original maturity (1 month, 2 months, 3 months, etc.) and adjust them so that we can conform as precisely as possible to the 12 liability scenarios mandated by the NCUA for this project.

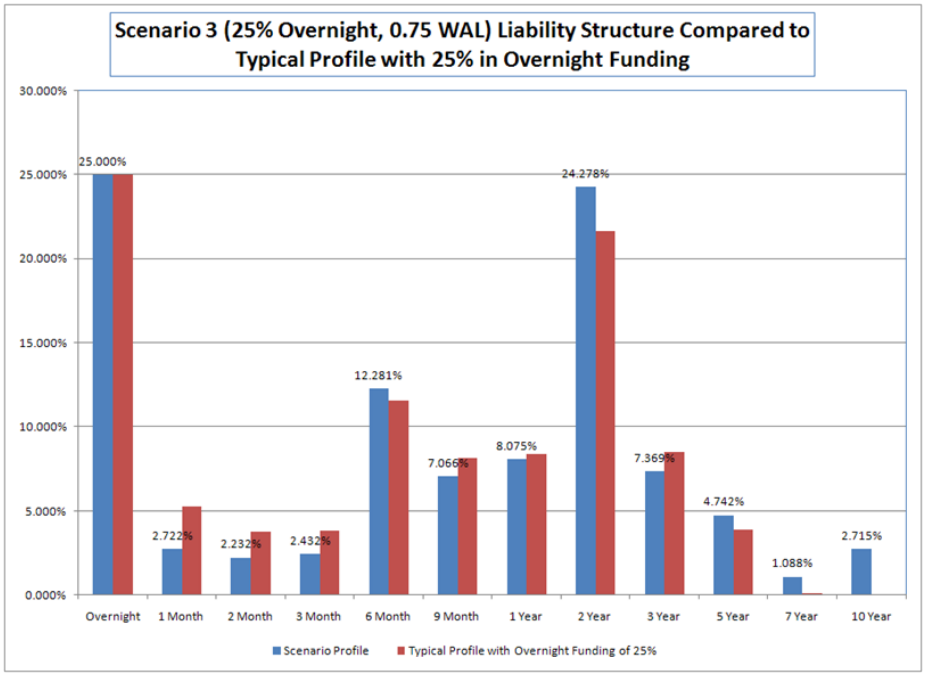
Note that the 12 liability strategies specified by the NCUA do not provide for a unique liability structure. For each of the 12 strategies specified by the NCUA, Kamakura defines the "best" liability strategy as follows:

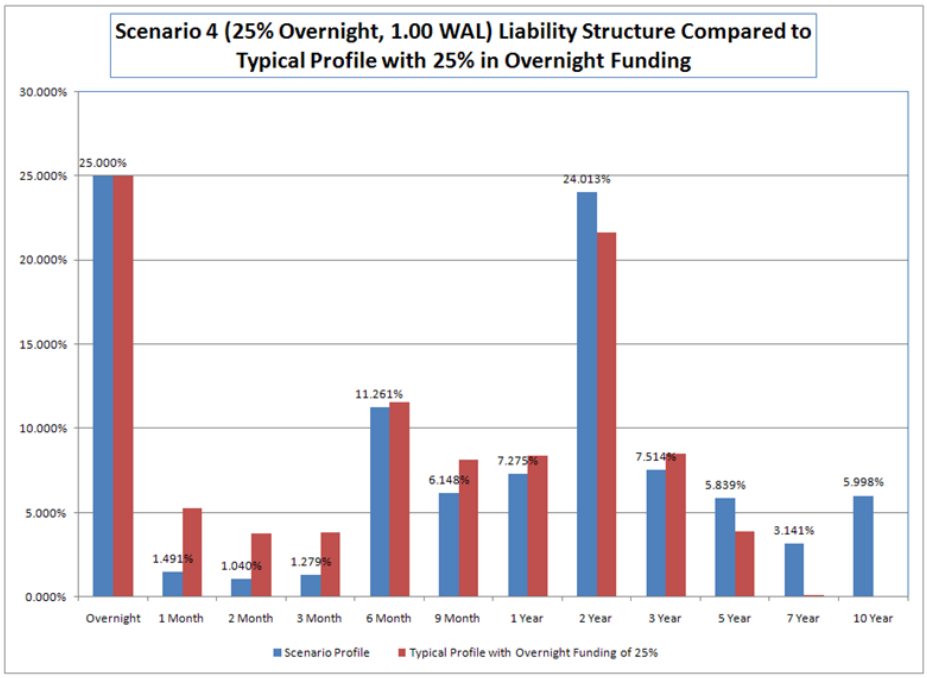
- The liability structure meets the overnight funding ratio required by the NCUA in that scenario.
- The liability structure meets the weighted average life requirement for all liabilities specified in that scenario.
- The distribution of term liabilities minimizes the sum of squared errors versus the "normal" distribution of term liabilities, within the constraints on the overnight funding percentage and weighted average life.

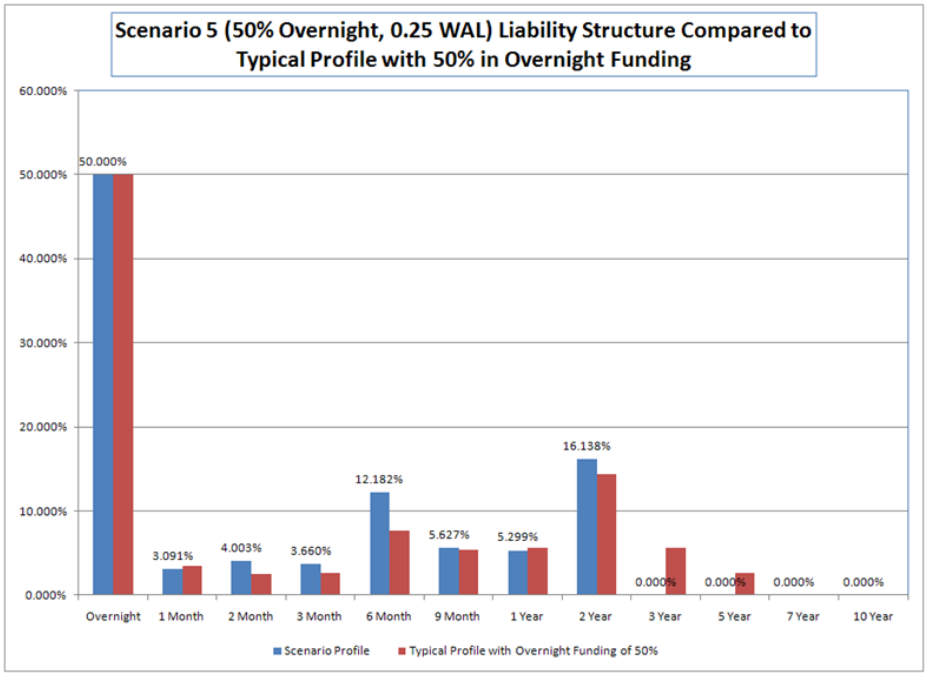
The 12 liability strategies that meet this criterion for best are shown in the following graphs: blue represents the Liability strategy used by Kamakura in the ultimate simulations, and red represents the average weights from the historical corporate credit union data detailed above.

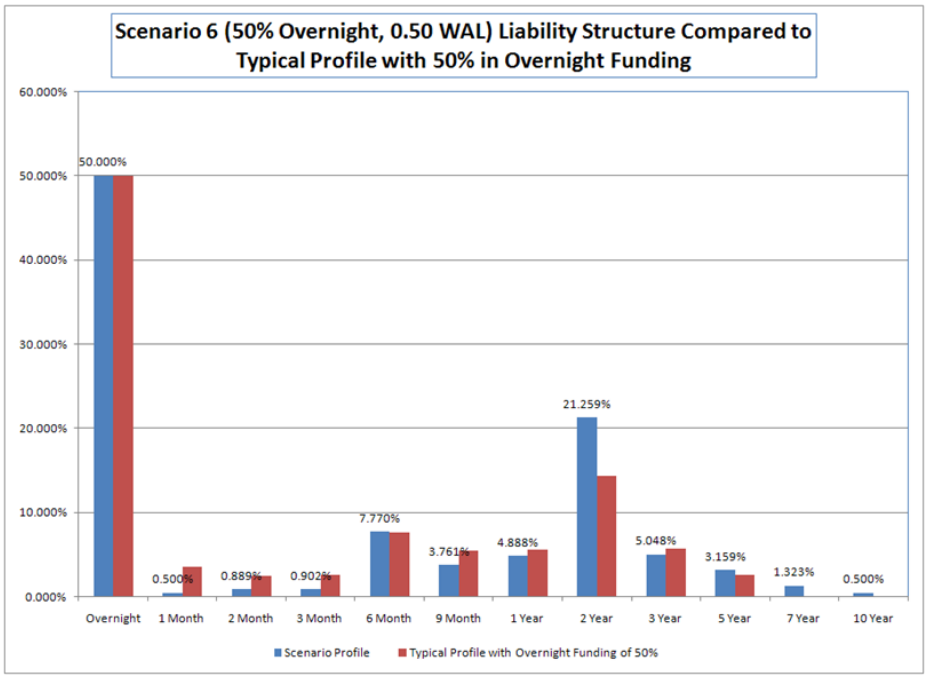

Scenario 1 (25% Overnight, 0.25 WAL) Liability Structure Compared to Typical Profile with 25% in Overnight Funding
30.000%
25.000%
20.000%
15.000%
10.000%
5.000%
0.000%
25.000%
11.748%
10.273%
9.538%
16.455%
8.541%
6.735%
11.710%
0.000%
0.000%
0.000%
0.000%
Overnight
1 Month
2 Month
3 Month
6 Month
9 Month
1 Year
2 Year
3 Year
5 Year
7 Year
10 Year
Scenario Profile
Typical Profile with Overnight Funding of 25%

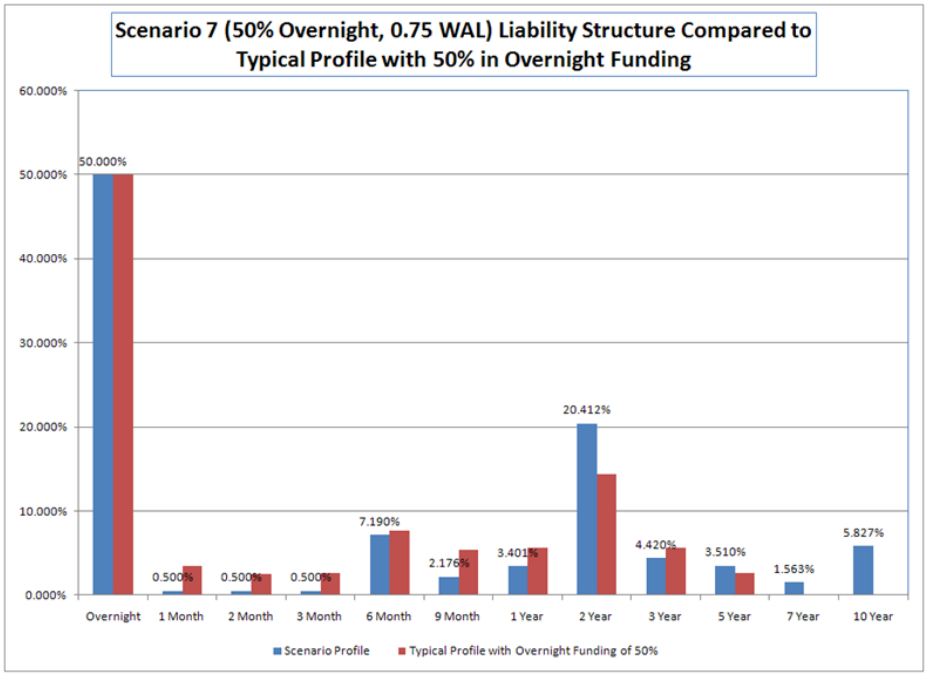

Scenario 2 (25% Overnight, 0.50 WAL) Liability Structure Compared to Typical Profile with 25% in Overnight Funding
30.000%
25.000%
20.000%
15.000%
10.000%
5.000%
0.000%
25.000%
4.772%
3.742%
3.865%
13.498%
8.039%
8.818%
24.166%
6.278%
1.823%
0.000%
0.000%
Overnight
1 Month
2 Month
3 Month
6 Month
9 Month
1 Year
2 Year
3 Year
5 Year
7 Year
10 Year
Scenario Profile
Typical Profile with Overnight Funding of 25%

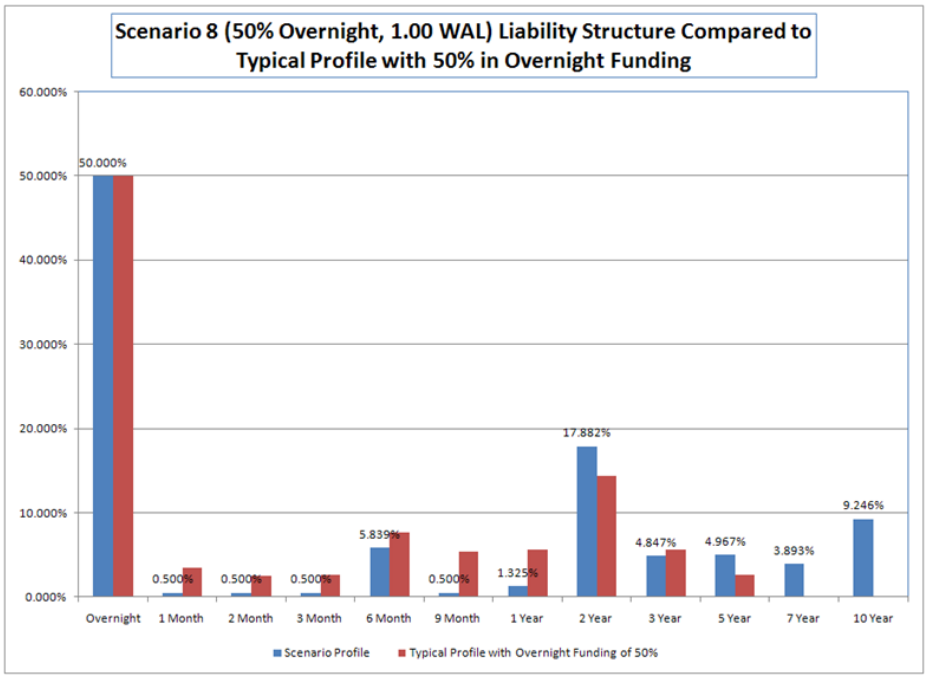

Scenario 3 (25% Overnight, 0.75 WAL) Liability Structure Compared to Typical Profile with 25% in Overnight Funding
30.000%
25.000%
20.000%
15.000%
10.000%
5.000%
0.000%
25.000%
2.722%
2.232%
2.432%
12.281%
7.066%
8.075%
24.278%
7.369%
4.742%
1.088%
2.715%
Overnight
1 Month
2 Month
3 Month
6 Month
9 Month
1 Year
2 Year
3 Year
5 Year
7 Year
10 Year
Scenario Profile
Typical Profile with Overnight Funding of 25%

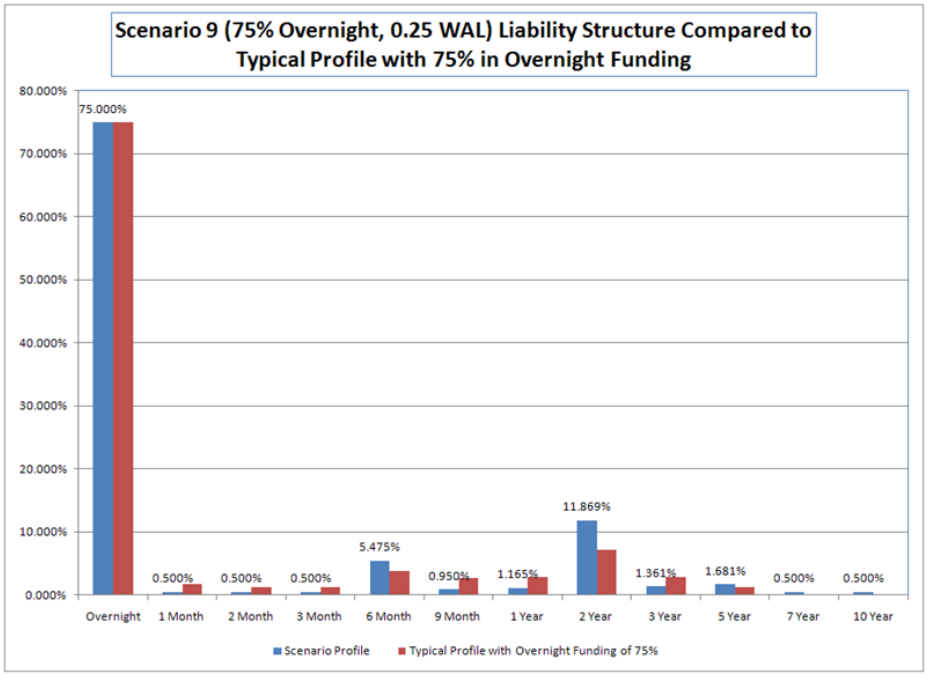

Scenario 4 (25% Overnight, 1.00 WAL) Liability Structure Compared to Typical Profile with 25% in Overnight Funding
30.000%
25.000%
20.000%
15.000%
10.000%
5.000%
0.000%
25.000%
1.491%
1.040%
1.279%
11.261%
6.148%
7.275%
24.013%
7.514%
5.839%
3.141%
5.998%
Overnight
1 Month
2 Month
3 Month
6 Month
9 Month
1 Year
2 Year
3 Year
5 Year
7 Year
10 Year
Scenario Profile
Typical Profile with Overnight Funding of 25%

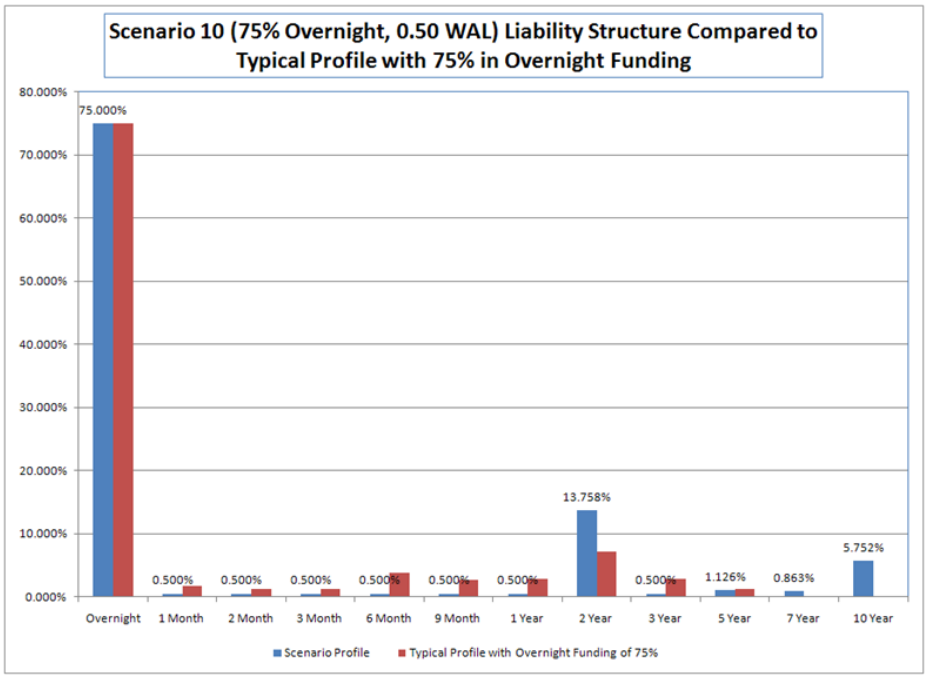

Scenario 5 (50% Overnight, 0.25 WAL) Liability Structure Compared to Typical Profile with 50% in Overnight Funding
60.000%
50.000%
40.000%
30.000%
20.000%
10.000%
0.000%
50.000%
3.091%
4.003%
3.660%
12.182%
5.627%
5.299%
16.138%
0.000%
0.000%
0.000%
0.000%
Overnight
1 Month
2 Month
3 Month
6 Month
9 Month
1 Year
2 Year
3 Year
5 Year
7 Year
10 Year
Scenario Profile
Typical Profile with Overnight Funding of 50%

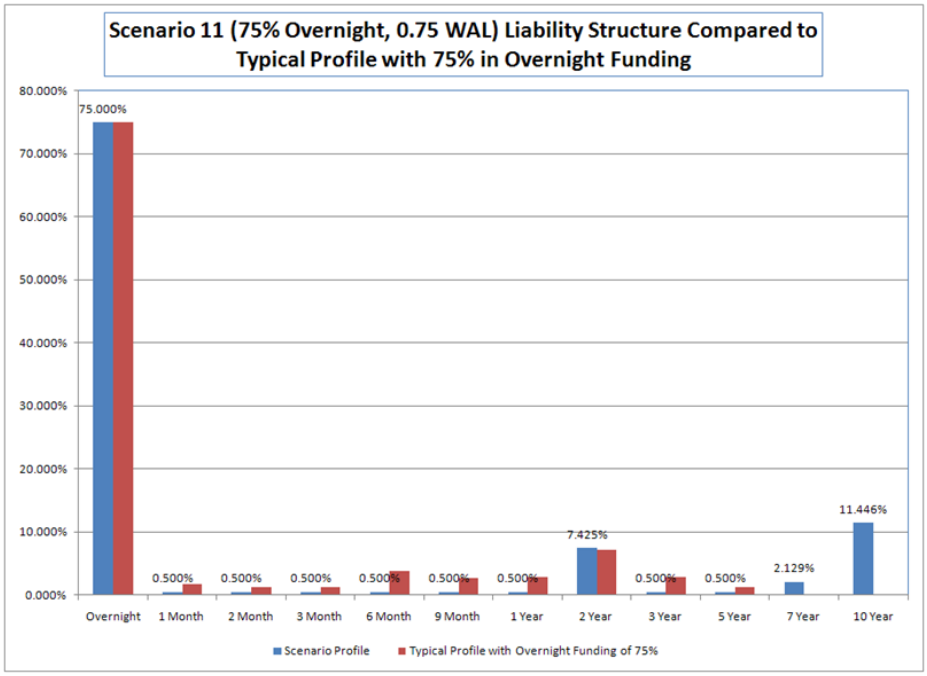

Scenario 6 (50% Overnight, 0.50 WAL) Liability Structure Compared to Typical Profile with 50% in Overnight Funding
60.000%
50.000%
40.000%
30.000%
20.000%
10.000%
0.000%
50.000%
0.500%
0.889%
0.902%
7.770%
3.761%
4.888%
21.259%
5.048%
3.159%
1.323%
0.500%
Overnight
1 Month
2 Month
3 Month
6 Month
9 Month
1 Year
2 Year
3 Year
5 Year
7 Year
10 Year
Scenario Profile
Typical Profile with Overnight Funding of 50%

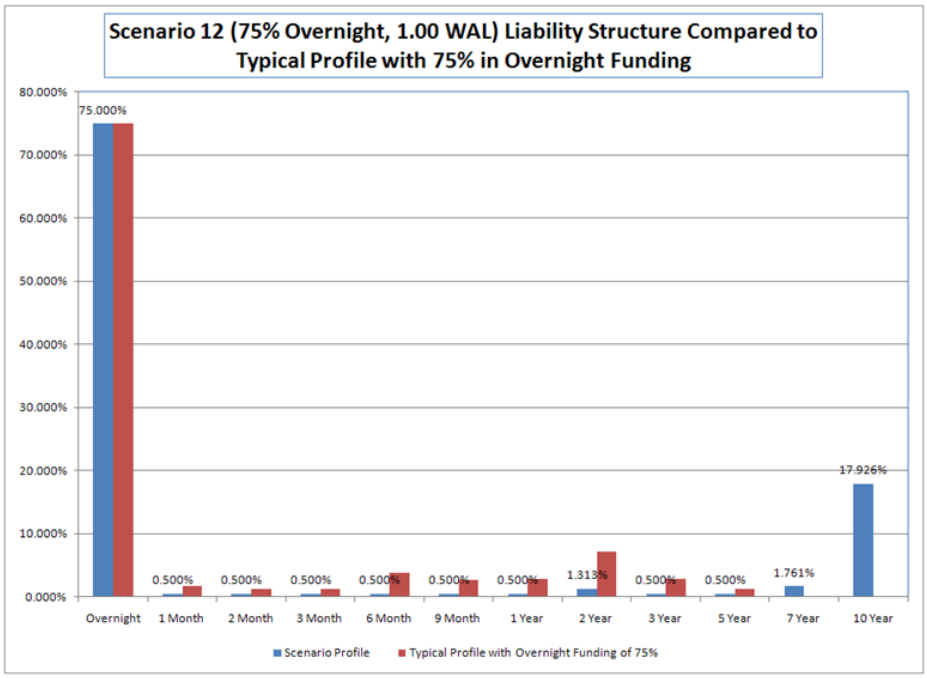

Scenario 7 (50% Overnight, 0.75 WAL) Liability Structure Compared to Typical Profile with 50% in Overnight Funding
60.000%
50.000%
40.000%
30.000%
20.000%
10.000%
0.000%
50.000%
0.500%
0.500%
0.500%
7.190%
2.176%
3.401%
20.412%
4.420%
3.510%
1.563%
5.827%
Overnight
1 Month
2 Month
3 Month
6 Month
9 Month
1 Year
2 Year
3 Year
5 Year
7 Year
10 Year
Scenario Profile
Typical Profile with Overnight Funding of 50%


Scenario 8 (50% Overnight, 1.00 WAL) Liability Structure Compared to Typical Profile with 50% in Overnight Funding
60.000%
50.000%
40.000%
30.000%
20.000%
10.000%
0.000%
50.000%
0.500%
0.500%
0.500%
5.839%
0.500%
1.325%
17.882%
4.847%
4.967%
3.893%
9.246%
Overnight
1 Month
2 Month
3 Month
6 Month
9 Month
1 Year
2 Year
3 Year
5 Year
7 Year
10 Year
Scenario Profile
Typical Profile with Overnight Funding of 50%


Scenario 9 (75% Overnight, 0.25 WAL) Liability Structure Compared to Typical Profile with 75% in Overnight Funding
80.000%
70.000%
60.000%
50.000%
40.000%
30.000%
20.000%
10.000%
0.000%
75.000%
0.500%
0.500%
0.500%
5.475%
0.950%
1.165%
11.869%
1.361%
1.681%
0.500%
0.500%
Overnight
1 Month
2 Month
3 Month
6 Month
9 Month
1 Year
2 Year
3 Year
5 Year
7 Year
10 Year
Scenario Profile
Typical Profile with Overnight Funding of 75%


Scenario 10 (75% Overnight, 0.50 WAL) Liability Structure Compared to Typical Profile with 75% in Overnight Funding
80.000%
70.000%
60.000%
50.000%
40.000%
30.000%
20.000%
10.000%
0.000%
75.000%
0.500%
0.500%
0.500%
0.500%
0.500%
0.500%
13.758%
0.500%
1.126%
0.863%
5.752%
Overnight
1 Month
2 Month
3 Month
6 Month
9 Month
1 Year
2 Year
3 Year
5 Year
7 Year
10 Year
Scenario Profile
Typical Profile with Overnight Funding of 75%

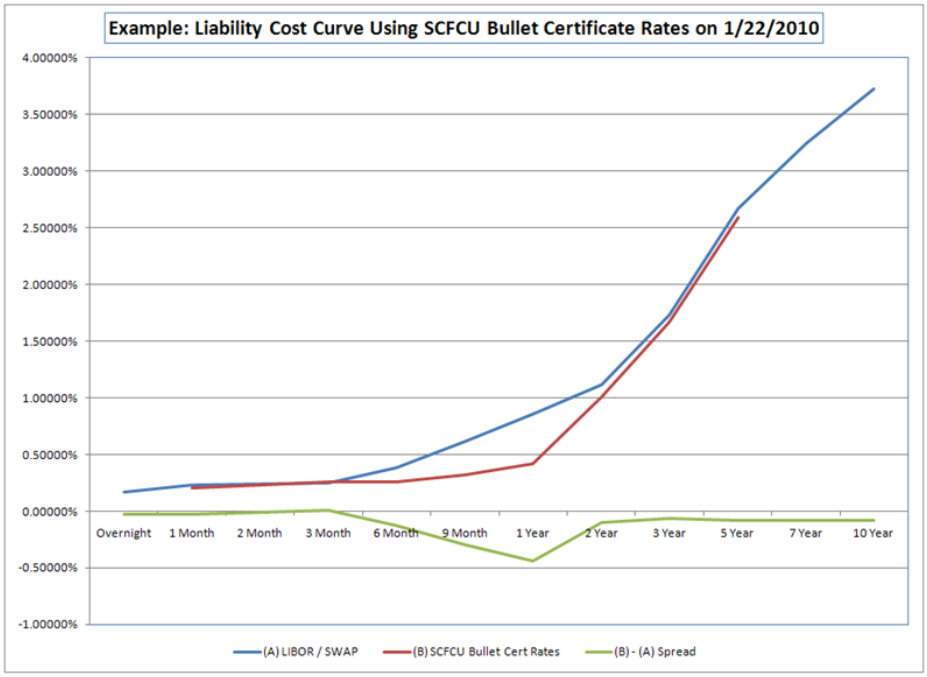

Scenario 11 (75% Overnight, 0.75 WAL) Liability Structure Compared to Typical Profile with 75% in Overnight Funding
80.000%
70.000%
60.000%
50.000%
40.000%
30.000%
20.000%
10.000%
0.000%
75.000%
0.500%
0.500%
0.500%
0.500%
0.500%
0.500%
7.425%
0.500%
0.500%
2.129%
11.446%
Overnight
1 Month
2 Month
3 Month
6 Month
9 Month
1 Year
2 Year
3 Year
5 Year
7 Year
10 Year
Scenario Profile
Typical Profile with Overnight Funding of 75%


Scenario 12 (75% Overnight, 1.00 WAL) Liability Structure Compared to Typical Profile with 75% in Overnight Funding
80.000%
70.000%
60.000%
50.000%
40.000%
30.000%
20.000%
10.000%
0.000%
75.000%
0.500%
0.500%
0.500%
0.500%
0.500%
0.500%
1.313%
0.500%
0.500%
1.761%
17.926%
Overnight
1 Month
2 Month
3 Month
6 Month
9 Month
1 Year
2 Year
3 Year
5 Year
7 Year
10 Year
Scenario Profile
Typical Profile with Overnight Funding of 75%

The liability weights are summarized in the following chart:

Scenario Number					1	2	3	4	5	6	7	8	9	10	11	12
Scenario Name					25% with 0.25 WAL	25% with 0.50 WAL	25% with 0.75 WAL	25% with 1.00 WAL	50% with 0.25 WAL	50% with 0.50 WAL	50% with 0.75 WAL	50% with 1.00 WAL	75% with 0.25 WAL	75% with 0.50 WAL	75% with 0.75 WAL	75% with 1.00 WAL
Target Overnight Percentage					25.00%	25.00%	25.00%	25.00%	50.00%	50.00%	50.00%	50.00%	75.00%	75.00%	75.00%	75.00%
Target Weighted Average Life (Years)					0.25	0.50	0.75	1.00	0.25	0.50	0.75	1.00	0.25	0.50	0.75	1.00
		Adjusted Distributions with Overnight Funding														
Original Maturity	Typical MCCU Distribution of Term Funds	Typical Profile with Overnight Funding of 25%	Typical Profile with Overnight Funding of 50%	Typical Profile with Overnight Funding of 75%	Scenario Profile	Scenario Profile	Scenario Profile	Scenario Profile	Scenario Profile	Scenario Profile	Scenario Profile	Scenario Profile	Scenario Profile	Scenario Profile	Scenario Profile	Scenario Profile
Overnight		25.00%	50.00%	75.00%	25.000%	25.000%	25.000%	25.000%	50.000%	50.000%	50.000%	50.000%	75.000%	75.000%	75.000%	75.000%
1 Month	7.01%	5.26%	3.51%	1.75%	11.748%	4.772%	2.722%	1.491%	3.091%	0.500%	0.500%	0.500%	0.500%	0.500%	0.500%	0.500%
2 Month	4.99%	3.74%	2.50%	1.25%	10.273%	3.742%	2.232%	1.040%	4.003%	0.889%	0.500%	0.500%	0.500%	0.500%	0.500%	0.500%
3 Month	5.13%	3.85%	2.56%	1.28%	9.538%	3.865%	2.432%	1.279%	3.660%	0.902%	0.500%	0.500%	0.500%	0.500%	0.500%	0.500%
6 Month	15.37%	11.53%	7.69%	3.84%	16.455%	13.498%	12.281%	11.261%	12.182%	7.770%	7.190%	5.839%	5.475%	0.500%	0.500%	0.500%
9 Month	10.85%	8.14%	5.42%	2.71%	8.541%	8.039%	7.066%	6.148%	5.627%	3.761%	2.176%	0.500%	0.950%	0.500%	0.500%	0.500%
1 Year	11.18%	8.38%	5.59%	2.79%	6.735%	8.818%	8.075%	7.275%	5.299%	4.888%	3.401%	1.325%	1.165%	0.500%	0.500%	0.500%
2 Year	28.82%	21.61%	14.41%	7.20%	11.710%	24.166%	24.278%	24.013%	16.138%	21.259%	20.412%	17.882%	11.869%	13.758%	7.425%	1.313%
3 Year	11.35%	8.51%	5.68%	2.84%	0.000%	6.278%	7.369%	7.514%	0.000%	5.048%	4.420%	4.847%	1.361%	0.500%	0.500%	0.500%
5 Year	5.20%	3.90%	2.60%	1.30%	0.000%	1.823%	4.742%	5.839%	0.000%	3.159%	3.510%	4.967%	1.681%	1.126%	0.500%	0.500%
7 Year	0.10%	0.08%	0.05%	0.03%	0.000%	0.000%	1.088%	3.141%	0.000%	1.323%	1.563%	3.893%	0.500%	0.863%	2.129%	1.761%
10 Year	0.00%	0.00%	0.00%	0.00%	0.000%	0.000%	2.715%	5.998%	0.000%	0.500%	5.827%	9.246%	0.500%	5.752%	11.446%	17.926%
Total Liability Cor	100.00%	100.00%	100.00%	100.00%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

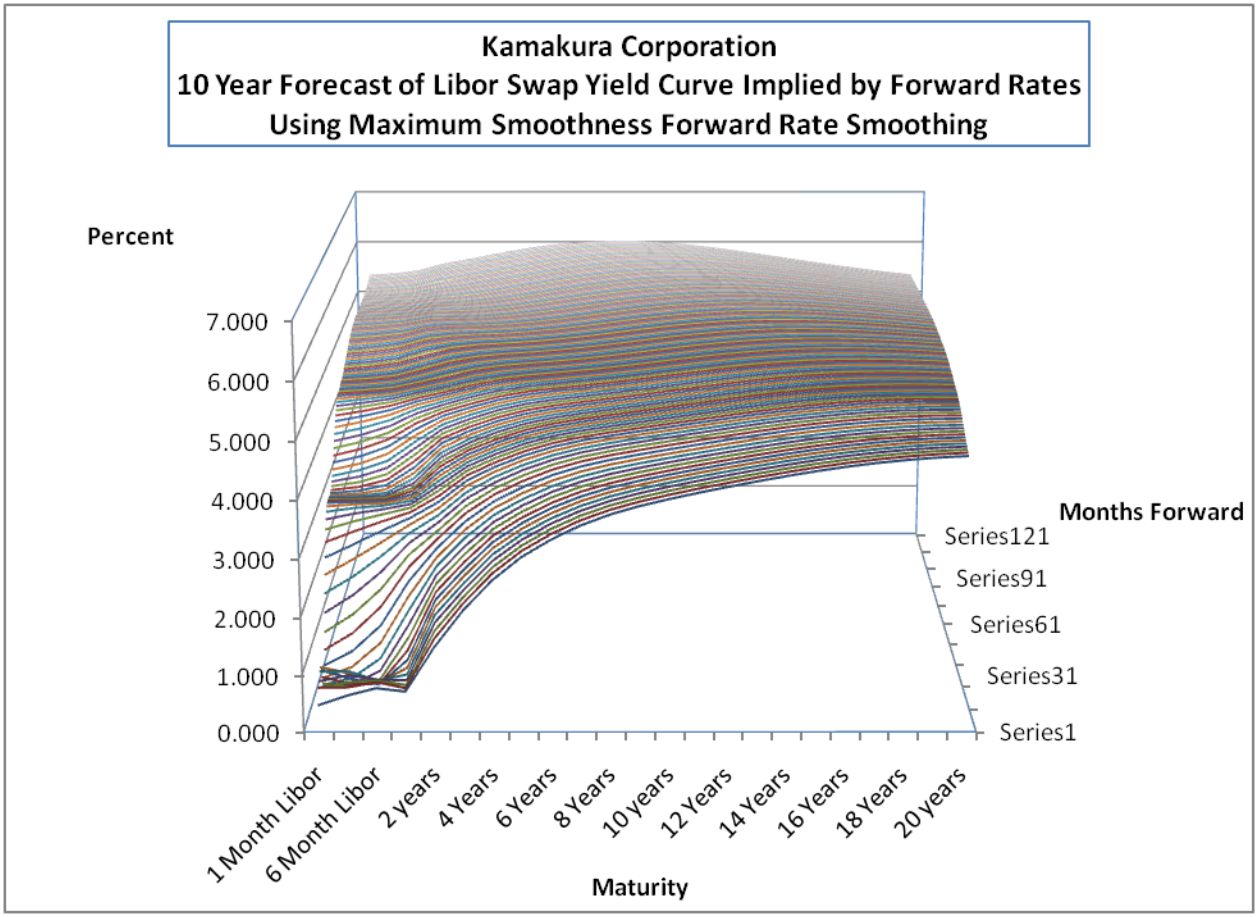
One of the key assumptions of the Kamakura Risk Manager analysis revolves around the funding costs of a model corporate credit union. In order to make reasonable assumptions about the actual funding costs of a "typical" corporate credit union, we compared the posted rates of Southwest Corporate Federal Credit Union with interest rate swap rates on January 22, 2010:



As the graph shows, the marginal cost of funds to Southwest are very close to the "market" levels as captured by the libor/interest rate swap curve. In simulating liability costs forward, we assumed that the differential versus the swap curve for our model corporate credit union persisted at the levels of January 22,

2010 for Southwest. The overnight differential was assumed to be the same as the one month differential. The 7 and 10 year differences versus the swap curve were assumed to be the same as the 5 year difference versus swaps.

Retained earnings are assuming to have no fixed funding costs. To allow for this assumption to be modified, Kamakura presents the 10 year market-implied forecast surface (interpolated with quartic spline smoothing) of the term structure of LIBOR-swap curve as of 12/31/2009. A description of the imputation of market-implied yield surfaces can be found in many finance textbooks and is available upon request.



The market implied forward curves show a large flattening over time, as the short term rates (horizontal axis) rise to the level of the long term rates over the next five years (depth axis, measured in months).

Objective and Portfolio Construction Algorithm

With any subset N of the 9.1 million securities with CUSIPs, there still remains an infinite number of portfolios which could be constructed from these N securities. We therefore specify the following criteria for portfolio selection looking forward from March 31, 2007 and December 31, 2009:

- **Equal weights**: we assume that we hold an equal amount of every asset. Note that since corporate credit union legacy assets are not analyzed, book value equals market value at time zero in the simulation, but par value may be different for each security.
- **Maximum diversification**: there are many measures of diversification. Here we consider the simplest measure: of the universe of potential members of each portfolio, we choose the maximum number of securities that we can add to the portfolio and still meet two criteria: adherence to (a) time zero Part 704 limits and (b) equal weights on each security.

Kamakura believes that this additional structure is ex-ante fair and provides the additional structure needed to make this analysis tractable and repeatable.

At the outset, our portfolio is designed to meet the following objectives:

Time zero asset size:	$10 billion
Time zero capital:	4% of total assets, $400 million
Time zero liabilities:	$9.6 billion

To create the final asset portfolios, Kamakura follows the following algorithm:

Step 1: Stress Test the 12 Liability Strategies

Proposed Regulations 704.8(d)(e)(f) apply to the entire balance sheet, both assets and liabilities. For that reason, we cannot select the assets without knowing which liability strategy is being employed. That means two things:

- We must stress test all 12 liability strategies with respect to yield shifts, spread shifts and the combination of spread and prepay shifts as required by 704.8(d)(e)(f).[30]
- Having done that, we can then select the asset strategies for which the total balance sheet meets 704.8(d)(e)(f) plus the weighted average life constraint on assets.

Step 2: Stress Test All Candidate Assets on 3/31/2007 and 12/31/2009

For every potential asset in the universe, for both March 31, 2007 and December 31, 2009, we must calculate the following:

- Weighted average life.
- Market value.
- Percentage change in market value for 300 basis point yield shift.
- Percentage change in market value for 300 basis point spread shift.[31]

[30] This also means that the admissibility of any given transaction cannot be determined without substantial portfolio-level calculation. These calculations require a non-trivial amount of human and computing resources, particularly when the composition of the asset and liability side of the balance sheet changes with high frequency.

- Percentage change in market value for 300 basis point spread shift in combination with a 50 percent reduction on prepayment speeds.

Step 3: Select a Stress Test Threshold and Calculate Amount of Each Candidate Security to Buy

The next step is to select a particular stress test threshold. For any given threshold level of stress test performance, Kamakura constructs a portfolio of all assets that have stress test performance at least as good as the threshold level. For all of the securities that meet that standard, the amount which will be purchased will be the desired dollar amount of market value X divided by the market price of each security.

Step 4: Impose Criterion for Best Portfolio

The "best" portfolio is defined as that portfolio which includes the largest number of candidate assets, constrained in such a way that equal market value of each candidate asset is purchased. This portfolio can also be seen as the portfolio that results from Step 3 with the lowest stress test performance that is still consistent with the proposed regulations in parts 704.8(d)(e)(f).

Step 5: Perform Other Tests Required by the Proposed Regulations

"Best" means the portfolio with the maximum number of holdings (i.e. maximum cusips) within the defined universe. Thus far, we have a portfolio that meets that criteria, and also satisfies the stress test requirements in the proposed regulations. The final step is to ensure compliance with the other dimensions of the proposed rule. For a given portfolio resulting from step 4, Kamakura verifies that:

- Assets must be selected such that the ultimate portfolio meets the 2 year weighted average life constraint
- Assets must be allocated in such a way so that none of the sector concentration limits in the proposed rule are violated
- Assets must be allocated in such a way so that none of the subordination limits in the proposed rule are violated.
- Assets and liabilities (12 scenarios) must have percentage change in market value of 20% or less if yields rise 300 bp.
- Assets and liabilities (12 scenarios) must have percentage change in market value of 20% or less if spreads rise 300 bp with best estimated prepayment.
- Assets and liabilities (12 scenarios) must have percentage change in market value of 30% or less if spreads rise 300 bp with best estimated prepayment rate times ½.
- Risk-weighted capital test must be met.

---

[31] The spread stress tests implicitly assume that the index on the floating rate instrument (say LIBOR) is independent of the risk of the borrower. This assumption will not be true if the borrower is a bank (with credit risk highly correlated to LIBOR) or if the borrower and the index have a common dependence on macro-economic factors like home prices.

2007 Stress Test Results

This section contains the results from the three stress tests in the proposed rule when applied to the 2007 universe. The results are presented by asset class, and again for each individual CUSIP in a given asset class. Screen captures are taken from Kamakura's Risk Portal reporting software.

2007 Yield Curve Stress Tests- by asset class:

NCUA

REPORTS | ADMINISTRATION

Portfolio | Interest Rate Risk | Liquidity Risk | Market Risk | Credit Risk | Economic Capital | Basel Capital | Financial Ratio Analysis | Other Reports | Report Finder | Help

Sensitivity - by Attribute

KRM Run: Assets 2007 Stress Test YC Shifts (values in USD)

View By (Edit) Currently Selected: [Asset Type, Transaction]

Market Value | Change in MV | % Change in MV | by Shift

Expand All | Collapse All

				% Change in MV			
	CUSIP	Maturity Date	Remaining Maturity	Base Case	Upward 300bp	Upward 200bp	Upward 100bp
⊞ ABS Other				0.00%	(2.98%)	(1.93%)	(1.01%)
⊞ Auto Loan				0.00%	(6.25%)	(4.23%)	(2.15%)
⊞ BAC2				0.00%	(10.93%)	(7.51%)	(3.87%)
⊞ C				0.00%	(11.03%)	(7.58%)	(3.91%)
⊞ CMBS				0.00%	(9.30%)	(6.38%)	(3.28%)
⊞ CVX				0.00%	(13.87%)	(9.55%)	(4.93%)
⊞ Credit Card				0.00%	2.16%	1.41%	0.54%
⊞ DNA				0.00%	(13.88%)	(9.56%)	(4.94%)
⊞ JNJ				0.00%	(13.82%)	(9.51%)	(4.91%)
⊞ JPM				0.00%	(10.99%)	(7.55%)	(3.89%)
⊞ MBS Agency				0.00%	(9.03%)	(6.14%)	(3.13%)
⊞ MDT				0.00%	(11.03%)	(7.58%)	(3.91%)
⊞ MMM				0.00%	(11.11%)	(7.63%)	(3.94%)
⊞ PFE				0.00%	(11.04%)	(7.58%)	(3.91%)
⊞ PG				0.00%	(11.02%)	(7.57%)	(3.91%)
⊞ RMBS PA				0.00%	(8.53%)	(5.76%)	(2.79%)
⊞ RMBS PF				0.00%	(19.04%)	(13.42%)	(6.99%)
⊞ RMBS SA				0.00%	(0.66%)	(0.43%)	(0.21%)
⊞ RMBS SF				0.00%	(14.58%)	(10.21%)	(5.34%)
⊞ SYY				0.00%	(13.79%)	(9.49%)	(4.90%)
⊞ Student Loan FFELP				0.00%	0.25%	0.17%	0.08%
⊞ Student Loan Private				0.00%	0.66%	0.42%	0.29%
⊞ Treasury Security				0.00%	(7.15%)	(4.88%)	(2.50%)
⊞ USB				0.00%	(11.02%)	(7.57%)	(3.91%)
⊞ WB				0.00%	(11.06%)	(7.60%)	(3.92%)
⊞ WFC				0.00%	(11.09%)	(7.62%)	(3.93%)
⊞ XOM				0.00%	(13.79%)	(9.49%)	(4.90%)

User: Sean Klein Kamakura Corporation

ABS Other

⊟ ABS Other				0.00%	(2.98%)	(1.93%)	(1.01%)
ABS.061	42805RAK5	11/25/11	4y 7m 25d	0.00%	0.08%	0.05%	0.03%
ABS.062	368288AE6	11/17/20	13y 7m 17d	0.00%	0.16%	0.10%	0.05%
ABS.063	64908PAA1	1/15/21	13y 9m 15d	0.00%	(17.34%)	(12.06%)	(6.30%)
ABS.064	89676AAN3	11/26/21	14y 7m 26d	0.00%	0.84%	0.27%	0.05%
ABS.065	897790AC5	12/15/16	9y 8m 15d	0.00%	0.15%	0.10%	0.05%
ABS.066	368288AD8	4/17/19	12y 0m 17d	0.00%	0.11%	0.07%	0.04%
ABS.067	42805RAS8	11/25/11	4y 7m 25d	0.00%	0.08%	0.05%	0.03%
ABS.068	125565AD3	4/20/14	7y 0m 20d	0.00%	(8.04%)	(5.44%)	(2.76%)
ABS.069	00080ABE9	10/25/17	10y 6m 25d	0.00%	0.54%	0.36%	0.18%
ABS.070	903485AA8	4/15/14	7y 0m 15d	0.00%	(4.59%)	(3.10%)	(1.57%)
ABS.071	34528QAC8	6/15/13	6y 2m 15d	0.00%	(2.37%)	1.12%	0.47%
ABS.072	760106AU8	6/25/11	4y 2m 25d	0.00%	0.06%	0.04%	0.02%
ABS.073	15132CAE2	5/20/13	6y 1m 20d	0.00%	0.13%	0.08%	0.04%
ABS.074	649083AA0	3/15/19	11y 11m 15d	0.00%	(15.47%)	(10.70%)	(5.55%)
ABS.075	15132CAG7	7/20/10	3y 3m 20d	0.00%	0.10%	0.07%	0.03%
ABS.076	19716QAA5	3/20/21	13y 11m 20d	0.00%	(1.04%)	(0.69%)	(0.34%)
ABS.077	14056GAB4	9/20/22	15y 5m 20d	0.00%	0.19%	0.13%	0.06%
ABS.078	00083EAA7	11/27/19	12y 7m 27d	0.00%	0.36%	0.24%	0.12%
ABS.079	883145AC8	5/15/20	13y 1m 15d	0.00%	0.17%	0.12%	0.06%
ABS.080	64908QAA9	1/15/21	13y 9m 15d	0.00%	(17.91%)	(12.48%)	(6.53%)

Auto Loan

⊟ Auto Loan				0.00%	(6.25%)	(4.23%)	(2.15%)
ABS.001	13973AAD5	5/15/11	4y 1m 15d	0.00%	(5.68%)	(3.83%)	(1.94%)
ABS.002	404285AC2	6/17/11	4y 2m 17d	0.00%	(4.34%)	(2.92%)	(1.47%)
ABS.003	14042CAD6	7/15/12	5y 3m 15d	0.00%	(8.47%)	(5.74%)	(2.92%)
ABS.004	65475CAD4	11/15/11	4y 7m 15d	0.00%	(7.44%)	(5.03%)	(2.55%)
ABS.005	262073AD1	12/16/13	6y 8m 16d	0.00%	(8.44%)	(5.72%)	(2.91%)
ABS.006	34528CAE5	2/15/12	4y 10m 15d	0.00%	(8.81%)	(5.97%)	(3.03%)
ABS.007	481238AD5	12/15/14	7y 8m 15d	0.00%	(8.92%)	(6.05%)	(3.08%)
ABS.008	92977FAD4	3/20/13	5y 11m 20d	0.00%	(8.79%)	(5.96%)	(3.03%)
ABS.009	14042DAE2	11/15/13	6y 7m 15d	0.00%	(0.06%)	(0.04%)	(0.02%)
ABS.010	895787AX7	4/12/13	6y 0m 12d	0.00%	(8.41%)	(5.70%)	(2.90%)
ABS.011	92977AAN3	4/20/12	5y 0m 20d	0.00%	(7.95%)	(5.38%)	(2.73%)
ABS.012	54238NAD2	9/15/13	6y 5m 15d	0.00%	(9.94%)	(6.76%)	(3.44%)
ABS.013	030613AD5	10/6/13	6y 6m 6d	0.00%	0.07%	0.05%	0.02%
ABS.014	449182BS2	11/15/12	5y 7m 15d	0.00%	(7.29%)	(4.93%)	(2.50%)
ABS.015	14041VAE3	7/15/13	6y 3m 15d	0.00%	(0.04%)	(0.03%)	(0.01%)
ABS.016	233880AB9	2/8/11	3y 10m 8d	0.00%	(5.85%)	(3.94%)	(1.99%)
ABS.017	89578PAC3	11/14/11	4y 7m 14d	0.00%	(5.95%)	(4.01%)	(2.03%)
ABS.018	03061NJJ9	5/6/12	5y 1m 6d	0.00%	(0.02%)	(0.01%)	(0.00%)
ABS.019	03062XAD8	9/6/13	6y 5m 6d	0.00%	(10.39%)	(7.07%)	(3.61%)
ABS.020	34528AAE9	9/15/11	4y 5m 15d	0.00%	(8.03%)	(5.43%)	(2.76%)

Credit Cards

⊟ Credit Card				0.00%	2.16%	1.41%	0.54%
ABS.022	8761ENAA1	10/27/14	7y 6m 27d	0.00%	(0.22%)	(0.14%)	(0.07%)
ABS.023	55264TAE1	12/16/13	6y 8m 16d	0.00%	(0.19%)	(0.13%)	(0.06%)
ABS.024	55262TFJ7	10/15/12	5y 6m 15d	0.00%	(8.01%)	(5.42%)	(2.75%)
ABS.025	981464BD1	2/15/17	9y 10m 15d	0.00%	(0.13%)	(0.08%)	(0.04%)
ABS.026	161571BB9	4/15/13	6y 0m 15d	0.00%	(0.14%)	(0.09%)	(0.05%)
ABS.027	55264TDN8	5/15/13	6y 1m 15d	0.00%	(0.14%)	(0.09%)	(0.05%)
ABS.028	14041NBW0	8/15/14	7y 4m 15d	0.00%	26.77%	16.54%	5.13%
ABS.029	25466KFJ3	6/18/13	6y 2m 18d	0.00%	(0.14%)	(0.09%)	(0.05%)
ABS.030	02586GAA0	8/15/11	4y 4m 15d	0.00%	(0.14%)	(0.09%)	(0.05%)
ABS.031	55264TDL2	4/15/13	6y 0m 15d	0.00%	(0.14%)	(0.09%)	(0.05%)
ABS.032	36159JAG6	3/15/13	5y 11m 15d	0.00%	(0.14%)	(0.09%)	(0.05%)
ABS.033	161571AW4	12/17/12	5y 8m 17d	0.00%	(9.31%)	(6.31%)	(3.21%)
ABS.034	635414AG0	3/17/14	6y 11m 17d	0.00%	(0.10%)	(0.07%)	(0.03%)
ABS.035	55262NAL0	1/15/13	5y 9m 15d	0.00%	(0.17%)	(0.11%)	(0.06%)
ABS.036	635414AD7	3/15/13	5y 11m 15d	0.00%	(0.14%)	(0.09%)	(0.05%)
ABS.037	14041NBY6	1/15/15	7y 9m 15d	0.00%	34.76%	24.14%	12.22%
ABS.038	161571AT1	10/15/12	5y 6m 15d	0.00%	(0.14%)	(0.09%)	(0.05%)
ABS.039	16151RCR2	1/15/16	8y 9m 15d	0.00%	(0.24%)	(0.16%)	(0.08%)
ABS.040	55264TCK5	7/15/13	6y 3m 15d	0.00%	(0.16%)	(0.11%)	(0.05%)

CMBS

⊟ CMBS				0.00%	(9.30%)	(6.38%)	(3.28%)
MBS.251	05947UBM9	4/15/36	29y 0m 15d	0.00%	(8.57%)	(5.81%)	(2.95%)
MBS.252	05947UCF3	5/11/35	28y 1m 11d	0.00%	(9.70%)	(6.59%)	(3.36%)
MBS.254	05947UDP0	4/11/37	30y 0m 11d	0.00%	(10.31%)	(7.01%)	(3.57%)
MBS.255	07383FGE2	11/15/16	9y 7m 15d	0.00%	(4.67%)	(3.15%)	(1.59%)
MBS.256	07383F7S1	6/11/41	34y 2m 11d	0.00%	(4.68%)	(3.15%)	(1.59%)
MBS.257	12513EAH7	7/15/44	37y 3m 15d	0.00%	(15.73%)	(10.85%)	(5.62%)
MBS.259	12513EAJ3	7/15/44	37y 3m 15d	0.00%	(18.24%)	(12.63%)	(6.56%)
MBS.260	20047MAE4	2/5/19	11y 10m 5d	0.00%	(9.85%)	(6.69%)	(3.41%)
MBS.261	20047MAF1	2/5/19	11y 10m 5d	0.00%	0.03%	0.02%	0.01%
MBS.263	20046FAA8	7/16/34	27y 3m 16d	0.00%	(7.98%)	(5.41%)	(2.75%)
MBS.264	225470NG4	12/15/40	33y 8m 15d	0.00%	(4.90%)	(3.30%)	(1.67%)
MBS.265	173067GK9	5/15/43	36y 1m 15d	0.00%	(5.04%)	(3.40%)	(1.72%)
MBS.266	337368AB0	3/15/33	25y 11m 15d	0.00%	(8.47%)	(5.74%)	(2.92%)
MBS.267	36828QNQ5	7/10/45	38y 3m 10d	0.00%	(5.95%)	(4.01%)	(2.03%)
MBS.269	361849MQ2	8/16/33	26y 4m 16d	0.00%	(4.81%)	(3.26%)	(1.65%)
MBS.270	36228CJT1	5/3/18	11y 1m 3d	0.00%	(4.41%)	(2.97%)	(1.50%)
MBS.271	46625YVR1	1/12/43	35y 9m 12d	0.00%	(4.99%)	(3.36%)	(1.70%)
MBS.272	46625YWG4	1/12/43	35y 9m 12d	0.00%	(16.41%)	(11.33%)	(5.87%)
MBS.273	46625YNS8	7/15/42	35y 3m 15d	0.00%	(13.76%)	(9.45%)	(4.86%)
MBS.274	46625YUP6	10/15/42	35y 6m 15d	0.00%	(15.52%)	(10.70%)	(5.53%)
MBS.275	46625YTY9	10/15/42	35y 6m 15d	0.00%	(8.64%)	(5.85%)	(2.97%)
MBS.276	46625YXL2	12/15/44	37y 8m 15d	0.00%	(5.24%)	(3.53%)	(1.78%)
MBS.277	46625YXR9	12/15/44	37y 8m 15d	0.00%	(15.57%)	(10.73%)	(5.55%)
MBS.278	59022HKZ4	11/12/37	30y 7m 12d	0.00%	(5.48%)	(3.69%)	(1.87%)
MBS.279	59022HLH3	11/12/37	30y 7m 12d	0.00%	(17.59%)	(12.17%)	(6.32%)
MBS.280	59022HNA6	1/12/44	36y 9m 12d	0.00%	(17.22%)	(11.91%)	(6.18%)
MBS.281	59022HMW9	1/12/44	36y 9m 12d	0.00%	(9.30%)	(6.31%)	(3.21%)
MBS.282	617451AA7	9/15/42	35y 5m 15d	0.00%	(5.66%)	(3.82%)	(1.93%)
MBS.283	617451AB5	9/15/42	35y 5m 15d	0.00%	(16.27%)	(11.23%)	(5.82%)
MBS.284	617451AF6	9/15/42	35y 5m 15d	0.00%	(17.73%)	(12.26%)	(6.36%)
MBS.285	356486AA8	7/12/16	9y 3m 12d	0.00%	(0.08%)	(0.05%)	(0.03%)
MBS.286	61746WGM6	3/11/16	8y 11m 11d	0.00%	(5.69%)	(3.84%)	(1.95%)
MBS.287	61746WGN4	3/11/16	8y 11m 11d	0.00%	(0.09%)	(0.06%)	(0.03%)
MBS.288	589929VX3	2/3/16	8y 10m 3d	0.00%	(5.73%)	(3.87%)	(1.96%)
MBS.289	901921AC0	2/3/16	8y 10m 3d	0.00%	(5.54%)	(3.74%)	(1.89%)
MBS.290	901921AG1	2/3/16	8y 10m 3d	0.00%	(0.00%)	0.00%	0.00%
MBS.291	929766W74	5/15/44	37y 1m 15d	0.00%	(8.53%)	(5.78%)	(2.93%)
MBS.292	929766X57	5/15/44	37y 1m 15d	0.00%	0.06%	0.04%	0.02%
MBS.293	929766X65	5/15/44	37y 1m 15d	0.00%	(17.95%)	(12.41%)	(6.44%)
MBS.294	9297664R1	5/15/44	37y 1m 15d	0.00%	(16.23%)	(11.20%)	(5.80%)
MBS.295	9297664K6	7/15/42	35y 3m 15d	0.00%	(0.06%)	(0.04%)	(0.02%)
MBS.296	9297664U4	7/15/42	35y 3m 15d	0.00%	(17.97%)	(12.43%)	(6.45%)
MBS.297	9297667B3	10/15/44	37y 6m 15d	0.00%	(16.20%)	(11.18%)	(5.79%)
MBS.298	9297667C1	10/15/44	37y 6m 15d	0.00%	(0.06%)	(0.04%)	(0.02%)
MBS.299	9297667K3	10/15/44	37y 6m 15d	0.00%	(18.27%)	(12.65%)	(6.57%)
MBS.300	9297667J6	10/15/44	37y 6m 15d	0.00%	(18.18%)	(12.59%)	(6.54%)

RMBS- By Credit Rating and Rate Reset

⊟ RMBS PA				0.00%	(8.53%)	(5.76%)	(2.79%)
MBS.021	36228FUT1	7/25/18	11y 3m 25d	0.00%	(7.04%)	(4.79%)	(2.45%)
MBS.041	9292276V3	7/25/18	11y 3m 25d	0.00%	(10.96%)	(7.53%)	(3.88%)
MBS.042	949762AA6	9/25/18	11y 5m 25d	0.00%	(8.96%)	(6.13%)	(3.15%)
MBS.055	81744FFY8	1/20/35	27y 9m 20d	0.00%	(0.22%)	(0.15%)	(0.07%)
MBS.065	07387AEA9	8/25/35	28y 4m 25d	0.00%	(13.27%)	(9.08%)	(4.66%)
MBS.069	05948X7A3	6/25/19	12y 2m 25d	0.00%	(7.72%)	(5.25%)	(2.68%)
MBS.071	92922FGY8	11/25/33	26y 7m 25d	0.00%	(22.70%)	(14.11%)	(4.47%)
MBS.077	000759BW9	3/15/32	24y 11m 15d	0.00%	(5.57%)	(3.77%)	(1.91%)
MBS.081	949788AE3	7/25/19	12y 3m 25d	0.00%	(11.40%)	(7.84%)	(4.04%)
MBS.100	22541SX29	12/25/19	12y 8m 25d	0.00%	(11.68%)	(8.03%)	(4.15%)
MBS.111	86359LGE3	5/19/35	28y 1m 19d	0.00%	(0.20%)	(0.13%)	(0.07%)
MBS.118	12669FA86	7/25/34	27y 3m 25d	0.00%	(26.39%)	(18.74%)	(10.01%)
MBS.131	16162WAM1	11/25/18	11y 7m 25d	0.00%	(10.47%)	(7.18%)	(3.70%)
MBS.132	59020UL45	11/25/35	28y 7m 25d	0.00%	(0.59%)	(0.31%)	(0.15%)
MBS.138	55265KU31	11/25/18	11y 7m 25d	0.00%	(10.54%)	(7.23%)	(3.72%)
MBS.148	81744FAZ0	5/20/34	27y 1m 20d	0.00%	(1.30%)	(0.87%)	(0.44%)
MBS.156	576434SF2	7/25/19	12y 3m 25d	0.00%	(11.28%)	(7.75%)	(4.00%)
MBS.166	43708DAA4	3/25/37	29y 11m 25d	0.00%	(0.31%)	(0.19%)	(0.08%)
MBS.178	05946XKZ5	10/25/19	12y 6m 25d	0.00%	(12.30%)	(8.48%)	(4.38%)

⊟ RMBS PF				0.00%	(19.04%)	(13.42%)	(6.99%)
[illegible]	57643MKG8	5/25/35	28y 1m 25d	0.00%	(11.22%)	(7.73%)	(4.00%)
MBS.044	74957XAR6	9/25/36	29y 5m 25d	0.00%	(23.27%)	(16.42%)	(8.71%)
MBS.137	74958EAB2	12/25/36	29y 8m 25d	0.00%	(9.37%)	(6.44%)	(3.33%)
MBS.142	55274QBB0	6/25/36	29y 2m 25d	0.00%	(30.10%)	(21.84%)	(11.94%)
MBS.157	52520MAQ6	11/25/35	28y 7m 25d	0.00%	(27.83%)	(19.51%)	(9.58%)
MBS.184	74957XAK1	9/25/36	29y 5m 25d	0.00%	(11.67%)	(7.97%)	(4.09%)

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⊟ RMBS SA				0.00%	(0.66%)	(0.43%)	(0.21%)
MBS.001	542512AD0	12/25/36	29y 8m 25d	0.00%	0.19%	0.13%	0.07%
MBS.003	81377GAB5	8/25/36	29y 4m 25d	0.00%	(0.12%)	(0.08%)	(0.04%)
MBS.004	75156QAC0	11/25/36	29y 7m 25d	0.00%	(0.09%)	(0.06%)	(0.03%)
MBS.005	17307G4W5	1/25/36	28y 9m 25d	0.00%	(0.14%)	(0.09%)	(0.05%)
MBS.006	39538WGD4	4/25/36	29y 0m 25d	0.00%	(0.16%)	(0.10%)	(0.05%)
MBS.007	17311BAD5	12/25/36	29y 8m 25d	0.00%	0.25%	0.18%	0.10%
MBS.008	39539BAA1	3/12/37	29y 11m 12d	0.00%	(2.74%)	(0.96%)	(0.05%)
MBS.010	59020UVQ5	4/25/35	28y 0m 25d	0.00%	(0.27%)	(0.18%)	(0.09%)
MBS.011	68389FJJ4	11/25/35	28y 7m 25d	0.00%	(0.20%)	(0.13%)	(0.07%)
MBS.012	367910AG1	10/25/35	28y 6m 25d	0.00%	(0.21%)	(0.14%)	(0.07%)
MBS.013	55275BAF4	8/25/36	29y 4m 25d	0.00%	(0.15%)	(0.10%)	(0.05%)
MBS.014	933635AD6	3/25/47	39y 11m 25d	0.00%	(0.23%)	(0.11%)	(0.06%)
MBS.015	126673KG6	2/15/34	26y 10m 15d	0.00%	(2.45%)	(1.65%)	(0.83%)
MBS.016	362341QT9	9/25/35	28y 5m 25d	0.00%	(0.28%)	(0.19%)	(0.09%)
MBS.018	17309PAB2	9/25/36	29y 5m 25d	0.00%	(0.14%)	(0.09%)	(0.05%)
MBS.019	74922PAD6	2/25/37	29y 10m 25d	0.00%	0.08%	0.06%	0.04%
MBS.020	46626LBK5	9/25/35	28y 5m 25d	0.00%	(0.20%)	(0.13%)	(0.07%)
MBS.022	05950MAB6	7/20/36	29y 3m 20d	0.00%	(0.04%)	(0.02%)	(0.01%)
MBS.023	87222PAB9	1/25/37	29y 9m 25d	0.00%	(0.15%)	(0.10%)	(0.05%)
MBS.024	32028TAF4	1/25/38	30y 9m 25d	0.00%	0.04%	0.03%	0.02%
MBS.025	040104PE5	11/25/35	28y 7m 25d	0.00%	(0.20%)	(0.14%)	(0.07%)
MBS.026	23243HAF8	6/25/47	40y 2m 25d	0.00%	0.07%	0.05%	0.03%
MBS.027	863579KH0	2/25/35	27y 10m 25d	0.00%	(0.39%)	(0.17%)	(0.08%)
MBS.028	007036TP1	1/25/36	28y 9m 25d	0.00%	(0.23%)	(0.16%)	(0.08%)
MBS.029	92977YAZ4	10/25/35	28y 6m 25d	0.00%	(0.21%)	(0.14%)	(0.07%)
MBS.030	320276AG3	6/25/36	29y 2m 25d	0.00%	(0.11%)	(0.07%)	(0.04%)
MBS.031	40430MAG2	7/25/36	29y 3m 25d	0.00%	(0.12%)	(0.08%)	(0.04%)
MBS.032	05950PAU7	10/20/36	29y 6m 20d	0.00%	(0.07%)	(0.05%)	(0.02%)
MBS.034	126682AA1	4/15/37	30y 0m 15d	0.00%	(3.65%)	(2.45%)	(1.22%)
MBS.036	126685DJ2	5/15/36	29y 1m 15d	0.00%	(5.67%)	(3.85%)	(1.97%)
MBS.037	69337BAC8	2/25/37	29y 10m 25d	0.00%	0.01%	0.01%	0.01%
MBS.039	456606HV7	10/25/35	28y 6m 25d	0.00%	(0.22%)	(0.15%)	(0.07%)
MBS.040	07401TAB2	3/25/37	29y 11m 25d	0.00%	0.41%	0.30%	0.17%
MBS.043	318340AD8	9/25/26	19y 5m 25d	0.00%	0.06%	0.04%	0.03%
MBS.046	61744CVZ6	11/25/35	28y 7m 25d	0.00%	(0.19%)	(0.13%)	(0.06%)
MBS.048	45257BAC4	1/25/37	29y 9m 25d	0.00%	(0.10%)	(0.06%)	(0.03%)
MBS.049	23243JAB3	10/15/36	29y 6m 15d	0.00%	(6.90%)	(4.72%)	(2.43%)
MBS.051	46626LHC7	2/25/36	28y 10m 25d	0.00%	(0.16%)	(0.11%)	(0.06%)

MBS.052	36242DN25	3/25/35	27y 11m 25d	0.00%	(0.20%)	(0.13%)	(0.07%)
MBS.053	76113AAJ0	2/25/36	28y 10m 25d	0.00%	(0.18%)	(0.12%)	(0.06%)
MBS.054	542514KS2	4/25/35	28y 0m 25d	0.00%	(0.22%)	(0.13%)	(0.07%)
MBS.056	61744CSV9	7/25/35	28y 3m 25d	0.00%	(0.20%)	(0.13%)	(0.07%)
MBS.057	126686AB0	11/15/36	29y 7m 15d	0.00%	(6.83%)	(4.65%)	(2.38%)
MBS.058	040104SU6	4/25/36	29y 0m 25d	0.00%	(0.16%)	(0.11%)	(0.05%)
MBS.059	74922QAA0	9/25/36	29y 5m 25d	0.00%	(0.08%)	(0.05%)	(0.03%)
MBS.060	23332QAF0	11/19/37	30y 7m 19d	0.00%	(0.05%)	(0.03%)	(0.02%)
MBS.061	073871AB1	8/25/36	29y 4m 25d	0.00%	(0.18%)	(0.12%)	(0.06%)
MBS.062	61748HWP2	3/25/36	28y 11m 25d	0.00%	(0.31%)	(0.17%)	(0.08%)
MBS.063	75156TAD2	2/25/36	28y 10m 25d	0.00%	(0.16%)	(0.11%)	(0.05%)
MBS.064	65537EAB0	10/25/36	29y 6m 25d	0.00%	(0.13%)	(0.08%)	(0.04%)
MBS.066	39539KAG8	2/25/37	29y 10m 25d	0.00%	0.30%	0.21%	0.11%
MBS.067	57643LNG7	1/25/36	28y 9m 25d	0.00%	(0.17%)	(0.11%)	(0.06%)
MBS.068	17309YAB3	10/25/36	29y 6m 25d	0.00%	(0.13%)	(0.09%)	(0.04%)
MBS.070	17309LAF2	8/25/36	29y 4m 25d	0.00%	(0.13%)	(0.09%)	(0.04%)
MBS.072	46626LHW3	3/25/36	28y 11m 25d	0.00%	(0.16%)	(0.11%)	(0.05%)
MBS.074	45071KCN2	2/25/36	28y 10m 25d	0.00%	(0.19%)	(0.13%)	(0.06%)
MBS.075	86362HAA1	12/25/36	29y 8m 25d	0.00%	(0.05%)	(0.03%)	(0.01%)
MBS.076	55027YAB4	10/25/46	39y 6m 25d	0.00%	(0.14%)	(0.09%)	(0.05%)
MBS.078	617538AE3	12/25/36	29y 8m 25d	0.00%	0.02%	0.02%	0.01%
MBS.079	785814AA2	1/25/37	29y 9m 25d	0.00%	(0.08%)	(0.05%)	(0.02%)
MBS.080	03072SRX5	7/25/34	27y 3m 25d	0.00%	(0.22%)	(0.15%)	(0.07%)
MBS.082	35729QAF5	8/25/36	29y 4m 25d	0.00%	(0.11%)	(0.07%)	(0.04%)
MBS.083	07386HK34	5/25/36	29y 1m 25d	0.00%	(0.18%)	(0.12%)	(0.06%)
MBS.084	12668ASY2	8/25/35	28y 4m 25d	0.00%	(0.15%)	(0.10%)	(0.05%)
MBS.085	55028CAA3	11/25/36	29y 7m 25d	0.00%	(0.12%)	(0.08%)	(0.04%)
MBS.086	45660JAD6	3/25/37	29y 11m 25d	0.00%	(16.88%)	(11.80%)	(6.20%)
MBS.087	61749KAG8	7/25/36	29y 3m 25d	0.00%	(0.07%)	(0.05%)	(0.02%)
MBS.089	39538WGB8	4/25/36	29y 0m 25d	0.00%	(0.17%)	(0.12%)	(0.06%)
MBS.090	81879MAY5	2/25/36	28y 10m 25d	0.00%	(0.16%)	(0.11%)	(0.05%)
MBS.091	86358ESK3	5/25/35	28y 1m 25d	0.00%	(0.19%)	(0.13%)	(0.06%)
MBS.094	75406BAE7	3/25/36	28y 11m 25d	0.00%	(0.16%)	(0.11%)	(0.05%)
MBS.096	75115BAA7	7/25/36	29y 3m 25d	0.00%	(0.14%)	(0.09%)	(0.05%)
MBS.098	542514QX5	1/25/46	38y 9m 25d	0.00%	(0.19%)	(0.13%)	(0.06%)
MBS.099	05951VAW9	10/20/46	39y 6m 20d	0.00%	(0.15%)	(0.10%)	(0.05%)
MBS.101	07401MAH4	2/25/37	29y 10m 25d	0.00%	0.22%	0.16%	0.09%
MBS.102	007037BK9	3/25/37	29y 11m 25d	0.00%	(0.03%)	(0.02%)	(0.01%)
MBS.103	86361WAK7	10/25/37	30y 6m 25d	0.00%	(0.04%)	(0.02%)	(0.01%)

MBS.104	07386XAA4	1/25/47	39y 9m 25d	0.00%	(0.14%)	(0.09%)	(0.05%)
MBS.106	23245FAD5	11/25/36	29y 7m 25d	0.00%	0.01%	0.01%	0.01%
MBS.107	542514TW4	3/25/46	38y 11m 25d	0.00%	(0.17%)	(0.11%)	(0.06%)
MBS.108	17307GXU7	8/25/35	28y 4m 25d	0.00%	(4.28%)	(2.66%)	(1.24%)
MBS.109	126673WX6	7/25/35	28y 3m 25d	0.00%	(0.16%)	(0.11%)	(0.05%)
MBS.110	040104PD7	11/25/35	28y 7m 25d	0.00%	(0.20%)	(0.13%)	(0.07%)
MBS.113	46626LFQ8	5/25/35	28y 1m 25d	0.00%	(0.19%)	(0.13%)	(0.06%)
MBS.114	75115VAA3	11/25/36	29y 7m 25d	0.00%	(0.13%)	(0.09%)	(0.04%)
MBS.116	45667SAM9	1/25/37	29y 9m 25d	0.00%	(0.10%)	(0.06%)	(0.03%)
MBS.119	46602WAF1	8/25/36	29y 4m 25d	0.00%	(0.15%)	(0.10%)	(0.05%)
MBS.120	74922MAA9	7/25/36	29y 3m 25d	0.00%	(0.12%)	(0.08%)	(0.04%)
MBS.121	232422AF2	4/25/46	39y 0m 25d	0.00%	(0.09%)	(0.06%)	(0.03%)
MBS.122	026929AA7	12/25/46	39y 8m 25d	0.00%	(0.10%)	(0.07%)	(0.04%)
MBS.124	43709RAA2	2/25/37	29y 10m 25d	0.00%	(0.21%)	(0.14%)	(0.07%)
MBS.126	76110W6P6	11/25/35	28y 7m 25d	0.00%	(0.19%)	(0.13%)	(0.06%)
MBS.127	073875AB2	12/25/46	39y 8m 25d	0.00%	(0.15%)	(0.10%)	(0.05%)
MBS.128	29256PAX2	1/25/36	28y 9m 25d	0.00%	(0.19%)	(0.13%)	(0.06%)
MBS.129	126685AB2	5/15/35	28y 1m 15d	0.00%	(2.54%)	(1.70%)	(0.84%)
MBS.133	456606MZ2	4/25/36	29y 0m 25d	0.00%	(5.73%)	(3.89%)	(1.99%)
MBS.134	05530MAB5	1/25/37	29y 9m 25d	0.00%	(0.11%)	(0.07%)	(0.04%)
MBS.135	64352VNL1	10/25/35	28y 6m 25d	0.00%	(0.21%)	(0.14%)	(0.07%)
MBS.136	75405WAG7	11/25/35	28y 7m 25d	0.00%	(0.20%)	(0.13%)	(0.07%)
MBS.140	70069FHU4	5/25/35	28y 1m 25d	0.00%	(0.19%)	(0.13%)	(0.06%)
MBS.141	76112BYV6	8/25/35	28y 4m 25d	0.00%	(0.22%)	(0.15%)	(0.07%)
MBS.143	02150TAB6	4/25/47	40y 0m 25d	0.00%	0.14%	0.10%	0.05%
MBS.144	46602WAE4	8/25/36	29y 4m 25d	0.00%	(0.13%)	(0.09%)	(0.04%)
MBS.146	61748HKW0	9/25/35	28y 5m 25d	0.00%	(0.61%)	(0.18%)	(0.09%)
MBS.147	754058AE5	10/25/35	28y 6m 25d	0.00%	(0.19%)	(0.13%)	(0.06%)
MBS.149	23242QAE2	7/15/36	29y 3m 15d	0.00%	(5.96%)	(4.03%)	(2.04%)
MBS.150	54251MAF1	5/25/36	29y 1m 25d	0.00%	(0.12%)	(0.08%)	(0.04%)
MBS.151	83612CAF6	7/25/36	29y 3m 25d	0.00%	(0.16%)	(0.11%)	(0.05%)
MBS.152	61745M4E0	4/25/35	28y 0m 25d	0.00%	(1.07%)	(0.18%)	(0.09%)
MBS.153	39539BAB9	3/12/37	29y 11m 12d	0.00%	(2.74%)	(0.96%)	(0.05%)
MBS.154	43709KAA7	10/25/36	29y 6m 25d	0.00%	(0.16%)	(0.12%)	(0.06%)
MBS.155	57645MAG7	10/25/36	29y 6m 25d	0.00%	(0.04%)	(0.03%)	(0.01%)
MBS.158	76110W4H6	9/25/35	28y 5m 25d	0.00%	(0.20%)	(0.14%)	(0.07%)
MBS.159	46629EAE3	9/25/36	29y 5m 25d	0.00%	(0.17%)	(0.11%)	(0.06%)
MBS.161	86358ERV0	4/25/35	28y 0m 25d	0.00%	(0.19%)	(0.13%)	(0.06%)
MBS.162	75115GAC2	12/25/36	29y 8m 25d	0.00%	0.15%	0.12%	0.06%

MBS.163	126685AF3	11/15/35	28y 7m 15d	0.00%	(3.55%)	(2.39%)	(1.21%)
MBS.164	04013BAE2	9/25/36	29y 5m 25d	0.00%	(0.06%)	(0.04%)	(0.02%)
MBS.167	52523YAD6	12/25/36	29y 8m 25d	0.00%	(0.09%)	(0.06%)	(0.03%)
MBS.168	61748HQW4	12/25/35	28y 8m 25d	0.00%	(0.82%)	(0.34%)	(0.09%)
MBS.169	61746RFV8	5/25/34	27y 1m 25d	0.00%	(0.23%)	(0.16%)	(0.08%)
MBS.170	073879KR8	9/25/34	27y 5m 25d	0.00%	(0.30%)	(0.20%)	(0.10%)
MBS.171	54251MAG9	5/25/36	29y 1m 25d	0.00%	(0.13%)	(0.09%)	(0.04%)
MBS.173	07401NAQ2	1/25/37	29y 9m 25d	0.00%	0.30%	0.22%	0.12%
MBS.174	74922NAB5	12/25/36	29y 8m 25d	0.00%	(0.03%)	(0.02%)	(0.01%)
MBS.176	61744CYD2	12/25/35	28y 8m 25d	0.00%	0.02%	0.02%	0.01%
MBS.177	41162CAE1	12/19/37	30y 8m 19d	0.00%	0.09%	0.06%	0.03%
MBS.179	81378AAC5	12/25/36	29y 8m 25d	0.00%	0.00%	0.00%	0.00%
MBS.180	07401PAA2	3/25/37	29y 11m 25d	0.00%	(0.11%)	(0.07%)	(0.04%)
MBS.181	126685BW5	2/15/36	28y 10m 15d	0.00%	(7.63%)	(5.17%)	(2.63%)
MBS.182	32027AAA7	1/25/28	20y 9m 25d	0.00%	(0.06%)	(0.04%)	(0.02%)
MBS.183	17307GZ84	12/25/35	28y 8m 25d	0.00%	(0.19%)	(0.13%)	(0.06%)
MBS.186	46626LAU4	7/25/35	28y 3m 25d	0.00%	(0.21%)	(0.14%)	(0.07%)
MBS.187	43709YAB5	3/25/37	29y 11m 25d	0.00%	(0.19%)	(0.12%)	(0.06%)
MBS.188	32028KAG1	12/25/36	29y 8m 25d	0.00%	(0.05%)	(0.03%)	(0.02%)
MBS.189	86362XAR9	1/25/37	29y 9m 25d	0.00%	0.13%	0.10%	0.06%
MBS.192	04012MAB5	7/25/36	29y 3m 25d	0.00%	(0.13%)	(0.08%)	(0.04%)
MBS.193	03072SS89	12/25/35	28y 8m 25d	0.00%	(0.19%)	(0.13%)	(0.06%)
MBS.194	872224AC4	9/25/36	29y 5m 25d	0.00%	(0.19%)	(0.13%)	(0.06%)
MBS.195	00764MFR3	8/25/35	28y 4m 25d	0.00%	(0.20%)	(0.14%)	(0.07%)
MBS.196	320277AG1	5/25/36	29y 1m 25d	0.00%	(0.14%)	(0.10%)	(0.05%)
MBS.199	07401GAA2	11/25/36	29y 7m 25d	0.00%	(0.14%)	(0.09%)	(0.04%)
MBS.200	02660TFV0	9/25/35	28y 5m 25d	0.00%	(0.20%)	(0.13%)	(0.07%)

⊟ RMBS SF				0.00%	(14.58%)	(10.21%)	(5.34%)
MBS.017	46627MEL7	3/25/36	28y 11m 25d	0.00%	(25.78%)	(18.39%)	(9.87%)
MBS.033	761118DX3	8/25/35	28y 4m 25d	0.00%	(20.22%)	(14.13%)	(7.40%)
MBS.045	93934FBR2	8/25/35	28y 4m 25d	0.00%	(22.76%)	(16.06%)	(8.51%)
MBS.047	32052GAF1	12/25/36	29y 8m 25d	0.00%	(1.99%)	(1.34%)	(0.67%)
MBS.050	45660L6R5	4/25/36	29y 0m 25d	0.00%	(16.71%)	(11.74%)	(6.20%)
MBS.073	073856AA4	12/25/36	29y 8m 25d	0.00%	(7.81%)	(5.32%)	(2.72%)
MBS.105	74922GAU8	11/25/36	29y 7m 25d	0.00%	(0.53%)	(0.36%)	(0.18%)
MBS.117	12668AUV5	12/25/35	28y 8m 25d	0.00%	(21.31%)	(14.94%)	(7.75%)
MBS.145	12668BGD9	2/25/36	28y 10m 25d	0.00%	(13.30%)	(9.26%)	(4.84%)
MBS.172	12667FW84	3/25/35	27y 11m 25d	0.00%	(8.52%)	(5.81%)	(2.98%)
MBS.198	251510HY2	11/25/35	28y 7m 25d	0.00%	(20.48%)	(14.22%)	(7.29%)

MBS Agency

⊟ MBS Agency				0.00%	(9.03%)	(6.14%)	(3.13%)
MBS.201	31393ART6	3/25/17	9y 11m 25d	0.00%	(5.19%)	(3.51%)	(1.78%)
MBS.202	31395RAN8	4/15/15	8y 0m 15d	0.00%	(7.03%)	(4.77%)	(2.43%)
MBS.203	31394K4X9	10/15/33	26y 6m 15d	0.00%	(12.64%)	(8.76%)	(4.56%)
MBS.204	31393GDF8	12/15/17	10y 8m 15d	0.00%	(7.51%)	(5.12%)	(2.62%)
MBS.205	31393DDG3	7/25/33	26y 3m 25d	0.00%	(6.93%)	(4.73%)	(2.42%)
MBS.206	3136FASC5	9/1/32	25y 5m 1d	0.00%	(5.96%)	(4.05%)	(2.07%)
MBS.207	31395CQJ3	8/15/30	23y 4m 15d	0.00%	(8.12%)	(5.53%)	(2.82%)
MBS.208	3128HWJJ7	12/15/36	29y 8m 15d	0.00%	(9.36%)	(3.35%)	(0.07%)
MBS.209	3136FCBM7	12/1/33	26y 8m 1d	0.00%	(10.05%)	(6.92%)	(3.58%)
MBS.210	31393RSY7	10/15/26	19y 6m 15d	0.00%	(4.75%)	(3.20%)	(1.62%)
MBS.211	31396C3Q1	10/15/15	8y 6m 15d	0.00%	(8.09%)	(5.51%)	(2.81%)
MBS.212	31394TAA3	3/15/34	26y 11m 15d	0.00%	(10.48%)	(7.21%)	(3.72%)
MBS.213	31393BWD3	12/25/17	10y 8m 25d	0.00%	(7.16%)	(4.87%)	(2.48%)
MBS.214	3128HWCS4	11/15/36	29y 7m 15d	0.00%	(11.55%)	(8.00%)	(4.16%)
MBS.215	31395VCE7	6/15/35	28y 2m 15d	0.00%	(11.67%)	(8.05%)	(4.17%)
MBS.216	31393TSX5	10/25/33	26y 6m 25d	0.00%	(7.07%)	(4.82%)	(2.47%)
MBS.217	31394HAE1	8/15/33	26y 4m 15d	0.00%	(9.34%)	(6.42%)	(3.31%)
MBS.218	3136FCKK1	8/1/34	27y 4m 1d	0.00%	(11.08%)	(7.66%)	(3.97%)
MBS.219	31393KK95	12/15/21	14y 8m 15d	0.00%	(6.29%)	(4.26%)	(2.17%)
MBS.220	3136FAWR7	1/1/33	25y 9m 1d	0.00%	(9.03%)	(6.20%)	(3.20%)
MBS.221	31395LC41	1/15/35	27y 9m 15d	0.00%	(12.50%)	(8.66%)	(4.50%)
MBS.222	31394D2P4	10/25/29	22y 6m 25d	0.00%	(10.46%)	(7.12%)	(3.63%)
MBS.223	31394UAC6	10/25/35	28y 6m 25d	0.00%	(9.67%)	(6.66%)	(3.44%)
MBS.224	31393J5G9	12/15/28	21y 8m 15d	0.00%	(6.08%)	(4.12%)	(2.09%)
MBS.225	31393QST0	5/15/33	26y 1m 15d	0.00%	(12.43%)	(8.61%)	(4.48%)
MBS.226	31393HRJ3	6/15/22	15y 2m 15d	0.00%	(7.06%)	(4.80%)	(2.45%)
MBS.227	31393RYN4	10/15/26	19y 6m 15d	0.00%	(4.77%)	(3.22%)	(1.63%)
MBS.228	31393XB22	4/25/34	27y 0m 25d	0.00%	(9.61%)	(6.61%)	(3.41%)
MBS.229	31393DT50	8/25/18	11y 4m 25d	0.00%	(9.10%)	(6.22%)	(3.19%)
MBS.230	31393VDF5	6/15/18	11y 2m 15d	0.00%	(10.54%)	(7.24%)	(3.73%)
MBS.231	31393NYY9	3/15/17	9y 11m 15d	0.00%	(5.31%)	(3.58%)	(1.82%)
MBS.232	31395VTS8	7/15/15	8y 3m 15d	0.00%	(6.40%)	(4.34%)	(2.20%)
MBS.233	31393EVW6	9/25/33	26y 5m 25d	0.00%	(9.81%)	(6.75%)	(3.49%)
MBS.234	31396C3S7	3/15/31	23y 11m 15d	0.00%	(8.09%)	(5.51%)	(2.81%)
MBS.235	31394FNC5	9/25/35	28y 5m 25d	0.00%	(11.59%)	(8.00%)	(4.14%)
MBS.236	3136FCW93	7/1/36	29y 3m 1d	0.00%	(13.47%)	(9.38%)	(4.90%)
MBS.237	31392GPK5	4/25/16	9y 0m 25d	0.00%	(3.65%)	(2.46%)	(1.24%)
MBS.238	31396UAM2	7/15/36	29y 3m 15d	0.00%	(13.16%)	(9.11%)	(4.73%)
MBS.239	3136FC5W2	10/1/36	29y 6m 1d	0.00%	(17.44%)	(12.28%)	(6.50%)
MBS.240	31392WFM7	10/15/17	10y 6m 15d	0.00%	(5.72%)	(3.88%)	(1.97%)
MBS.241	31395VUK3	5/15/31	24y 1m 15d	0.00%	(6.40%)	(4.34%)	(2.20%)
MBS.242	31397AGJ6	5/15/29	22y 1m 15d	0.00%	(9.54%)	(6.52%)	(3.35%)
MBS.243	31395RBA5	4/15/20	13y 0m 15d	0.00%	(18.74%)	(13.00%)	(6.77%)
MBS.244	31392JTS8	10/25/16	9y 6m 25d	0.00%	(4.87%)	(3.28%)	(1.66%)
MBS.245	31396AP73	9/15/35	28y 5m 15d	0.00%	(11.47%)	(7.91%)	(4.10%)
MBS.246	31393GJQ8	5/15/22	15y 1m 15d	0.00%	(6.33%)	(4.30%)	(2.19%)
MBS.247	3136FCHB5	3/1/34	26y 11m 1d	0.00%	(9.78%)	(6.73%)	(3.48%)
MBS.248	31393YDE2	5/25/34	27y 1m 25d	0.00%	(9.34%)	(6.42%)	(3.31%)
MBS.249	31396NCJ3	9/15/33	26y 5m 15d	0.00%	(12.99%)	(8.99%)	(4.67%)
MBS.250	31396C2Y5	10/15/15	8y 6m 15d	0.00%	(8.06%)	(5.49%)	(2.80%)

Student Loan

⊟ Student Loan FFELP				0.00%	0.25%	0.17%	0.08%
ABS.041	64031QCP4	2/23/16	8y 10m 23d	0.00%	0.30%	0.20%	0.10%
ABS.042	784420AF8	3/15/18	10y 11m 15d	0.00%	0.23%	0.15%	0.08%
ABS.044	784427AB2	6/15/15	8y 2m 15d	0.00%	0.12%	0.08%	0.04%
ABS.048	00432CCM1	11/22/24	17y 7m 22d	0.00%	0.23%	0.16%	0.08%
ABS.050	78442GPN0	10/25/21	14y 6m 25d	0.00%	0.45%	0.30%	0.15%
ABS.053	194268AA6	1/25/23	15y 9m 25d	0.00%	(0.20%)	(0.13%)	(0.07%)
ABS.054	00432CDB4	8/25/23	16y 4m 25d	0.00%	0.43%	0.28%	0.13%
ABS.057	784420AL5	6/15/20	13y 2m 15d	0.00%	0.29%	0.19%	0.10%
ABS.058	78442GQN9	7/25/22	15y 3m 25d	0.00%	0.45%	0.30%	0.15%
⊟ Student Loan Private				0.00%	0.66%	0.42%	0.29%
ABS.043	78443CAY0	9/15/16	9y 5m 15d	0.00%	1.93%	1.30%	0.65%
ABS.045	78443CAL8	9/15/17	10y 5m 15d	0.00%	2.00%	1.35%	0.68%
ABS.046	00432CCJ8	4/25/35	28y 0m 25d	0.00%	(0.13%)	(0.10%)	(0.05%)
ABS.047	00432CBG5	4/25/29	22y 0m 25d	0.00%	3.34%	0.90%	0.15%
ABS.051	78443CBL7	6/15/18	11y 2m 15d	0.00%	0.09%	0.06%	0.03%
ABS.052	78443CBY9	12/16/19	12y 8m 16d	0.00%	0.10%	0.07%	0.03%
ABS.055	66704JBP2	11/28/23	16y 7m 28d	0.00%	0.24%	0.19%	0.10%
ABS.056	00432CCT6	4/25/18	11y 0m 25d	0.00%	1.45%	2.26%	1.86%
ABS.059	28140XAB5	10/25/29	22y 6m 25d	0.00%	(0.74%)	(0.33%)	(0.15%)
ABS.060	63543WAE1	2/27/12	4y 10m 27d	0.00%	(8.14%)	(6.86%)	(2.29%)

Treasury Securities

⊟ Treasury Security				0.00%	(7.15%)	(4.88%)	(2.50%)
TR.001	912795ZN	6/28/07	0y 2m 28d	0.00%	(0.73%)	(0.49%)	(0.24%)
TR.002	912795ZK	6/7/07	0y 2m 7d	0.00%	(0.56%)	(0.37%)	(0.19%)
TR.003	912795ZG	5/17/07	0y 1m 17d	0.00%	(0.38%)	(0.26%)	(0.13%)
TR.004	912795ZD	4/26/07	0y 0m 26d	0.00%	(0.21%)	(0.14%)	(0.07%)
TR.005	912795ZB	4/12/07	0y 0m 12d	0.00%	(0.10%)	(0.07%)	(0.03%)
TR.006	912795ZM	6/21/07	0y 2m 21d	0.00%	(0.67%)	(0.45%)	(0.22%)
TR.007	912795ZP	7/5/07	0y 3m 5d	0.00%	(0.78%)	(0.52%)	(0.26%)
TR.008	912795A2	9/20/07	0y 5m 20d	0.00%	(1.41%)	(0.94%)	(0.47%)
TR.009	912795ZE	5/3/07	0y 1m 3d	0.00%	(0.27%)	(0.18%)	(0.09%)
TR.010	912795ZV	8/16/07	0y 4m 16d	0.00%	(1.12%)	(0.75%)	(0.38%)
TR.011	912795ZU	8/9/07	0y 4m 9d	0.00%	(1.07%)	(0.71%)	(0.36%)
TR.012	912795ZA	4/5/07	0y 0m 5d	0.00%	(0.04%)	(0.03%)	(0.01%)
TR.013	912795ZJ	5/31/07	0y 2m 0d	0.00%	(0.50%)	(0.33%)	(0.17%)
TR.014	912795ZQ	7/12/07	0y 3m 12d	0.00%	(0.84%)	(0.56%)	(0.28%)
TR.015	912795ZX	8/30/07	0y 4m 30d	0.00%	(1.24%)	(0.83%)	(0.41%)
TR.016	912795ZR	7/19/07	0y 3m 19d	0.00%	(0.90%)	(0.60%)	(0.30%)
TR.017	912795ZF	5/10/07	0y 1m 10d	0.00%	(0.33%)	(0.22%)	(0.11%)
TR.018	912795ZY	9/6/07	0y 5m 6d	0.00%	(1.29%)	(0.87%)	(0.43%)
TR.019	912795ZC	4/19/07	0y 0m 19d	0.00%	(0.16%)	(0.10%)	(0.05%)
TR.020	912795ZL	6/14/07	0y 2m 14d	0.00%	(0.61%)	(0.41%)	(0.20%)
TR.021	912828CE	4/15/09	2y 0m 15d	0.00%	(5.72%)	(3.85%)	(1.94%)
TR.022	912828BG	8/15/08	1y 4m 15d	0.00%	(3.97%)	(2.67%)	(1.34%)
TR.023	912828DG	1/15/10	2y 9m 15d	0.00%	(7.67%)	(5.18%)	(2.63%)
TR.024	912828DM	2/15/15	7y 10m 15d	0.00%	(18.22%)	(12.59%)	(6.53%)
TR.025	912828FP	8/15/09	2y 4m 15d	0.00%	(6.55%)	(4.42%)	(2.23%)
TR.026	912828EE	8/15/15	8y 4m 15d	0.00%	(18.91%)	(13.10%)	(6.80%)
TR.027	912828EZ	3/31/08	1y 0m 0d	0.00%	(2.92%)	(1.96%)	(0.98%)
TR.028	912828DU	5/15/10	3y 1m 15d	0.00%	(8.39%)	(5.68%)	(2.88%)
TR.029	9128273X	2/15/08	0y 10m 15d	0.00%	(2.56%)	(1.71%)	(0.86%)
TR.030	912828FK	6/30/11	4y 3m 0d	0.00%	(10.82%)	(7.36%)	(3.75%)
TR.031	9128272U	5/15/07	0y 1m 15d	0.00%	(0.37%)	(0.25%)	(0.12%)
TR.032	912828GA	11/30/11	4y 8m 0d	0.00%	(11.79%)	(8.03%)	(4.11%)
TR.033	9128276J	8/15/10	3y 4m 15d	0.00%	(8.87%)	(6.01%)	(3.05%)
TR.034	912828DW	5/31/07	0y 2m 0d	0.00%	(0.50%)	(0.33%)	(0.17%)
TR.035	912828FR	8/31/08	1y 5m 0d	0.00%	(4.06%)	(2.73%)	(1.37%)
TR.036	912828DE	12/15/09	2y 8m 15d	0.00%	(7.44%)	(5.03%)	(2.55%)
TR.037	912828DX	6/15/10	3y 2m 15d	0.00%	(8.66%)	(5.86%)	(2.98%)
TR.038	9128275G	5/15/09	2y 1m 15d	0.00%	(5.80%)	(3.91%)	(1.97%)

TR.039	912828BQ	11/15/08	1y 7m 15d	0.00%	(4.62%)	(3.10%)	(1.56%)
TR.040	912828CJ	5/15/14	7y 1m 15d	0.00%	(16.38%)	(11.28%)	(5.83%)
TR.041	912828AU	2/15/13	5y 10m 15d	0.00%	(14.56%)	(9.98%)	(5.13%)
TR.042	912828GF	1/31/12	4y 10m 0d	0.00%	(12.18%)	(8.31%)	(4.25%)
TR.043	912828CS	8/15/09	2y 4m 15d	0.00%	(6.63%)	(4.47%)	(2.26%)
TR.044	912828CT	8/15/14	7y 4m 15d	0.00%	(17.22%)	(11.88%)	(6.15%)
TR.045	912828GJ	2/28/09	1y 11m 0d	0.00%	(5.39%)	(3.62%)	(1.83%)
TR.046	912828DY	6/30/07	0y 3m 0d	0.00%	(0.74%)	(0.50%)	(0.25%)
TR.047	912828EM	11/15/10	3y 7m 15d	0.00%	(9.49%)	(6.44%)	(3.27%)
TR.048	912828EQ	12/15/10	3y 8m 15d	0.00%	(9.73%)	(6.60%)	(3.36%)
TR.049	912828CL	6/15/09	2y 2m 15d	0.00%	(6.13%)	(4.13%)	(2.09%)
TR.050	912828EY	2/29/08	0y 11m 0d	0.00%	(2.68%)	(1.79%)	(0.90%)
TR.051	912828EK	10/31/07	0y 7m 0d	0.00%	(1.71%)	(1.14%)	(0.57%)
TR.052	912828FM	7/31/08	1y 4m 0d	0.00%	(3.82%)	(2.56%)	(1.29%)
TR.053	912828FV	10/31/08	1y 7m 0d	0.00%	(4.44%)	(2.99%)	(1.50%)
TR.054	912828ES	1/15/11	3y 9m 15d	0.00%	(9.98%)	(6.77%)	(3.45%)
TR.055	912828AP	11/15/12	5y 7m 15d	0.00%	(13.88%)	(9.50%)	(4.88%)
TR.056	912828FQ	8/15/16	9y 4m 15d	0.00%	(20.10%)	(13.97%)	(7.29%)
TR.057	912828DV	5/15/15	8y 1m 15d	0.00%	(18.37%)	(12.71%)	(6.60%)
TR.058	9128274V	11/15/08	1y 7m 15d	0.00%	(4.57%)	(3.07%)	(1.55%)
TR.059	912828FZ	11/30/08	1y 8m 0d	0.00%	(4.69%)	(3.15%)	(1.59%)
TR.060	912828FY	11/15/16	9y 7m 15d	0.00%	(20.38%)	(14.18%)	(7.41%)
TR.061	912828AC	5/15/07	0y 1m 15d	0.00%	(0.37%)	(0.25%)	(0.12%)
TR.062	912828FD	4/30/11	4y 1m 0d	0.00%	(10.41%)	(7.08%)	(3.61%)
TR.063	912828FC	4/30/08	1y 1m 0d	0.00%	(3.09%)	(2.07%)	(1.04%)
TR.064	912828DR	4/15/10	3y 0m 15d	0.00%	(8.15%)	(5.51%)	(2.80%)
TR.065	912828DL	2/15/10	2y 10m 15d	0.00%	(7.91%)	(5.35%)	(2.71%)
TR.066	912828BA	5/15/13	6y 1m 15d	0.00%	(14.99%)	(10.29%)	(5.29%)
TR.067	912828EH	9/30/07	0y 6m 0d	0.00%	(1.49%)	(1.00%)	(0.50%)
TR.068	912828BH	8/15/13	6y 4m 15d	0.00%	(15.40%)	(10.58%)	(5.45%)
TR.069	912828EN	11/15/15	8y 7m 15d	0.00%	(18.96%)	(13.14%)	(6.84%)
TR.070	912828EJ	10/15/10	3y 6m 15d	0.00%	(9.30%)	(6.30%)	(3.21%)
TR.071	912828GH	2/15/17	9y 10m 15d	0.00%	(20.98%)	(14.61%)	(7.64%)
TR.072	912828FF	5/15/16	9y 1m 15d	0.00%	(19.35%)	(13.44%)	(7.00%)
TR.073	912828BK	9/15/08	1y 5m 15d	0.00%	(4.22%)	(2.83%)	(1.43%)
TR.074	9128277B	8/15/11	4y 4m 15d	0.00%	(11.18%)	(7.61%)	(3.88%)
TR.075	9128275Z	2/15/10	2y 10m 15d	0.00%	(7.66%)	(5.17%)	(2.62%)
TR.076	912828FN	7/31/11	4y 4m 0d	0.00%	(11.09%)	(7.55%)	(3.85%)
TR.077	912828EX	2/28/11	3y 11m 0d	0.00%	(10.27%)	(6.97%)	(3.55%)

TR.078	912828BT	12/15/08	1y 8m 15d	0.00%	(4.85%)	(3.26%)	(1.65%)
TR.079	912828AN	11/15/07	0y 7m 15d	0.00%	(1.84%)	(1.23%)	(0.62%)
TR.080	912828DB	11/15/09	2y 7m 15d	0.00%	(7.21%)	(4.87%)	(2.47%)
TR.081	9128276T	2/15/11	3y 10m 15d	0.00%	(10.10%)	(6.86%)	(3.49%)
TR.082	912828DC	11/15/14	7y 7m 15d	0.00%	(17.47%)	(12.06%)	(6.25%)
TR.083	912828EU	1/31/08	0y 10m 0d	0.00%	(2.45%)	(1.64%)	(0.82%)
TR.084	912828CV	9/15/09	2y 5m 15d	0.00%	(6.88%)	(4.64%)	(2.35%)
TR.085	912828GK	2/29/12	4y 11m 0d	0.00%	(12.41%)	(8.47%)	(4.33%)
TR.086	912828EW	2/15/16	8y 10m 15d	0.00%	(19.57%)	(13.58%)	(7.07%)
TR.087	912828EG	9/15/10	3y 5m 15d	0.00%	(9.31%)	(6.31%)	(3.21%)
TR.088	912828EV	2/15/09	1y 10m 15d	0.00%	(5.29%)	(3.56%)	(1.80%)
TR.089	912828BZ	2/15/09	1y 10m 15d	0.00%	(5.35%)	(3.60%)	(1.82%)
TR.090	912828FW	10/31/11	4y 7m 0d	0.00%	(11.54%)	(7.86%)	(4.02%)
TR.091	912828ED	8/15/10	3y 4m 15d	0.00%	(9.05%)	(6.13%)	(3.12%)
TR.092	912828FG	5/31/08	1y 2m 0d	0.00%	(3.34%)	(2.24%)	(1.13%)
TR.093	912828GB	12/31/08	1y 9m 0d	0.00%	(4.93%)	(3.31%)	(1.67%)
TR.094	912828FE	5/15/09	2y 1m 15d	0.00%	(5.84%)	(3.93%)	(1.99%)
TR.095	912828FU	9/30/11	4y 6m 0d	0.00%	(11.60%)	(7.90%)	(4.04%)
TR.096	912828FA	3/31/11	4y 0m 0d	0.00%	(10.46%)	(7.10%)	(3.62%)
TR.097	912828AJ	8/15/12	5y 4m 15d	0.00%	(13.40%)	(9.16%)	(4.70%)
TR.098	912828DS	4/30/07	0y 1m 0d	0.00%	(0.25%)	(0.16%)	(0.08%)
TR.099	912828CH	5/15/09	2y 1m 15d	0.00%	(5.90%)	(3.98%)	(2.01%)
TR.100	912828CN	7/15/09	2y 3m 15d	0.00%	(6.39%)	(4.31%)	(2.18%)

Corporates

⊟ BAC2				0.00%	(10.93%)	(7.51%)	(3.87%)
BAC2.01	BAC2.01	3/1/08	0y 11m 1d	0.00%	(2.68%)	(1.80%)	(0.90%)
BAC2.03	BAC2.03	3/2/10	2y 11m 2d	0.00%	(7.92%)	(5.35%)	(2.71%)
BAC2.05	BAC2.05	3/5/12	4y 11m 5d	0.00%	(12.40%)	(8.46%)	(4.33%)
BAC2.10	BAC2.10	3/6/17	9y 11m 6d	0.00%	(20.75%)	(14.45%)	(7.55%)
⊟ C				0.00%	(11.03%)	(7.58%)	(3.91%)
C.01	C.01	3/7/08	0y 11m 7d	0.00%	(2.73%)	(1.83%)	(0.92%)
C.03	C.03	3/8/10	2y 11m 8d	0.00%	(7.97%)	(5.39%)	(2.73%)
C.05	C.05	3/9/12	4y 11m 9d	0.00%	(12.47%)	(8.51%)	(4.36%)
C.10	C.10	3/12/17	9y 11m 12d	0.00%	(20.98%)	(14.61%)	(7.64%)
⊟ CVX				0.00%	(13.87%)	(9.55%)	(4.93%)
CVX.03	CVX.03	3/14/10	2y 11m 14d	0.00%	(8.02%)	(5.42%)	(2.75%)
CVX.05	CVX.05	3/15/12	4y 11m 15d	0.00%	(12.52%)	(8.55%)	(4.38%)
CVX.10	CVX.10	3/16/17	9y 11m 16d	0.00%	(21.07%)	(14.68%)	(7.67%)
⊟ DNA				0.00%	(13.88%)	(9.56%)	(4.94%)
DNA.03	DNA.03	3/19/10	2y 11m 19d	0.00%	(8.06%)	(5.45%)	(2.76%)
DNA.05	DNA.05	3/20/12	4y 11m 20d	0.00%	(12.55%)	(8.57%)	(4.39%)
DNA.10	DNA.10	3/21/17	9y 11m 21d	0.00%	(21.05%)	(14.66%)	(7.67%)
⊟ JNJ				0.00%	(13.82%)	(9.51%)	(4.91%)
JNJ.03	JNJ.03	3/5/10	2y 11m 5d	0.00%	(7.95%)	(5.38%)	(2.73%)
JNJ.05	JNJ.05	3/6/12	4y 11m 6d	0.00%	(12.47%)	(8.51%)	(4.35%)
JNJ.10	JNJ.10	3/7/17	9y 11m 7d	0.00%	(21.04%)	(14.66%)	(7.66%)
⊟ JPM				0.00%	(10.99%)	(7.55%)	(3.89%)
JPM.01	JPM.01	3/8/08	0y 11m 8d	0.00%	(2.74%)	(1.83%)	(0.92%)
JPM.03	JPM.03	3/9/10	2y 11m 9d	0.00%	(7.98%)	(5.39%)	(2.74%)
JPM.05	JPM.05	3/1/12	4y 11m 1d	0.00%	(12.40%)	(8.46%)	(4.33%)
JPM.10	JPM.10	3/2/17	9y 11m 2d	0.00%	(20.87%)	(14.53%)	(7.60%)

⊟ MDT				0.00%	(11.03%)	(7.58%)	(3.91%)
MDT.01	MDT.01	3/5/08	0y 11m 5d	0.00%	(2.71%)	(1.82%)	(0.91%)
MDT.03	MDT.03	3/6/10	2y 11m 6d	0.00%	(7.96%)	(5.38%)	(2.73%)
MDT.05	MDT.05	3/7/12	4y 11m 7d	0.00%	(12.46%)	(8.50%)	(4.35%)
MDT.10	MDT.10	3/16/17	9y 11m 16d	0.00%	(21.02%)	(14.64%)	(7.66%)
⊟ MMM				0.00%	(11.11%)	(7.63%)	(3.94%)
MMM.01	MMM.01	3/19/08	0y 11m 19d	0.00%	(2.82%)	(1.89%)	(0.95%)
MMM.03	MMM.03	3/20/10	2y 11m 20d	0.00%	(8.07%)	(5.45%)	(2.77%)
MMM.05	MMM.05	3/21/12	4y 11m 21d	0.00%	(12.57%)	(8.58%)	(4.39%)
MMM.10	MMM.10	3/5/17	9y 11m 5d	0.00%	(20.98%)	(14.61%)	(7.64%)
⊟ PFE				0.00%	(11.04%)	(7.58%)	(3.91%)
PFE.01	PFE.01	3/5/08	0y 11m 5d	0.00%	(2.71%)	(1.82%)	(0.91%)
PFE.03	PFE.03	3/6/10	2y 11m 6d	0.00%	(7.96%)	(5.38%)	(2.73%)
PFE.05	PFE.05	3/7/12	4y 11m 7d	0.00%	(12.47%)	(8.51%)	(4.36%)
PFE.10	PFE.10	3/8/17	9y 11m 8d	0.00%	(21.03%)	(14.65%)	(7.66%)
⊟ PG				0.00%	(11.02%)	(7.57%)	(3.91%)
PG.01	PG.01	3/9/08	0y 11m 9d	0.00%	(2.75%)	(1.84%)	(0.92%)
PG.03	PG.03	3/12/10	2y 11m 12d	0.00%	(8.01%)	(5.41%)	(2.75%)
PG.05	PG.05	3/1/12	4y 11m 1d	0.00%	(12.42%)	(8.47%)	(4.34%)
PG.10	PG.10	3/2/17	9y 11m 2d	0.00%	(20.94%)	(14.59%)	(7.62%)

⊟ SYY				0.00%	(13.79%)	(9.49%)	(4.90%)
SYY.03	SYY.03	3/6/10	2y 11m 6d	0.00%	(7.96%)	(5.38%)	(2.73%)
SYY.05	SYY.05	3/7/12	4y 11m 7d	0.00%	(12.45%)	(8.49%)	(4.35%)
SYY.10	SYY.10	3/19/17	9y 11m 19d	0.00%	(20.98%)	(14.62%)	(7.64%)

⊟ USB				0.00%	(11.02%)	(7.57%)	(3.91%)
USB.01	USB.01	3/6/08	0y 11m 6d	0.00%	(2.72%)	(1.82%)	(0.92%)
USB.03	USB.03	3/7/10	2y 11m 7d	0.00%	(7.97%)	(5.39%)	(2.73%)
USB.05	USB.05	3/8/12	4y 11m 8d	0.00%	(12.46%)	(8.50%)	(4.35%)
USB.10	USB.10	3/9/17	9y 11m 9d	0.00%	(20.96%)	(14.60%)	(7.63%)

⊟ USB				0.00%	(11.02%)	(7.57%)	(3.91%)
USB.01	USB.01	3/6/08	0y 11m 6d	0.00%	(2.72%)	(1.82%)	(0.92%)
USB.03	USB.03	3/7/10	2y 11m 7d	0.00%	(7.97%)	(5.39%)	(2.73%)
USB.05	USB.05	3/8/12	4y 11m 8d	0.00%	(12.46%)	(8.50%)	(4.35%)
USB.10	USB.10	3/9/17	9y 11m 9d	0.00%	(20.96%)	(14.60%)	(7.63%)

⊟ WB				0.00%	(11.06%)	(7.60%)	(3.92%)
WB.01	WB.01	3/12/08	0y 11m 12d	0.00%	(2.77%)	(1.85%)	(0.93%)
WB.03	WB.03	3/12/10	2y 11m 12d	0.00%	(8.00%)	(5.41%)	(2.74%)
WB.05	WB.05	3/14/12	4y 11m 14d	0.00%	(12.50%)	(8.53%)	(4.37%)
WB.10	WB.10	3/15/17	9y 11m 15d	0.00%	(20.99%)	(14.62%)	(7.64%)
⊟ WFC				0.00%	(11.09%)	(7.62%)	(3.93%)
WFC.01	WFC.01	3/16/08	0y 11m 16d	0.00%	(2.80%)	(1.88%)	(0.94%)
WFC.03	WFC.03	3/16/10	2y 11m 16d	0.00%	(8.03%)	(5.43%)	(2.76%)
WFC.05	WFC.05	3/19/12	4y 11m 19d	0.00%	(12.54%)	(8.56%)	(4.38%)
WFC.10	WFC.10	3/20/17	9y 11m 20d	0.00%	(21.03%)	(14.65%)	(7.66%)
⊟ XOM				0.00%	(13.79%)	(9.49%)	(4.90%)
XOM.03	XOM.03	3/1/10	2y 11m 1d	0.00%	(7.92%)	(5.36%)	(2.72%)
XOM.05	XOM.05	3/2/12	4y 11m 2d	0.00%	(12.44%)	(8.49%)	(4.34%)
XOM.10	XOM.10	3/5/17	9y 11m 5d	0.00%	(21.03%)	(14.65%)	(7.66%)

2007 Spread Stress Tests

NCUA

REPORTS | ADMINISTRATION

Portfolio | Interest Rate Risk | Liquidity Risk | Market Risk | Credit Risk | Economic Capital | Basel Capital | Financial Ratio Analysis | Other Reports | Report Finder | Help

Sensitivity - by Attribute

KRM Run: Assets 2007 Stress Test Spread Shifts (values in USD)

View By (Edit) Currently Selected: [Asset Type, Transaction]

Market Value | Change in MV | % Change in MV | by Shift

Expand All | Collapse All

				% Change in MV			
	CUSIP	Maturity Date	Remaining Maturity	Base Case	Upward 300bp	Upward 200bp	Upward 100bp
⊞ ABS Other				0.00%	(10.82%)	(7.40%)	(3.80%)
⊞ Auto Loan				0.00%	(8.02%)	(5.43%)	(2.76%)
⊞ BAC2				0.00%	(10.93%)	(7.51%)	(3.87%)
⊞ C				0.00%	(11.03%)	(7.58%)	(3.91%)
⊞ CMBS				0.00%	(10.89%)	(7.46%)	(3.84%)
⊞ CVX				0.00%	(13.87%)	(9.55%)	(4.93%)
⊞ Credit Card				0.00%	(10.51%)	(7.15%)	(3.65%)
⊞ DNA				0.00%	(13.88%)	(9.56%)	(4.94%)
⊞ JNJ				0.00%	(13.82%)	(9.51%)	(4.91%)
⊞ JPM				0.00%	(10.99%)	(7.55%)	(3.89%)
⊞ MBS Agency				0.00%	(9.23%)	(6.34%)	(3.27%)
⊞ MDT				0.00%	(11.03%)	(7.58%)	(3.91%)
⊞ MMM				0.00%	(11.11%)	(7.63%)	(3.94%)
⊞ PFE				0.00%	(11.04%)	(7.58%)	(3.91%)
⊞ PG				0.00%	(11.02%)	(7.57%)	(3.91%)
⊞ RMBS PA				0.00%	(10.48%)	(7.26%)	(3.77%)
⊞ RMBS PF				0.00%	(19.41%)	(13.80%)	(7.38%)
⊞ RMBS SA				0.00%	(10.74%)	(7.41%)	(3.84%)
⊞ RMBS SF				0.00%	(14.66%)	(10.29%)	(5.43%)
⊞ SYY				0.00%	(13.79%)	(9.49%)	(4.90%)
⊞ Student Loan FFELP				0.00%	(13.23%)	(9.09%)	(4.69%)
⊞ Student Loan Private				0.00%	(16.28%)	(11.38%)	(5.97%)
⊞ Treasury Security				0.00%	(7.15%)	(4.88%)	(2.50%)
⊞ USB				0.00%	(11.02%)	(7.57%)	(3.91%)
⊞ WB				0.00%	(11.06%)	(7.60%)	(3.92%)
⊞ WFC				0.00%	(11.09%)	(7.62%)	(3.93%)
⊞ XOM				0.00%	(13.79%)	(9.49%)	(4.90%)

User: Sean Klein Kamakura Corporation

ABS Other

⊟ ABS Other				0.00%	(10.82%)	(7.40%)	(3.80%)
ABS.061	42805RAK5	11/25/11	4y 7m 25d	0.00%	(9.04%)	(6.13%)	(3.12%)
ABS.062	368288AE6	11/17/20	13y 7m 17d	0.00%	(10.41%)	(7.12%)	(3.65%)
ABS.063	64908PAA1	1/15/21	13y 9m 15d	0.00%	(17.34%)	(12.06%)	(6.30%)
ABS.064	89676AAN3	11/26/21	14y 7m 26d	0.00%	(11.37%)	(7.80%)	(4.01%)
ABS.065	897790AC5	12/15/16	9y 8m 15d	0.00%	(8.48%)	(5.74%)	(2.91%)
ABS.066	368288AD8	4/17/19	12y 0m 17d	0.00%	(8.82%)	(6.01%)	(3.07%)
ABS.067	42805RAS8	11/25/11	4y 7m 25d	0.00%	(9.04%)	(6.13%)	(3.12%)
ABS.068	125565AD3	4/20/14	7y 0m 20d	0.00%	(8.04%)	(5.44%)	(2.76%)
ABS.069	00080ABE9	10/25/17	10y 6m 25d	0.00%	(8.53%)	(5.79%)	(2.94%)
ABS.070	903485AA8	4/15/14	7y 0m 15d	0.00%	(4.59%)	(3.10%)	(1.57%)
ABS.071	34528QAC8	6/15/13	6y 2m 15d	0.00%	(11.84%)	(8.10%)	(4.16%)
ABS.072	760106AU8	6/25/11	4y 2m 25d	0.00%	(8.08%)	(5.46%)	(2.77%)
ABS.073	15132CAE2	5/20/13	6y 1m 20d	0.00%	(12.19%)	(8.32%)	(4.26%)
ABS.074	649083AA0	3/15/19	11y 11m 15d	0.00%	(15.47%)	(10.70%)	(5.55%)
ABS.075	15132CAG7	7/20/10	3y 3m 20d	0.00%	(8.24%)	(5.57%)	(2.83%)
ABS.076	19716QAA5	3/20/21	13y 11m 20d	0.00%	(14.78%)	(10.15%)	(5.23%)
ABS.077	14056GAB4	9/20/22	15y 5m 20d	0.00%	(12.21%)	(8.33%)	(4.27%)
ABS.078	00083EAA7	11/27/19	12y 7m 27d	0.00%	(12.24%)	(8.36%)	(4.29%)
ABS.079	883145AC8	5/15/20	13y 1m 15d	0.00%	(9.90%)	(6.76%)	(3.47%)
ABS.080	64908QAA9	1/15/21	13y 9m 15d	0.00%	(17.91%)	(12.48%)	(6.53%)

Auto Loan

⊟ Auto Loan				0.00%	(8.02%)	(5.43%)	(2.76%)
ABS.001	13973AAD5	5/15/11	4y 1m 15d	0.00%	(5.68%)	(3.83%)	(1.94%)
Select to collapse	404285AC2	6/17/11	4y 2m 17d	0.00%	(4.34%)	(2.92%)	(1.47%)
ABS.003	14042CAD6	7/15/12	5y 3m 15d	0.00%	(8.47%)	(5.74%)	(2.92%)
ABS.004	65475CAD4	11/15/11	4y 7m 15d	0.00%	(7.44%)	(5.03%)	(2.55%)
ABS.005	262073AD1	12/16/13	6y 8m 16d	0.00%	(8.44%)	(5.72%)	(2.91%)
ABS.006	34528CAE5	2/15/12	4y 10m 15d	0.00%	(8.81%)	(5.97%)	(3.03%)
ABS.007	481238AD5	12/15/14	7y 8m 15d	0.00%	(8.92%)	(6.05%)	(3.08%)
ABS.008	92977FAD4	3/20/13	5y 11m 20d	0.00%	(8.79%)	(5.96%)	(3.03%)
ABS.009	14042DAE2	11/15/13	6y 7m 15d	0.00%	(8.66%)	(5.87%)	(2.99%)
ABS.010	895787AX7	4/12/13	6y 0m 12d	0.00%	(8.41%)	(5.70%)	(2.90%)
ABS.011	92977AAN3	4/20/12	5y 0m 20d	0.00%	(7.95%)	(5.38%)	(2.73%)
ABS.012	54238NAD2	9/15/13	6y 5m 15d	0.00%	(9.94%)	(6.76%)	(3.44%)
ABS.013	030613AD5	10/6/13	6y 6m 6d	0.00%	(11.55%)	(7.87%)	(4.02%)
ABS.014	449182BS2	11/15/12	5y 7m 15d	0.00%	(7.29%)	(4.93%)	(2.50%)
ABS.015	14041VAE3	7/15/13	6y 3m 15d	0.00%	(9.39%)	(6.37%)	(3.25%)
ABS.016	233880AB9	2/8/11	3y 10m 8d	0.00%	(5.85%)	(3.94%)	(1.99%)
ABS.017	89578PAC3	11/14/11	4y 7m 14d	0.00%	(5.95%)	(4.01%)	(2.03%)
ABS.018	03061NJJ9	5/6/12	5y 1m 6d	0.00%	(6.17%)	(4.16%)	(2.11%)
ABS.019	03062XAD8	9/6/13	6y 5m 6d	0.00%	(10.39%)	(7.07%)	(3.61%)
ABS.020	34528AAE9	9/15/11	4y 5m 15d	0.00%	(8.03%)	(5.43%)	(2.76%)

Credit Cards

⊟ Credit Card				0.00%	(10.51%)	(7.15%)	(3.65%)
Select to collapse	8761ENAA1	10/27/14	7y 6m 27d	0.00%	(9.33%)	(6.33%)	(3.22%)
ABS.023	55264TAE1	12/16/13	6y 8m 16d	0.00%	(10.86%)	(7.39%)	(3.77%)
ABS.024	55262TFJ7	10/15/12	5y 6m 15d	0.00%	(8.01%)	(5.42%)	(2.75%)
ABS.025	981464BD1	2/15/17	9y 10m 15d	0.00%	(14.34%)	(9.83%)	(5.06%)
ABS.026	161571BB9	4/15/13	6y 0m 15d	0.00%	(10.01%)	(6.80%)	(3.46%)
ABS.027	55264TDN8	5/15/13	6y 1m 15d	0.00%	(9.63%)	(6.54%)	(3.33%)
ABS.028	14041NBW0	8/15/14	7y 4m 15d	0.00%	(13.48%)	(9.24%)	(4.75%)
ABS.029	25466KFJ3	6/18/13	6y 2m 18d	0.00%	(9.63%)	(6.53%)	(3.33%)
ABS.030	02586GAA0	8/15/11	4y 4m 15d	0.00%	(9.07%)	(6.15%)	(3.13%)
ABS.031	55264TDL2	4/15/13	6y 0m 15d	0.00%	(9.45%)	(6.41%)	(3.26%)
ABS.032	36159JAG6	3/15/13	5y 11m 15d	0.00%	(7.89%)	(5.34%)	(2.71%)
ABS.033	161571AW4	12/17/12	5y 8m 17d	0.00%	(9.31%)	(6.31%)	(3.21%)
ABS.034	635414AG0	3/17/14	6y 11m 17d	0.00%	(12.07%)	(8.24%)	(4.21%)
ABS.035	55262NAL0	1/15/13	5y 9m 15d	0.00%	(8.85%)	(6.00%)	(3.05%)
ABS.036	635414AD7	3/15/13	5y 11m 15d	0.00%	(10.18%)	(6.91%)	(3.52%)
ABS.037	14041NBY6	1/15/15	7y 9m 15d	0.00%	(13.77%)	(9.45%)	(4.86%)
ABS.038	161571AT1	10/15/12	5y 6m 15d	0.00%	(8.88%)	(6.02%)	(3.06%)
ABS.039	16151RCR2	1/15/16	8y 9m 15d	0.00%	(15.08%)	(10.35%)	(5.33%)
ABS.040	55264TCK5	7/15/13	6y 3m 15d	0.00%	(9.99%)	(6.78%)	(3.46%)

CMBS

⊟ CMBS				0.00%	(10.89%)	(7.46%)	(3.84%)
MBS.251	05947UBM9	4/15/36	29y 0m 15d	0.00%	(8.57%)	(5.81%)	(2.95%)
MBS.252	05947UCF3	5/11/35	28y 1m 11d	0.00%	(9.70%)	(6.59%)	(3.36%)
MBS.254	05947UDP0	4/11/37	30y 0m 11d	0.00%	(10.31%)	(7.01%)	(3.57%)
MBS.255	07383FGE2	11/15/16	9y 7m 15d	0.00%	(4.67%)	(3.15%)	(1.59%)
MBS.256	07383F7S1	6/11/41	34y 2m 11d	0.00%	(4.68%)	(3.15%)	(1.59%)
MBS.257	12513EAH7	7/15/44	37y 3m 15d	0.00%	(15.73%)	(10.85%)	(5.62%)
MBS.259	12513EAJ3	7/15/44	37y 3m 15d	0.00%	(18.24%)	(12.63%)	(6.56%)
MBS.260	20047MAE4	2/5/19	11y 10m 5d	0.00%	(9.85%)	(6.69%)	(3.41%)
MBS.261	20047MAF1	2/5/19	11y 10m 5d	0.00%	(9.89%)	(6.72%)	(3.42%)
MBS.263	20046FAA8	7/16/34	27y 3m 16d	0.00%	(7.98%)	(5.41%)	(2.75%)
MBS.264	225470NG4	12/15/40	33y 8m 15d	0.00%	(4.90%)	(3.30%)	(1.67%)
MBS.265	173067GK9	5/15/43	36y 1m 15d	0.00%	(5.04%)	(3.40%)	(1.72%)
MBS.266	337368AB0	3/15/33	25y 11m 15d	0.00%	(8.47%)	(5.74%)	(2.92%)
MBS.267	36828QNQ5	7/10/45	38y 3m 10d	0.00%	(5.95%)	(4.01%)	(2.03%)
MBS.269	361849MQ2	8/16/33	26y 4m 16d	0.00%	(4.81%)	(3.26%)	(1.65%)
MBS.270	36228CJT1	5/3/18	11y 1m 3d	0.00%	(4.41%)	(2.97%)	(1.50%)
MBS.271	46625YVR1	1/12/43	35y 9m 12d	0.00%	(4.99%)	(3.36%)	(1.70%)
MBS.272	46625YWG4	1/12/43	35y 9m 12d	0.00%	(16.41%)	(11.33%)	(5.87%)
MBS.273	46625YNS8	7/15/42	35y 3m 15d	0.00%	(13.76%)	(9.45%)	(4.86%)
MBS.274	46625YUP6	10/15/42	35y 6m 15d	0.00%	(15.52%)	(10.70%)	(5.53%)
MBS.275	46625YTY9	10/15/42	35y 6m 15d	0.00%	(8.64%)	(5.85%)	(2.97%)
MBS.276	46625YXL2	12/15/44	37y 8m 15d	0.00%	(5.24%)	(3.53%)	(1.78%)
MBS.277	46625YXR9	12/15/44	37y 8m 15d	0.00%	(15.57%)	(10.73%)	(5.55%)
MBS.278	59022HKZ4	11/12/37	30y 7m 12d	0.00%	(5.48%)	(3.69%)	(1.87%)
MBS.279	59022HLH3	11/12/37	30y 7m 12d	0.00%	(17.59%)	(12.17%)	(6.32%)
MBS.280	59022HNA6	1/12/44	36y 9m 12d	0.00%	(17.22%)	(11.91%)	(6.18%)
MBS.281	59022HMW9	1/12/44	36y 9m 12d	0.00%	(9.30%)	(6.31%)	(3.21%)
MBS.282	617451AA7	9/15/42	35y 5m 15d	0.00%	(5.66%)	(3.82%)	(1.93%)
MBS.283	617451AB5	9/15/42	35y 5m 15d	0.00%	(16.27%)	(11.23%)	(5.82%)
MBS.284	617451AF6	9/15/42	35y 5m 15d	0.00%	(17.73%)	(12.26%)	(6.36%)
MBS.285	356486AA8	7/12/16	9y 3m 12d	0.00%	(6.06%)	(4.10%)	(2.08%)
MBS.286	61746WGM6	3/11/16	8y 11m 11d	0.00%	(5.69%)	(3.84%)	(1.95%)
MBS.287	61746WGN4	3/11/16	8y 11m 11d	0.00%	(10.05%)	(6.83%)	(3.48%)
MBS.288	589929VX3	2/3/16	8y 10m 3d	0.00%	(5.73%)	(3.87%)	(1.96%)
MBS.289	901921AC0	2/3/16	8y 10m 3d	0.00%	(5.54%)	(3.74%)	(1.89%)
MBS.290	901921AG1	2/3/16	8y 10m 3d	0.00%	(9.85%)	(6.69%)	(3.41%)
MBS.291	929766W74	5/15/44	37y 1m 15d	0.00%	(8.53%)	(5.78%)	(2.93%)
MBS.292	929766X57	5/15/44	37y 1m 15d	0.00%	(17.73%)	(12.25%)	(6.36%)
MBS.293	929766X65	5/15/44	37y 1m 15d	0.00%	(17.95%)	(12.41%)	(6.44%)
MBS.294	9297664R1	5/15/44	37y 1m 15d	0.00%	(16.23%)	(11.20%)	(5.80%)
MBS.295	9297664K6	7/15/42	35y 3m 15d	0.00%	(8.66%)	(5.87%)	(2.98%)
MBS.296	9297664U4	7/15/42	35y 3m 15d	0.00%	(17.97%)	(12.43%)	(6.45%)
MBS.297	9297667B3	10/15/44	37y 6m 15d	0.00%	(16.20%)	(11.18%)	(5.79%)
MBS.298	9297667C1	10/15/44	37y 6m 15d	0.00%	(8.79%)	(5.95%)	(3.03%)
MBS.299	9297667K3	10/15/44	37y 6m 15d	0.00%	(18.27%)	(12.65%)	(6.57%)
MBS.300	9297667J6	10/15/44	37y 6m 15d	0.00%	(18.18%)	(12.59%)	(6.54%)

RMBS- By Credit Rating and Rate Reset

⊟ RMBS PA				0.00%	(10.48%)	(7.26%)	(3.77%)
Select to collapse	36228FUT1	7/25/18	11y 3m 25d	0.00%	(7.04%)	(4.79%)	(2.45%)
MBS.041	9292276V3	7/25/18	11y 3m 25d	0.00%	(10.96%)	(7.53%)	(3.88%)
MBS.042	949762AA6	9/25/18	11y 5m 25d	0.00%	(8.96%)	(6.13%)	(3.15%)
MBS.055	81744FFY8	1/20/35	27y 9m 20d	0.00%	(4.96%)	(3.36%)	(1.71%)
MBS.065	07387AEA9	8/25/35	28y 4m 25d	0.00%	(13.27%)	(9.08%)	(4.66%)
MBS.069	05948X7A3	6/25/19	12y 2m 25d	0.00%	(7.72%)	(5.25%)	(2.68%)
MBS.071	92922FGY8	11/25/33	26y 7m 25d	0.00%	(29.41%)	(21.25%)	(11.56%)
MBS.077	000759BW9	3/15/32	24y 11m 15d	0.00%	(5.57%)	(3.77%)	(1.91%)
MBS.081	949788AE3	7/25/19	12y 3m 25d	0.00%	(11.40%)	(7.84%)	(4.04%)
MBS.100	22541SX29	12/25/19	12y 8m 25d	0.00%	(11.68%)	(8.03%)	(4.15%)
MBS.111	86359LGE3	5/19/35	28y 1m 19d	0.00%	(3.13%)	(2.11%)	(1.07%)
MBS.118	12669FA86	7/25/34	27y 3m 25d	0.00%	(26.39%)	(18.74%)	(10.01%)
MBS.131	16162WAM1	11/25/18	11y 7m 25d	0.00%	(10.47%)	(7.18%)	(3.70%)
MBS.132	59020UL45	11/25/35	28y 7m 25d	0.00%	(8.83%)	(6.06%)	(3.12%)
MBS.138	55265KU31	11/25/18	11y 7m 25d	0.00%	(10.54%)	(7.23%)	(3.72%)
MBS.148	81744FAZ0	5/20/34	27y 1m 20d	0.00%	(4.95%)	(3.34%)	(1.69%)
MBS.156	576434SF2	7/25/19	12y 3m 25d	0.00%	(11.28%)	(7.75%)	(4.00%)
MBS.166	43708DAA4	3/25/37	29y 11m 25d	0.00%	(8.52%)	(5.81%)	(2.97%)
MBS.178	05946XKZ5	10/25/19	12y 6m 25d	0.00%	(12.30%)	(8.48%)	(4.38%)
⊟ RMBS PF				0.00%	(19.41%)	(13.80%)	(7.38%)
MBS.038	57643MKG8	5/25/35	28y 1m 25d	0.00%	(11.22%)	(7.73%)	(4.00%)
MBS.044	74957XAR6	9/25/36	29y 5m 25d	0.00%	(23.27%)	(16.42%)	(8.71%)
MBS.137	74958EAB2	12/25/36	29y 8m 25d	0.00%	(9.37%)	(6.44%)	(3.33%)
MBS.142	55274QBB0	6/25/36	29y 2m 25d	0.00%	(30.10%)	(21.84%)	(11.94%)
MBS.157	52520MAQ6	11/25/35	28y 7m 25d	0.00%	(29.96%)	(21.70%)	(11.84%)
MBS.184	74957XAK1	9/25/36	29y 5m 25d	0.00%	(11.67%)	(7.97%)	(4.09%)

⊟ RMBS SA				0.00%	(10.74%)	(7.41%)	(3.84%)
MBS.001	542512AD0	12/25/36	29y 8m 25d	0.00%	(21.89%)	(15.36%)	(8.09%)
MBS.003	81377GAB5	8/25/36	29y 4m 25d	0.00%	(9.59%)	(6.52%)	(3.33%)
MBS.004	75156QAC0	11/25/36	29y 7m 25d	0.00%	(11.50%)	(7.85%)	(4.02%)
MBS.005	17307G4W5	1/25/36	28y 9m 25d	0.00%	(12.82%)	(8.76%)	(4.50%)
MBS.006	39538WGD4	4/25/36	29y 0m 25d	0.00%	(8.52%)	(5.85%)	(3.01%)
MBS.007	17311BAD5	12/25/36	29y 8m 25d	0.00%	(25.80%)	(18.37%)	(9.84%)
MBS.008	39539BAA1	3/12/37	29y 11m 12d	0.00%	(5.32%)	(3.61%)	(1.83%)
MBS.010	59020UVQ5	4/25/35	28y 0m 25d	0.00%	(6.40%)	(4.36%)	(2.23%)
MBS.011	68389FJJ4	11/25/35	28y 7m 25d	0.00%	(10.97%)	(7.52%)	(3.87%)
MBS.012	367910AG1	10/25/35	28y 6m 25d	0.00%	(10.04%)	(6.87%)	(3.52%)
MBS.013	55275BAF4	8/25/36	29y 4m 25d	0.00%	(8.53%)	(5.78%)	(2.93%)
MBS.014	933635AD6	3/25/47	39y 11m 25d	0.00%	(6.45%)	(4.40%)	(2.25%)
MBS.015	126673KG6	2/15/34	26y 10m 15d	0.00%	(2.68%)	(1.80%)	(0.91%)
MBS.016	362341QT9	9/25/35	28y 5m 25d	0.00%	(12.48%)	(8.59%)	(4.44%)
MBS.018	17309PAB2	9/25/36	29y 5m 25d	0.00%	(7.91%)	(5.38%)	(2.75%)
MBS.019	74922PAD6	2/25/37	29y 10m 25d	0.00%	(16.59%)	(11.65%)	(6.15%)
MBS.020	46626LBK5	9/25/35	28y 5m 25d	0.00%	(9.34%)	(6.37%)	(3.26%)
MBS.022	05950MAB6	7/20/36	29y 3m 20d	0.00%	(12.30%)	(8.54%)	(4.45%)
MBS.023	87222PAB9	1/25/37	29y 9m 25d	0.00%	(8.06%)	(5.46%)	(2.77%)
MBS.024	32028TAF4	1/25/38	30y 9m 25d	0.00%	(19.85%)	(13.81%)	(7.21%)
MBS.025	040104PE5	11/25/35	28y 7m 25d	0.00%	(9.68%)	(6.61%)	(3.39%)
MBS.026	23243HAF8	6/25/47	40y 2m 25d	0.00%	(22.05%)	(15.44%)	(8.12%)
MBS.027	863579KH0	2/25/35	27y 10m 25d	0.00%	(3.36%)	(2.27%)	(1.15%)
MBS.028	007036TP1	1/25/36	28y 9m 25d	0.00%	(2.20%)	(1.48%)	(0.74%)
MBS.029	92977YAZ4	10/25/35	28y 6m 25d	0.00%	(9.07%)	(6.18%)	(3.16%)
MBS.030	320276AG3	6/25/36	29y 2m 25d	0.00%	(11.95%)	(8.15%)	(4.17%)
MBS.031	40430MAG2	7/25/36	29y 3m 25d	0.00%	(11.05%)	(7.53%)	(3.84%)
MBS.032	05950PAU7	10/20/36	29y 6m 20d	0.00%	(8.97%)	(6.17%)	(3.18%)
MBS.034	126682AA1	4/15/37	30y 0m 15d	0.00%	(3.67%)	(2.48%)	(1.25%)
MBS.036	126685DJ2	5/15/36	29y 1m 15d	0.00%	(5.90%)	(4.01%)	(2.04%)
MBS.037	69337BAC8	2/25/37	29y 10m 25d	0.00%	(15.11%)	(10.57%)	(5.56%)
MBS.039	456606HV7	10/25/35	28y 6m 25d	0.00%	(11.51%)	(7.91%)	(4.08%)
MBS.040	07401TAB2	3/25/37	29y 11m 25d	0.00%	(27.56%)	(19.76%)	(10.67%)
MBS.043	318340AD8	9/25/26	19y 5m 25d	0.00%	(22.91%)	(16.11%)	(8.51%)
MBS.046	61744CVZ6	11/25/35	28y 7m 25d	0.00%	(9.97%)	(6.81%)	(3.49%)
MBS.048	45257BAC4	1/25/37	29y 9m 25d	0.00%	(10.88%)	(7.42%)	(3.80%)
MBS.049	23243JAB3	10/15/36	29y 6m 15d	0.00%	(7.01%)	(4.79%)	(2.45%)
MBS.051	46626LHC7	2/25/36	28y 10m 25d	0.00%	(10.24%)	(6.97%)	(3.56%)

MBS.052	36242DN25	3/25/35	27y 11m 25d	0.00%	(12.31%)	(8.41%)	(4.31%)
MBS.053	76113AAJ0	2/25/36	28y 10m 25d	0.00%	(12.82%)	(8.83%)	(4.56%)
MBS.054	542514KS2	4/25/35	28y 0m 25d	0.00%	(6.52%)	(4.40%)	(2.23%)
MBS.056	61744CSV9	7/25/35	28y 3m 25d	0.00%	(9.02%)	(6.13%)	(3.12%)
MBS.057	126686AB0	11/15/36	29y 7m 15d	0.00%	(6.83%)	(4.65%)	(2.38%)
MBS.058	040104SU6	4/25/36	29y 0m 25d	0.00%	(11.28%)	(7.73%)	(3.98%)
MBS.059	74922QAA0	9/25/36	29y 5m 25d	0.00%	(10.46%)	(7.22%)	(3.74%)
MBS.060	23332QAF0	11/19/37	30y 7m 19d	0.00%	(10.06%)	(6.93%)	(3.58%)
MBS.061	073871AB1	8/25/36	29y 4m 25d	0.00%	(5.15%)	(3.49%)	(1.78%)
MBS.062	61748HWP2	3/25/36	28y 11m 25d	0.00%	(8.16%)	(5.59%)	(2.88%)
MBS.063	75156TAD2	2/25/36	28y 10m 25d	0.00%	(11.17%)	(7.65%)	(3.93%)
MBS.064	65537EAB0	10/25/36	29y 6m 25d	0.00%	(9.38%)	(6.46%)	(3.33%)
MBS.066	39539KAG8	2/25/37	29y 10m 25d	0.00%	(24.35%)	(17.19%)	(9.12%)
MBS.067	57643LNG7	1/25/36	28y 9m 25d	0.00%	(10.53%)	(7.20%)	(3.69%)
MBS.068	17309YAB3	10/25/36	29y 6m 25d	0.00%	(9.41%)	(6.39%)	(3.25%)
MBS.070	17309LAF2	8/25/36	29y 4m 25d	0.00%	(11.33%)	(7.74%)	(3.96%)
MBS.072	46626LHW3	3/25/36	28y 11m 25d	0.00%	(11.21%)	(7.68%)	(3.95%)
MBS.074	45071KCN2	2/25/36	28y 10m 25d	0.00%	(9.84%)	(6.71%)	(3.43%)
MBS.075	86362HAA1	12/25/36	29y 8m 25d	0.00%	(11.56%)	(8.01%)	(4.17%)
MBS.076	55027YAB4	10/25/46	39y 6m 25d	0.00%	(8.08%)	(5.53%)	(2.84%)
MBS.078	617538AE3	12/25/36	29y 8m 25d	0.00%	(20.78%)	(14.59%)	(7.70%)
MBS.079	785814AA2	1/25/37	29y 9m 25d	0.00%	(9.03%)	(6.21%)	(3.21%)
MBS.080	03072SRX5	7/25/34	27y 3m 25d	0.00%	(6.65%)	(4.49%)	(2.28%)
MBS.082	35729QAF5	8/25/36	29y 4m 25d	0.00%	(13.03%)	(8.96%)	(4.63%)
MBS.083	07386HK34	5/25/36	29y 1m 25d	0.00%	(6.16%)	(4.19%)	(2.14%)
MBS.084	12668ASY2	8/25/35	28y 4m 25d	0.00%	(9.06%)	(6.23%)	(3.22%)
MBS.085	55028CAA3	11/25/36	29y 7m 25d	0.00%	(8.23%)	(5.64%)	(2.90%)
MBS.086	45660JAD6	3/25/37	29y 11m 25d	0.00%	(16.88%)	(11.80%)	(6.20%)
MBS.087	61749KAG8	7/25/36	29y 3m 25d	0.00%	(14.83%)	(10.26%)	(5.32%)
MBS.089	39538WGB8	4/25/36	29y 0m 25d	0.00%	(6.47%)	(4.40%)	(2.25%)
MBS.090	81879MAY5	2/25/36	28y 10m 25d	0.00%	(10.42%)	(7.11%)	(3.64%)
MBS.091	86358ESK3	5/25/35	28y 1m 25d	0.00%	(7.28%)	(4.93%)	(2.50%)
MBS.094	75406BAE7	3/25/36	28y 11m 25d	0.00%	(12.67%)	(8.72%)	(4.50%)
MBS.096	75115BAA7	7/25/36	29y 3m 25d	0.00%	(7.53%)	(5.15%)	(2.64%)
MBS.098	542514QX5	1/25/46	38y 9m 25d	0.00%	(10.78%)	(7.38%)	(3.79%)
MBS.099	05951VAW9	10/20/46	39y 6m 20d	0.00%	(4.00%)	(2.70%)	(1.37%)
MBS.101	07401MAH4	2/25/37	29y 10m 25d	0.00%	(22.57%)	(16.01%)	(8.55%)
MBS.102	007037BK9	3/25/37	29y 11m 25d	0.00%	(11.86%)	(8.23%)	(4.28%)
MBS.103	86361WAK7	10/25/37	30y 6m 25d	0.00%	(13.27%)	(9.22%)	(4.81%)

MBS.104	07386XAA4	1/25/47	39y 9m 25d	0.00%	(7.34%)	(5.01%)	(2.57%)
MBS.106	23245FAD5	11/25/36	29y 7m 25d	0.00%	(17.19%)	(11.94%)	(6.22%)
MBS.107	542514TW4	3/25/46	38y 11m 25d	0.00%	(10.85%)	(7.42%)	(3.81%)
MBS.108	17307GXU7	8/25/35	28y 4m 25d	0.00%	(8.25%)	(5.65%)	(2.91%)
MBS.109	126673WX6	7/25/35	28y 3m 25d	0.00%	(10.23%)	(6.96%)	(3.55%)
MBS.110	040104PD7	11/25/35	28y 7m 25d	0.00%	(9.82%)	(6.71%)	(3.44%)
MBS.113	46626LFQ8	5/25/35	28y 1m 25d	0.00%	(9.93%)	(6.77%)	(3.47%)
MBS.114	75115VAA3	11/25/36	29y 7m 25d	0.00%	(8.02%)	(5.49%)	(2.82%)
MBS.116	45667SAM9	1/25/37	29y 9m 25d	0.00%	(10.59%)	(7.32%)	(3.79%)
MBS.119	46602WAF1	8/25/36	29y 4m 25d	0.00%	(11.13%)	(7.62%)	(3.91%)
MBS.120	74922MAA9	7/25/36	29y 3m 25d	0.00%	(8.92%)	(6.13%)	(3.16%)
MBS.121	232422AF2	4/25/46	39y 0m 25d	0.00%	(13.90%)	(9.59%)	(4.96%)
MBS.122	026929AA7	12/25/46	39y 8m 25d	0.00%	(11.49%)	(7.94%)	(4.12%)
MBS.124	43709RAA2	2/25/37	29y 10m 25d	0.00%	(8.79%)	(6.00%)	(3.07%)
MBS.126	76110W6P6	11/25/35	28y 7m 25d	0.00%	(10.40%)	(7.11%)	(3.65%)
MBS.127	073875AB2	12/25/46	39y 8m 25d	0.00%	(8.32%)	(5.70%)	(2.93%)
MBS.128	29256PAX2	1/25/36	28y 9m 25d	0.00%	(9.09%)	(6.18%)	(3.16%)
MBS.129	126685AB2	5/15/35	28y 1m 15d	0.00%	(2.79%)	(1.87%)	(0.95%)
MBS.133	456606MZ2	4/25/36	29y 0m 25d	0.00%	(5.96%)	(4.05%)	(2.07%)
MBS.134	05530MAB5	1/25/37	29y 9m 25d	0.00%	(10.00%)	(6.89%)	(3.57%)
MBS.135	64352VNL1	10/25/35	28y 6m 25d	0.00%	(11.40%)	(7.83%)	(4.04%)
MBS.136	75405WAG7	11/25/35	28y 7m 25d	0.00%	(10.75%)	(7.37%)	(3.79%)
MBS.140	70069FHU4	5/25/35	28y 1m 25d	0.00%	(7.19%)	(4.87%)	(2.48%)
MBS.141	76112BYV6	8/25/35	28y 4m 25d	0.00%	(12.13%)	(8.35%)	(4.31%)
MBS.143	02150TAB6	4/25/47	40y 0m 25d	0.00%	(18.31%)	(12.89%)	(6.82%)
MBS.144	46602WAE4	8/25/36	29y 4m 25d	0.00%	(11.27%)	(7.71%)	(3.96%)
MBS.146	61748HKW0	9/25/35	28y 5m 25d	0.00%	(6.26%)	(4.26%)	(2.18%)
MBS.147	754058AE5	10/25/35	28y 6m 25d	0.00%	(11.14%)	(7.64%)	(3.94%)
MBS.149	23242QAE2	7/15/36	29y 3m 15d	0.00%	(6.01%)	(4.08%)	(2.08%)
MBS.150	54251MAF1	5/25/36	29y 1m 25d	0.00%	(13.34%)	(9.20%)	(4.76%)
MBS.151	83612CAF6	7/25/36	29y 3m 25d	0.00%	(7.60%)	(5.14%)	(2.61%)
MBS.152	61745M4E0	4/25/35	28y 0m 25d	0.00%	(7.21%)	(4.92%)	(2.52%)
MBS.153	39539BAB9	3/12/37	29y 11m 12d	0.00%	(5.32%)	(3.61%)	(1.83%)
MBS.154	43709KAA7	10/25/36	29y 6m 25d	0.00%	(8.64%)	(5.89%)	(3.01%)
MBS.155	57645MAG7	10/25/36	29y 6m 25d	0.00%	(15.28%)	(10.51%)	(5.42%)
MBS.158	76110W4H6	9/25/35	28y 5m 25d	0.00%	(8.88%)	(6.05%)	(3.09%)
MBS.159	46629EAE3	9/25/36	29y 5m 25d	0.00%	(6.10%)	(4.11%)	(2.08%)
MBS.161	86358ERV0	4/25/35	28y 0m 25d	0.00%	(6.56%)	(4.43%)	(2.24%)
MBS.162	75115GAC2	12/25/36	29y 8m 25d	0.00%	(19.23%)	(13.56%)	(7.18%)

MBS.163	126685AF3	11/15/35	28y 7m 15d	0.00%	(3.77%)	(2.55%)	(1.29%)
MBS.164	04013BAE2	9/25/36	29y 5m 25d	0.00%	(16.27%)	(11.29%)	(5.88%)
MBS.167	52523YAD6	12/25/36	29y 8m 25d	0.00%	(9.59%)	(6.60%)	(3.41%)
MBS.168	61748HQW4	12/25/35	28y 8m 25d	0.00%	(8.17%)	(5.60%)	(2.88%)
MBS.169	61746RFV8	5/25/34	27y 1m 25d	0.00%	(7.42%)	(5.03%)	(2.55%)
MBS.170	073879KR8	9/25/34	27y 5m 25d	0.00%	(6.09%)	(4.12%)	(2.09%)
MBS.171	54251MAG9	5/25/36	29y 1m 25d	0.00%	(13.32%)	(9.18%)	(4.75%)
MBS.173	07401NAQ2	1/25/37	29y 9m 25d	0.00%	(24.81%)	(17.68%)	(9.48%)
MBS.174	74922NAB5	12/25/36	29y 8m 25d	0.00%	(12.38%)	(8.59%)	(4.48%)
MBS.176	61744CYD2	12/25/35	28y 8m 25d	0.00%	(30.07%)	(21.76%)	(11.85%)
MBS.177	41162CAE1	12/19/37	30y 8m 19d	0.00%	(14.91%)	(10.42%)	(5.47%)
MBS.179	81378AAC5	12/25/36	29y 8m 25d	0.00%	(15.01%)	(10.36%)	(5.37%)
MBS.180	07401PAA2	3/25/37	29y 11m 25d	0.00%	(8.43%)	(5.79%)	(2.99%)
MBS.181	126685BW5	2/15/36	28y 10m 15d	0.00%	(7.86%)	(5.33%)	(2.71%)
MBS.182	32027AAA7	1/25/28	20y 9m 25d	0.00%	(12.38%)	(8.57%)	(4.46%)
MBS.183	17307GZ84	12/25/35	28y 8m 25d	0.00%	(10.35%)	(7.08%)	(3.63%)
MBS.186	46626LAU4	7/25/35	28y 3m 25d	0.00%	(9.23%)	(6.29%)	(3.22%)
MBS.187	43709YAB5	3/25/37	29y 11m 25d	0.00%	(4.53%)	(3.06%)	(1.55%)
MBS.188	32028KAG1	12/25/36	29y 8m 25d	0.00%	(14.60%)	(10.02%)	(5.16%)
MBS.189	86362XAR9	1/25/37	29y 9m 25d	0.00%	(19.94%)	(14.07%)	(7.47%)
MBS.192	04012MAB5	7/25/36	29y 3m 25d	0.00%	(12.20%)	(8.37%)	(4.31%)
MBS.193	03072SS89	12/25/35	28y 8m 25d	0.00%	(9.39%)	(6.40%)	(3.28%)
MBS.194	872224AC4	9/25/36	29y 5m 25d	0.00%	(4.55%)	(3.06%)	(1.54%)
MBS.195	00764MFR3	8/25/35	28y 4m 25d	0.00%	(8.91%)	(6.07%)	(3.10%)
MBS.196	320277AG1	5/25/36	29y 1m 25d	0.00%	(9.29%)	(6.30%)	(3.21%)
MBS.199	07401GAA2	11/25/36	29y 7m 25d	0.00%	(7.21%)	(4.94%)	(2.54%)
MBS.200	02660TFV0	9/25/35	28y 5m 25d	0.00%	(2.92%)	(1.96%)	(0.99%)

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MBS.201	31393ART6	3/25/17	9y 11m 25d	0.00%	(5.19%)	(3.51%)	(1.78%)
MBS.202	31395RAN8	4/15/15	8y 0m 15d	0.00%	(7.03%)	(4.77%)	(2.43%)
MBS.203	31394K4X9	10/15/33	26y 6m 15d	0.00%	(12.64%)	(8.76%)	(4.56%)
MBS.204	31393GDF8	12/15/17	10y 8m 15d	0.00%	(7.51%)	(5.12%)	(2.62%)
MBS.205	31393DDG3	7/25/33	26y 3m 25d	0.00%	(6.93%)	(4.73%)	(2.42%)
MBS.206	3136FASC5	9/1/32	25y 5m 1d	0.00%	(5.96%)	(4.05%)	(2.07%)
MBS.207	31395CQJ3	8/15/30	23y 4m 15d	0.00%	(8.12%)	(5.53%)	(2.82%)
MBS.208	3128HWJJ7	12/15/36	29y 8m 15d	0.00%	(18.94%)	(13.38%)	(7.11%)
MBS.209	3136FCBM7	12/1/33	26y 8m 1d	0.00%	(10.05%)	(6.92%)	(3.58%)
MBS.210	31393RSY7	10/15/26	19y 6m 15d	0.00%	(4.75%)	(3.20%)	(1.62%)
MBS.211	31396C3Q1	10/15/15	8y 6m 15d	0.00%	(8.09%)	(5.51%)	(2.81%)
MBS.212	31394TAA3	3/15/34	26y 11m 15d	0.00%	(10.48%)	(7.21%)	(3.72%)
MBS.213	31393BWD3	12/25/17	10y 8m 25d	0.00%	(7.16%)	(4.87%)	(2.48%)
MBS.214	3128HWCS4	11/15/36	29y 7m 15d	0.00%	(11.55%)	(8.00%)	(4.16%)
MBS.215	31395VCE7	6/15/35	28y 2m 15d	0.00%	(11.67%)	(8.05%)	(4.17%)
MBS.216	31393TSX5	10/25/33	26y 6m 25d	0.00%	(7.07%)	(4.82%)	(2.47%)
MBS.217	31394HAE1	8/15/33	26y 4m 15d	0.00%	(9.34%)	(6.42%)	(3.31%)
MBS.218	3136FCKK1	8/1/34	27y 4m 1d	0.00%	(11.08%)	(7.66%)	(3.97%)
MBS.219	31393KK95	12/15/21	14y 8m 15d	0.00%	(6.29%)	(4.26%)	(2.17%)
MBS.220	3136FAWR7	1/1/33	25y 9m 1d	0.00%	(9.03%)	(6.20%)	(3.20%)
MBS.221	31395LC41	1/15/35	27y 9m 15d	0.00%	(12.50%)	(8.66%)	(4.50%)
MBS.222	31394D2P4	10/25/29	22y 6m 25d	0.00%	(10.46%)	(7.12%)	(3.63%)
MBS.223	31394UAC6	10/25/35	28y 6m 25d	0.00%	(9.67%)	(6.66%)	(3.44%)
MBS.224	31393J5G9	12/15/28	21y 8m 15d	0.00%	(6.08%)	(4.12%)	(2.09%)
MBS.225	31393QST0	5/15/33	26y 1m 15d	0.00%	(12.43%)	(8.61%)	(4.48%)
MBS.226	31393HRJ3	6/15/22	15y 2m 15d	0.00%	(7.06%)	(4.80%)	(2.45%)
MBS.227	31393RYN4	10/15/26	19y 6m 15d	0.00%	(4.77%)	(3.22%)	(1.63%)
MBS.228	31393XB22	4/25/34	27y 0m 25d	0.00%	(9.61%)	(6.61%)	(3.41%)
MBS.229	31393DT50	8/25/18	11y 4m 25d	0.00%	(9.10%)	(6.22%)	(3.19%)
MBS.230	31393VDF5	6/15/18	11y 2m 15d	0.00%	(10.54%)	(7.24%)	(3.73%)
MBS.231	31393NYY9	3/15/17	9y 11m 15d	0.00%	(5.31%)	(3.58%)	(1.82%)
MBS.232	31395VTS8	7/15/15	8y 3m 15d	0.00%	(6.40%)	(4.34%)	(2.20%)
MBS.233	31393EVW6	9/25/33	26y 5m 25d	0.00%	(9.81%)	(6.75%)	(3.49%)
MBS.234	31396C3S7	3/15/31	23y 11m 15d	0.00%	(8.09%)	(5.51%)	(2.81%)
MBS.235	31394FNC5	9/25/35	28y 5m 25d	0.00%	(11.59%)	(8.00%)	(4.14%)
MBS.236	3136FCW93	7/1/36	29y 3m 1d	0.00%	(13.47%)	(9.38%)	(4.90%)
MBS.237	31392GPK5	4/25/16	9y 0m 25d	0.00%	(3.65%)	(2.46%)	(1.24%)
MBS.238	31396UAM2	7/15/36	29y 3m 15d	0.00%	(13.16%)	(9.11%)	(4.73%)
MBS.239	3136FC5W2	10/1/36	29y 6m 1d	0.00%	(17.44%)	(12.28%)	(6.50%)
MBS.240	31392WFM7	10/15/17	10y 6m 15d	0.00%	(5.72%)	(3.88%)	(1.97%)
MBS.241	31395VUK3	5/15/31	24y 1m 15d	0.00%	(6.40%)	(4.34%)	(2.20%)
MBS.242	31397AGJ6	5/15/29	22y 1m 15d	0.00%	(9.54%)	(6.52%)	(3.35%)
MBS.243	31395RBA5	4/15/20	13y 0m 15d	0.00%	(18.74%)	(13.00%)	(6.77%)
MBS.244	31392JTS8	10/25/16	9y 6m 25d	0.00%	(4.87%)	(3.28%)	(1.66%)
MBS.245	31396AP73	9/15/35	28y 5m 15d	0.00%	(11.47%)	(7.91%)	(4.10%)
MBS.246	31393GJQ8	5/15/22	15y 1m 15d	0.00%	(6.33%)	(4.30%)	(2.19%)
MBS.247	3136FCHB5	3/1/34	26y 11m 1d	0.00%	(9.78%)	(6.73%)	(3.48%)
MBS.248	31393YDE2	5/25/34	27y 1m 25d	0.00%	(9.34%)	(6.42%)	(3.31%)
MBS.249	31396NCJ3	9/15/33	26y 5m 15d	0.00%	(12.99%)	(8.99%)	(4.67%)
MBS.250	31396C2Y5	10/15/15	8y 6m 15d	0.00%	(8.06%)	(5.49%)	(2.80%)

Student Loan

⊟ Student Loan FFELP				0.00%	(13.23%)	(9.09%)	(4.69%)
ABS.041	64031QCP4	2/23/16	8y 10m 23d	0.00%	(10.26%)	(6.98%)	(3.57%)
ABS.042	784420AF8	3/15/18	10y 11m 15d	0.00%	(9.22%)	(6.28%)	(3.21%)
ABS.044	784427AB2	6/15/15	8y 2m 15d	0.00%	(9.06%)	(6.15%)	(3.14%)
ABS.048	00432CCM1	11/22/24	17y 7m 22d	0.00%	(16.29%)	(11.22%)	(5.80%)
ABS.050	78442GPN0	10/25/21	14y 6m 25d	0.00%	(18.59%)	(12.89%)	(6.70%)
ABS.053	194268AA6	1/25/23	15y 9m 25d	0.00%	(8.68%)	(5.89%)	(3.00%)
ABS.054	00432CDB4	8/25/23	16y 4m 25d	0.00%	(16.04%)	(11.06%)	(5.72%)
ABS.057	784420AL5	6/15/20	13y 2m 15d	0.00%	(11.78%)	(8.08%)	(4.16%)
ABS.058	78442GQN9	7/25/22	15y 3m 25d	0.00%	(18.09%)	(12.52%)	(6.51%)
⊟ Student Loan Private				0.00%	(16.28%)	(11.38%)	(5.97%)
ABS.043	78443CAY0	9/15/16	9y 5m 15d	0.00%	(8.89%)	(6.04%)	(3.08%)
ABS.045	78443CAL8	9/15/17	10y 5m 15d	0.00%	(8.10%)	(5.50%)	(2.80%)
ABS.046	00432CCJ8	4/25/35	28y 0m 25d	0.00%	(27.80%)	(19.87%)	(10.68%)
ABS.047	00432CBG5	4/25/29	22y 0m 25d	0.00%	(22.34%)	(15.71%)	(8.29%)
ABS.051	78443CBL7	6/15/18	11y 2m 15d	0.00%	(8.37%)	(5.69%)	(2.90%)
ABS.052	78443CBY9	12/16/19	12y 8m 16d	0.00%	(10.70%)	(7.28%)	(3.72%)
ABS.055	66704JBP2	11/28/23	16y 7m 28d	0.00%	(19.32%)	(13.41%)	(6.99%)
ABS.056	00432CCT6	4/25/18	11y 0m 25d	0.00%	(15.97%)	(11.07%)	(5.76%)
ABS.059	28140XAB5	10/25/29	22y 6m 25d	0.00%	(26.92%)	(19.15%)	(10.24%)
ABS.060	63543WAE1	2/27/12	4y 10m 27d	0.00%	(6.66%)	(4.51%)	(2.29%)

Treasury Securities

⊟ Treasury Security				0.00%	(7.15%)	(4.88%)	(2.50%)
TR.001	912795ZN	6/28/07	0y 2m 28d	0.00%	(0.73%)	(0.49%)	(0.24%)
TR.002	912795ZK	6/7/07	0y 2m 7d	0.00%	(0.56%)	(0.37%)	(0.19%)
TR.003	912795ZG	5/17/07	0y 1m 17d	0.00%	(0.38%)	(0.26%)	(0.13%)
TR.004	912795ZD	4/26/07	0y 0m 26d	0.00%	(0.21%)	(0.14%)	(0.07%)
TR.005	912795ZB	4/12/07	0y 0m 12d	0.00%	(0.10%)	(0.07%)	(0.03%)
TR.006	912795ZM	6/21/07	0y 2m 21d	0.00%	(0.67%)	(0.45%)	(0.22%)
TR.007	912795ZP	7/5/07	0y 3m 5d	0.00%	(0.78%)	(0.52%)	(0.26%)
TR.008	912795A2	9/20/07	0y 5m 20d	0.00%	(1.41%)	(0.94%)	(0.47%)
TR.009	912795ZE	5/3/07	0y 1m 3d	0.00%	(0.27%)	(0.18%)	(0.09%)
TR.010	912795ZV	8/16/07	0y 4m 16d	0.00%	(1.12%)	(0.75%)	(0.38%)
TR.011	912795ZU	8/9/07	0y 4m 9d	0.00%	(1.07%)	(0.71%)	(0.36%)
TR.012	912795ZA	4/5/07	0y 0m 5d	0.00%	(0.04%)	(0.03%)	(0.01%)
TR.013	912795ZJ	5/31/07	0y 2m 0d	0.00%	(0.50%)	(0.33%)	(0.17%)
TR.014	912795ZQ	7/12/07	0y 3m 12d	0.00%	(0.84%)	(0.56%)	(0.28%)
TR.015	912795ZX	8/30/07	0y 4m 30d	0.00%	(1.24%)	(0.83%)	(0.41%)
TR.016	912795ZR	7/19/07	0y 3m 19d	0.00%	(0.90%)	(0.60%)	(0.30%)
TR.017	912795ZF	5/10/07	0y 1m 10d	0.00%	(0.33%)	(0.22%)	(0.11%)
TR.018	912795ZY	9/6/07	0y 5m 6d	0.00%	(1.29%)	(0.87%)	(0.43%)
TR.019	912795ZC	4/19/07	0y 0m 19d	0.00%	(0.16%)	(0.10%)	(0.05%)
TR.020	912795ZL	6/14/07	0y 2m 14d	0.00%	(0.61%)	(0.41%)	(0.20%)
TR.021	912828CE	4/15/09	2y 0m 15d	0.00%	(5.72%)	(3.85%)	(1.94%)
TR.022	912828BG	8/15/08	1y 4m 15d	0.00%	(3.97%)	(2.67%)	(1.34%)
TR.023	912828DG	1/15/10	2y 9m 15d	0.00%	(7.67%)	(5.18%)	(2.63%)
TR.024	912828DM	2/15/15	7y 10m 15d	0.00%	(18.22%)	(12.59%)	(6.53%)
TR.025	912828FP	8/15/09	2y 4m 15d	0.00%	(6.55%)	(4.42%)	(2.23%)
TR.026	912828EE	8/15/15	8y 4m 15d	0.00%	(18.91%)	(13.10%)	(6.80%)
TR.027	912828EZ	3/31/08	1y 0m 0d	0.00%	(2.92%)	(1.96%)	(0.98%)
TR.028	912828DU	5/15/10	3y 1m 15d	0.00%	(8.39%)	(5.68%)	(2.88%)
TR.029	9128273X	2/15/08	0y 10m 15d	0.00%	(2.56%)	(1.71%)	(0.86%)
TR.030	912828FK	6/30/11	4y 3m 0d	0.00%	(10.82%)	(7.36%)	(3.75%)
TR.031	9128272U	5/15/07	0y 1m 15d	0.00%	(0.37%)	(0.25%)	(0.12%)
TR.032	912828GA	11/30/11	4y 8m 0d	0.00%	(11.79%)	(8.03%)	(4.11%)
TR.033	9128276J	8/15/10	3y 4m 15d	0.00%	(8.87%)	(6.01%)	(3.05%)

TR.034	912828DW	5/31/07	0y 2m 0d	0.00%	(0.50%)	(0.33%)	(0.17%)
TR.035	912828FR	8/31/08	1y 5m 0d	0.00%	(4.06%)	(2.73%)	(1.37%)
TR.036	912828DE	12/15/09	2y 8m 15d	0.00%	(7.44%)	(5.03%)	(2.55%)
TR.037	912828DX	6/15/10	3y 2m 15d	0.00%	(8.66%)	(5.86%)	(2.98%)
TR.038	9128275G	5/15/09	2y 1m 15d	0.00%	(5.80%)	(3.91%)	(1.97%)
TR.039	912828BQ	11/15/08	1y 7m 15d	0.00%	(4.62%)	(3.10%)	(1.56%)
TR.040	912828CJ	5/15/14	7y 1m 15d	0.00%	(16.38%)	(11.28%)	(5.83%)
TR.041	912828AU	2/15/13	5y 10m 15d	0.00%	(14.56%)	(9.98%)	(5.13%)
TR.042	912828GF	1/31/12	4y 10m 0d	0.00%	(12.18%)	(8.31%)	(4.25%)
TR.043	912828CS	8/15/09	2y 4m 15d	0.00%	(6.63%)	(4.47%)	(2.26%)
TR.044	912828CT	8/15/14	7y 4m 15d	0.00%	(17.22%)	(11.88%)	(6.15%)
TR.045	912828GJ	2/28/09	1y 11m 0d	0.00%	(5.39%)	(3.62%)	(1.83%)
TR.046	912828DY	6/30/07	0y 3m 0d	0.00%	(0.74%)	(0.50%)	(0.25%)
TR.047	912828EM	11/15/10	3y 7m 15d	0.00%	(9.49%)	(6.44%)	(3.27%)
TR.048	912828EQ	12/15/10	3y 8m 15d	0.00%	(9.73%)	(6.60%)	(3.36%)
TR.049	912828CL	6/15/09	2y 2m 15d	0.00%	(6.13%)	(4.13%)	(2.09%)
TR.050	912828EY	2/29/08	0y 11m 0d	0.00%	(2.68%)	(1.79%)	(0.90%)
TR.051	912828EK	10/31/07	0y 7m 0d	0.00%	(1.71%)	(1.14%)	(0.57%)
TR.052	912828FM	7/31/08	1y 4m 0d	0.00%	(3.82%)	(2.56%)	(1.29%)
TR.053	912828FV	10/31/08	1y 7m 0d	0.00%	(4.44%)	(2.99%)	(1.50%)
TR.054	912828ES	1/15/11	3y 9m 15d	0.00%	(9.98%)	(6.77%)	(3.45%)
TR.055	912828AP	11/15/12	5y 7m 15d	0.00%	(13.88%)	(9.50%)	(4.88%)
TR.056	912828FQ	8/15/16	9y 4m 15d	0.00%	(20.10%)	(13.97%)	(7.29%)
TR.057	912828DV	5/15/15	8y 1m 15d	0.00%	(18.37%)	(12.71%)	(6.60%)
TR.058	9128274V	11/15/08	1y 7m 15d	0.00%	(4.57%)	(3.07%)	(1.55%)
TR.059	912828FZ	11/30/08	1y 8m 0d	0.00%	(4.69%)	(3.15%)	(1.59%)
TR.060	912828FY	11/15/16	9y 7m 15d	0.00%	(20.38%)	(14.18%)	(7.41%)
TR.061	912828AC	5/15/07	0y 1m 15d	0.00%	(0.37%)	(0.25%)	(0.12%)
TR.062	912828FD	4/30/11	4y 1m 0d	0.00%	(10.41%)	(7.08%)	(3.61%)
TR.063	912828FC	4/30/08	1y 1m 0d	0.00%	(3.09%)	(2.07%)	(1.04%)
TR.064	912828DR	4/15/10	3y 0m 15d	0.00%	(8.15%)	(5.51%)	(2.80%)
TR.065	912828DL	2/15/10	2y 10m 15d	0.00%	(7.91%)	(5.35%)	(2.71%)
TR.066	912828BA	5/15/13	6y 1m 15d	0.00%	(14.99%)	(10.29%)	(5.29%)
TR.067	912828EH	9/30/07	0y 6m 0d	0.00%	(1.49%)	(1.00%)	(0.50%)
TR.068	912828BH	8/15/13	6y 4m 15d	0.00%	(15.40%)	(10.58%)	(5.45%)
TR.069	912828EN	11/15/15	8y 7m 15d	0.00%	(18.96%)	(13.14%)	(6.84%)
TR.070	912828EJ	10/15/10	3y 6m 15d	0.00%	(9.30%)	(6.30%)	(3.21%)
TR.071	912828GH	2/15/17	9y 10m 15d	0.00%	(20.98%)	(14.61%)	(7.64%)
TR.072	912828FF	5/15/16	9y 1m 15d	0.00%	(19.35%)	(13.44%)	(7.00%)

TR.073	912828BK	9/15/08	1y 5m 15d	0.00%	(4.22%)	(2.83%)	(1.43%)
TR.074	9128277B	8/15/11	4y 4m 15d	0.00%	(11.18%)	(7.61%)	(3.88%)
TR.075	9128275Z	2/15/10	2y 10m 15d	0.00%	(7.66%)	(5.17%)	(2.62%)
TR.076	912828FN	7/31/11	4y 4m 0d	0.00%	(11.09%)	(7.55%)	(3.85%)
TR.077	912828EX	2/28/11	3y 11m 0d	0.00%	(10.27%)	(6.97%)	(3.55%)
TR.078	912828BT	12/15/08	1y 8m 15d	0.00%	(4.85%)	(3.26%)	(1.65%)
TR.079	912828AN	11/15/07	0y 7m 15d	0.00%	(1.84%)	(1.23%)	(0.62%)
TR.080	912828DB	11/15/09	2y 7m 15d	0.00%	(7.21%)	(4.87%)	(2.47%)
TR.081	9128276T	2/15/11	3y 10m 15d	0.00%	(10.10%)	(6.86%)	(3.49%)
TR.082	912828DC	11/15/14	7y 7m 15d	0.00%	(17.47%)	(12.06%)	(6.25%)
TR.083	912828EU	1/31/08	0y 10m 0d	0.00%	(2.45%)	(1.64%)	(0.82%)
TR.084	912828CV	9/15/09	2y 5m 15d	0.00%	(6.88%)	(4.64%)	(2.35%)
TR.085	912828GK	2/29/12	4y 11m 0d	0.00%	(12.41%)	(8.47%)	(4.33%)
TR.086	912828EW	2/15/16	8y 10m 15d	0.00%	(19.57%)	(13.58%)	(7.07%)
TR.087	912828EG	9/15/10	3y 5m 15d	0.00%	(9.31%)	(6.31%)	(3.21%)
TR.088	912828EV	2/15/09	1y 10m 15d	0.00%	(5.29%)	(3.56%)	(1.80%)
TR.089	912828BZ	2/15/09	1y 10m 15d	0.00%	(5.35%)	(3.60%)	(1.82%)
TR.090	912828FW	10/31/11	4y 7m 0d	0.00%	(11.54%)	(7.86%)	(4.02%)
TR.091	912828ED	8/15/10	3y 4m 15d	0.00%	(9.05%)	(6.13%)	(3.12%)
TR.092	912828FG	5/31/08	1y 2m 0d	0.00%	(3.34%)	(2.24%)	(1.13%)
TR.093	912828GB	12/31/08	1y 9m 0d	0.00%	(4.93%)	(3.31%)	(1.67%)
TR.094	912828FE	5/15/09	2y 1m 15d	0.00%	(5.84%)	(3.93%)	(1.99%)
TR.095	912828FU	9/30/11	4y 6m 0d	0.00%	(11.60%)	(7.90%)	(4.04%)
TR.096	912828FA	3/31/11	4y 0m 0d	0.00%	(10.46%)	(7.10%)	(3.62%)
TR.097	912828AJ	8/15/12	5y 4m 15d	0.00%	(13.40%)	(9.16%)	(4.70%)
TR.098	912828DS	4/30/07	0y 1m 0d	0.00%	(0.25%)	(0.16%)	(0.08%)
TR.099	912828CH	5/15/09	2y 1m 15d	0.00%	(5.90%)	(3.98%)	(2.01%)
TR.100	912828CN	7/15/09	2y 3m 15d	0.00%	(6.39%)	(4.31%)	(2.18%)

Corporates

⊟ BAC2				0.00%	(10.93%)	(7.51%)	(3.87%)
BAC2.01	BAC2.01	3/1/08	0y 11m 1d	0.00%	(2.68%)	(1.80%)	(0.90%)
BAC2.03	BAC2.03	3/2/10	2y 11m 2d	0.00%	(7.92%)	(5.35%)	(2.71%)
BAC2.05	BAC2.05	3/5/12	4y 11m 5d	0.00%	(12.40%)	(8.46%)	(4.33%)
BAC2.10	BAC2.10	3/6/17	9y 11m 6d	0.00%	(20.75%)	(14.45%)	(7.55%)
⊟ C				0.00%	(11.03%)	(7.58%)	(3.91%)
C.01	C.01	3/7/08	0y 11m 7d	0.00%	(2.73%)	(1.83%)	(0.92%)
C.03	C.03	3/8/10	2y 11m 8d	0.00%	(7.97%)	(5.39%)	(2.73%)
C.05	C.05	3/9/12	4y 11m 9d	0.00%	(12.47%)	(8.51%)	(4.36%)
C.10	C.10	3/12/17	9y 11m 12d	0.00%	(20.98%)	(14.61%)	(7.64%)
⊟ CVX				0.00%	(13.87%)	(9.55%)	(4.93%)
Select to collapse	CVX.03	3/14/10	2y 11m 14d	0.00%	(8.02%)	(5.42%)	(2.75%)
CVX.05	CVX.05	3/15/12	4y 11m 15d	0.00%	(12.52%)	(8.55%)	(4.38%)
CVX.10	CVX.10	3/16/17	9y 11m 16d	0.00%	(21.07%)	(14.68%)	(7.67%)
⊟ DNA				0.00%	(13.88%)	(9.56%)	(4.94%)
DNA.03	DNA.03	3/19/10	2y 11m 19d	0.00%	(8.06%)	(5.45%)	(2.76%)
DNA.05	DNA.05	3/20/12	4y 11m 20d	0.00%	(12.55%)	(8.57%)	(4.39%)
DNA.10	DNA.10	3/21/17	9y 11m 21d	0.00%	(21.05%)	(14.66%)	(7.67%)
⊟ JNJ				0.00%	(13.82%)	(9.51%)	(4.91%)
JNJ.03	JNJ.03	3/5/10	2y 11m 5d	0.00%	(7.95%)	(5.38%)	(2.73%)
JNJ.05	JNJ.05	3/6/12	4y 11m 6d	0.00%	(12.47%)	(8.51%)	(4.35%)
JNJ.10	JNJ.10	3/7/17	9y 11m 7d	0.00%	(21.04%)	(14.66%)	(7.66%)
⊟ JPM				0.00%	(10.99%)	(7.55%)	(3.89%)
JPM.01	JPM.01	3/8/08	0y 11m 8d	0.00%	(2.74%)	(1.83%)	(0.92%)
JPM.03	JPM.03	3/9/10	2y 11m 9d	0.00%	(7.98%)	(5.39%)	(2.74%)
JPM.05	JPM.05	3/1/12	4y 11m 1d	0.00%	(12.40%)	(8.46%)	(4.33%)
JPM.10	JPM.10	3/2/17	9y 11m 2d	0.00%	(20.87%)	(14.53%)	(7.60%)

⊟ MDT				0.00%	(11.03%)	(7.58%)	(3.91%)
MDT.01	MDT.01	3/5/08	0y 11m 5d	0.00%	(2.71%)	(1.82%)	(0.91%)
MDT.03	MDT.03	3/6/10	2y 11m 6d	0.00%	(7.96%)	(5.38%)	(2.73%)
MDT.05	MDT.05	3/7/12	4y 11m 7d	0.00%	(12.46%)	(8.50%)	(4.35%)
MDT.10	MDT.10	3/16/17	9y 11m 16d	0.00%	(21.02%)	(14.64%)	(7.66%)
⊟ MMM				0.00%	(11.11%)	(7.63%)	(3.94%)
MMM.01	MMM.01	3/19/08	0y 11m 19d	0.00%	(2.82%)	(1.89%)	(0.95%)
MMM.03	MMM.03	3/20/10	2y 11m 20d	0.00%	(8.07%)	(5.45%)	(2.77%)
MMM.05	MMM.05	3/21/12	4y 11m 21d	0.00%	(12.57%)	(8.58%)	(4.39%)
MMM.10	MMM.10	3/5/17	9y 11m 5d	0.00%	(20.98%)	(14.61%)	(7.64%)
⊟ PFE				0.00%	(11.04%)	(7.58%)	(3.91%)
PFE.01	PFE.01	3/5/08	0y 11m 5d	0.00%	(2.71%)	(1.82%)	(0.91%)
PFE.03	PFE.03	3/6/10	2y 11m 6d	0.00%	(7.96%)	(5.38%)	(2.73%)
PFE.05	PFE.05	3/7/12	4y 11m 7d	0.00%	(12.47%)	(8.51%)	(4.36%)
PFE.10	PFE.10	3/8/17	9y 11m 8d	0.00%	(21.03%)	(14.65%)	(7.66%)
⊟ PG				0.00%	(11.02%)	(7.57%)	(3.91%)
PG.01	PG.01	3/9/08	0y 11m 9d	0.00%	(2.75%)	(1.84%)	(0.92%)
PG.03	PG.03	3/12/10	2y 11m 12d	0.00%	(8.01%)	(5.41%)	(2.75%)
PG.05	PG.05	3/1/12	4y 11m 1d	0.00%	(12.42%)	(8.47%)	(4.34%)
PG.10	PG.10	3/2/17	9y 11m 2d	0.00%	(20.94%)	(14.59%)	(7.62%)

⊟ SYY				0.00%	(13.79%)	(9.49%)	(4.90%)
SYY.03	SYY.03	3/6/10	2y 11m 6d	0.00%	(7.96%)	(5.38%)	(2.73%)
SYY.05	SYY.05	3/7/12	4y 11m 7d	0.00%	(12.45%)	(8.49%)	(4.35%)
SYY.10	SYY.10	3/19/17	9y 11m 19d	0.00%	(20.98%)	(14.62%)	(7.64%)

⊟ USB				0.00%	(11.02%)	(7.57%)	(3.91%)
USB.01	USB.01	3/6/08	0y 11m 6d	0.00%	(2.72%)	(1.82%)	(0.92%)
USB.03	USB.03	3/7/10	2y 11m 7d	0.00%	(7.97%)	(5.39%)	(2.73%)
USB.05	USB.05	3/8/12	4y 11m 8d	0.00%	(12.46%)	(8.50%)	(4.35%)
USB.10	USB.10	3/9/17	9y 11m 9d	0.00%	(20.96%)	(14.60%)	(7.63%)
⊟ WB				0.00%	(11.06%)	(7.60%)	(3.92%)
WB.01	WB.01	3/12/08	0y 11m 12d	0.00%	(2.77%)	(1.85%)	(0.93%)
WB.03	WB.03	3/12/10	2y 11m 12d	0.00%	(8.00%)	(5.41%)	(2.74%)
WB.05	WB.05	3/14/12	4y 11m 14d	0.00%	(12.50%)	(8.53%)	(4.37%)
WB.10	WB.10	3/15/17	9y 11m 15d	0.00%	(20.99%)	(14.62%)	(7.64%)
⊟ WFC				0.00%	(11.09%)	(7.62%)	(3.93%)
WFC.01	WFC.01	3/16/08	0y 11m 16d	0.00%	(2.80%)	(1.88%)	(0.94%)
WFC.03	WFC.03	3/16/10	2y 11m 16d	0.00%	(8.03%)	(5.43%)	(2.76%)
WFC.05	WFC.05	3/19/12	4y 11m 19d	0.00%	(12.54%)	(8.56%)	(4.38%)
WFC.10	WFC.10	3/20/17	9y 11m 20d	0.00%	(21.03%)	(14.65%)	(7.66%)
⊟ XOM				0.00%	(13.79%)	(9.49%)	(4.90%)
XOM.03	XOM.03	3/1/10	2y 11m 1d	0.00%	(7.92%)	(5.36%)	(2.72%)
XOM.05	XOM.05	3/2/12	4y 11m 2d	0.00%	(12.44%)	(8.49%)	(4.34%)
XOM.10	XOM.10	3/5/17	9y 11m 5d	0.00%	(21.03%)	(14.65%)	(7.66%)

2007 Spread +PP Stress Tests

NCUA

REPORTS | ADMINISTRATION

Portfolio | Interest Rate Risk | Liquidity Risk | Market Risk | Credit Risk | Economic Capital | Basel Capital | Financial Ratio Analysis | Other Reports | Report Finder | Help

Sensitivity - by Attribute

KRM Run: Assets 2007 Stress Test SPD shft + CPR (values in USD)

View By (Edit) Currently Selected: [Asset Type, Transaction]

Market Value | Change in MV | % Change in MV | by Shift

Expand All | Collapse All

				% Change in MV			
	CUSIP	Maturity Date	Remaining Maturity	Base Case	Upward 300bp	Upward 200bp	Upward 100bp
⊞ ABS Other				0.00%	(10.94%)	(7.48%)	(3.84%)
⊞ Auto Loan				0.00%	(8.87%)	(6.02%)	(3.06%)
⊞ BAC2				0.00%	(10.93%)	(7.51%)	(3.87%)
⊞ C				0.00%	(11.03%)	(7.58%)	(3.91%)
⊞ CMBS				0.00%	(10.90%)	(7.46%)	(3.84%)
⊞ CVX				0.00%	(13.87%)	(9.55%)	(4.93%)
⊞ Credit Card				0.00%	(10.51%)	(7.15%)	(3.65%)
⊞ DNA				0.00%	(13.88%)	(9.56%)	(4.94%)
⊞ JNJ				0.00%	(13.82%)	(9.51%)	(4.91%)
⊞ JPM				0.00%	(10.99%)	(7.55%)	(3.89%)
⊞ MBS Agency				0.00%	(12.20%)	(8.45%)	(4.40%)
⊞ MDT				0.00%	(11.03%)	(7.58%)	(3.91%)
⊞ MMM				0.00%	(11.11%)	(7.63%)	(3.94%)
⊞ PFE				0.00%	(11.04%)	(7.58%)	(3.91%)
⊞ PG				0.00%	(11.02%)	(7.57%)	(3.91%)
⊞ RMBS PA				0.00%	(13.05%)	(9.06%)	(4.73%)
⊞ RMBS PF				0.00%	(23.28%)	(16.65%)	(8.96%)
⊞ RMBS SA				0.00%	(16.06%)	(11.24%)	(5.91%)
⊞ RMBS SF				0.00%	(20.36%)	(14.46%)	(7.73%)
⊞ SYY				0.00%	(13.79%)	(9.49%)	(4.90%)
⊞ Student Loan FFELP				0.00%	(13.23%)	(9.09%)	(4.69%)
⊞ Student Loan Private				0.00%	(16.28%)	(11.38%)	(5.97%)
⊞ Treasury Security				0.00%	(7.15%)	(4.88%)	(2.50%)
⊞ USB				0.00%	(11.02%)	(7.57%)	(3.91%)
⊞ WB				0.00%	(11.06%)	(7.60%)	(3.92%)
⊞ WFC				0.00%	(11.09%)	(7.62%)	(3.93%)
⊞ XOM				0.00%	(13.79%)	(9.49%)	(4.90%)

User: Sean Klein Kamakura Corporation

ABS Other

⊟ ABS Other				0.00%	(10.94%)	(7.48%)	(3.84%)
ABS.061	42805RAK5	11/25/11	4y 7m 25d	0.00%	(9.04%)	(6.13%)	(3.12%)
ABS.062	368288AE6	11/17/20	13y 7m 17d	0.00%	(10.41%)	(7.12%)	(3.65%)
ABS.063	64908PAA1	1/15/21	13y 9m 15d	0.00%	(17.34%)	(12.06%)	(6.30%)
ABS.064	89676AAN3	11/26/21	14y 7m 26d	0.00%	(11.37%)	(7.80%)	(4.01%)
ABS.065	897790AC5	12/15/16	9y 8m 15d	0.00%	(8.48%)	(5.74%)	(2.91%)
ABS.066	368288AD8	4/17/19	12y 0m 17d	0.00%	(8.82%)	(6.01%)	(3.07%)
ABS.067	42805RAS8	11/25/11	4y 7m 25d	0.00%	(9.04%)	(6.13%)	(3.12%)
ABS.068	125565AD3	4/20/14	7y 0m 20d	0.00%	(8.25%)	(5.58%)	(2.83%)
ABS.069	00080ABE9	10/25/17	10y 6m 25d	0.00%	(8.53%)	(5.79%)	(2.94%)
ABS.070	903485AA8	4/15/14	7y 0m 15d	0.00%	(4.80%)	(3.24%)	(1.64%)
ABS.071	34528QAC8	6/15/13	6y 2m 15d	0.00%	(13.19%)	(9.04%)	(4.65%)
ABS.072	760106AU8	6/25/11	4y 2m 25d	0.00%	(8.08%)	(5.46%)	(2.77%)
ABS.073	15132CAE2	5/20/13	6y 1m 20d	0.00%	(12.19%)	(8.32%)	(4.26%)
ABS.074	649083AA0	3/15/19	11y 11m 15d	0.00%	(15.47%)	(10.70%)	(5.55%)
ABS.075	15132CAG7	7/20/10	3y 3m 20d	0.00%	(8.24%)	(5.57%)	(2.83%)
ABS.076	19716QAA5	3/20/21	13y 11m 20d	0.00%	(14.76%)	(10.14%)	(5.22%)
ABS.077	14056GAB4	9/20/22	15y 5m 20d	0.00%	(12.21%)	(8.33%)	(4.27%)
ABS.078	00083EAA7	11/27/19	12y 7m 27d	0.00%	(12.90%)	(8.83%)	(4.53%)
ABS.079	883145AC8	5/15/20	13y 1m 15d	0.00%	(9.90%)	(6.76%)	(3.47%)
ABS.080	64908QAA9	1/15/21	13y 9m 15d	0.00%	(17.91%)	(12.48%)	(6.53%)

Auto Loan

⊟ Auto Loan				0.00%	(8.87%)	(6.02%)	(3.06%)
ABS.001	13973AAD5	5/15/11	4y 1m 15d	0.00%	(6.19%)	(4.17%)	(2.11%)
ABS.002	404285AC2	6/17/11	4y 2m 17d	0.00%	(5.52%)	(3.72%)	(1.88%)
ABS.003	14042CAD6	7/15/12	5y 3m 15d	0.00%	(9.29%)	(6.30%)	(3.21%)
ABS.004	65475CAD4	11/15/11	4y 7m 15d	0.00%	(7.75%)	(5.24%)	(2.66%)
ABS.005	262073AD1	12/16/13	6y 8m 16d	0.00%	(9.20%)	(6.24%)	(3.18%)
ABS.006	34528CAE5	2/15/12	4y 10m 15d	0.00%	(9.54%)	(6.47%)	(3.29%)
ABS.007	481238AD5	12/15/14	7y 8m 15d	0.00%	(9.63%)	(6.54%)	(3.33%)
ABS.008	92977FAD4	3/20/13	5y 11m 20d	0.00%	(9.56%)	(6.49%)	(3.30%)
ABS.009	14042DAE2	11/15/13	6y 7m 15d	0.00%	(10.59%)	(7.21%)	(3.68%)
ABS.010	895787AX7	4/12/13	6y 0m 12d	0.00%	(9.40%)	(6.38%)	(3.25%)
ABS.011	92977AAN3	4/20/12	5y 0m 20d	0.00%	(9.24%)	(6.26%)	(3.19%)
ABS.012	54238NAD2	9/15/13	6y 5m 15d	0.00%	(10.92%)	(7.43%)	(3.79%)
ABS.013	030613AD5	10/6/13	6y 6m 6d	0.00%	(11.85%)	(8.08%)	(4.13%)
ABS.014	449182BS2	11/15/12	5y 7m 15d	0.00%	(8.17%)	(5.53%)	(2.81%)
ABS.015	14041VAE3	7/15/13	6y 3m 15d	0.00%	(10.41%)	(7.08%)	(3.61%)
ABS.016	233880AB9	2/8/11	3y 10m 8d	0.00%	(6.62%)	(4.47%)	(2.26%)
ABS.017	89578PAC3	11/14/11	4y 7m 14d	0.00%	(7.04%)	(4.76%)	(2.41%)
ABS.018	03061NJJ9	5/6/12	5y 1m 6d	0.00%	(7.00%)	(4.73%)	(2.40%)
ABS.019	03062XAD8	9/6/13	6y 5m 6d	0.00%	(10.87%)	(7.40%)	(3.78%)
ABS.020	34528AAE9	9/15/11	4y 5m 15d	0.00%	(8.79%)	(5.95%)	(3.03%)

Credit Cards

⊟ Credit Card				0.00%	(10.51%)	(7.15%)	(3.65%)
ABS.022	8761ENAA1	10/27/14	7y 6m 27d	0.00%	(9.33%)	(6.33%)	(3.22%)
ABS.023	55264TAE1	12/16/13	6y 8m 16d	0.00%	(10.86%)	(7.39%)	(3.77%)
ABS.024	55262TFJ7	10/15/12	5y 6m 15d	0.00%	(8.01%)	(5.42%)	(2.75%)
ABS.025	981464BD1	2/15/17	9y 10m 15d	0.00%	(14.34%)	(9.83%)	(5.06%)
ABS.026	161571BB9	4/15/13	6y 0m 15d	0.00%	(10.01%)	(6.80%)	(3.46%)
ABS.027	55264TDN8	5/15/13	6y 1m 15d	0.00%	(9.63%)	(6.54%)	(3.33%)
ABS.028	14041NBW0	8/15/14	7y 4m 15d	0.00%	(13.48%)	(9.24%)	(4.75%)
ABS.029	25466KFJ3	6/18/13	6y 2m 18d	0.00%	(9.63%)	(6.53%)	(3.33%)
ABS.030	02586GAA0	8/15/11	4y 4m 15d	0.00%	(9.07%)	(6.15%)	(3.13%)
ABS.031	55264TDL2	4/15/13	6y 0m 15d	0.00%	(9.45%)	(6.41%)	(3.26%)
ABS.032	36159JAG6	3/15/13	5y 11m 15d	0.00%	(7.89%)	(5.34%)	(2.71%)
ABS.033	161571AW4	12/17/12	5y 8m 17d	0.00%	(9.31%)	(6.31%)	(3.21%)
ABS.034	635414AG0	3/17/14	6y 11m 17d	0.00%	(12.07%)	(8.24%)	(4.21%)
ABS.035	55262NAL0	1/15/13	5y 9m 15d	0.00%	(8.85%)	(6.00%)	(3.05%)
ABS.036	635414AD7	3/15/13	5y 11m 15d	0.00%	(10.18%)	(6.91%)	(3.52%)
ABS.037	14041NBY6	1/15/15	7y 9m 15d	0.00%	(13.77%)	(9.45%)	(4.86%)
ABS.038	161571AT1	10/15/12	5y 6m 15d	0.00%	(8.88%)	(6.02%)	(3.06%)
ABS.039	16151RCR2	1/15/16	8y 9m 15d	0.00%	(15.08%)	(10.35%)	(5.33%)
ABS.040	55264TCK5	7/15/13	6y 3m 15d	0.00%	(9.99%)	(6.78%)	(3.46%)

CMBS

⊟ CMBS				0.00%	(10.90%)	(7.46%)	(3.84%)
MBS.251	05947UBM9	4/15/36	29y 0m 15d	0.00%	(8.59%)	(5.82%)	(2.96%)
MBS.252	05947UCF3	5/11/35	28y 1m 11d	0.00%	(9.72%)	(6.60%)	(3.36%)
MBS.254	05947UDP0	4/11/37	30y 0m 11d	0.00%	(10.31%)	(7.01%)	(3.57%)
MBS.255	07383FGE2	11/15/16	9y 7m 15d	0.00%	(4.71%)	(3.17%)	(1.60%)
MBS.256	07383F7S1	6/11/41	34y 2m 11d	0.00%	(4.68%)	(3.15%)	(1.59%)
MBS.257	12513EAH7	7/15/44	37y 3m 15d	0.00%	(15.73%)	(10.85%)	(5.62%)
MBS.259	12513EAJ3	7/15/44	37y 3m 15d	0.00%	(18.24%)	(12.63%)	(6.56%)
MBS.260	20047MAE4	2/5/19	11y 10m 5d	0.00%	(9.85%)	(6.69%)	(3.41%)
MBS.261	20047MAF1	2/5/19	11y 10m 5d	0.00%	(9.89%)	(6.72%)	(3.42%)
MBS.263	20046FAA8	7/16/34	27y 3m 16d	0.00%	(7.98%)	(5.41%)	(2.75%)
MBS.264	225470NG4	12/15/40	33y 8m 15d	0.00%	(4.90%)	(3.30%)	(1.67%)
MBS.265	173067GK9	5/15/43	36y 1m 15d	0.00%	(5.04%)	(3.40%)	(1.72%)
MBS.266	337368AB0	3/15/33	25y 11m 15d	0.00%	(8.48%)	(5.74%)	(2.92%)
MBS.267	36828QNQ5	7/10/45	38y 3m 10d	0.00%	(5.95%)	(4.01%)	(2.03%)
MBS.269	361849MQ2	8/16/33	26y 4m 16d	0.00%	(4.83%)	(3.27%)	(1.66%)
MBS.270	36228CJT1	5/3/18	11y 1m 3d	0.00%	(4.41%)	(2.97%)	(1.50%)
MBS.271	46625YVR1	1/12/43	35y 9m 12d	0.00%	(4.99%)	(3.36%)	(1.70%)
MBS.272	46625YWG4	1/12/43	35y 9m 12d	0.00%	(16.41%)	(11.33%)	(5.87%)
MBS.273	46625YNS8	7/15/42	35y 3m 15d	0.00%	(13.76%)	(9.45%)	(4.86%)
MBS.274	46625YUP6	10/15/42	35y 6m 15d	0.00%	(15.52%)	(10.70%)	(5.53%)
MBS.275	46625YTY9	10/15/42	35y 6m 15d	0.00%	(8.66%)	(5.86%)	(2.98%)
MBS.276	46625YXL2	12/15/44	37y 8m 15d	0.00%	(5.24%)	(3.53%)	(1.78%)
MBS.277	46625YXR9	12/15/44	37y 8m 15d	0.00%	(15.57%)	(10.73%)	(5.55%)
MBS.278	59022HKZ4	11/12/37	30y 7m 12d	0.00%	(5.48%)	(3.69%)	(1.87%)
MBS.279	59022HLH3	11/12/37	30y 7m 12d	0.00%	(17.59%)	(12.17%)	(6.32%)
MBS.280	59022HNA6	1/12/44	36y 9m 12d	0.00%	(17.22%)	(11.91%)	(6.18%)
MBS.281	59022HMW9	1/12/44	36y 9m 12d	0.00%	(9.30%)	(6.31%)	(3.21%)
MBS.282	617451AA7	9/15/42	35y 5m 15d	0.00%	(5.66%)	(3.82%)	(1.93%)
MBS.283	617451AB5	9/15/42	35y 5m 15d	0.00%	(16.27%)	(11.23%)	(5.82%)
MBS.284	617451AF6	9/15/42	35y 5m 15d	0.00%	(17.73%)	(12.26%)	(6.36%)
MBS.285	356486AA8	7/12/16	9y 3m 12d	0.00%	(6.06%)	(4.10%)	(2.08%)
MBS.286	61746WGM6	3/11/16	8y 11m 11d	0.00%	(5.69%)	(3.84%)	(1.95%)
MBS.287	61746WGN4	3/11/16	8y 11m 11d	0.00%	(10.05%)	(6.83%)	(3.48%)
MBS.288	589929VX3	2/3/16	8y 10m 3d	0.00%	(5.73%)	(3.87%)	(1.96%)
MBS.289	901921AC0	2/3/16	8y 10m 3d	0.00%	(5.54%)	(3.74%)	(1.89%)
MBS.290	901921AG1	2/3/16	8y 10m 3d	0.00%	(9.85%)	(6.69%)	(3.41%)
MBS.291	929766W74	5/15/44	37y 1m 15d	0.00%	(8.53%)	(5.78%)	(2.93%)
MBS.292	929766X57	5/15/44	37y 1m 15d	0.00%	(17.73%)	(12.25%)	(6.36%)
MBS.293	929766X65	5/15/44	37y 1m 15d	0.00%	(17.95%)	(12.41%)	(6.44%)
MBS.294	9297664R1	5/15/44	37y 1m 15d	0.00%	(16.23%)	(11.20%)	(5.80%)
MBS.295	9297664K6	7/15/42	35y 3m 15d	0.00%	(8.66%)	(5.87%)	(2.98%)
MBS.296	9297664U4	7/15/42	35y 3m 15d	0.00%	(17.97%)	(12.43%)	(6.45%)
MBS.297	9297667B3	10/15/44	37y 6m 15d	0.00%	(16.20%)	(11.18%)	(5.79%)
MBS.298	9297667C1	10/15/44	37y 6m 15d	0.00%	(8.79%)	(5.95%)	(3.03%)
MBS.299	9297667K3	10/15/44	37y 6m 15d	0.00%	(18.27%)	(12.65%)	(6.57%)
MBS.300	9297667J6	10/15/44	37y 6m 15d	0.00%	(18.18%)	(12.59%)	(6.54%)

RMBS- By Credit Rating and Rate Reset

⊟ RMBS PA				0.00%	(13.05%)	(9.06%)	(4.73%)
MBS.021	36228FUT1	7/25/18	11y 3m 25d	0.00%	(9.49%)	(6.50%)	(3.34%)
MBS.041	9292276V3	7/25/18	11y 3m 25d	0.00%	(12.09%)	(8.31%)	(4.29%)
MBS.042	949762AA6	9/25/18	11y 5m 25d	0.00%	(10.91%)	(7.49%)	(3.86%)
MBS.055	81744FFY8	1/20/35	27y 9m 20d	0.00%	(9.57%)	(6.58%)	(3.40%)
MBS.065	07387AEA9	8/25/35	28y 4m 25d	0.00%	(17.76%)	(12.28%)	(6.37%)
MBS.069	05948X7A3	6/25/19	12y 2m 25d	0.00%	(9.26%)	(6.32%)	(3.23%)
MBS.071	92922FGY8	11/25/33	26y 7m 25d	0.00%	(29.41%)	(21.25%)	(11.56%)
MBS.077	000759BW9	3/15/32	24y 11m 15d	0.00%	(9.97%)	(6.82%)	(3.50%)
MBS.081	949788AE3	7/25/19	12y 3m 25d	0.00%	(12.77%)	(8.80%)	(4.55%)
MBS.100	22541SX29	12/25/19	12y 8m 25d	0.00%	(12.90%)	(8.90%)	(4.60%)
MBS.111	86359LGE3	5/19/35	28y 1m 19d	0.00%	(7.14%)	(4.88%)	(2.50%)
MBS.118	12669FA86	7/25/34	27y 3m 25d	0.00%	(32.83%)	(23.75%)	(12.94%)
MBS.131	16162WAM1	11/25/18	11y 7m 25d	0.00%	(11.93%)	(8.21%)	(4.24%)
MBS.132	59020UL45	11/25/35	28y 7m 25d	0.00%	(13.90%)	(9.68%)	(5.07%)
MBS.138	55265KU31	11/25/18	11y 7m 25d	0.00%	(11.94%)	(8.21%)	(4.24%)
MBS.148	81744FAZ0	5/20/34	27y 1m 20d	0.00%	(9.77%)	(6.69%)	(3.44%)
MBS.156	576434SF2	7/25/19	12y 3m 25d	0.00%	(12.72%)	(8.76%)	(4.53%)
MBS.166	43708DAA4	3/25/37	29y 11m 25d	0.00%	(11.08%)	(7.60%)	(3.91%)
MBS.178	05946XKZ5	10/25/19	12y 6m 25d	0.00%	(13.30%)	(9.17%)	(4.75%)
⊟ RMBS PF				0.00%	(23.28%)	(16.65%)	(8.96%)
MBS.038	57643MKG8	5/25/35	28y 1m 25d	0.00%	(15.99%)	(11.18%)	(5.87%)
MBS.044	74957XAR6	9/25/36	29y 5m 25d	0.00%	(28.70%)	(20.68%)	(11.22%)
MBS.137	74958EAB2	12/25/36	29y 8m 25d	0.00%	(14.54%)	(10.16%)	(5.33%)
MBS.142	55274QBB0	6/25/36	29y 2m 25d	0.00%	(30.10%)	(21.84%)	(11.94%)
MBS.157	52520MAQ6	11/25/35	28y 7m 25d	0.00%	(30.49%)	(22.15%)	(12.13%)
MBS.184	74957XAK1	9/25/36	29y 5m 25d	0.00%	(19.08%)	(13.30%)	(6.96%)

⊟ RMBS SA				0.00%	(16.06%)	(11.24%)	(5.91%)
MBS.001	542512AD0	12/25/36	29y 8m 25d	0.00%	(27.94%)	(20.02%)	(10.79%)
MBS.003	81377GAB5	8/25/36	29y 4m 25d	0.00%	(17.36%)	(12.03%)	(6.26%)
MBS.004	75156QAC0	11/25/36	29y 7m 25d	0.00%	(19.05%)	(13.25%)	(6.91%)
MBS.005	17307G4W5	1/25/36	28y 9m 25d	0.00%	(13.39%)	(9.24%)	(4.79%)
MBS.006	39538WGD4	4/25/36	29y 0m 25d	0.00%	(14.02%)	(9.78%)	(5.13%)
MBS.007	17311BAD5	12/25/36	29y 8m 25d	0.00%	(29.36%)	(21.17%)	(11.49%)
MBS.008	39539BAA1	3/12/37	29y 11m 12d	0.00%	(9.51%)	(6.52%)	(3.36%)
MBS.010	59020UVQ5	4/25/35	28y 0m 25d	0.00%	(11.53%)	(7.98%)	(4.15%)
MBS.011	68389FJJ4	11/25/35	28y 7m 25d	0.00%	(17.34%)	(12.11%)	(6.35%)
MBS.012	367910AG1	10/25/35	28y 6m 25d	0.00%	(16.04%)	(11.17%)	(5.84%)
MBS.013	55275BAF4	8/25/36	29y 4m 25d	0.00%	(15.22%)	(10.46%)	(5.40%)
MBS.014	933635AD6	3/25/47	39y 11m 25d	0.00%	(11.74%)	(8.12%)	(4.22%)
MBS.015	126673KG6	2/15/34	26y 10m 15d	0.00%	(6.13%)	(4.16%)	(2.12%)
MBS.016	362341QT9	9/25/35	28y 5m 25d	0.00%	(19.21%)	(13.46%)	(7.09%)
MBS.018	17309PAB2	9/25/36	29y 5m 25d	0.00%	(14.87%)	(10.30%)	(5.35%)
MBS.019	74922PAD6	2/25/37	29y 10m 25d	0.00%	(21.24%)	(15.09%)	(8.06%)
MBS.020	46626LBK5	9/25/35	28y 5m 25d	0.00%	(14.47%)	(10.04%)	(5.23%)
MBS.022	05950MAB6	7/20/36	29y 3m 20d	0.00%	(17.51%)	(12.32%)	(6.52%)
MBS.023	87222PAB9	1/25/37	29y 9m 25d	0.00%	(15.12%)	(10.40%)	(5.37%)
MBS.024	32028TAF4	1/25/38	30y 9m 25d	0.00%	(26.85%)	(19.12%)	(10.24%)
MBS.025	040104PE5	11/25/35	28y 7m 25d	0.00%	(15.29%)	(10.63%)	(5.55%)
MBS.026	23243HAF8	6/25/47	40y 2m 25d	0.00%	(28.37%)	(20.36%)	(10.99%)
MBS.027	863579KH0	2/25/35	27y 10m 25d	0.00%	(7.40%)	(5.06%)	(2.60%)
MBS.028	007036TP1	1/25/36	28y 9m 25d	0.00%	(5.70%)	(3.88%)	(1.98%)
MBS.029	92977YAZ4	10/25/35	28y 6m 25d	0.00%	(14.22%)	(9.86%)	(5.14%)
MBS.030	320276AG3	6/25/36	29y 2m 25d	0.00%	(19.43%)	(13.51%)	(7.05%)
MBS.031	40430MAG2	7/25/36	29y 3m 25d	0.00%	(18.66%)	(12.95%)	(6.74%)
MBS.032	05950PAU7	10/20/36	29y 6m 20d	0.00%	(14.32%)	(10.00%)	(5.25%)
MBS.034	126682AA1	4/15/37	30y 0m 15d	0.00%	(7.71%)	(5.27%)	(2.70%)
MBS.036	126685DJ2	5/15/36	29y 1m 15d	0.00%	(10.95%)	(7.55%)	(3.91%)
MBS.037	69337BAC8	2/25/37	29y 10m 25d	0.00%	(19.99%)	(14.16%)	(7.55%)
MBS.039	456606HV7	10/25/35	28y 6m 25d	0.00%	(17.98%)	(12.57%)	(6.60%)
MBS.040	07401TAB2	3/25/37	29y 11m 25d	0.00%	(29.08%)	(20.94%)	(11.35%)
MBS.043	318340AD8	9/25/26	19y 5m 25d	0.00%	(26.10%)	(18.53%)	(9.88%)
MBS.046	61744CVZ6	11/25/35	28y 7m 25d	0.00%	(15.85%)	(11.02%)	(5.76%)
MBS.048	45257BAC4	1/25/37	29y 9m 25d	0.00%	(18.05%)	(12.53%)	(6.53%)
MBS.049	23243JAB3	10/15/36	29y 6m 15d	0.00%	(11.97%)	(8.29%)	(4.31%)
MBS.051	46626LHC7	2/25/36	28y 10m 25d	0.00%	(13.80%)	(9.54%)	(4.95%)

MBS.052	36242DN25	3/25/35	27y 11m 25d	0.00%	(11.62%)	(7.95%)	(4.08%)
MBS.053	76113AAJ0	2/25/36	28y 10m 25d	0.00%	(19.78%)	(13.87%)	(7.31%)
MBS.054	542514KS2	4/25/35	28y 0m 25d	0.00%	(11.58%)	(7.92%)	(4.07%)
MBS.056	61744CSV9	7/25/35	28y 3m 25d	0.00%	(12.15%)	(8.37%)	(4.33%)
MBS.057	126686AB0	11/15/36	29y 7m 15d	0.00%	(12.00%)	(8.31%)	(4.32%)
MBS.058	040104SU6	4/25/36	29y 0m 25d	0.00%	(17.96%)	(12.54%)	(6.58%)
MBS.059	74922QAA0	9/25/36	29y 5m 25d	0.00%	(15.89%)	(11.14%)	(5.87%)
MBS.060	23332QAF0	11/19/37	30y 7m 19d	0.00%	(15.89%)	(11.11%)	(5.84%)
MBS.061	073871AB1	8/25/36	29y 4m 25d	0.00%	(9.80%)	(6.75%)	(3.49%)
MBS.062	61748HWP2	3/25/36	28y 11m 25d	0.00%	(13.35%)	(9.29%)	(4.86%)
MBS.063	75156TAD2	2/25/36	28y 10m 25d	0.00%	(17.68%)	(12.34%)	(6.47%)
MBS.064	65537EAB0	10/25/36	29y 6m 25d	0.00%	(14.77%)	(10.33%)	(5.43%)
MBS.066	39539KAG8	2/25/37	29y 10m 25d	0.00%	(28.59%)	(20.51%)	(11.07%)
MBS.067	57643LNG7	1/25/36	28y 9m 25d	0.00%	(16.18%)	(11.26%)	(5.88%)
MBS.068	17309YAB3	10/25/36	29y 6m 25d	0.00%	(16.68%)	(11.50%)	(5.95%)
MBS.070	17309LAF2	8/25/36	29y 4m 25d	0.00%	(16.52%)	(11.48%)	(5.99%)
MBS.072	46626LHW3	3/25/36	28y 11m 25d	0.00%	(17.85%)	(12.46%)	(6.54%)
MBS.074	45071KCN2	2/25/36	28y 10m 25d	0.00%	(14.57%)	(10.10%)	(5.26%)
MBS.075	86362HAA1	12/25/36	29y 8m 25d	0.00%	(17.01%)	(11.96%)	(6.32%)
MBS.076	55027YAB4	10/25/46	39y 6m 25d	0.00%	(13.75%)	(9.56%)	(5.00%)
MBS.078	617538AE3	12/25/36	29y 8m 25d	0.00%	(27.19%)	(19.47%)	(10.49%)
MBS.079	785814AA2	1/25/37	29y 9m 25d	0.00%	(13.63%)	(9.48%)	(4.96%)
MBS.080	03072SRX5	7/25/34	27y 3m 25d	0.00%	(11.04%)	(7.54%)	(3.86%)
MBS.082	35729QAF5	8/25/36	29y 4m 25d	0.00%	(20.24%)	(14.20%)	(7.49%)
MBS.083	07386HK34	5/25/36	29y 1m 25d	0.00%	(11.07%)	(7.66%)	(3.98%)
MBS.084	12668ASY2	8/25/35	28y 4m 25d	0.00%	(14.14%)	(9.88%)	(5.19%)
MBS.085	55028CAA3	11/25/36	29y 7m 25d	0.00%	(13.50%)	(9.40%)	(4.92%)
MBS.086	45660JAD6	3/25/37	29y 11m 25d	0.00%	(21.16%)	(14.91%)	(7.89%)
MBS.087	61749KAG8	7/25/36	29y 3m 25d	0.00%	(22.28%)	(15.72%)	(8.34%)
MBS.089	39538WGB8	4/25/36	29y 0m 25d	0.00%	(11.58%)	(8.01%)	(4.16%)
MBS.090	81879MAY5	2/25/36	28y 10m 25d	0.00%	(15.63%)	(10.85%)	(5.66%)
MBS.091	86358ESK3	5/25/35	28y 1m 25d	0.00%	(10.32%)	(7.08%)	(3.64%)
MBS.094	75406BAE7	3/25/36	28y 11m 25d	0.00%	(19.59%)	(13.73%)	(7.23%)
MBS.096	75115BAA7	7/25/36	29y 3m 25d	0.00%	(12.68%)	(8.81%)	(4.60%)
MBS.098	542514QX5	1/25/46	38y 9m 25d	0.00%	(17.11%)	(11.94%)	(6.26%)
MBS.099	05951VAW9	10/20/46	39y 6m 20d	0.00%	(8.34%)	(5.72%)	(2.94%)
MBS.101	07401MAH4	2/25/37	29y 10m 25d	0.00%	(26.65%)	(19.07%)	(10.27%)
MBS.102	007037BK9	3/25/37	29y 11m 25d	0.00%	(17.22%)	(12.12%)	(6.41%)
MBS.103	86361WAK7	10/25/37	30y 6m 25d	0.00%	(19.20%)	(13.54%)	(7.17%)

MBS.104	07386XAA4	1/25/47	39y 9m 25d	0.00%	(12.47%)	(8.66%)	(4.52%)
MBS.106	23245FAD5	11/25/36	29y 7m 25d	0.00%	(24.04%)	(17.02%)	(9.05%)
MBS.107	542514TW4	3/25/46	38y 11m 25d	0.00%	(17.31%)	(12.08%)	(6.33%)
MBS.108	17307GXU7	8/25/35	28y 4m 25d	0.00%	(13.38%)	(9.31%)	(4.87%)
MBS.109	126673WX6	7/25/35	28y 3m 25d	0.00%	(11.72%)	(8.04%)	(4.14%)
MBS.110	040104PD7	11/25/35	28y 7m 25d	0.00%	(15.31%)	(10.64%)	(5.56%)
MBS.113	46626LFQ8	5/25/35	28y 1m 25d	0.00%	(15.27%)	(10.61%)	(5.53%)
MBS.114	75115VAA3	11/25/36	29y 7m 25d	0.00%	(13.26%)	(9.23%)	(4.83%)
MBS.116	45667SAM9	1/25/37	29y 9m 25d	0.00%	(16.07%)	(11.28%)	(5.95%)
MBS.119	46602WAF1	8/25/36	29y 4m 25d	0.00%	(17.75%)	(12.38%)	(6.49%)
MBS.120	74922MAA9	7/25/36	29y 3m 25d	0.00%	(14.23%)	(9.93%)	(5.21%)
MBS.121	232422AF2	4/25/46	39y 0m 25d	0.00%	(21.11%)	(14.84%)	(7.85%)
MBS.122	026929AA7	12/25/46	39y 8m 25d	0.00%	(18.00%)	(12.66%)	(6.69%)
MBS.124	43709RAA2	2/25/37	29y 10m 25d	0.00%	(11.42%)	(7.84%)	(4.04%)
MBS.126	76110W6P6	11/25/35	28y 7m 25d	0.00%	(16.66%)	(11.61%)	(6.08%)
MBS.127	073875AB2	12/25/46	39y 8m 25d	0.00%	(13.61%)	(9.49%)	(4.97%)
MBS.128	29256PAX2	1/25/36	28y 9m 25d	0.00%	(13.44%)	(9.30%)	(4.83%)
MBS.129	126685AB2	5/15/35	28y 1m 15d	0.00%	(6.48%)	(4.40%)	(2.25%)
MBS.133	456606MZ2	4/25/36	29y 0m 25d	0.00%	(10.90%)	(7.51%)	(3.89%)
MBS.134	05530MAB5	1/25/37	29y 9m 25d	0.00%	(15.46%)	(10.83%)	(5.70%)
MBS.135	64352VNL1	10/25/35	28y 6m 25d	0.00%	(17.91%)	(12.52%)	(6.58%)
MBS.136	75405WAG7	11/25/35	28y 7m 25d	0.00%	(17.11%)	(11.93%)	(6.25%)
MBS.140	70069FHU4	5/25/35	28y 1m 25d	0.00%	(10.71%)	(7.36%)	(3.80%)
MBS.141	76112BYV6	8/25/35	28y 4m 25d	0.00%	(18.74%)	(13.13%)	(6.91%)
MBS.143	02150TAB6	4/25/47	40y 0m 25d	0.00%	(23.72%)	(16.89%)	(9.05%)
MBS.144	46602WAE4	8/25/36	29y 4m 25d	0.00%	(17.77%)	(12.40%)	(6.50%)
MBS.146	61748HKW0	9/25/35	28y 5m 25d	0.00%	(11.17%)	(7.72%)	(4.01%)
MBS.147	754058AE5	10/25/35	28y 6m 25d	0.00%	(17.53%)	(12.24%)	(6.42%)
MBS.149	23242QAE2	7/15/36	29y 3m 15d	0.00%	(10.85%)	(7.49%)	(3.88%)
MBS.150	54251MAF1	5/25/36	29y 1m 25d	0.00%	(20.67%)	(14.53%)	(7.68%)
MBS.151	83612CAF6	7/25/36	29y 3m 25d	0.00%	(12.00%)	(8.19%)	(4.19%)
MBS.152	61745M4E0	4/25/35	28y 0m 25d	0.00%	(12.11%)	(8.40%)	(4.38%)
MBS.153	39539BAB9	3/12/37	29y 11m 12d	0.00%	(9.51%)	(6.52%)	(3.36%)
MBS.154	43709KAA7	10/25/36	29y 6m 25d	0.00%	(11.13%)	(7.63%)	(3.93%)
MBS.155	57645MAG7	10/25/36	29y 6m 25d	0.00%	(23.23%)	(16.33%)	(8.62%)
MBS.158	76110W4H6	9/25/35	28y 5m 25d	0.00%	(13.98%)	(9.69%)	(5.04%)
MBS.159	46629EAE3	9/25/36	29y 5m 25d	0.00%	(16.04%)	(11.16%)	(5.84%)
MBS.161	86358ERV0	4/25/35	28y 0m 25d	0.00%	(9.17%)	(6.26%)	(3.21%)
MBS.162	75115GAC2	12/25/36	29y 8m 25d	0.00%	(24.67%)	(17.58%)	(9.42%)

MBS.163	126685AF3	11/15/35	28y 7m 15d	0.00%	(8.01%)	(5.47%)	(2.81%)
MBS.164	04013BAE2	9/25/36	29y 5m 25d	0.00%	(23.53%)	(16.66%)	(8.86%)
MBS.167	52523YAD6	12/25/36	29y 8m 25d	0.00%	(14.84%)	(10.38%)	(5.45%)
MBS.168	61748HQW4	12/25/35	28y 8m 25d	0.00%	(13.30%)	(9.26%)	(4.84%)
MBS.169	61746RFV8	5/25/34	27y 1m 25d	0.00%	(14.29%)	(9.83%)	(5.08%)
MBS.170	073879KR8	9/25/34	27y 5m 25d	0.00%	(11.10%)	(7.57%)	(3.87%)
MBS.171	54251MAG9	5/25/36	29y 1m 25d	0.00%	(20.66%)	(14.52%)	(7.67%)
MBS.173	07401NAQ2	1/25/37	29y 9m 25d	0.00%	(27.69%)	(19.86%)	(10.72%)
MBS.174	74922NAB5	12/25/36	29y 8m 25d	0.00%	(17.71%)	(12.48%)	(6.61%)
MBS.176	61744CYD2	12/25/35	28y 8m 25d	0.00%	(30.07%)	(21.76%)	(11.85%)
MBS.177	41162CAE1	12/19/37	30y 8m 19d	0.00%	(20.48%)	(14.49%)	(7.72%)
MBS.179	81378AAC5	12/25/36	29y 8m 25d	0.00%	(22.52%)	(15.87%)	(8.41%)
MBS.180	07401PAA2	3/25/37	29y 11m 25d	0.00%	(13.19%)	(9.18%)	(4.80%)
MBS.181	126685BW5	2/15/36	28y 10m 15d	0.00%	(15.77%)	(10.87%)	(5.63%)
MBS.182	32027AAA7	1/25/28	20y 9m 25d	0.00%	(16.63%)	(11.60%)	(6.08%)
MBS.183	17307GZ84	12/25/35	28y 8m 25d	0.00%	(16.57%)	(11.54%)	(6.04%)
MBS.186	46626LAU4	7/25/35	28y 3m 25d	0.00%	(14.36%)	(9.97%)	(5.20%)
MBS.187	43709YAB5	3/25/37	29y 11m 25d	0.00%	(8.16%)	(5.57%)	(2.85%)
MBS.188	32028KAG1	12/25/36	29y 8m 25d	0.00%	(22.62%)	(15.87%)	(8.36%)
MBS.189	86362XAR9	1/25/37	29y 9m 25d	0.00%	(25.18%)	(17.95%)	(9.63%)
MBS.192	04012MAB5	7/25/36	29y 3m 25d	0.00%	(19.18%)	(13.42%)	(7.06%)
MBS.193	03072SS89	12/25/35	28y 8m 25d	0.00%	(14.88%)	(10.33%)	(5.38%)
MBS.194	872224AC4	9/25/36	29y 5m 25d	0.00%	(9.05%)	(6.13%)	(3.12%)
MBS.195	00764MFR3	8/25/35	28y 4m 25d	0.00%	(13.23%)	(9.16%)	(4.76%)
MBS.196	320277AG1	5/25/36	29y 1m 25d	0.00%	(16.17%)	(11.15%)	(5.77%)
MBS.199	07401GAA2	11/25/36	29y 7m 25d	0.00%	(11.80%)	(8.19%)	(4.27%)
MBS.200	02660TFV0	9/25/35	28y 5m 25d	0.00%	(6.50%)	(4.41%)	(2.25%)

⊟ RMBS SF				0.00%	(20.36%)	(14.46%)	(7.73%)
MBS.017	46627MEL7	3/25/36	28y 11m 25d	0.00%	(25.78%)	(18.39%)	(9.87%)
MBS.033	761118DX3	8/25/35	28y 4m 25d	0.00%	(27.38%)	(19.61%)	(10.57%)
MBS.045	93934FBR2	8/25/35	28y 4m 25d	0.00%	(28.49%)	(20.51%)	(11.11%)
MBS.047	32052GAF1	12/25/36	29y 8m 25d	0.00%	(12.23%)	(8.54%)	(4.48%)
MBS.050	45660L6R5	4/25/36	29y 0m 25d	0.00%	(20.46%)	(14.51%)	(7.73%)
MBS.073	073856AA4	12/25/36	29y 8m 25d	0.00%	(12.89%)	(8.93%)	(4.65%)
MBS.105	74922GAU8	11/25/36	29y 7m 25d	0.00%	(15.72%)	(11.28%)	(6.09%)
MBS.117	12668AUV5	12/25/35	28y 8m 25d	0.00%	(22.00%)	(15.58%)	(8.29%)
MBS.145	12668BGD9	2/25/36	28y 10m 25d	0.00%	(17.88%)	(12.60%)	(6.68%)
MBS.172	12667FW84	3/25/35	27y 11m 25d	0.00%	(13.38%)	(9.27%)	(4.82%)
MBS.198	251510HY2	11/25/35	28y 7m 25d	0.00%	(27.19%)	(19.46%)	(10.48%)

MBS Agency

⊟ MBS Agency				0.00%	(12.20%)	(8.45%)	(4.40%)
MBS.201	31393ART6	3/25/17	9y 11m 25d	0.00%	(7.14%)	(4.85%)	(2.47%)
MBS.202	31395RAN8	4/15/15	8y 0m 15d	0.00%	(9.13%)	(6.23%)	(3.19%)
MBS.203	31394K4X9	10/15/33	26y 6m 15d	0.00%	(15.01%)	(10.46%)	(5.48%)
MBS.204	31393GDF8	12/15/17	10y 8m 15d	0.00%	(9.62%)	(6.59%)	(3.38%)
MBS.205	31393DDG3	7/25/33	26y 3m 25d	0.00%	(11.54%)	(7.98%)	(4.15%)
MBS.206	3136FASC5	9/1/32	25y 5m 1d	0.00%	(10.35%)	(7.13%)	(3.69%)
MBS.207	31395CQJ3	8/15/30	23y 4m 15d	0.00%	(9.91%)	(6.78%)	(3.48%)
MBS.208	3128HWJJ7	12/15/36	29y 8m 15d	0.00%	(22.04%)	(15.68%)	(8.40%)
MBS.209	3136FCBM7	12/1/33	26y 8m 1d	0.00%	(14.74%)	(10.29%)	(5.40%)
MBS.210	31393RSY7	10/15/26	19y 6m 15d	0.00%	(6.44%)	(4.36%)	(2.22%)
MBS.211	31396C3Q1	10/15/15	8y 6m 15d	0.00%	(11.73%)	(8.05%)	(4.15%)
MBS.212	31394TAA3	3/15/34	26y 11m 15d	0.00%	(12.02%)	(8.29%)	(4.29%)
MBS.213	31393BWD3	12/25/17	10y 8m 25d	0.00%	(9.24%)	(6.31%)	(3.23%)
MBS.214	3128HWCS4	11/15/36	29y 7m 15d	0.00%	(16.50%)	(11.59%)	(6.12%)
MBS.215	31395VCE7	6/15/35	28y 2m 15d	0.00%	(13.44%)	(9.30%)	(4.84%)
MBS.216	31393TSX5	10/25/33	26y 6m 25d	0.00%	(11.61%)	(8.03%)	(4.17%)
MBS.217	31394HAE1	8/15/33	26y 4m 15d	0.00%	(13.95%)	(9.72%)	(5.09%)
MBS.218	3136FCKK1	8/1/34	27y 4m 1d	0.00%	(15.86%)	(11.11%)	(5.85%)
MBS.219	31393KK95	12/15/21	14y 8m 15d	0.00%	(9.47%)	(6.47%)	(3.32%)
MBS.220	3136FAWR7	1/1/33	25y 9m 1d	0.00%	(13.63%)	(9.48%)	(4.96%)
MBS.221	31395LC41	1/15/35	27y 9m 15d	0.00%	(13.89%)	(9.64%)	(5.02%)
MBS.222	31394D2P4	10/25/29	22y 6m 25d	0.00%	(11.02%)	(7.50%)	(3.83%)
MBS.223	31394UAC6	10/25/35	28y 6m 25d	0.00%	(14.25%)	(9.93%)	(5.20%)
MBS.224	31393J5G9	12/15/28	21y 8m 15d	0.00%	(9.85%)	(6.74%)	(3.46%)
MBS.225	31393QST0	5/15/33	26y 1m 15d	0.00%	(15.16%)	(10.57%)	(5.54%)
MBS.226	31393HRJ3	6/15/22	15y 2m 15d	0.00%	(10.30%)	(7.06%)	(3.63%)
MBS.227	31393RYN4	10/15/26	19y 6m 15d	0.00%	(6.49%)	(4.39%)	(2.23%)
MBS.228	31393XB22	4/25/34	27y 0m 25d	0.00%	(14.23%)	(9.92%)	(5.20%)
MBS.229	31393DT50	8/25/18	11y 4m 25d	0.00%	(10.54%)	(7.22%)	(3.71%)
MBS.230	31393VDF5	6/15/18	11y 2m 15d	0.00%	(11.37%)	(7.83%)	(4.05%)
MBS.231	31393NYY9	3/15/17	9y 11m 15d	0.00%	(7.29%)	(4.95%)	(2.52%)
MBS.232	31395VTS8	7/15/15	8y 3m 15d	0.00%	(10.24%)	(7.01%)	(3.60%)
MBS.233	31393EVW6	9/25/33	26y 5m 25d	0.00%	(14.41%)	(10.05%)	(5.27%)
MBS.234	31396C3S7	3/15/31	23y 11m 15d	0.00%	(12.30%)	(8.47%)	(4.38%)
MBS.235	31394FNC5	9/25/35	28y 5m 25d	0.00%	(11.96%)	(8.26%)	(4.28%)
MBS.236	3136FCW93	7/1/36	29y 3m 1d	0.00%	(18.21%)	(12.83%)	(6.80%)
MBS.237	31392GPK5	4/25/16	9y 0m 25d	0.00%	(5.21%)	(3.52%)	(1.78%)
MBS.238	31396UAM2	7/15/36	29y 3m 15d	0.00%	(14.47%)	(10.05%)	(5.24%)
MBS.239	3136FC5W2	10/1/36	29y 6m 1d	0.00%	(21.02%)	(14.93%)	(7.97%)
MBS.240	31392WFM7	10/15/17	10y 6m 15d	0.00%	(8.04%)	(5.48%)	(2.80%)
MBS.241	31395VUK3	5/15/31	24y 1m 15d	0.00%	(10.39%)	(7.12%)	(3.66%)
MBS.242	31397AGJ6	5/15/29	22y 1m 15d	0.00%	(13.47%)	(9.31%)	(4.83%)
MBS.243	31395RBA5	4/15/20	13y 0m 15d	0.00%	(20.44%)	(14.24%)	(7.45%)
MBS.244	31392JTS8	10/25/16	9y 6m 25d	0.00%	(6.67%)	(4.52%)	(2.30%)
MBS.245	31396AP73	9/15/35	28y 5m 15d	0.00%	(12.18%)	(8.41%)	(4.36%)
MBS.246	31393GJQ8	5/15/22	15y 1m 15d	0.00%	(9.59%)	(6.56%)	(3.37%)
MBS.247	3136FCHB5	3/1/34	26y 11m 1d	0.00%	(14.43%)	(10.07%)	(5.28%)
MBS.248	31393YDE2	5/25/34	27y 1m 25d	0.00%	(13.96%)	(9.73%)	(5.09%)
MBS.249	31396NCJ3	9/15/33	26y 5m 15d	0.00%	(17.21%)	(12.05%)	(6.34%)
MBS.250	31396C2Y5	10/15/15	8y 6m 15d	0.00%	(11.66%)	(8.01%)	(4.13%)

Student Loan

⊟ Student Loan FFELP				0.00%	(13.23%)	(9.09%)	(4.69%)
Select to collapse	64031QCP4	2/23/16	8y 10m 23d	0.00%	(10.26%)	(6.98%)	(3.57%)
ABS.042	784420AF8	3/15/18	10y 11m 15d	0.00%	(9.22%)	(6.28%)	(3.21%)
ABS.044	784427AB2	6/15/15	8y 2m 15d	0.00%	(9.06%)	(6.15%)	(3.14%)
ABS.048	00432CCM1	11/22/24	17y 7m 22d	0.00%	(16.29%)	(11.22%)	(5.80%)
ABS.050	78442GPN0	10/25/21	14y 6m 25d	0.00%	(18.59%)	(12.89%)	(6.70%)
ABS.053	194268AA6	1/25/23	15y 9m 25d	0.00%	(8.68%)	(5.89%)	(3.00%)
ABS.054	00432CDB4	8/25/23	16y 4m 25d	0.00%	(16.04%)	(11.06%)	(5.72%)
ABS.057	784420AL5	6/15/20	13y 2m 15d	0.00%	(11.78%)	(8.08%)	(4.16%)
ABS.058	78442GQN9	7/25/22	15y 3m 25d	0.00%	(18.09%)	(12.52%)	(6.51%)
⊟ Student Loan Private				0.00%	(16.28%)	(11.38%)	(5.97%)
ABS.043	78443CAY0	9/15/16	9y 5m 15d	0.00%	(8.89%)	(6.04%)	(3.08%)
ABS.045	78443CAL8	9/15/17	10y 5m 15d	0.00%	(8.10%)	(5.50%)	(2.80%)
ABS.046	00432CCJ8	4/25/35	28y 0m 25d	0.00%	(27.80%)	(19.87%)	(10.68%)
ABS.047	00432CBG5	4/25/29	22y 0m 25d	0.00%	(22.34%)	(15.71%)	(8.29%)
ABS.051	78443CBL7	6/15/18	11y 2m 15d	0.00%	(8.37%)	(5.69%)	(2.90%)
ABS.052	78443CBY9	12/16/19	12y 8m 16d	0.00%	(10.70%)	(7.28%)	(3.72%)
ABS.055	66704JBP2	11/28/23	16y 7m 28d	0.00%	(19.32%)	(13.41%)	(6.99%)
ABS.056	00432CCT6	4/25/18	11y 0m 25d	0.00%	(15.97%)	(11.07%)	(5.76%)
ABS.059	28140XAB5	10/25/29	22y 6m 25d	0.00%	(26.92%)	(19.15%)	(10.24%)
ABS.060	63543WAE1	2/27/12	4y 10m 27d	0.00%	(6.66%)	(4.51%)	(2.29%)

Treasury Securities

⊟ Treasury Security				0.00%	(7.15%)	(4.88%)	(2.50%)
TR.001	912795ZN	6/28/07	0y 2m 28d	0.00%	(0.73%)	(0.49%)	(0.24%)
TR.002	912795ZK	6/7/07	0y 2m 7d	0.00%	(0.56%)	(0.37%)	(0.19%)
TR.003	912795ZG	5/17/07	0y 1m 17d	0.00%	(0.38%)	(0.26%)	(0.13%)
TR.004	912795ZD	4/26/07	0y 0m 26d	0.00%	(0.21%)	(0.14%)	(0.07%)
TR.005	912795ZB	4/12/07	0y 0m 12d	0.00%	(0.10%)	(0.07%)	(0.03%)
TR.006	912795ZM	6/21/07	0y 2m 21d	0.00%	(0.67%)	(0.45%)	(0.22%)
TR.007	912795ZP	7/5/07	0y 3m 5d	0.00%	(0.78%)	(0.52%)	(0.26%)
TR.008	912795A2	9/20/07	0y 5m 20d	0.00%	(1.41%)	(0.94%)	(0.47%)
TR.009	912795ZE	5/3/07	0y 1m 3d	0.00%	(0.27%)	(0.18%)	(0.09%)
TR.010	912795ZV	8/16/07	0y 4m 16d	0.00%	(1.12%)	(0.75%)	(0.38%)
TR.011	912795ZU	8/9/07	0y 4m 9d	0.00%	(1.07%)	(0.71%)	(0.36%)
TR.012	912795ZA	4/5/07	0y 0m 5d	0.00%	(0.04%)	(0.03%)	(0.01%)
TR.013	912795ZJ	5/31/07	0y 2m 0d	0.00%	(0.50%)	(0.33%)	(0.17%)
TR.014	912795ZQ	7/12/07	0y 3m 12d	0.00%	(0.84%)	(0.56%)	(0.28%)
TR.015	912795ZX	8/30/07	0y 4m 30d	0.00%	(1.24%)	(0.83%)	(0.41%)
TR.016	912795ZR	7/19/07	0y 3m 19d	0.00%	(0.90%)	(0.60%)	(0.30%)
TR.017	912795ZF	5/10/07	0y 1m 10d	0.00%	(0.33%)	(0.22%)	(0.11%)
TR.018	912795ZY	9/6/07	0y 5m 6d	0.00%	(1.29%)	(0.87%)	(0.43%)
TR.019	912795ZC	4/19/07	0y 0m 19d	0.00%	(0.16%)	(0.10%)	(0.05%)
TR.020	912795ZL	6/14/07	0y 2m 14d	0.00%	(0.61%)	(0.41%)	(0.20%)
TR.021	912828CE	4/15/09	2y 0m 15d	0.00%	(5.72%)	(3.85%)	(1.94%)
TR.022	912828BG	8/15/08	1y 4m 15d	0.00%	(3.97%)	(2.67%)	(1.34%)
TR.023	912828DG	1/15/10	2y 9m 15d	0.00%	(7.67%)	(5.18%)	(2.63%)
TR.024	912828DM	2/15/15	7y 10m 15d	0.00%	(18.22%)	(12.59%)	(6.53%)
TR.025	912828FP	8/15/09	2y 4m 15d	0.00%	(6.55%)	(4.42%)	(2.23%)
TR.026	912828EE	8/15/15	8y 4m 15d	0.00%	(18.91%)	(13.10%)	(6.80%)
TR.027	912828EZ	3/31/08	1y 0m 0d	0.00%	(2.92%)	(1.96%)	(0.98%)
TR.028	912828DU	5/15/10	3y 1m 15d	0.00%	(8.39%)	(5.68%)	(2.88%)
TR.029	9128273X	2/15/08	0y 10m 15d	0.00%	(2.56%)	(1.71%)	(0.86%)
TR.030	912828FK	6/30/11	4y 3m 0d	0.00%	(10.82%)	(7.36%)	(3.75%)
TR.031	9128272U	5/15/07	0y 1m 15d	0.00%	(0.37%)	(0.25%)	(0.12%)
TR.032	912828GA	11/30/11	4y 8m 0d	0.00%	(11.79%)	(8.03%)	(4.11%)
TR.033	9128276J	8/15/10	3y 4m 15d	0.00%	(8.87%)	(6.01%)	(3.05%)

TR.034	912828DW	5/31/07	0y 2m 0d	0.00%	(0.50%)	(0.33%)	(0.17%)
TR.035	912828FR	8/31/08	1y 5m 0d	0.00%	(4.06%)	(2.73%)	(1.37%)
TR.036	912828DE	12/15/09	2y 8m 15d	0.00%	(7.44%)	(5.03%)	(2.55%)
TR.037	912828DX	6/15/10	3y 2m 15d	0.00%	(8.66%)	(5.86%)	(2.98%)
TR.038	9128275G	5/15/09	2y 1m 15d	0.00%	(5.80%)	(3.91%)	(1.97%)
TR.039	912828BQ	11/15/08	1y 7m 15d	0.00%	(4.62%)	(3.10%)	(1.56%)
TR.040	912828CJ	5/15/14	7y 1m 15d	0.00%	(16.38%)	(11.28%)	(5.83%)
TR.041	912828AU	2/15/13	5y 10m 15d	0.00%	(14.56%)	(9.98%)	(5.13%)
TR.042	912828GF	1/31/12	4y 10m 0d	0.00%	(12.18%)	(8.31%)	(4.25%)
TR.043	912828CS	8/15/09	2y 4m 15d	0.00%	(6.63%)	(4.47%)	(2.26%)
TR.044	912828CT	8/15/14	7y 4m 15d	0.00%	(17.22%)	(11.88%)	(6.15%)
TR.045	912828GJ	2/28/09	1y 11m 0d	0.00%	(5.39%)	(3.62%)	(1.83%)
TR.046	912828DY	6/30/07	0y 3m 0d	0.00%	(0.74%)	(0.50%)	(0.25%)
TR.047	912828EM	11/15/10	3y 7m 15d	0.00%	(9.49%)	(6.44%)	(3.27%)
TR.048	912828EQ	12/15/10	3y 8m 15d	0.00%	(9.73%)	(6.60%)	(3.36%)
TR.049	912828CL	6/15/09	2y 2m 15d	0.00%	(6.13%)	(4.13%)	(2.09%)
TR.050	912828EY	2/29/08	0y 11m 0d	0.00%	(2.68%)	(1.79%)	(0.90%)
TR.051	912828EK	10/31/07	0y 7m 0d	0.00%	(1.71%)	(1.14%)	(0.57%)
TR.052	912828FM	7/31/08	1y 4m 0d	0.00%	(3.82%)	(2.56%)	(1.29%)
TR.053	912828FV	10/31/08	1y 7m 0d	0.00%	(4.44%)	(2.99%)	(1.50%)
TR.054	912828ES	1/15/11	3y 9m 15d	0.00%	(9.98%)	(6.77%)	(3.45%)
TR.055	912828AP	11/15/12	5y 7m 15d	0.00%	(13.88%)	(9.50%)	(4.88%)
TR.056	912828FQ	8/15/16	9y 4m 15d	0.00%	(20.10%)	(13.97%)	(7.29%)
TR.057	912828DV	5/15/15	8y 1m 15d	0.00%	(18.37%)	(12.71%)	(6.60%)
TR.058	9128274V	11/15/08	1y 7m 15d	0.00%	(4.57%)	(3.07%)	(1.55%)
TR.059	912828FZ	11/30/08	1y 8m 0d	0.00%	(4.69%)	(3.15%)	(1.59%)
TR.060	912828FY	11/15/16	9y 7m 15d	0.00%	(20.38%)	(14.18%)	(7.41%)
TR.061	912828AC	5/15/07	0y 1m 15d	0.00%	(0.37%)	(0.25%)	(0.12%)
TR.062	912828FD	4/30/11	4y 1m 0d	0.00%	(10.41%)	(7.08%)	(3.61%)
TR.063	912828FC	4/30/08	1y 1m 0d	0.00%	(3.09%)	(2.07%)	(1.04%)
TR.064	912828DR	4/15/10	3y 0m 15d	0.00%	(8.15%)	(5.51%)	(2.80%)
TR.065	912828DL	2/15/10	2y 10m 15d	0.00%	(7.91%)	(5.35%)	(2.71%)
TR.066	912828BA	5/15/13	6y 1m 15d	0.00%	(14.99%)	(10.29%)	(5.29%)
TR.067	912828EH	9/30/07	0y 6m 0d	0.00%	(1.49%)	(1.00%)	(0.50%)
TR.068	912828BH	8/15/13	6y 4m 15d	0.00%	(15.40%)	(10.58%)	(5.45%)
TR.069	912828EN	11/15/15	8y 7m 15d	0.00%	(18.96%)	(13.14%)	(6.84%)
TR.070	912828EJ	10/15/10	3y 6m 15d	0.00%	(9.30%)	(6.30%)	(3.21%)
TR.071	912828GH	2/15/17	9y 10m 15d	0.00%	(20.98%)	(14.61%)	(7.64%)
TR.072	912828FF	5/15/16	9y 1m 15d	0.00%	(19.35%)	(13.44%)	(7.00%)

TR.073	912828BK	9/15/08	1y 5m 15d	0.00%	(4.22%)	(2.83%)	(1.43%)
TR.074	9128277B	8/15/11	4y 4m 15d	0.00%	(11.18%)	(7.61%)	(3.88%)
TR.075	9128275Z	2/15/10	2y 10m 15d	0.00%	(7.66%)	(5.17%)	(2.62%)
TR.076	912828FN	7/31/11	4y 4m 0d	0.00%	(11.09%)	(7.55%)	(3.85%)
TR.077	912828EX	2/28/11	3y 11m 0d	0.00%	(10.27%)	(6.97%)	(3.55%)
TR.078	912828BT	12/15/08	1y 8m 15d	0.00%	(4.85%)	(3.26%)	(1.65%)
TR.079	912828AN	11/15/07	0y 7m 15d	0.00%	(1.84%)	(1.23%)	(0.62%)
TR.080	912828DB	11/15/09	2y 7m 15d	0.00%	(7.21%)	(4.87%)	(2.47%)
TR.081	9128276T	2/15/11	3y 10m 15d	0.00%	(10.10%)	(6.86%)	(3.49%)
TR.082	912828DC	11/15/14	7y 7m 15d	0.00%	(17.47%)	(12.06%)	(6.25%)
TR.083	912828EU	1/31/08	0y 10m 0d	0.00%	(2.45%)	(1.64%)	(0.82%)
TR.084	912828CV	9/15/09	2y 5m 15d	0.00%	(6.88%)	(4.64%)	(2.35%)
TR.085	912828GK	2/29/12	4y 11m 0d	0.00%	(12.41%)	(8.47%)	(4.33%)
TR.086	912828EW	2/15/16	8y 10m 15d	0.00%	(19.57%)	(13.58%)	(7.07%)
TR.087	912828EG	9/15/10	3y 5m 15d	0.00%	(9.31%)	(6.31%)	(3.21%)
TR.088	912828EV	2/15/09	1y 10m 15d	0.00%	(5.29%)	(3.56%)	(1.80%)
TR.089	912828BZ	2/15/09	1y 10m 15d	0.00%	(5.35%)	(3.60%)	(1.82%)
TR.090	912828FW	10/31/11	4y 7m 0d	0.00%	(11.54%)	(7.86%)	(4.02%)
TR.091	912828ED	8/15/10	3y 4m 15d	0.00%	(9.05%)	(6.13%)	(3.12%)
TR.092	912828FG	5/31/08	1y 2m 0d	0.00%	(3.34%)	(2.24%)	(1.13%)
TR.093	912828GB	12/31/08	1y 9m 0d	0.00%	(4.93%)	(3.31%)	(1.67%)
TR.094	912828FE	5/15/09	2y 1m 15d	0.00%	(5.84%)	(3.93%)	(1.99%)
TR.095	912828FU	9/30/11	4y 6m 0d	0.00%	(11.60%)	(7.90%)	(4.04%)
TR.096	912828FA	3/31/11	4y 0m 0d	0.00%	(10.46%)	(7.10%)	(3.62%)
TR.097	912828AJ	8/15/12	5y 4m 15d	0.00%	(13.40%)	(9.16%)	(4.70%)
TR.098	912828DS	4/30/07	0y 1m 0d	0.00%	(0.25%)	(0.16%)	(0.08%)
TR.099	912828CH	5/15/09	2y 1m 15d	0.00%	(5.90%)	(3.98%)	(2.01%)
TR.100	912828CN	7/15/09	2y 3m 15d	0.00%	(6.39%)	(4.31%)	(2.18%)

Corporates

⊟ BAC2				0.00%	(10.93%)	(7.51%)	(3.87%)
BAC2.01	BAC2.01	3/1/08	0y 11m 1d	0.00%	(2.68%)	(1.80%)	(0.90%)
BAC2.03	BAC2.03	3/2/10	2y 11m 2d	0.00%	(7.92%)	(5.35%)	(2.71%)
BAC2.05	BAC2.05	3/5/12	4y 11m 5d	0.00%	(12.40%)	(8.46%)	(4.33%)
BAC2.10	BAC2.10	3/6/17	9y 11m 6d	0.00%	(20.75%)	(14.45%)	(7.55%)
⊟ C				0.00%	(11.03%)	(7.58%)	(3.91%)
C.01	C.01	3/7/08	0y 11m 7d	0.00%	(2.73%)	(1.83%)	(0.92%)
C.03	C.03	3/8/10	2y 11m 8d	0.00%	(7.97%)	(5.39%)	(2.73%)
C.05	C.05	3/9/12	4y 11m 9d	0.00%	(12.47%)	(8.51%)	(4.36%)
C.10	C.10	3/12/17	9y 11m 12d	0.00%	(20.98%)	(14.61%)	(7.64%)
⊟ CVX				0.00%	(13.87%)	(9.55%)	(4.93%)
CVX.03	CVX.03	3/14/10	2y 11m 14d	0.00%	(8.02%)	(5.42%)	(2.75%)
CVX.05	CVX.05	3/15/12	4y 11m 15d	0.00%	(12.52%)	(8.55%)	(4.38%)
CVX.10	CVX.10	3/16/17	9y 11m 16d	0.00%	(21.07%)	(14.68%)	(7.67%)
⊟ DNA				0.00%	(13.88%)	(9.56%)	(4.94%)
DNA.03	DNA.03	3/19/10	2y 11m 19d	0.00%	(8.06%)	(5.45%)	(2.76%)
DNA.05	DNA.05	3/20/12	4y 11m 20d	0.00%	(12.55%)	(8.57%)	(4.39%)
DNA.10	DNA.10	3/21/17	9y 11m 21d	0.00%	(21.05%)	(14.66%)	(7.67%)
⊟ JNJ				0.00%	(13.82%)	(9.51%)	(4.91%)
JNJ.03	JNJ.03	3/5/10	2y 11m 5d	0.00%	(7.95%)	(5.38%)	(2.73%)
JNJ.05	JNJ.05	3/6/12	4y 11m 6d	0.00%	(12.47%)	(8.51%)	(4.35%)
JNJ.10	JNJ.10	3/7/17	9y 11m 7d	0.00%	(21.04%)	(14.66%)	(7.66%)
⊟ JPM				0.00%	(10.99%)	(7.55%)	(3.89%)
JPM.01	JPM.01	3/8/08	0y 11m 8d	0.00%	(2.74%)	(1.83%)	(0.92%)
JPM.03	JPM.03	3/9/10	2y 11m 9d	0.00%	(7.98%)	(5.39%)	(2.74%)
JPM.05	JPM.05	3/1/12	4y 11m 1d	0.00%	(12.40%)	(8.46%)	(4.33%)

⊟ MDT				0.00%	(11.03%)	(7.58%)	(3.91%)
MDT.01	MDT.01	3/5/08	0y 11m 5d	0.00%	(2.71%)	(1.82%)	(0.91%)
MDT.03	MDT.03	3/6/10	2y 11m 6d	0.00%	(7.96%)	(5.38%)	(2.73%)
MDT.05	MDT.05	3/7/12	4y 11m 7d	0.00%	(12.46%)	(8.50%)	(4.35%)
MDT.10	MDT.10	3/16/17	9y 11m 16d	0.00%	(21.02%)	(14.64%)	(7.66%)
⊟ MMM				0.00%	(11.11%)	(7.63%)	(3.94%)
MMM.01	MMM.01	3/19/08	0y 11m 19d	0.00%	(2.82%)	(1.89%)	(0.95%)
MMM.03	MMM.03	3/20/10	2y 11m 20d	0.00%	(8.07%)	(5.45%)	(2.77%)
MMM.05	MMM.05	3/21/12	4y 11m 21d	0.00%	(12.57%)	(8.58%)	(4.39%)
MMM.10	MMM.10	3/5/17	9y 11m 5d	0.00%	(20.98%)	(14.61%)	(7.64%)
⊟ PFE				0.00%	(11.04%)	(7.58%)	(3.91%)
PFE.01	PFE.01	3/5/08	0y 11m 5d	0.00%	(2.71%)	(1.82%)	(0.91%)
PFE.03	PFE.03	3/6/10	2y 11m 6d	0.00%	(7.96%)	(5.38%)	(2.73%)
PFE.05	PFE.05	3/7/12	4y 11m 7d	0.00%	(12.47%)	(8.51%)	(4.36%)
PFE.10	PFE.10	3/8/17	9y 11m 8d	0.00%	(21.03%)	(14.65%)	(7.66%)
⊟ PG				0.00%	(11.02%)	(7.57%)	(3.91%)
PG.01	PG.01	3/9/08	0y 11m 9d	0.00%	(2.75%)	(1.84%)	(0.92%)
PG.03	PG.03	3/12/10	2y 11m 12d	0.00%	(8.01%)	(5.41%)	(2.75%)
PG.05	PG.05	3/1/12	4y 11m 1d	0.00%	(12.42%)	(8.47%)	(4.34%)
PG.10	PG.10	3/2/17	9y 11m 2d	0.00%	(20.94%)	(14.59%)	(7.62%)

⊟ SYY				0.00%	(13.79%)	(9.49%)	(4.90%)
SYY.03	SYY.03	3/6/10	2y 11m 6d	0.00%	(7.96%)	(5.38%)	(2.73%)
SYY.05	SYY.05	3/7/12	4y 11m 7d	0.00%	(12.45%)	(8.49%)	(4.35%)
SYY.10	SYY.10	3/19/17	9y 11m 19d	0.00%	(20.98%)	(14.62%)	(7.64%)
⊟ USB				0.00%	(11.02%)	(7.57%)	(3.91%)
Select to collapse	USB.01	3/6/08	0y 11m 6d	0.00%	(2.72%)	(1.82%)	(0.92%)
USB.03	USB.03	3/7/10	2y 11m 7d	0.00%	(7.97%)	(5.39%)	(2.73%)
USB.05	USB.05	3/8/12	4y 11m 8d	0.00%	(12.46%)	(8.50%)	(4.35%)
USB.10	USB.10	3/9/17	9y 11m 9d	0.00%	(20.96%)	(14.60%)	(7.63%)
⊟ WB				0.00%	(11.06%)	(7.60%)	(3.92%)
WB.01	WB.01	3/12/08	0y 11m 12d	0.00%	(2.77%)	(1.85%)	(0.93%)
WB.03	WB.03	3/12/10	2y 11m 12d	0.00%	(8.00%)	(5.41%)	(2.74%)
WB.05	WB.05	3/14/12	4y 11m 14d	0.00%	(12.50%)	(8.53%)	(4.37%)
WB.10	WB.10	3/15/17	9y 11m 15d	0.00%	(20.99%)	(14.62%)	(7.64%)
⊟ WFC				0.00%	(11.09%)	(7.62%)	(3.93%)
WFC.01	WFC.01	3/16/08	0y 11m 16d	0.00%	(2.80%)	(1.88%)	(0.94%)
WFC.03	WFC.03	3/16/10	2y 11m 16d	0.00%	(8.03%)	(5.43%)	(2.76%)
WFC.05	WFC.05	3/19/12	4y 11m 19d	0.00%	(12.54%)	(8.56%)	(4.38%)
WFC.10	WFC.10	3/20/17	9y 11m 20d	0.00%	(21.03%)	(14.65%)	(7.66%)
⊟ XOM				0.00%	(13.79%)	(9.49%)	(4.90%)
XOM.03	XOM.03	3/1/10	2y 11m 1d	0.00%	(7.92%)	(5.36%)	(2.72%)
XOM.05	XOM.05	3/2/12	4y 11m 2d	0.00%	(12.44%)	(8.49%)	(4.34%)
XOM.10	XOM.10	3/5/17	9y 11m 5d	0.00%	(21.03%)	(14.65%)	(7.66%)

2007 Illustrative Home Price Stress Tests on RMBS Securities

Kamakura strongly believes that inspection of many macro-economic factor based stress tests is key to accurately assessing the risk of the portfolio, particularly given the recent experiences in the financial markets. To this end, Kamakura suggests that several other stress tests be considered, either in addition to, or in lieu of the yield and spread stress tests detailed in the previous sections. As macro factor based tests depend on models for rates, spreads, default rates, prepayment rates, and recovery rates (among others), they are not as replicable as tests that depend solely on modified duration calculations of the underlying securities. However, Kamakura believes that these tests more accurately identified risky securities when compared to yield and spread tests. For reference purposes, and to make this recommendation explicit, Kamakura has calculated the effect of a 25% and a 50% decline in residential real estate prices on the value of the mortgage backed securities in the portfolio. We will reference these stress tests later in this document. At a minimum, Kamakura would recommend additional (alternative) stress tests based on home prices, commercial real estate prices, domestic equity prices, commodity prices (such as oil), unemployment rates, gross domestic prices, and interest rates.

Overall

Sensitivity - by Attribute

KRM Run: 2007 Home Price Stress Test (values in USD)

View By (Edit) Currently Selected: [Asset Type, Transaction]

Market Value | Change in MV | % Change in MV | by Shift

Expand All | Collapse All

				% Change in MV				
	CUSIP	Maturity Date	Remaining Maturity	Home Price Down 50%	Home Price Down 25%	Home Price Up 50%	Home Price Up 25%	Base Case
⊞ RMBS PA				(2.21%)	(0.69%)	0.44%	0.30%	0.00%
⊞ RMBS PF				(0.03%)	(0.02%)	0.02%	0.01%	0.00%
⊞ RMBS SA				(15.49%)	(9.35%)	23.58%	12.98%	0.00%
⊞ RMBS SF				(0.01%)	(0.00%)	0.00%	0.00%	0.00%

RMBS Prime Adjustable

⊟ RMBS PA				(2.21%)	(0.69%)	0.44%	0.30%	0.00%
MBS.021	36228FUT1	7/25/18	11y 3m 25d	(0.00%)	(0.00%)	0.00%	0.00%	0.00%
MBS.041	9292276V3	7/25/18	11y 3m 25d	(3.49%)	(1.17%)	0.83%	0.55%	0.00%
MBS.042	949762AA6	9/25/18	11y 5m 25d	(3.21%)	(1.08%)	0.77%	0.52%	0.00%
MBS.055	81744FFY8	1/20/35	27y 9m 20d	(0.14%)	(0.01%)	0.01%	0.01%	0.00%
MBS.065	07387AEA9	8/25/35	28y 4m 25d	(3.46%)	(0.87%)	0.11%	0.11%	0.00%
MBS.069	05948X7A3	6/25/19	12y 2m 25d	(3.12%)	(1.06%)	0.74%	0.50%	0.00%
MBS.071	92922FGY8	11/25/33	26y 7m 25d	(4.23%)	(1.43%)	1.13%	0.74%	0.00%
MBS.077	000759BW9	3/15/32	24y 11m 15d	(0.18%)	(0.06%)	0.05%	0.03%	0.00%
MBS.081	949788AE3	7/25/19	12y 3m 25d	(3.32%)	(1.13%)	0.83%	0.56%	0.00%
MBS.100	22541SX29	12/25/19	12y 8m 25d	(3.20%)	(1.05%)	0.75%	0.50%	0.00%
MBS.111	86359LGE3	5/19/35	28y 1m 19d	(0.01%)	0.01%	0.00%	0.00%	0.00%
MBS.118	12669FA86	7/25/34	27y 3m 25d	(7.19%)	(2.52%)	1.98%	1.31%	0.00%
MBS.131	16162WAM1	11/25/18	11y 7m 25d	(3.45%)	(1.17%)	0.85%	0.57%	0.00%
MBS.132	59020UL45	11/25/35	28y 7m 25d	(2.46%)	(0.60%)	(0.10%)	(0.07%)	0.00%
MBS.138	55265KU31	11/25/18	11y 7m 25d	(3.27%)	(1.06%)	0.74%	0.50%	0.00%
MBS.148	81744FAZ0	5/20/34	27y 1m 20d	(0.05%)	(0.02%)	0.01%	(0.00%)	0.00%
MBS.156	576434SF2	7/25/19	12y 3m 25d	(1.36%)	(0.05%)	0.00%	0.00%	0.00%
MBS.166	43708DAA4	3/25/37	29y 11m 25d	0.09%	0.03%	(0.02%)	(0.01%)	0.00%
MBS.178	05946XKZ5	10/25/19	12y 6m 25d	(3.28%)	(1.11%)	0.81%	0.54%	0.00%

Sensitivity - by Attribute

KRM Run: 2007 Home Price Stress Test (values in USD)

View By (Edit) Currently Selected: [Asset Type, Transaction]

Market Value | Change in MV | % Change in MV | by Shift

Expand All | Collapse All

				% Change in MV				
	CUSIP	Maturity Date	Remaining Maturity	Home Price Down 50%	Home Price Down 25%	Home Price Up 50%	Home Price Up 25%	Base Case

RMBS Prime Fixed

RMBS PF				(0.03%)	(0.02%)	0.02%	0.01%	0.00%
MBS.038	57643MKG8	5/25/35	28y 1m 25d	(0.00%)	(0.00%)	0.00%	0.00%	0.00%
MBS.044	74957XAR6	9/25/36	29y 5m 25d	0.00%	0.00%	(0.00%)	(0.00%)	0.00%
MBS.137	74958EAB2	12/25/36	29y 8m 25d	0.00%	0.00%	(0.00%)	(0.00%)	0.00%
MBS.142	55274QBB0	6/25/36	29y 2m 25d	(0.20%)	(0.09%)	0.14%	0.07%	0.00%
MBS.157	52520MAQ6	11/25/35	28y 7m 25d	0.00%	0.00%	(0.00%)	(0.00%)	0.00%
MBS.184	74957XAK1	9/25/36	29y 5m 25d	0.00%	0.00%	(0.00%)	(0.00%)	0.00%

RMBS Subprime Adjustable

RMBS SA				(15.49%)	(9.35%)	23.58%	12.98%	0.00%
MBS.001	542512AD0	12/25/36	29y 8m 25d	(13.84%)	(4.76%)	4.67%	3.30%	0.00%
MBS.003	81377GAB5	8/25/36	29y 4m 25d	(12.85%)	(5.40%)	30.63%	14.06%	0.00%
MBS.004	75156QAC0	11/25/36	29y 7m 25d	(13.81%)	(7.20%)	12.64%	7.22%	0.00%
MBS.005	17307G4W5	1/25/36	28y 9m 25d	(40.21%)	0.42%	(0.19%)	(0.13%)	0.00%
MBS.006	39538WGD4	4/25/36	29y 0m 25d	(0.40%)	(0.19%)	0.25%	0.15%	0.00%
MBS.007	17311BAD5	12/25/36	29y 8m 25d	(52.60%)	(35.46%)	86.10%	56.31%	0.00%
MBS.008	39539BAA1	3/12/37	29y 11m 12d	(0.08%)	(0.04%)	0.05%	0.03%	0.00%
MBS.010	59020UVQ5	4/25/35	28y 0m 25d	(6.06%)	(2.68%)	1.55%	1.65%	0.00%
MBS.011	68389FJJ4	11/25/35	28y 7m 25d	(57.93%)	(39.24%)	93.26%	46.16%	0.00%
MBS.012	367910AG1	10/25/35	28y 6m 25d	(70.59%)	(49.91%)	819.83%	329.97%	0.00%
MBS.013	55275BAF4	8/25/36	29y 4m 25d	(59.49%)	(38.93%)	78.59%	39.34%	0.00%
MBS.014	933635AD6	3/25/47	39y 11m 25d	(39.82%)	(22.76%)	29.96%	17.91%	0.00%
MBS.015	126673KG6	2/15/34	26y 10m 15d	(0.02%)	(0.01%)	0.01%	0.01%	0.00%
MBS.016	362341QT9	9/25/35	28y 5m 25d	(62.73%)	(42.90%)	87.88%	48.82%	0.00%
MBS.018	17309PAB2	9/25/36	29y 5m 25d	(26.72%)	(13.98%)	19.78%	11.61%	0.00%
MBS.019	74922PAD6	2/25/37	29y 10m 25d	(36.11%)	(23.09%)	33.95%	20.57%	0.00%
MBS.020	46626LBK5	9/25/35	28y 5m 25d	(64.81%)	(44.52%)	888.60%	81.56%	0.00%
MBS.022	05950MAB6	7/20/36	29y 3m 20d	(7.91%)	(3.60%)	4.14%	2.51%	0.00%
MBS.023	87222PAB9	1/25/37	29y 9m 25d	(15.83%)	(7.49%)	9.08%	5.54%	0.00%
MBS.024	32028TAF4	1/25/38	30y 9m 25d	(62.02%)	(41.15%)	55.61%	32.08%	0.00%
MBS.025	040104PE5	11/25/35	28y 7m 25d	(68.88%)	(47.57%)	787.53%	133.85%	0.00%
MBS.026	23243HAF8	6/25/47	40y 2m 25d	(53.38%)	(35.02%)	98.75%	62.74%	0.00%
MBS.027	863579KH0	2/25/35	27y 10m 25d	(1.48%)	(0.03%)	0.03%	0.02%	0.00%
MBS.028	007036TP1	1/25/36	28y 9m 25d	(0.05%)	(0.05%)	0.02%	0.02%	0.00%
MBS.029	92977YAZ4	10/25/35	28y 6m 25d	(75.50%)	(55.94%)	614.48%	591.81%	0.00%
MBS.030	320276AG3	6/25/36	29y 2m 25d	(55.26%)	(36.98%)	87.35%	55.63%	0.00%
MBS.031	40430MAG2	7/25/36	29y 3m 25d	(58.71%)	(39.17%)	75.88%	44.87%	0.00%
MBS.032	05950PAU7	10/20/36	29y 6m 20d	(8.53%)	(3.75%)	4.38%	2.67%	0.00%
MBS.034	126682AA1	4/15/37	30y 0m 15d	(0.03%)	(0.01%)	0.02%	0.01%	0.00%
MBS.036	126685DJ2	5/15/36	29y 1m 15d	0.28%	0.13%	(0.17%)	(0.10%)	0.00%
MBS.037	69337BAC8	2/25/37	29y 10m 25d	(21.63%)	(11.57%)	17.56%	10.74%	0.00%
MBS.039	456606HV7	10/25/35	28y 6m 25d	(60.21%)	(40.92%)	85.16%	44.43%	0.00%
MBS.040	07401TAB2	3/25/37	29y 11m 25d	(17.28%)	(7.87%)	9.29%	5.68%	0.00%
MBS.043	318340AD8	9/25/26	19y 5m 25d	0.32%	0.11%	0.04%	(0.02%)	0.00%
MBS.046	61744CVZ6	11/25/35	28y 7m 25d	(59.47%)	(39.49%)	97.43%	53.53%	0.00%
MBS.048	45257BAC4	1/25/37	29y 9m 25d	(10.69%)	(4.66%)	4.60%	2.93%	0.00%
MBS.049	23243JAB3	10/15/36	29y 6m 15d	(0.02%)	(0.01%)	0.01%	0.01%	0.00%
MBS.051	46626LHC7	2/25/36	28y 10m 25d	(66.12%)	(46.91%)	1,000.26%	509.65%	0.00%

Sensitivity - by Attribute

KRM Run: 2007 Home Price Stress Test (values in USD)

View By (Edit) Currently Selected: [Asset Type, Transaction]

Market Value | Change in MV | % Change in MV | by Shift

Expand All | Collapse All

				% Change in MV				
	CUSIP	Maturity Date	Remaining Maturity	Home Price Down 50%	Home Price Down 25%	Home Price Up 50%	Home Price Up 25%	Base Case
MBS.052	36242DN25	3/25/35	27y 11m 25d	(0.01%)	(0.02%)	0.12%	0.02%	0.00%
MBS.053	76113AAJ0	2/25/36	28y 10m 25d	(57.58%)	(36.11%)	120.33%	73.52%	0.00%
MBS.054	542514KS2	4/25/35	28y 0m 25d	0.10%	0.02%	0.10%	0.01%	0.00%
MBS.056	61744CSV9	7/25/35	28y 3m 25d	(93.47%)	(43.94%)	(0.71%)	(0.52%)	0.00%
MBS.057	126686AB0	11/15/36	29y 7m 15d	0.27%	0.13%	(0.16%)	(0.10%)	0.00%
MBS.058	040104SU6	4/25/36	29y 0m 25d	(56.19%)	(36.94%)	92.20%	53.46%	0.00%
MBS.059	74922QAA0	9/25/36	29y 5m 25d	(9.04%)	(4.30%)	5.30%	3.22%	0.00%
MBS.060	23332QAF0	11/19/37	30y 7m 19d	(0.37%)	(0.23%)	0.30%	0.18%	0.00%
MBS.061	073871AB1	8/25/36	29y 4m 25d	(43.33%)	(23.59%)	24.15%	17.79%	0.00%
MBS.062	61748HWP2	3/25/36	28y 11m 25d	(8.57%)	(4.02%)	4.80%	2.93%	0.00%
MBS.063	75156TAD2	2/25/36	28y 10m 25d	(58.74%)	(39.86%)	90.86%	44.02%	0.00%
MBS.064	65537EAB0	10/25/36	29y 6m 25d	(41.16%)	(26.21%)	39.43%	23.40%	0.00%
MBS.066	39539KAG8	2/25/37	29y 10m 25d	(10.75%)	(4.83%)	5.64%	3.48%	0.00%
MBS.067	57643LNG7	1/25/36	28y 9m 25d	(61.34%)	(40.93%)	485.41%	59.68%	0.00%
MBS.068	17309YAB3	10/25/36	29y 6m 25d	(7.56%)	(2.53%)	3.75%	1.97%	0.00%
MBS.070	17309LAF2	8/25/36	29y 4m 25d	(93.17%)	(85.92%)	72.32%	73.28%	0.00%
MBS.072	46626LHW3	3/25/36	28y 11m 25d	(61.54%)	(42.42%)	101.41%	47.91%	0.00%
MBS.074	45071KCN2	2/25/36	28y 10m 25d	(79.85%)	(65.86%)	433.35%	354.37%	0.00%
MBS.075	86362HAA1	12/25/36	29y 8m 25d	(7.45%)	(3.16%)	3.36%	2.07%	0.00%
MBS.076	55027YAB4	10/25/46	39y 6m 25d	(20.57%)	(8.73%)	9.72%	5.99%	0.00%
MBS.078	617538AE3	12/25/36	29y 8m 25d	(64.06%)	(39.44%)	68.14%	37.83%	0.00%
MBS.079	785814AA2	1/25/37	29y 9m 25d	(13.06%)	(5.52%)	(0.19%)	(0.15%)	0.00%
MBS.080	03072SRX5	7/25/34	27y 3m 25d	(0.07%)	(0.03%)	1.82%	0.39%	0.00%
MBS.082	35729QAF5	8/25/36	29y 4m 25d	(68.51%)	(46.16%)	470.60%	74.79%	0.00%
MBS.083	07386HK34	5/25/36	29y 1m 25d	(41.49%)	(21.71%)	23.09%	16.41%	0.00%
MBS.084	12668ASY2	8/25/35	28y 4m 25d	(9.28%)	(4.60%)	6.18%	3.69%	0.00%
MBS.085	55028CAA3	11/25/36	29y 7m 25d	(6.80%)	(2.73%)	2.71%	1.69%	0.00%
MBS.086	45660JAD6	3/25/37	29y 11m 25d	0.47%	0.22%	(0.28%)	(0.17%)	0.00%
MBS.087	61749KAG8	7/25/36	29y 3m 25d	(59.45%)	(39.37%)	79.08%	43.74%	0.00%
MBS.089	39538WGB8	4/25/36	29y 0m 25d	(0.32%)	(0.15%)	0.16%	0.10%	0.00%
MBS.090	81879MAY5	2/25/36	28y 10m 25d	(60.93%)	(42.15%)	131.38%	52.54%	0.00%
MBS.091	86358ESK3	5/25/35	28y 1m 25d	(90.92%)	(84.84%)	143.73%	137.98%	0.00%
MBS.094	75406BAE7	3/25/36	28y 11m 25d	(58.37%)	(39.38%)	85.27%	42.33%	0.00%
MBS.096	75115BAA7	7/25/36	29y 3m 25d	(9.01%)	(4.32%)	5.39%	3.25%	0.00%
MBS.098	542514QX5	1/25/46	38y 9m 25d	(68.02%)	(46.30%)	696.66%	212.96%	0.00%
MBS.099	05951VAW9	10/20/46	39y 6m 20d	(43.57%)	(26.39%)	35.68%	21.54%	0.00%
MBS.101	07401MAH4	2/25/37	29y 10m 25d	(29.53%)	(15.39%)	18.84%	11.41%	0.00%
MBS.102	007037BK9	3/25/37	29y 11m 25d	(29.35%)	(13.25%)	15.24%	9.31%	0.00%
MBS.103	86361WAK7	10/25/37	30y 6m 25d	(0.45%)	(0.28%)	0.34%	0.21%	0.00%

Sensitivity - by Attribute

KRM Run: 2007 Home Price Stress Test (values in USD)

View By (Edit) Currently Selected: [Asset Type, Transaction]

Market Value | Change in MV | % Change in MV | by Shift

Expand All | Collapse All

				% Change in MV				
	CUSIP	Maturity Date	Remaining Maturity	Home Price Down 50%	Home Price Down 25%	Home Price Up 50%	Home Price Up 25%	Base Case
MBS.104	07386XAA4	1/25/47	39y 9m 25d	(6.38%)	(2.71%)	3.08%	1.88%	0.00%
MBS.106	23245FAD5	11/25/36	29y 7m 25d	(53.89%)	(34.85%)	94.96%	36.56%	0.00%
MBS.107	542514TW4	3/25/46	38y 11m 25d	(65.06%)	(44.06%)	120.68%	53.14%	0.00%
MBS.108	17307GXU7	8/25/35	28y 4m 25d	(8.84%)	(4.48%)	6.38%	3.74%	0.00%
MBS.109	126673WX6	7/25/35	28y 3m 25d	0.05%	0.00%	0.03%	0.02%	0.00%
MBS.110	040104PD7	11/25/35	28y 7m 25d	(89.99%)	(80.28%)	143.19%	146.48%	0.00%
MBS.113	46626LFQ8	5/25/35	28y 1m 25d	(61.31%)	(41.88%)	129.04%	51.79%	0.00%
MBS.114	75115VAA3	11/25/36	29y 7m 25d	(7.22%)	(3.07%)	3.40%	2.09%	0.00%
MBS.116	45667SAM9	1/25/37	29y 9m 25d	(40.87%)	(25.02%)	34.37%	20.57%	0.00%
MBS.119	46602WAF1	8/25/36	29y 4m 25d	(58.49%)	(38.71%)	97.52%	55.11%	0.00%
MBS.120	74922MAA9	7/25/36	29y 3m 25d	(9.06%)	(4.34%)	5.40%	3.27%	0.00%
MBS.121	232422AF2	4/25/46	39y 0m 25d	(56.73%)	(37.48%)	81.45%	48.26%	0.00%
MBS.122	026929AA7	12/25/46	39y 8m 25d	(2.61%)	(1.10%)	1.19%	0.74%	0.00%
MBS.124	43709RAA2	2/25/37	29y 10m 25d	(0.27%)	(0.13%)	0.16%	0.10%	0.00%
MBS.126	76110W6P6	11/25/35	28y 7m 25d	(68.88%)	(48.51%)	667.78%	101.10%	0.00%
MBS.127	073875AB2	12/25/46	39y 8m 25d	(43.41%)	(26.01%)	35.94%	21.41%	0.00%
MBS.128	29256PAX2	1/25/36	28y 9m 25d	(89.29%)	(80.68%)	188.12%	183.39%	0.00%
MBS.129	126685AB2	5/15/35	28y 1m 15d	0.09%	0.04%	(0.03%)	(0.02%)	0.00%
MBS.133	456606MZ2	4/25/36	29y 0m 25d	0.12%	0.06%	(0.06%)	(0.04%)	0.00%
MBS.134	05530MAB5	1/25/37	29y 9m 25d	(39.36%)	(24.82%)	35.70%	21.40%	0.00%
MBS.135	64352VNL1	10/25/35	28y 6m 25d	(57.44%)	(38.30%)	82.68%	41.58%	0.00%
MBS.136	75405WAG7	11/25/35	28y 7m 25d	(54.08%)	(37.54%)	107.30%	65.00%	0.00%
MBS.140	70069FHU4	5/25/35	28y 1m 25d	(59.56%)	(40.77%)	1,022.77%	237.46%	0.00%
MBS.141	76112BYV6	8/25/35	28y 4m 25d	(56.47%)	(36.55%)	91.51%	54.11%	0.00%
MBS.143	02150TAB6	4/25/47	40y 0m 25d	(21.03%)	(9.41%)	11.05%	6.76%	0.00%
MBS.144	46602WAE4	8/25/36	29y 4m 25d	(60.00%)	(40.92%)	101.97%	47.39%	0.00%
MBS.146	61748HKW0	9/25/35	28y 5m 25d	(8.82%)	(4.26%)	5.32%	3.25%	0.00%
MBS.147	754058AE5	10/25/35	28y 6m 25d	(54.60%)	(36.03%)	91.13%	51.70%	0.00%
MBS.149	23242QAE2	7/15/36	29y 3m 15d	0.22%	0.11%	(0.13%)	(0.08%)	0.00%
MBS.150	54251MAF1	5/25/36	29y 1m 25d	(64.76%)	(43.03%)	115.83%	51.90%	0.00%
MBS.151	83612CAF6	7/25/36	29y 3m 25d	(66.85%)	(45.12%)	686.13%	182.62%	0.00%
MBS.152	61745M4E0	4/25/35	28y 0m 25d	(8.53%)	(4.07%)	4.65%	3.05%	0.00%
MBS.153	39539BAB9	3/12/37	29y 11m 12d	(0.08%)	(0.04%)	0.05%	0.03%	0.00%
MBS.154	43709KAA7	10/25/36	29y 6m 25d	(0.28%)	(0.14%)	0.17%	0.11%	0.00%
MBS.155	57645MAG7	10/25/36	29y 6m 25d	(58.87%)	(38.61%)	66.48%	39.97%	0.00%
MBS.158	76110W4H6	9/25/35	28y 5m 25d	(58.81%)	(40.31%)	110.39%	55.25%	0.00%
MBS.159	46629EAE3	9/25/36	29y 5m 25d	(9.56%)	(4.24%)	3.61%	2.54%	0.00%
MBS.161	86358ERV0	4/25/35	28y 0m 25d	(92.56%)	(87.65%)	111.50%	112.25%	0.00%
MBS.162	75115GAC2	12/25/36	29y 8m 25d	(0.38%)	(0.24%)	0.35%	0.21%	0.00%
MBS.163	126685AF3	11/15/35	28y 7m 15d	0.09%	0.04%	(0.04%)	(0.03%)	0.00%
MBS.164	04013BAE2	9/25/36	29y 5m 25d	(64.26%)	(41.19%)	81.92%	43.30%	0.00%
MBS.167	52523YAD6	12/25/36	29y 8m 25d	(7.55%)	(3.36%)	4.00%	2.43%	0.00%
MBS.168	61748HQW4	12/25/35	28y 8m 25d	(8.61%)	(4.01%)	4.74%	2.90%	0.00%
MBS.169	61746RFV8	5/25/34	27y 1m 25d	(1.01%)	(0.71%)	0.26%	0.16%	0.00%
MBS.170	073879KR8	9/25/34	27y 5m 25d	(0.45%)	(0.42%)	1.69%	1.52%	0.00%
MBS.171	54251MAG9	5/25/36	29y 1m 25d	(63.42%)	(42.27%)	83.95%	43.72%	0.00%
MBS.173	07401NAQ2	1/25/37	29y 9m 25d	(18.63%)	(8.52%)	10.19%	6.21%	0.00%
MBS.174	74922NAB5	12/25/36	29y 8m 25d	(7.83%)	(3.47%)	3.97%	2.42%	0.00%
MBS.176	61744CYD2	12/25/35	28y 8m 25d	(53.36%)	(33.84%)	84.21%	54.62%	0.00%
MBS.177	41162CAE1	12/19/37	30y 8m 19d	(0.45%)	(0.27%)	0.33%	0.20%	0.00%
MBS.179	81378AAC5	12/25/36	29y 8m 25d	(21.21%)	(12.74%)	16.23%	10.63%	0.00%
MBS.180	07401PAA2	3/25/37	29y 11m 25d	(10.93%)	(2.90%)	(0.07%)	(0.06%)	0.00%
MBS.181	126685BW5	2/15/36	28y 10m 15d	0.13%	0.06%	(0.07%)	(0.04%)	0.00%
MBS.182	32027AAA7	1/25/28	20y 9m 25d	(12.32%)	(5.33%)	2.89%	3.02%	0.00%
MBS.183	17307GZ84	12/25/35	28y 8m 25d	(61.79%)	(42.47%)	99.94%	50.19%	0.00%
MBS.186	46626LAU4	7/25/35	28y 3m 25d	(65.74%)	(45.41%)	849.92%	383.16%	0.00%
MBS.187	43709YAB5	3/25/37	29y 11m 25d	(11.84%)	(3.57%)	0.02%	0.01%	0.00%
MBS.188	32028KAG1	12/25/36	29y 8m 25d	(55.39%)	(36.20%)	101.38%	65.23%	0.00%
MBS.189	86362XAR9	1/25/37	29y 9m 25d	(31.89%)	(16.25%)	19.41%	11.90%	0.00%
MBS.192	04012MAB5	7/25/36	29y 3m 25d	(56.53%)	(37.64%)	85.51%	48.95%	0.00%
MBS.193	03072SS89	12/25/35	28y 8m 25d	(65.50%)	(44.96%)	126.62%	54.67%	0.00%
MBS.194	872224AC4	9/25/36	29y 5m 25d	(0.12%)	(0.03%)	0.04%	0.02%	0.00%
MBS.195	00764MFR3	8/25/35	28y 4m 25d	(93.04%)	(86.31%)	55.28%	55.76%	0.00%
MBS.196	320277AG1	5/25/36	29y 1m 25d	(56.79%)	(37.04%)	85.52%	52.29%	0.00%
MBS.199	07401GAA2	11/25/36	29y 7m 25d	(8.75%)	(0.46%)	(0.03%)	(0.03%)	0.00%
MBS.200	02660TFV0	9/25/35	28y 5m 25d	(0.18%)	(0.03%)	(0.02%)	(0.01%)	0.00%

Sensitivity - by Attribute

KRM Run: 2007 Home Price Stress Test (values in USD)

View By (Edit) Currently Selected: [Asset Type, Transaction]

Market Value | Change in MV | % Change in MV | by Shift

Expand All | Collapse All

				% Change in MV				
	CUSIP	Maturity Date	Remaining Maturity	Home Price Down 50%	Home Price Down 25%	Home Price Up 50%	Home Price Up 25%	Base Case

RMBS Subprime Fixed

RMBS SF				(0.01%)	(0.00%)	0.00%	0.00%	0.00%
MBS.017	46627MEL7	3/25/36	28y 11m 25d	(0.01%)	(0.01%)	0.01%	0.00%	0.00%
Select to collapse	761118DX3	8/25/35	28y 4m 25d	0.01%	0.00%	(0.00%)	(0.00%)	0.00%
MBS.045	93934FBR2	8/25/35	28y 4m 25d	(0.09%)	(0.02%)	0.02%	0.01%	0.00%
MBS.047	32052GAF1	12/25/36	29y 8m 25d	(0.00%)	(0.00%)	0.00%	0.00%	0.00%
MBS.050	45660L6R5	4/25/36	29y 0m 25d	(0.00%)	(0.00%)	0.00%	0.00%	0.00%
MBS.073	073856AA4	12/25/36	29y 8m 25d	(0.03%)	(0.01%)	0.02%	0.01%	0.00%
MBS.105	74922GAU8	11/25/36	29y 7m 25d	(0.00%)	(0.00%)	0.00%	0.00%	0.00%
MBS.117	12668AUV5	12/25/35	28y 8m 25d	(0.01%)	(0.01%)	0.00%	0.00%	0.00%
MBS.145	12668BGD9	2/25/36	28y 10m 25d	0.00%	0.00%	(0.00%)	(0.00%)	0.00%
MBS.172	12667FW84	3/25/35	27y 11m 25d	0.00%	0.00%	(0.00%)	(0.00%)	0.00%
MBS.198	251510HY2	11/25/35	28y 7m 25d	0.01%	0.00%	(0.00%)	(0.00%)	0.00%

2009 Stress Test Results

Note: approximately twenty structured products were removed from the portfolio due to ratings conflicts between the proposed regulations and the Kamakura database discovered in early May, 2010. These CUSIPs are listed in the comprehensive stress tests below, but are *not* included in the final universe used for portfolio construction:

81744FAZ0	32027NLA7	14056GAB4
61748HGR6	525221HQ3	140553CS5
144531CZ1	03072SM28	14042DAE2
03072SS89	57643LJX5	63543XAE9
03072SRX5	57643LJY3	BDX CORPORATE
59020UVQ5	12667FW84	MDT CORPORATE
36242DN58	12667FX26	PFE CORPORATE
02660TFV0	12667FX91	SYY CORPORATE
66987WBX4	140554AA4	WFC CORPORATE

2009 Yield Curve Stress Tests

NCUA

REPORTS | ADMINISTRATION

Portfolio | Interest Rate Risk | Liquidity Risk | Market Risk | Credit Risk | Economic Capital | Basel Capital | Financial Ratio Analysis | Other Reports | Report Finder | Help

Sensitivity - by Attribute

KRM Run: Assets 2009 Stress Test YC Shifts (values in USD)

View By (Edit) Currently Selected: [Asset Type, Transaction]

Market Value | Change in MV | % Change in MV | by Shift

Expand All | Collapse All

				% Change in MV			
	CUSIP	Maturity Date	Remaining Maturity	Base Case	Upward 300bp	Upward 200bp	Upward 100bp
⊞ ABS Other				0.00%	(3.12%)	(2.19%)	(1.14%)
⊞ Auto Loan				0.00%	(0.96%)	(0.64%)	(0.32%)
⊞ BDX				0.00%	(11.19%)	(7.69%)	(3.96%)
⊞ CMBS				0.00%	(4.86%)	(3.31%)	(1.69%)
⊞ CVX				0.00%	(11.34%)	(7.80%)	(4.02%)
⊞ Credit Card				0.00%	(1.23%)	(0.73%)	(0.38%)
⊞ DNA				0.00%	(11.33%)	(7.79%)	(4.02%)
⊞ JNJ				0.00%	(11.40%)	(7.84%)	(4.04%)
⊞ MBS Agency				0.00%	(8.12%)	(5.58%)	(2.88%)
⊞ MDT				0.00%	(11.26%)	(7.74%)	(3.99%)
⊞ MMM				0.00%	(11.30%)	(7.77%)	(4.01%)
⊞ MSFT				0.00%	(11.33%)	(7.79%)	(4.02%)
⊞ PCAR				0.00%	(14.20%)	(9.78%)	(5.05%)
⊞ PFE				0.00%	(11.37%)	(7.81%)	(4.03%)
⊞ PG				0.00%	(11.30%)	(7.77%)	(4.01%)
⊞ RMBS PA				0.00%	(5.39%)	(3.25%)	(1.61%)
⊞ RMBS PF				0.00%	(8.16%)	(5.57%)	(2.86%)
⊞ RMBS SA				0.00%	0.96%	0.78%	0.42%
⊞ RMBS SF				0.00%	(5.55%)	(3.63%)	(1.74%)
⊞ SYY				0.00%	(11.32%)	(7.78%)	(4.01%)
⊞ Student Loan FFELP				0.00%	(0.23%)	(0.15%)	(0.08%)
⊞ Student Loan Private				0.00%	(0.52%)	(0.53%)	(0.28%)
⊞ Treasury Security				0.00%	(7.29%)	(4.98%)	(2.55%)
⊞ WFC				0.00%	(11.23%)	(7.72%)	(3.98%)
⊞ XOM				0.00%	(11.36%)	(7.81%)	(4.03%)

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ABS Other

⊟ ABS Other				0.00%	(3.12%)	(2.19%)	(1.14%)
ABS.061	140554AA4	3/20/17	7y 2m 20d	0.00%	0.07%	0.05%	0.02%
ABS.062	00083EAA7	11/27/19	9y 10m 27d	0.00%	0.09%	0.06%	0.03%
ABS.064	64908QAA9	1/15/21	11y 0m 15d	0.00%	(16.15%)	(11.19%)	(5.82%)
ABS.065	140553CS5	8/22/16	6y 7m 22d	0.00%	(0.16%)	(0.11%)	(0.05%)
ABS.066	15132CAE2	5/20/13	3y 4m 20d	0.00%	0.19%	0.13%	0.07%
ABS.067	897790AC5	12/15/16	6y 11m 15d	0.00%	0.14%	0.09%	0.05%
ABS.068	36159LAR7	4/20/13	3y 3m 20d	0.00%	(0.15%)	(0.11%)	(0.06%)
ABS.069	12619DAD1	9/17/12	2y 8m 17d	0.00%	(0.12%)	(0.08%)	(0.04%)
ABS.070	36159WAD4	10/15/12	2y 9m 15d	0.00%	(0.12%)	(0.08%)	(0.04%)
ABS.071	649083AA0	3/15/19	9y 2m 15d	0.00%	(12.22%)	(8.39%)	(4.32%)
ABS.072	36828WAC7	8/26/19	9y 7m 26d	0.00%	(0.23%)	(0.15%)	(0.08%)
ABS.073	36159FAH2	1/25/18	8y 0m 25d	0.00%	(0.22%)	(0.15%)	(0.07%)
ABS.074	00080ABQ2	7/25/19	9y 6m 25d	0.00%	0.49%	0.33%	0.16%
ABS.075	64908PAA1	1/15/21	11y 0m 15d	0.00%	(14.69%)	(10.15%)	(5.26%)
ABS.076	12618PAD5	3/15/12	2y 2m 15d	0.00%	(0.12%)	(0.08%)	(0.04%)
ABS.077	125565AD3	4/20/14	4y 3m 20d	0.00%	(1.74%)	(1.17%)	(0.59%)
ABS.078	14056GAB4	9/20/22	12y 8m 20d	0.00%	(0.17%)	(0.11%)	(0.06%)
ABS.079	19716QAA5	3/20/21	11y 2m 20d	0.00%	0.80%	(0.27%)	(0.14%)
ABS.080	649085AA5	5/1/20	10y 4m 1d	0.00%	(14.28%)	(9.85%)	(5.09%)

Auto Loan

⊟ Auto Loan				0.00%	(0.96%)	(0.64%)	(0.32%)
ABS.001	233875AC7	11/8/11	1y 10m 8d	0.00%	(1.31%)	(0.87%)	(0.44%)
ABS.002	13973AAD5	5/15/11	1y 4m 15d	0.00%	(0.73%)	(0.49%)	(0.24%)
ABS.003	92977AAN3	4/20/12	2y 3m 20d	0.00%	(1.11%)	(0.74%)	(0.37%)
ABS.004	92977UAG4	3/20/12	2y 2m 20d	0.00%	(0.89%)	(0.60%)	(0.30%)
ABS.005	34528CAF2	2/15/12	2y 1m 15d	0.00%	(0.12%)	(0.08%)	(0.04%)
ABS.006	43812RAD0	4/15/12	2y 3m 15d	0.00%	(2.07%)	(1.39%)	(0.70%)
ABS.007	14042DAE2	11/15/13	3y 10m 15d	0.00%	(0.07%)	(0.05%)	(0.02%)
ABS.008	23383VDK3	1/8/11	1y 0m 8d	0.00%	(0.46%)	(0.30%)	(0.15%)
ABS.009	404285AC2	6/17/11	1y 5m 17d	0.00%	(0.42%)	(0.28%)	(0.14%)
ABS.010	92977FAD4	3/20/13	3y 2m 20d	0.00%	(1.81%)	(1.21%)	(0.61%)
ABS.011	14041GCR5	10/15/12	2y 9m 15d	0.00%	(0.11%)	(0.07%)	(0.04%)
ABS.012	14041GCV6	12/15/12	2y 11m 15d	0.00%	(0.10%)	(0.07%)	(0.03%)
ABS.013	981526AD8	11/15/12	2y 10m 15d	0.00%	(0.11%)	(0.07%)	(0.04%)
ABS.014	44920DAC0	4/15/11	1y 3m 15d	0.00%	(0.34%)	(0.22%)	(0.11%)
ABS.015	92867AAD8	7/22/13	3y 6m 22d	0.00%	(0.16%)	(0.11%)	(0.05%)
ABS.016	14042CAD6	7/15/12	2y 6m 15d	0.00%	(2.01%)	(1.35%)	(0.68%)
ABS.017	542391BW6	7/15/11	1y 6m 15d	0.00%	(1.19%)	(0.79%)	(0.40%)
ABS.018	98152DBZ3	10/17/11	1y 9m 17d	0.00%	(1.22%)	(0.82%)	(0.41%)
ABS.019	030610AD1	9/6/13	3y 8m 6d	0.00%	(2.92%)	(1.96%)	(0.99%)
ABS.020	055670AD5	8/25/11	1y 7m 25d	0.00%	(1.84%)	(1.23%)	(0.62%)

Credit Cards

⊟ Credit Card				0.00%	(1.23%)	(0.73%)	(0.38%)
ABS.021	161571AW4	12/17/12	2y 11m 17d	0.00%	(2.30%)	(1.54%)	(0.77%)
Select to collapse	14041NBW0	8/15/14	4y 7m 15d	0.00%	(3.73%)	(2.76%)	(1.52%)
ABS.023	25466KFJ3	6/18/13	3y 5m 18d	0.00%	(0.12%)	(0.08%)	(0.04%)
ABS.024	254684AE3	1/19/16	6y 0m 19d	0.00%	0.05%	0.03%	0.02%
ABS.025	36159JAN1	6/15/13	3y 5m 15d	0.00%	(1.34%)	(0.90%)	(0.45%)
ABS.026	55264TAE1	12/16/13	3y 11m 16d	0.00%	(0.10%)	(0.07%)	(0.03%)
ABS.027	16151RCR2	1/15/16	6y 0m 15d	0.00%	(0.04%)	(0.03%)	(0.01%)
ABS.028	161571BB9	4/15/13	3y 3m 15d	0.00%	(0.12%)	(0.08%)	(0.04%)
ABS.029	55262NAL0	1/15/13	3y 0m 15d	0.00%	(0.12%)	(0.08%)	(0.04%)
ABS.030	14041NCM1	9/16/13	3y 8m 16d	0.00%	(20.52%)	(14.38%)	(7.54%)
ABS.031	635414AA3	8/15/12	2y 7m 15d	0.00%	(0.12%)	(0.08%)	(0.04%)
ABS.032	14041NCC3	3/15/13	3y 2m 15d	0.00%	(8.60%)	(5.82%)	(2.96%)
ABS.033	55262TCB7	8/15/14	4y 7m 15d	0.00%	(0.07%)	(0.04%)	(0.02%)
ABS.034	05522RAA6	11/15/13	3y 10m 15d	0.00%	(0.10%)	(0.06%)	(0.03%)
ABS.035	05522RAT5	6/15/12	2y 5m 15d	0.00%	(0.12%)	(0.08%)	(0.04%)
ABS.036	981464BD1	2/15/17	7y 1m 15d	0.00%	0.04%	0.03%	0.01%
ABS.037	55264TDL2	4/15/13	3y 3m 15d	0.00%	(0.12%)	(0.08%)	(0.04%)
ABS.038	36159JAG6	3/15/13	3y 2m 15d	0.00%	(0.12%)	(0.08%)	(0.04%)
ABS.039	14041NAX9	7/15/13	3y 6m 15d	0.00%	12.50%	11.15%	5.78%
ABS.040	161571AT1	10/15/12	2y 9m 15d	0.00%	(0.12%)	(0.08%)	(0.04%)

CMBS

CMBS				0.00%	(4.86%)	(3.31%)	(1.69%)
Select to collapse	05947UBM9	4/15/36	26y 3m 15d	0.00%	(2.68%)	(1.80%)	(0.90%)
MBS.194	05947UCF3	5/11/35	25y 4m 11d	0.00%	(3.67%)	(2.47%)	(1.24%)
MBS.196	05947UDP0	4/11/37	27y 3m 11d	0.00%	(3.74%)	(2.51%)	(1.26%)
MBS.197	07383FGE2	11/15/16	6y 10m 15d	0.00%	(1.65%)	(1.10%)	(0.55%)
MBS.198	07383F7S1	6/11/41	31y 5m 11d	0.00%	(0.26%)	(0.18%)	(0.09%)
MBS.199	12513EAH7	7/15/44	34y 6m 15d	0.00%	(10.66%)	(7.28%)	(3.73%)
MBS.201	12513EAJ3	7/15/44	34y 6m 15d	0.00%	(13.66%)	(9.35%)	(4.80%)
MBS.202	20047MAE4	2/5/19	9y 1m 5d	0.00%	(3.14%)	(2.11%)	(1.06%)
MBS.203	20047MAF1	2/5/19	9y 1m 5d	0.00%	(0.03%)	(0.02%)	(0.01%)
MBS.205	20046FAA8	7/16/34	24y 6m 16d	0.00%	(3.03%)	(2.03%)	(1.02%)
MBS.206	225470NG4	12/15/40	30y 11m 15d	0.00%	(0.66%)	(0.44%)	(0.22%)
MBS.207	173067GK9	5/15/43	33y 4m 15d	0.00%	(0.12%)	(0.08%)	(0.04%)
MBS.208	337368AB0	3/15/33	23y 2m 15d	0.00%	(2.06%)	(1.38%)	(0.69%)
MBS.209	36828QNQ5	7/10/45	35y 6m 10d	0.00%	(0.54%)	(0.36%)	(0.18%)
MBS.213	36228CJT1	5/3/18	8y 4m 3d	0.00%	(0.51%)	(0.34%)	(0.17%)
MBS.214	46625YVR1	1/12/43	33y 0m 12d	0.00%	(0.63%)	(0.42%)	(0.21%)
MBS.215	46625YWG4	1/12/43	33y 0m 12d	0.00%	(11.61%)	(7.93%)	(4.06%)
MBS.216	46625YNS8	7/15/42	32y 6m 15d	0.00%	(8.00%)	(5.44%)	(2.77%)
MBS.217	46625YUP6	10/15/42	32y 9m 15d	0.00%	(10.46%)	(7.14%)	(3.65%)
MBS.218	46625YTY9	10/15/42	32y 9m 15d	0.00%	(1.55%)	(1.04%)	(0.52%)
MBS.219	46625YXL2	12/15/44	34y 11m 15d	0.00%	(0.61%)	(0.41%)	(0.20%)
MBS.220	46625YXR9	12/15/44	34y 11m 15d	0.00%	(10.43%)	(7.12%)	(3.64%)
MBS.221	59022HKZ4	11/12/37	27y 10m 12d	0.00%	(1.43%)	(0.96%)	(0.48%)
MBS.222	59022HLH3	11/12/37	27y 10m 12d	0.00%	(13.21%)	(9.04%)	(4.64%)
MBS.223	59022HNA6	1/12/44	34y 0m 12d	0.00%	(13.16%)	(9.01%)	(4.63%)
MBS.224	59022HMW9	1/12/44	34y 0m 12d	0.00%	(2.17%)	(1.45%)	(0.73%)
MBS.225	617451AA7	9/15/42	32y 8m 15d	0.00%	(1.35%)	(0.90%)	(0.45%)
MBS.226	617451AB5	9/15/42	32y 8m 15d	0.00%	(11.67%)	(7.97%)	(4.08%)
MBS.227	617451AF6	9/15/42	32y 8m 15d	0.00%	(13.02%)	(8.90%)	(4.56%)
MBS.228	356486AA8	7/12/16	6y 6m 12d	0.00%	(0.12%)	(0.08%)	(0.04%)
MBS.229	61746WGM6	3/11/16	6y 2m 11d	0.00%	(1.89%)	(1.27%)	(0.64%)
MBS.230	61746WGN4	3/11/16	6y 2m 11d	0.00%	(0.11%)	(0.07%)	(0.04%)
MBS.231	589929VX3	2/3/16	6y 1m 3d	0.00%	(1.90%)	(1.27%)	(0.64%)
MBS.232	901921AC0	2/3/16	6y 1m 3d	0.00%	(1.74%)	(1.17%)	(0.59%)
MBS.233	901921AG1	2/3/16	6y 1m 3d	0.00%	(0.07%)	(0.05%)	(0.02%)
MBS.234	929766W74	5/15/44	34y 4m 15d	0.00%	(1.33%)	(0.89%)	(0.44%)
MBS.235	929766X57	5/15/44	34y 4m 15d	0.00%	0.01%	0.01%	0.01%
MBS.236	929766X65	5/15/44	34y 4m 15d	0.00%	(13.13%)	(8.97%)	(4.60%)
MBS.237	9297664R1	5/15/44	34y 4m 15d	0.00%	(11.22%)	(7.67%)	(3.93%)
MBS.238	9297664K6	7/15/42	32y 6m 15d	0.00%	(0.12%)	(0.08%)	(0.04%)
MBS.239	9297667B3	10/15/44	34y 9m 15d	0.00%	(11.44%)	(7.81%)	(4.00%)
MBS.240	9297667C1	10/15/44	34y 9m 15d	0.00%	(0.11%)	(0.08%)	(0.04%)
MBS.241	9297667K3	10/15/44	34y 9m 15d	0.00%	(13.68%)	(9.36%)	(4.81%)
MBS.242	9297667J6	10/15/44	34y 9m 15d	0.00%	(13.57%)	(9.29%)	(4.77%)

RMBS- By Credit Rating and Rate Reset

⊟ RMBS PA				0.00%	(5.39%)	(3.25%)	(1.61%)
MBS.002	9292276V3	7/25/18	8y 6m 25d	0.00%	(9.31%)	(6.36%)	(3.26%)
MBS.003	36228FUT1	7/25/18	8y 6m 25d	0.00%	(6.86%)	(4.66%)	(2.38%)
MBS.005	55265KG60	9/25/33	23y 8m 25d	0.00%	(6.46%)	(3.31%)	(0.75%)
MBS.006	55265KK24	9/25/18	8y 8m 25d	0.00%	(8.02%)	(5.47%)	(2.79%)
MBS.007	32051DL34	9/25/18	8y 8m 25d	0.00%	(8.46%)	(5.77%)	(2.95%)
MBS.008	949762AA6	9/25/18	8y 8m 25d	0.00%	(7.95%)	(5.41%)	(2.77%)
MBS.009	949808AP4	10/25/33	23y 9m 25d	0.00%	(11.51%)	(7.73%)	(3.99%)
MBS.010	949768AA3	11/25/33	23y 10m 25d	0.00%	(10.79%)	(7.27%)	(3.75%)
MBS.011	949768AB1	11/25/33	23y 10m 25d	0.00%	(10.79%)	(7.27%)	(3.75%)
MBS.012	949769AB9	11/25/33	23y 10m 25d	0.00%	(9.93%)	(6.72%)	(3.46%)
MBS.013	22541QZT2	11/25/33	23y 10m 25d	0.00%	(8.66%)	(5.23%)	(2.58%)
MBS.014	55265KU31	11/25/18	8y 10m 25d	0.00%	(8.73%)	(5.95%)	(3.05%)
MBS.015	36228FYK6	10/25/33	23y 9m 25d	0.00%	(8.45%)	(4.81%)	(2.30%)
MBS.017	16162WAM1	11/25/18	8y 10m 25d	0.00%	(8.96%)	(6.12%)	(3.13%)
MBS.018	94979FAB2	11/25/18	8y 10m 25d	0.00%	(9.10%)	(6.21%)	(3.18%)
MBS.019	92922FGY8	11/25/33	23y 10m 25d	0.00%	(1.09%)	0.27%	0.53%
MBS.020	94980DAA6	12/25/33	23y 11m 25d	0.00%	(10.22%)	(6.91%)	(3.56%)
MBS.021	94980XAA2	12/25/33	23y 11m 25d	0.00%	(11.01%)	(7.43%)	(3.83%)
MBS.022	94980YAE2	12/25/18	8y 11m 25d	0.00%	(9.40%)	(6.42%)	(3.29%)
MBS.023	466247AZ6	11/25/33	23y 10m 25d	0.00%	(2.60%)	(1.16%)	(0.61%)
MBS.024	12669FJF1	2/25/34	24y 1m 25d	0.00%	(6.63%)	(4.35%)	(2.14%)
MBS.025	61748HAD3	2/25/34	24y 1m 25d	0.00%	(7.77%)	(4.90%)	(2.40%)
MBS.026	05948X5T4	4/25/34	24y 3m 25d	0.00%	(2.67%)	(0.88%)	(0.43%)
MBS.027	81744FAZ0	5/20/34	24y 4m 20d	0.00%	0.64%	0.45%	0.23%
MBS.028	949805AB1	5/25/34	24y 4m 25d	0.00%	(9.52%)	(6.47%)	(3.33%)
MBS.029	94981DAB3	5/25/34	24y 4m 25d	0.00%	(9.75%)	(6.62%)	(3.40%)
MBS.030	07384YTL0	3/25/44	34y 2m 25d	0.00%	(3.97%)	(2.17%)	(0.94%)
MBS.031	05948X7A3	6/25/19	9y 5m 25d	0.00%	(2.97%)	(1.99%)	(1.00%)
MBS.032	07384MS86	7/25/34	24y 6m 25d	0.00%	(5.35%)	(2.13%)	(0.74%)
MBS.033	576434SF2	7/25/19	9y 6m 25d	0.00%	(8.37%)	(5.71%)	(2.92%)
MBS.035	76111XLE1	7/25/34	24y 6m 25d	0.00%	(3.35%)	(1.69%)	(0.81%)
MBS.036	36228F4R4	6/25/34	24y 5m 25d	0.00%	(3.28%)	(0.71%)	(0.33%)
MBS.037	949788AE3	7/25/19	9y 6m 25d	0.00%	(9.54%)	(6.52%)	(3.35%)
MBS.038	61748HAW1	7/25/34	24y 6m 25d	0.00%	(4.10%)	(2.05%)	(1.01%)
MBS.039	949758AD8	8/25/34	24y 7m 25d	0.00%	(10.84%)	(7.35%)	(3.79%)
MBS.040	41161PFV0	8/19/34	24y 7m 19d	0.00%	(4.06%)	(1.83%)	(0.91%)
MBS.041	466247DZ3	9/25/34	24y 8m 25d	0.00%	(4.02%)	(2.02%)	(0.93%)
MBS.042	466247EH2	9/25/34	24y 8m 25d	0.00%	(4.02%)	(2.02%)	(0.93%)

MBS.043	61748HBQ3	8/25/34	24y 7m 25d	0.00%	(1.95%)	(0.70%)	(0.32%)
MBS.044	94978LAA2	9/25/34	24y 8m 25d	0.00%	(3.32%)	(1.80%)	(0.91%)
MBS.045	94980MAB4	9/25/34	24y 8m 25d	0.00%	(9.24%)	(5.78%)	(2.81%)
MBS.046	92922FYA0	10/25/34	24y 9m 25d	0.00%	(5.00%)	(2.38%)	(0.80%)
MBS.047	06051GBB4	5/20/34	24y 4m 20d	0.00%	(3.45%)	(1.46%)	(0.68%)
MBS.048	59020UHH1	5/25/34	24y 4m 25d	0.00%	(2.08%)	(0.96%)	(0.49%)
MBS.049	07384MY30	10/25/34	24y 9m 25d	0.00%	(3.24%)	(1.64%)	(0.83%)
MBS.050	94981GAF7	9/25/34	24y 8m 25d	0.00%	(9.96%)	(6.85%)	(3.52%)
MBS.052	12669F5S8	8/25/34	24y 7m 25d	0.00%	(4.51%)	(2.10%)	(0.19%)
MBS.053	12669GBY6	11/20/34	24y 10m 20d	0.00%	(1.17%)	(0.25%)	(0.12%)
MBS.054	12669GBZ3	11/20/34	24y 10m 20d	0.00%	(1.17%)	(0.25%)	(0.12%)
MBS.055	59020ULR4	8/25/34	24y 7m 25d	0.00%	(5.19%)	(2.17%)	(0.64%)
MBS.056	94982AAA0	11/25/34	24y 10m 25d	0.00%	(7.44%)	(4.75%)	(2.41%)
MBS.057	05946XKZ5	10/25/19	9y 9m 25d	0.00%	(9.79%)	(6.69%)	(3.44%)
MBS.058	22541SX29	12/25/19	9y 11m 25d	0.00%	(9.27%)	(6.33%)	(3.25%)
MBS.059	57643MHZ0	12/25/19	9y 11m 25d	0.00%	(9.38%)	(6.41%)	(3.29%)
MBS.060	81744FFJ1	12/20/34	24y 11m 20d	0.00%	2.11%	1.62%	0.36%
MBS.063	86359LFN4	4/19/35	25y 3m 19d	0.00%	0.56%	0.38%	0.20%
MBS.064	939336V91	1/25/35	25y 0m 25d	0.00%	(5.56%)	(2.33%)	(0.64%)
MBS.065	885220GB3	12/25/44	34y 11m 25d	0.00%	0.86%	0.64%	0.32%
MBS.066	81744FFY8	1/20/35	25y 0m 20d	0.00%	2.35%	2.79%	0.04%
MBS.067	59020UNZ4	1/25/30	20y 0m 25d	0.00%	0.64%	0.49%	0.27%
MBS.070	86359LGE3	5/19/35	25y 4m 19d	0.00%	0.97%	0.66%	0.33%
MBS.071	466247LU5	2/25/35	25y 1m 25d	0.00%	(9.16%)	(5.66%)	(2.85%)
MBS.075	225458AL2	2/25/35	25y 1m 25d	0.00%	(5.26%)	(2.32%)	(0.16%)
MBS.077	59020USJ5	2/25/35	25y 1m 25d	0.00%	(2.28%)	(0.37%)	(0.38%)
MBS.081	36185N7G9	6/19/35	25y 5m 19d	0.00%	(4.54%)	(3.04%)	(1.54%)
MBS.087	07387AEA9	8/25/35	25y 7m 25d	0.00%	(0.63%)	(0.44%)	(0.23%)
MBS.093	59020UL52	11/25/35	25y 10m 25d	0.00%	0.72%	0.42%	0.05%
MBS.099	86359BYF2	8/25/34	24y 7m 25d	0.00%	(2.92%)	(1.92%)	(0.96%)
MBS.100	863579AS7	9/25/34	24y 8m 25d	0.00%	(4.24%)	(1.35%)	(0.15%)
MBS.101	863579AW8	9/25/34	24y 8m 25d	0.00%	(3.58%)	(2.08%)	(1.05%)
MBS.113	59020UL45	11/25/35	25y 10m 25d	0.00%	(2.09%)	(0.88%)	(0.30%)
MBS.118	12669FA86	7/25/34	24y 6m 25d	0.00%	(3.41%)	(0.99%)	(0.47%)
MBS.133	59020UL37	11/25/35	25y 10m 25d	0.00%	1.07%	1.42%	0.72%
MBS.138	36242DFX6	9/25/34	24y 8m 25d	0.00%	(2.57%)	(1.23%)	(0.62%)
MBS.140	07387AAB1	3/25/35	25y 2m 25d	0.00%	(0.90%)	(0.36%)	(0.34%)

⊟ RMBS PF				0.00%	(8.16%)	(5.57%)	(2.86%)
MBS.001	12669EFX9	6/25/33	23y 5m 25d	0.00%	(5.92%)	(4.01%)	(2.04%)
MBS.016	16162WAL3	11/25/18	8y 10m 25d	0.00%	(8.93%)	(6.10%)	(3.12%)
MBS.080	57643MKG8	5/25/35	25y 4m 25d	0.00%	(8.67%)	(5.93%)	(3.04%)
MBS.121	36242DQY2	12/25/34	24y 11m 25d	0.00%	(9.26%)	(6.36%)	(3.28%)
⊟ RMBS SA				0.00%	0.96%	0.78%	0.42%
MBS.051	542514HB3	9/25/34	24y 8m 25d	0.00%	0.47%	0.35%	0.23%
MBS.061	36242DPD9	12/25/34	24y 11m 25d	0.00%	0.94%	0.64%	0.32%
MBS.062	36242DPB3	12/25/34	24y 11m 25d	0.00%	1.43%	0.97%	0.49%
MBS.068	17307GMC9	12/25/34	24y 11m 25d	0.00%	1.05%	1.21%	0.16%
MBS.069	61748HGR6	1/25/35	25y 0m 25d	0.00%	1.19%	0.82%	0.41%
MBS.076	863579KH0	2/25/35	25y 1m 25d	0.00%	0.95%	0.64%	0.32%
MBS.078	61745M4E0	4/25/35	25y 3m 25d	0.00%	1.31%	0.88%	0.45%
MBS.079	70069FHU4	5/25/35	25y 4m 25d	0.00%	(0.57%)	0.68%	0.46%
MBS.082	70069FJP3	6/25/35	25y 5m 25d	0.00%	(1.39%)	(0.92%)	(0.41%)
MBS.083	59020UVQ5	4/25/35	25y 3m 25d	0.00%	0.53%	0.38%	0.20%
MBS.084	61745M4N0	7/25/35	25y 6m 25d	0.00%	(1.27%)	(0.43%)	(0.08%)
MBS.086	86359DMN4	8/25/35	25y 7m 25d	0.00%	0.66%	0.49%	0.27%
MBS.089	61748HKW0	9/25/35	25y 8m 25d	0.00%	0.49%	0.35%	0.18%
MBS.090	126685AF3	11/15/35	25y 10m 15d	0.00%	0.22%	1.05%	0.70%
MBS.091	61915RAU0	12/25/35	25y 11m 25d	0.00%	2.11%	1.47%	0.77%
MBS.092	61748HMC2	11/25/35	25y 10m 25d	0.00%	0.62%	0.41%	0.21%
MBS.094	525221HQ3	2/25/36	26y 1m 25d	0.00%	0.86%	0.67%	0.37%
MBS.095	05950MAB6	7/20/36	26y 6m 20d	0.00%	2.50%	1.69%	0.86%
MBS.096	41162CAE1	12/19/37	27y 11m 19d	0.00%	2.71%	1.77%	0.91%
MBS.097	026929AA7	12/25/46	36y 11m 25d	0.00%	2.15%	1.30%	0.51%
MBS.098	126682AA1	4/15/37	27y 3m 15d	0.00%	(2.61%)	(1.17%)	0.27%
MBS.102	32027NLA7	9/25/34	24y 8m 25d	0.00%	1.56%	1.01%	0.57%
MBS.103	86358ERV0	4/25/35	25y 3m 25d	0.00%	(2.43%)	(1.43%)	(0.65%)
MBS.104	126673WX6	7/25/35	25y 6m 25d	0.00%	0.65%	0.44%	0.22%
MBS.105	86358ESK3	5/25/35	25y 4m 25d	0.00%	(0.65%)	(0.41%)	(0.23%)
MBS.106	32027NRC7	5/25/35	25y 4m 25d	0.00%	0.24%	0.16%	(0.04%)
MBS.107	36242DN25	3/25/35	25y 2m 25d	0.00%	0.65%	0.44%	0.22%
MBS.108	57643LGW0	3/25/35	25y 2m 25d	0.00%	0.41%	0.27%	0.14%
MBS.109	00764MFR3	8/25/35	25y 7m 25d	0.00%	(6.03%)	(3.84%)	(1.88%)
MBS.110	61744CSV9	7/25/35	25y 6m 25d	0.00%	(0.45%)	(0.20%)	(0.10%)
MBS.111	32027NUM1	7/25/35	25y 6m 25d	0.00%	10.44%	6.99%	3.50%

MBS.112	76112BC57	9/25/35	25y 8m 25d	0.00%	0.03%	(0.39%)	(0.67%)
MBS.114	03072SU94	1/25/36	26y 0m 25d	0.00%	14.28%	10.08%	5.69%
MBS.115	76112BV72	2/25/36	26y 1m 25d	0.00%	(4.22%)	(2.58%)	(1.76%)
MBS.116	03072SX42	3/25/36	26y 2m 25d	0.00%	3.12%	2.16%	1.16%
MBS.119	61746RFV8	5/25/34	24y 4m 25d	0.00%	1.70%	1.13%	0.57%
MBS.120	073879KR8	9/25/34	24y 8m 25d	0.00%	2.66%	1.76%	0.88%
MBS.122	542514KS2	4/25/35	25y 3m 25d	0.00%	(0.30%)	(0.22%)	(0.12%)
MBS.123	12667GNG4	7/25/35	25y 6m 25d	0.00%	7.23%	4.74%	2.37%
MBS.124	144531CZ1	6/25/35	25y 5m 25d	0.00%	1.45%	1.13%	0.73%
MBS.125	70069FLY1	8/25/35	25y 7m 25d	0.00%	12.41%	11.44%	5.88%
MBS.126	46626LAU4	7/25/35	25y 6m 25d	0.00%	(1.37%)	(0.84%)	(0.41%)
MBS.127	76112BYV6	8/25/35	25y 7m 25d	0.00%	(3.05%)	(1.29%)	(0.95%)
MBS.128	02660TFV0	9/25/35	25y 8m 25d	0.00%	0.31%	0.18%	0.07%
MBS.129	754058AE5	10/25/35	25y 9m 25d	0.00%	(3.36%)	(1.54%)	(0.58%)
MBS.130	754058AF2	10/25/35	25y 9m 25d	0.00%	(1.88%)	(0.45%)	0.16%
MBS.131	03072SM28	10/25/35	25y 9m 25d	0.00%	3.39%	2.42%	1.29%
MBS.132	57643LJX5	6/25/35	25y 5m 25d	0.00%	4.29%	3.05%	1.64%
MBS.134	29256PAX2	1/25/36	26y 0m 25d	0.00%	6.90%	4.59%	2.32%
MBS.135	03072SS89	12/25/35	25y 11m 25d	0.00%	27.41%	18.52%	9.39%
MBS.136	03072SV28	1/25/36	26y 0m 25d	0.00%	27.64%	19.14%	10.62%
MBS.137	03072SRX5	7/25/34	24y 6m 25d	0.00%	1.98%	1.33%	0.68%
MBS.139	66987WBX4	3/25/35	25y 2m 25d	0.00%	1.50%	1.02%	0.54%
MBS.141	36242DN58	3/25/35	25y 2m 25d	0.00%	2.35%	1.58%	0.83%
MBS.142	57643LJY3	6/25/35	25y 5m 25d	0.00%	4.66%	3.13%	1.58%
⊟ RMBS SF				0.00%	(5.55%)	(3.63%)	(1.74%)
MBS.072	12667FW84	3/25/35	25y 2m 25d	0.00%	(4.59%)	(3.11%)	(1.58%)
MBS.073	12667FX26	3/25/35	25y 2m 25d	0.00%	(4.72%)	(3.19%)	(1.62%)
MBS.074	12667FX91	3/25/35	25y 2m 25d	0.00%	(4.13%)	(2.79%)	(1.41%)
MBS.085	93934FAL6	7/25/35	25y 6m 25d	0.00%	(9.69%)	(6.04%)	(2.63%)
MBS.117	126671RX6	5/25/32	22y 4m 25d	0.00%	(3.70%)	(2.49%)	(1.26%)

MBS Agency

⊟ MBS Agency				0.00%	(8.12%)	(5.58%)	(2.88%)
MBS.143	31393ART6	3/25/17	7y 2m 25d	0.00%	(2.98%)	(2.00%)	(1.01%)
MBS.144	31395RAN8	4/15/15	5y 3m 15d	0.00%	(4.05%)	(2.72%)	(1.38%)
MBS.145	31394K4X9	10/15/33	23y 9m 15d	0.00%	(11.62%)	(8.02%)	(4.16%)
MBS.146	31393GDF8	12/15/17	7y 11m 15d	0.00%	(6.88%)	(4.68%)	(2.38%)
MBS.147	31393DDG3	7/25/33	23y 6m 25d	0.00%	(8.50%)	(5.82%)	(2.99%)
MBS.148	3136FASC5	9/1/32	22y 8m 1d	0.00%	(7.28%)	(4.97%)	(2.54%)
MBS.149	31395CQJ3	8/15/30	20y 7m 15d	0.00%	(5.50%)	(3.71%)	(1.88%)
MBS.150	3128HWJJ7	12/15/36	26y 11m 15d	0.00%	(2.75%)	(1.03%)	(0.25%)
MBS.151	3136FCBM7	12/1/33	23y 11m 1d	0.00%	(26.52%)	(18.92%)	(10.15%)
MBS.152	31393RSY7	10/15/26	16y 9m 15d	0.00%	(0.91%)	(0.61%)	(0.30%)
MBS.153	31396C3Q1	10/15/15	5y 9m 15d	0.00%	(4.44%)	(2.99%)	(1.51%)
MBS.154	31394TAA3	3/15/34	24y 2m 15d	0.00%	(9.19%)	(6.31%)	(3.25%)
MBS.155	31393BWD3	12/25/17	7y 11m 25d	0.00%	(5.59%)	(3.78%)	(1.92%)
MBS.156	3128HWCS4	11/15/36	26y 10m 15d	0.00%	(9.26%)	(6.36%)	(3.28%)
MBS.157	31395VCE7	6/15/35	25y 5m 15d	0.00%	(10.34%)	(7.11%)	(3.67%)
MBS.158	31393TSX5	10/25/33	23y 9m 25d	0.00%	(8.30%)	(5.68%)	(2.92%)
MBS.159	31394HAE1	8/15/33	23y 7m 15d	0.00%	(9.91%)	(6.82%)	(3.52%)
MBS.160	3136FCKK1	8/1/34	24y 7m 1d	0.00%	(29.01%)	(20.80%)	(11.22%)
MBS.161	31393KK95	12/15/21	11y 11m 15d	0.00%	(4.33%)	(2.92%)	(1.47%)
MBS.162	3136FAWR7	1/1/33	23y 0m 1d	0.00%	(9.55%)	(6.56%)	(3.39%)
MBS.163	31395LC41	1/15/35	25y 0m 15d	0.00%	(11.51%)	(7.95%)	(4.12%)
MBS.164	31394D2P4	10/25/29	19y 9m 25d	0.00%	(3.91%)	(2.63%)	(1.33%)
MBS.165	31394UAC6	10/25/35	25y 9m 25d	0.00%	(10.30%)	(7.09%)	(3.67%)
MBS.166	31393J5G9	12/15/28	18y 11m 15d	0.00%	(3.40%)	(2.29%)	(1.15%)
MBS.167	31393QST0	5/15/33	23y 4m 15d	0.00%	(11.55%)	(7.98%)	(4.14%)
MBS.168	31393HRJ3	6/15/22	12y 5m 15d	0.00%	(5.62%)	(3.80%)	(1.93%)
MBS.169	31393RYN4	10/15/26	16y 9m 15d	0.00%	(0.91%)	(0.61%)	(0.30%)
MBS.170	31393XB22	4/25/34	24y 3m 25d	0.00%	(10.52%)	(7.25%)	(3.75%)
MBS.171	31393DT50	8/25/18	8y 7m 25d	0.00%	(7.75%)	(5.28%)	(2.69%)
MBS.172	31393VDF5	6/15/18	8y 5m 15d	0.00%	(10.38%)	(7.08%)	(3.62%)
MBS.173	31393NYY9	3/15/17	7y 2m 15d	0.00%	(3.06%)	(2.06%)	(1.04%)
MBS.174	31395VTS8	7/15/15	5y 6m 15d	0.00%	(3.74%)	(2.52%)	(1.27%)
MBS.175	31393EVW6	9/25/33	23y 8m 25d	0.00%	(10.46%)	(7.21%)	(3.73%)
MBS.176	31396C3S7	3/15/31	21y 2m 15d	0.00%	(4.44%)	(2.99%)	(1.51%)
MBS.177	31394FNC5	9/25/35	25y 8m 25d	0.00%	(10.36%)	(7.13%)	(3.68%)
MBS.178	3136FCW93	7/1/36	26y 6m 1d	0.00%	(14.91%)	(10.41%)	(5.46%)
MBS.179	31392GPK5	4/25/16	6y 3m 25d	0.00%	(0.74%)	(0.50%)	(0.25%)
MBS.180	31396UAM2	7/15/36	26y 6m 15d	0.00%	(11.44%)	(7.89%)	(4.09%)
MBS.181	3136FC5W2	10/1/36	26y 9m 1d	0.00%	(13.98%)	(9.72%)	(5.07%)
MBS.182	31392WFM7	10/15/17	7y 9m 15d	0.00%	(5.60%)	(3.79%)	(1.93%)
MBS.183	31395VUK3	5/15/31	21y 4m 15d	0.00%	(3.74%)	(2.52%)	(1.27%)
MBS.184	31397AGJ6	5/15/29	19y 4m 15d	0.00%	(4.40%)	(2.96%)	(1.50%)
MBS.185	31395RBA5	4/15/20	10y 3m 15d	0.00%	(13.60%)	(9.33%)	(4.80%)
MBS.186	31392JTS8	10/25/16	6y 9m 25d	0.00%	(2.19%)	(1.47%)	(0.74%)
MBS.187	31396AP73	9/15/35	25y 8m 15d	0.00%	(10.17%)	(6.99%)	(3.61%)
MBS.188	31393GJQ8	5/15/22	12y 4m 15d	0.00%	(4.87%)	(3.29%)	(1.66%)
MBS.189	3136FCHB5	3/1/34	24y 2m 1d	0.00%	(10.76%)	(7.42%)	(3.84%)
MBS.190	31393YDE2	5/25/34	24y 4m 25d	0.00%	(10.23%)	(7.04%)	(3.64%)
MBS.191	31396NCJ3	9/15/33	23y 8m 15d	0.00%	(7.05%)	(4.79%)	(2.44%)
MBS.192	31396C2Y5	10/15/15	5y 9m 15d	0.00%	(4.42%)	(2.98%)	(1.51%)

Student Loan

⊟ Student Loan FFELP				0.00%	(0.23%)	(0.15%)	(0.08%)
Select to collapse	194268AA6	1/25/23	13y 0m 25d	0.00%	(0.20%)	(0.13%)	(0.07%)
ABS.043	19458LAB6	9/28/20	10y 8m 28d	0.00%	(0.72%)	(0.48%)	(0.24%)
ABS.044	64031QAG6	9/25/24	14y 8m 25d	0.00%	(0.59%)	(0.39%)	(0.20%)
ABS.047	64031QAU5	7/25/22	12y 6m 25d	0.00%	(0.21%)	(0.14%)	(0.07%)
ABS.048	78443CAY0	9/15/16	6y 8m 15d	0.00%	(0.61%)	(0.41%)	(0.21%)
ABS.049	78442GPN0	10/25/21	11y 9m 25d	0.00%	0.71%	0.48%	0.24%
ABS.054	78442GNZ5	7/25/16	6y 6m 25d	0.00%	0.58%	0.39%	0.19%
ABS.055	64031RAY5	11/25/15	5y 10m 25d	0.00%	(0.46%)	(0.31%)	(0.15%)
ABS.058	78442GHG4	3/15/19	9y 2m 15d	0.00%	(0.60%)	(0.40%)	(0.20%)
ABS.059	00432CBU4	7/25/12	2y 6m 25d	0.00%	(0.20%)	(0.13%)	(0.07%)
⊟ Student Loan Private				0.00%	(0.52%)	(0.53%)	(0.28%)
ABS.041	78443CBY9	12/16/19	9y 11m 16d	0.00%	(0.61%)	(0.40%)	(0.20%)
ABS.045	78443CCE2	3/16/20	10y 2m 16d	0.00%	(0.61%)	(0.40%)	(0.20%)
ABS.046	78443CBF0	3/15/17	7y 2m 15d	0.00%	(0.62%)	(0.41%)	(0.21%)
ABS.050	63543XAE9	4/25/12	2y 3m 25d	0.00%	(4.74%)	(3.19%)	(1.61%)
ABS.051	63543PAV8	10/27/25	15y 9m 27d	0.00%	(0.32%)	(0.20%)	(0.09%)
ABS.052	28140XAB5	10/25/29	19y 9m 25d	0.00%	3.05%	0.18%	(0.00%)
ABS.053	66704JBP2	11/28/23	13y 10m 28d	0.00%	(0.54%)	(0.35%)	(0.18%)
ABS.056	00432CBG5	4/25/29	19y 3m 25d	0.00%	(0.15%)	(0.10%)	(0.05%)
ABS.057	78443DAA0	9/15/22	12y 8m 15d	0.00%	(0.51%)	(0.34%)	(0.17%)
ABS.060	63543XAA7	6/25/25	15y 5m 25d	0.00%	(0.25%)	(0.17%)	(0.08%)

Treasury Securities

⊟ Treasury Security				0.00%	(7.29%)	(4.98%)	(2.55%)
TR.001	912795R8	1/14/10	0y 0m 14d	0.00%	(0.12%)	(0.08%)	(0.04%)
TR.002	912795T4	2/25/10	0y 1m 25d	0.00%	(0.46%)	(0.31%)	(0.15%)
TR.003	912795UJ	11/18/10	0y 10m 18d	0.00%	(2.61%)	(1.75%)	(0.88%)
TR.004	912795U7	7/29/10	0y 6m 29d	0.00%	(1.71%)	(1.14%)	(0.57%)
TR.005	912795UT	6/10/10	0y 5m 10d	0.00%	(1.31%)	(0.88%)	(0.44%)
TR.006	912795U9	9/23/10	0y 8m 23d	0.00%	(2.16%)	(1.45%)	(0.73%)
TR.007	912795T5	3/4/10	0y 2m 4d	0.00%	(0.52%)	(0.34%)	(0.17%)
TR.008	912795UK	12/16/10	0y 11m 16d	0.00%	(2.84%)	(1.90%)	(0.95%)
TR.009	912795UL	4/1/10	0y 3m 1d	0.00%	(0.75%)	(0.50%)	(0.25%)
TR.010	912795T8	3/25/10	0y 2m 25d	0.00%	(0.69%)	(0.46%)	(0.23%)
TR.011	912795UU	6/17/10	0y 5m 17d	0.00%	(1.37%)	(0.92%)	(0.46%)
TR.012	912795T2	2/11/10	0y 1m 11d	0.00%	(0.34%)	(0.23%)	(0.12%)
TR.013	912795UQ	5/13/10	0y 4m 13d	0.00%	(1.09%)	(0.73%)	(0.36%)
TR.014	912795UP	4/29/10	0y 3m 29d	0.00%	(0.97%)	(0.65%)	(0.33%)
TR.015	912795UR	5/20/10	0y 4m 20d	0.00%	(1.14%)	(0.76%)	(0.38%)
TR.016	912795U6	7/1/10	0y 6m 1d	0.00%	(1.48%)	(0.99%)	(0.50%)
TR.017	912795R7	1/7/10	0y 0m 7d	0.00%	(0.06%)	(0.04%)	(0.02%)
TR.018	912795UN	4/22/10	0y 3m 22d	0.00%	(0.92%)	(0.61%)	(0.31%)
TR.019	912795S7	1/28/10	0y 0m 28d	0.00%	(0.23%)	(0.15%)	(0.08%)
TR.020	912795U5	6/3/10	0y 5m 3d	0.00%	(1.26%)	(0.84%)	(0.42%)
TR.021	912828KX	6/15/12	2y 5m 15d	0.00%	(6.97%)	(4.70%)	(2.38%)
TR.022	912828HH	11/15/17	7y 10m 15d	0.00%	(18.11%)	(12.51%)	(6.49%)
TR.023	912828JL	9/30/10	0y 9m 0d	0.00%	(2.20%)	(1.48%)	(0.74%)
TR.024	912828LH	8/15/12	2y 7m 15d	0.00%	(7.38%)	(4.99%)	(2.53%)
TR.025	912828CA	2/15/14	4y 1m 15d	0.00%	(10.74%)	(7.30%)	(3.72%)
TR.026	912828MD	12/31/16	7y 0m 0d	0.00%	(17.09%)	(11.77%)	(6.08%)
TR.027	912828DM	2/15/15	5y 1m 15d	0.00%	(12.90%)	(8.81%)	(4.51%)
TR.028	912828HQ	1/31/13	3y 1m 0d	0.00%	(8.43%)	(5.71%)	(2.90%)
TR.029	912828LP	9/30/16	6y 9m 0d	0.00%	(16.59%)	(11.42%)	(5.89%)
TR.030	912828EM	11/15/10	0y 10m 15d	0.00%	(2.56%)	(1.71%)	(0.86%)
TR.031	912828DX	6/15/10	0y 5m 15d	0.00%	(1.36%)	(0.91%)	(0.45%)
TR.032	912828GR	5/15/10	0y 4m 15d	0.00%	(1.10%)	(0.74%)	(0.37%)
TR.033	912828HA	8/15/17	7y 7m 15d	0.00%	(17.27%)	(11.92%)	(6.17%)
TR.034	912828KJ	3/31/14	4y 3m 0d	0.00%	(11.53%)	(7.84%)	(4.00%)
TR.035	912828DZ	7/15/10	0y 6m 15d	0.00%	(1.57%)	(1.05%)	(0.53%)
TR.036	912828JR	11/15/18	8y 10m 15d	0.00%	(20.03%)	(13.90%)	(7.24%)
TR.037	912828GG	2/15/10	0y 1m 15d	0.00%	(0.38%)	(0.25%)	(0.13%)

TR.038	912828JH	8/15/18	8y 7m 15d	0.00%	(19.29%)	(13.37%)	(6.96%)
TR.039	912828HE	9/30/12	2y 9m 0d	0.00%	(7.50%)	(5.07%)	(2.57%)
TR.040	912828KD	2/15/19	9y 1m 15d	0.00%	(20.99%)	(14.59%)	(7.61%)
TR.041	912828AP	11/15/12	2y 10m 15d	0.00%	(7.87%)	(5.32%)	(2.70%)
TR.042	912828JQ	10/31/13	3y 10m 0d	0.00%	(10.35%)	(7.03%)	(3.58%)
TR.043	912828CT	8/15/14	4y 7m 15d	0.00%	(11.77%)	(8.02%)	(4.10%)
TR.044	912828GK	2/29/12	2y 2m 0d	0.00%	(5.98%)	(4.03%)	(2.04%)
TR.045	912828LZ	11/30/14	4y 11m 0d	0.00%	(13.06%)	(8.92%)	(4.57%)
TR.046	912828LF	6/30/11	1y 6m 0d	0.00%	(4.36%)	(2.93%)	(1.48%)
TR.047	912828ME	12/31/14	5y 0m 0d	0.00%	(13.15%)	(8.98%)	(4.60%)
TR.048	912828JZ	1/31/14	4y 1m 0d	0.00%	(11.10%)	(7.55%)	(3.85%)
TR.049	912828LQ	9/30/14	4y 9m 0d	0.00%	(12.56%)	(8.57%)	(4.38%)
TR.050	912828GC	12/31/11	2y 0m 0d	0.00%	(5.64%)	(3.80%)	(1.92%)
TR.051	912828LY	11/15/19	9y 10m 15d	0.00%	(21.87%)	(15.24%)	(7.97%)
TR.052	912828HS	2/28/10	0y 2m 0d	0.00%	(0.48%)	(0.32%)	(0.16%)
TR.053	912828GW	6/30/12	2y 6m 0d	0.00%	(6.90%)	(4.66%)	(2.36%)
TR.054	912828FU	9/30/11	1y 9m 0d	0.00%	(4.93%)	(3.31%)	(1.67%)
TR.055	912828JA	5/31/10	0y 5m 0d	0.00%	(1.23%)	(0.82%)	(0.41%)
TR.056	912828FA	3/31/11	1y 3m 0d	0.00%	(3.57%)	(2.40%)	(1.21%)
TR.057	912828KE	2/28/11	1y 2m 0d	0.00%	(3.41%)	(2.28%)	(1.15%)
TR.058	912828FF	5/15/16	6y 4m 15d	0.00%	(15.14%)	(10.39%)	(5.35%)
TR.059	912828LG	7/31/11	1y 7m 0d	0.00%	(4.59%)	(3.08%)	(1.55%)
TR.060	912828KZ	6/30/16	6y 6m 0d	0.00%	(16.12%)	(11.08%)	(5.71%)
TR.061	912828EE	8/15/15	5y 7m 15d	0.00%	(13.84%)	(9.47%)	(4.86%)
TR.062	912828LW	9/30/11	1y 9m 0d	0.00%	(5.07%)	(3.41%)	(1.72%)
TR.063	912828DL	2/15/10	0y 1m 15d	0.00%	(0.38%)	(0.25%)	(0.13%)
TR.064	912828LM	9/15/12	2y 8m 15d	0.00%	(7.66%)	(5.17%)	(2.62%)
TR.065	912828EQ	12/15/10	0y 11m 15d	0.00%	(2.80%)	(1.87%)	(0.94%)
TR.066	912828HT	2/28/13	3y 2m 0d	0.00%	(8.66%)	(5.86%)	(2.98%)
TR.067	912828LK	8/31/14	4y 8m 0d	0.00%	(12.35%)	(8.42%)	(4.30%)
TR.068	912828FY	11/15/16	6y 10m 15d	0.00%	(16.21%)	(11.16%)	(5.76%)
TR.069	912828LR	10/15/12	2y 9m 15d	0.00%	(7.88%)	(5.33%)	(2.70%)
TR.070	912828KP	5/15/12	2y 4m 15d	0.00%	(6.77%)	(4.57%)	(2.31%)
TR.071	912828LD	7/31/16	6y 7m 0d	0.00%	(16.07%)	(11.05%)	(5.70%)
TR.072	912828JY	1/31/11	1y 1m 0d	0.00%	(3.18%)	(2.13%)	(1.07%)
TR.073	9128277B	8/15/11	1y 7m 15d	0.00%	(4.55%)	(3.06%)	(1.54%)
TR.074	912828GA	11/30/11	1y 11m 0d	0.00%	(5.40%)	(3.64%)	(1.83%)
TR.075	912828KC	2/15/12	2y 1m 15d	0.00%	(6.08%)	(4.10%)	(2.07%)

TR.076	912828ML	12/31/11	2y 0m 0d	0.00%	(5.78%)	(3.89%)	(1.97%)
TR.077	912828HG	10/31/12	2y 10m 0d	0.00%	(7.77%)	(5.25%)	(2.66%)
TR.078	912828DU	5/15/10	0y 4m 15d	0.00%	(1.10%)	(0.74%)	(0.37%)
TR.079	912828LU	10/31/16	6y 10m 0d	0.00%	(16.74%)	(11.52%)	(5.95%)
TR.080	912828DV	5/15/15	5y 4m 15d	0.00%	(13.50%)	(9.23%)	(4.73%)
TR.081	912828HU	3/31/10	0y 3m 0d	0.00%	(0.74%)	(0.49%)	(0.25%)
TR.082	912828HK	11/30/12	2y 11m 0d	0.00%	(8.04%)	(5.43%)	(2.76%)
TR.083	912828LX	11/15/12	2y 10m 15d	0.00%	(8.12%)	(5.49%)	(2.78%)
TR.084	912828FQ	8/15/16	6y 7m 15d	0.00%	(15.50%)	(10.66%)	(5.49%)
TR.085	912828JS	11/30/10	0y 11m 0d	0.00%	(2.70%)	(1.81%)	(0.91%)
TR.086	912828KN	4/30/14	4y 4m 0d	0.00%	(11.72%)	(7.98%)	(4.07%)
TR.087	912828GZ	7/31/12	2y 7m 0d	0.00%	(7.01%)	(4.73%)	(2.39%)
TR.088	912828FK	6/30/11	1y 6m 0d	0.00%	(4.28%)	(2.88%)	(1.45%)
TR.089	912828AU	2/15/13	3y 1m 15d	0.00%	(8.42%)	(5.70%)	(2.89%)
TR.090	9128277L	2/15/12	2y 1m 15d	0.00%	(5.86%)	(3.95%)	(1.99%)
TR.091	912828JF	7/31/10	0y 7m 0d	0.00%	(1.71%)	(1.14%)	(0.57%)
TR.092	912828HZ	5/15/18	8y 4m 15d	0.00%	(19.14%)	(13.25%)	(6.89%)
TR.093	912828FW	10/31/11	1y 10m 0d	0.00%	(5.16%)	(3.47%)	(1.75%)
TR.094	912828BR	11/15/13	3y 10m 15d	0.00%	(10.22%)	(6.94%)	(3.54%)
TR.095	912828HR	2/15/18	8y 1m 15d	0.00%	(18.78%)	(12.99%)	(6.75%)
TR.096	912828MA	11/30/16	6y 11m 0d	0.00%	(17.12%)	(11.79%)	(6.09%)
TR.097	912828KK	4/15/12	2y 3m 15d	0.00%	(6.54%)	(4.41%)	(2.23%)
TR.098	912828ES	1/15/11	1y 0m 15d	0.00%	(2.99%)	(2.00%)	(1.01%)
TR.099	912828JU	11/15/11	1y 10m 15d	0.00%	(5.39%)	(3.63%)	(1.83%)
TR.100	912828LT	10/31/11	1y 10m 0d	0.00%	(5.31%)	(3.57%)	(1.80%)

Corporates

⊟ BDX				0.00%	(11.19%)	(7.69%)	(3.96%)
BDX.01	BDX.01	12/1/10	0y 11m 1d	0.00%	(2.71%)	(1.81%)	(0.91%)
BDX.03	BDX.03	12/2/12	2y 11m 2d	0.00%	(8.16%)	(5.52%)	(2.80%)
BDX.05	BDX.05	12/4/14	4y 11m 4d	0.00%	(12.75%)	(8.70%)	(4.46%)
BDX.10	BDX.10	12/7/19	9y 11m 7d	0.00%	(20.98%)	(14.61%)	(7.64%)
⊟ CVX				0.00%	(11.34%)	(7.80%)	(4.02%)
CVX.01	CVX.01	12/7/10	0y 11m 7d	0.00%	(2.76%)	(1.85%)	(0.93%)
CVX.03	CVX.03	12/8/12	2y 11m 8d	0.00%	(8.23%)	(5.57%)	(2.83%)
CVX.05	CVX.05	12/9/14	4y 11m 9d	0.00%	(12.90%)	(8.80%)	(4.51%)
⊟ DNA				0.00%	(11.33%)	(7.79%)	(4.02%)
DNA.01	DNA.01	12/4/10	0y 11m 4d	0.00%	(2.73%)	(1.83%)	(0.92%)
DNA.03	DNA.03	12/14/12	2y 11m 14d	0.00%	(8.27%)	(5.60%)	(2.84%)
DNA.05	DNA.05	12/15/14	4y 11m 15d	0.00%	(12.91%)	(8.81%)	(4.51%)
DNA.10	DNA.10	12/16/19	9y 11m 16d	0.00%	(21.28%)	(14.83%)	(7.75%)
⊟ JNJ				0.00%	(11.40%)	(7.84%)	(4.04%)
JNJ.01	JNJ.01	12/16/10	0y 11m 16d	0.00%	(2.83%)	(1.90%)	(0.95%)
JNJ.03	JNJ.03	12/18/12	2y 11m 18d	0.00%	(8.31%)	(5.62%)	(2.85%)
JNJ.05	JNJ.05	12/21/14	4y 11m 21d	0.00%	(12.97%)	(8.85%)	(4.53%)
JNJ.10	JNJ.10	12/21/19	9y 11m 21d	0.00%	(21.39%)	(14.91%)	(7.80%)
⊟ MDT				0.00%	(11.26%)	(7.74%)	(3.99%)
MDT.01	MDT.01	12/1/10	0y 11m 1d	0.00%	(2.71%)	(1.82%)	(0.91%)
MDT.03	MDT.03	12/4/12	2y 11m 4d	0.00%	(8.19%)	(5.54%)	(2.81%)
MDT.05	MDT.05	12/7/14	4y 11m 7d	0.00%	(12.82%)	(8.75%)	(4.48%)
MDT.10	MDT.10	12/7/19	9y 11m 7d	0.00%	(21.16%)	(14.74%)	(7.71%)
⊟ MMM				0.00%	(11.30%)	(7.77%)	(4.01%)
MMM.01	MMM.01	12/8/10	0y 11m 8d	0.00%	(2.77%)	(1.85%)	(0.93%)
MMM.03	MMM.03	12/9/12	2y 11m 9d	0.00%	(8.24%)	(5.58%)	(2.83%)
MMM.05	MMM.05	12/1/14	4y 11m 1d	0.00%	(12.83%)	(8.76%)	(4.48%)
MMM.10	MMM.10	12/2/19	9y 11m 2d	0.00%	(21.22%)	(14.78%)	(7.73%)

⊟ MSFT				0.00%	(11.33%)	(7.79%)	(4.02%)
MSFT.01	MSFT.01	12/4/10	0y 11m 4d	0.00%	(2.74%)	(1.83%)	(0.92%)
MSFT.03	MSFT.03	12/7/12	2y 11m 7d	0.00%	(8.22%)	(5.56%)	(2.82%)
MSFT.05	MSFT.05	12/7/14	4y 11m 7d	0.00%	(12.88%)	(8.79%)	(4.50%)
MSFT.10	MSFT.10	12/16/19	9y 11m 16d	0.00%	(21.37%)	(14.89%)	(7.79%)
⊟ PCAR				0.00%	(14.20%)	(9.78%)	(5.05%)
PCAR.03	PCAR.03	12/7/12	2y 11m 7d	0.00%	(8.23%)	(5.56%)	(2.82%)
PCAR.05	PCAR.05	12/8/14	4y 11m 8d	0.00%	(12.89%)	(8.80%)	(4.51%)
PCAR.10	PCAR.10	12/9/19	9y 11m 9d	0.00%	(21.41%)	(14.92%)	(7.80%)
⊟ PFE				0.00%	(11.37%)	(7.81%)	(4.03%)
PFE.01	PFE.01	12/18/10	0y 11m 18d	0.00%	(2.85%)	(1.91%)	(0.96%)
PFE.03	PFE.03	12/21/12	2y 11m 21d	0.00%	(8.33%)	(5.63%)	(2.86%)
PFE.05	PFE.05	12/21/14	4y 11m 21d	0.00%	(12.95%)	(8.84%)	(4.53%)
PFE.10	PFE.10	12/4/19	9y 11m 4d	0.00%	(21.19%)	(14.76%)	(7.72%)
⊟ PG				0.00%	(11.30%)	(7.77%)	(4.01%)
PG.01	PG.01	12/4/10	0y 11m 4d	0.00%	(2.74%)	(1.83%)	(0.92%)
PG.03	PG.03	12/7/12	2y 11m 7d	0.00%	(8.22%)	(5.56%)	(2.82%)
PG.05	PG.05	12/7/14	4y 11m 7d	0.00%	(12.86%)	(8.78%)	(4.49%)
PG.10	PG.10	12/8/19	9y 11m 8d	0.00%	(21.26%)	(14.81%)	(7.75%)

⊟ SYY				0.00%	(11.32%)	(7.78%)	(4.01%)
SYY.01	SYY.01	12/9/10	0y 11m 9d	0.00%	(2.78%)	(1.86%)	(0.93%)
SYY.03	SYY.03	12/11/12	2y 11m 11d	0.00%	(8.26%)	(5.59%)	(2.83%)
SYY.05	SYY.05	12/1/14	4y 11m 1d	0.00%	(12.83%)	(8.75%)	(4.48%)
SYY.10	SYY.10	12/2/19	9y 11m 2d	0.00%	(21.26%)	(14.81%)	(7.74%)

⊟ WFC				0.00%	(11.23%)	(7.72%)	(3.98%)
WFC.01	WFC.01	12/21/10	0y 11m 21d	0.00%	(2.87%)	(1.92%)	(0.97%)
WFC.03	WFC.03	12/21/12	2y 11m 21d	0.00%	(8.28%)	(5.60%)	(2.84%)
WFC.05	WFC.05	12/21/14	4y 11m 21d	0.00%	(12.82%)	(8.75%)	(4.48%)
WFC.10	WFC.10	12/4/19	9y 11m 4d	0.00%	(20.82%)	(14.50%)	(7.58%)

⊟ XOM				0.00%	(11.36%)	(7.81%)	(4.03%)
XOM.01	XOM.01	12/7/10	0y 11m 7d	0.00%	(2.76%)	(1.85%)	(0.93%)
XOM.03	XOM.03	12/7/12	2y 11m 7d	0.00%	(8.23%)	(5.57%)	(2.82%)
XOM.05	XOM.05	12/8/14	4y 11m 8d	0.00%	(12.90%)	(8.80%)	(4.51%)
XOM.10	XOM.10	12/9/19	9y 11m 9d	0.00%	(21.42%)	(14.92%)	(7.80%)

2009 Spread Stress Tests

NCUA

REPORTS | ADMINISTRATION

Portfolio | Interest Rate Risk | Liquidity Risk | Market Risk | Credit Risk | Economic Capital | Basel Capital | Financial Ratio Analysis | Other Reports | Report Finder | Help

Sensitivity - by Attribute

KRM Run: Assets 2009 Stress Test Spread Shifts (values in USD)

View By (Edit) Currently Selected: [Asset Type, Transaction]

Market Value | Change in MV | % Change in MV | by Shift

Expand All | Collapse All

				% Change in MV			
	CUSIP	Maturity Date	Remaining Maturity	Base Case	Upward 300bp	Upward 200bp	Upward 100bp
⊞ ABS Other				0.00%	(5.95%)	(4.06%)	(2.08%)
⊞ Auto Loan				0.00%	(1.69%)	(1.13%)	(0.57%)
⊞ BDX				0.00%	(11.19%)	(7.69%)	(3.96%)
⊞ CMBS				0.00%	(5.51%)	(3.75%)	(1.91%)
⊞ CVX				0.00%	(11.34%)	(7.80%)	(4.02%)
⊞ Credit Card				0.00%	(5.01%)	(3.39%)	(1.72%)
⊞ DNA				0.00%	(11.33%)	(7.79%)	(4.02%)
⊞ JNJ				0.00%	(11.40%)	(7.84%)	(4.04%)
⊞ MBS Agency				0.00%	(8.31%)	(5.73%)	(2.97%)
⊞ MDT				0.00%	(11.26%)	(7.74%)	(3.99%)
⊞ MMM				0.00%	(11.30%)	(7.77%)	(4.01%)
⊞ MSFT				0.00%	(11.33%)	(7.79%)	(4.02%)
⊞ PCAR				0.00%	(14.20%)	(9.78%)	(5.05%)
⊞ PFE				0.00%	(11.37%)	(7.81%)	(4.03%)
⊞ PG				0.00%	(11.30%)	(7.77%)	(4.01%)
⊞ RMBS PA				0.00%	(9.54%)	(6.55%)	(3.38%)
⊞ RMBS PF				0.00%	(8.16%)	(5.57%)	(2.86%)
⊞ RMBS SA				0.00%	(5.94%)	(4.05%)	(2.07%)
⊞ RMBS SF				0.00%	(7.88%)	(5.42%)	(2.80%)
⊞ SYY				0.00%	(11.32%)	(7.78%)	(4.01%)
⊞ Student Loan FFELP				0.00%	(3.95%)	(2.66%)	(1.35%)
⊞ Student Loan Private				0.00%	(4.51%)	(3.08%)	(1.57%)
⊞ Treasury Security				0.00%	(7.29%)	(4.98%)	(2.55%)
⊞ WFC				0.00%	(11.23%)	(7.72%)	(3.98%)
⊞ XOM				0.00%	(11.36%)	(7.81%)	(4.03%)

User: Sean Klein Kamakura Corporation

ABS Other

⊟ ABS Other				0.00%	(5.95%)	(4.06%)	(2.08%)
Select to collapse	140554AA4	3/20/17	7y 2m 20d	0.00%	(4.21%)	(2.83%)	(1.43%)
ABS.062	00083EAA7	11/27/19	9y 10m 27d	0.00%	(5.19%)	(3.50%)	(1.77%)
ABS.064	64908QAA9	1/15/21	11y 0m 15d	0.00%	(16.15%)	(11.19%)	(5.82%)
ABS.065	140553CS5	8/22/16	6y 7m 22d	0.00%	(0.55%)	(0.37%)	(0.18%)
ABS.066	15132CAE2	5/20/13	3y 4m 20d	0.00%	(6.22%)	(4.19%)	(2.12%)
ABS.067	897790AC5	12/15/16	6y 11m 15d	0.00%	(1.34%)	(0.90%)	(0.45%)
ABS.068	36159LAR7	4/20/13	3y 3m 20d	0.00%	(8.80%)	(5.96%)	(3.03%)
ABS.069	12619DAD1	9/17/12	2y 8m 17d	0.00%	(2.09%)	(1.40%)	(0.71%)
ABS.070	36159WAD4	10/15/12	2y 9m 15d	0.00%	(1.72%)	(1.15%)	(0.58%)
ABS.071	649083AA0	3/15/19	9y 2m 15d	0.00%	(12.22%)	(8.39%)	(4.32%)
ABS.072	36828WAC7	8/26/19	9y 7m 26d	0.00%	(2.54%)	(1.70%)	(0.86%)
ABS.073	36159FAH2	1/25/18	8y 0m 25d	0.00%	(2.68%)	(1.80%)	(0.91%)
ABS.074	00080ABQ2	7/25/19	9y 6m 25d	0.00%	(4.59%)	(3.09%)	(1.56%)
ABS.075	64908PAA1	1/15/21	11y 0m 15d	0.00%	(14.69%)	(10.15%)	(5.26%)
ABS.076	12618PAD5	3/15/12	2y 2m 15d	0.00%	(1.73%)	(1.16%)	(0.58%)
ABS.077	125565AD3	4/20/14	4y 3m 20d	0.00%	(1.74%)	(1.17%)	(0.59%)
ABS.078	14056GAB4	9/20/22	12y 8m 20d	0.00%	(2.85%)	(1.91%)	(0.96%)
ABS.079	19716QAA5	3/20/21	11y 2m 20d	0.00%	(9.40%)	(6.37%)	(3.24%)
ABS.080	649085AA5	5/1/20	10y 4m 1d	0.00%	(14.28%)	(9.85%)	(5.09%)

Auto Loan

⊟ Auto Loan				0.00%	(1.69%)	(1.13%)	(0.57%)
ABS.001	233875AC7	11/8/11	1y 10m 8d	0.00%	(1.31%)	(0.87%)	(0.44%)
ABS.002	13973AAD5	5/15/11	1y 4m 15d	0.00%	(0.73%)	(0.49%)	(0.24%)
ABS.003	92977AAN3	4/20/12	2y 3m 20d	0.00%	(1.11%)	(0.74%)	(0.37%)
ABS.004	92977UAG4	3/20/12	2y 2m 20d	0.00%	(0.89%)	(0.60%)	(0.30%)
ABS.005	34528CAF2	2/15/12	2y 1m 15d	0.00%	(1.97%)	(1.32%)	(0.66%)
ABS.006	43812RAD0	4/15/12	2y 3m 15d	0.00%	(2.07%)	(1.39%)	(0.70%)
ABS.007	14042DAE2	11/15/13	3y 10m 15d	0.00%	(3.59%)	(2.41%)	(1.22%)
ABS.008	23383VDK3	1/8/11	1y 0m 8d	0.00%	(0.46%)	(0.30%)	(0.15%)
ABS.009	404285AC2	6/17/11	1y 5m 17d	0.00%	(0.42%)	(0.28%)	(0.14%)
ABS.010	92977FAD4	3/20/13	3y 2m 20d	0.00%	(1.81%)	(1.21%)	(0.61%)
ABS.011	14041GCR5	10/15/12	2y 9m 15d	0.00%	(2.51%)	(1.68%)	(0.85%)
ABS.012	14041GCV6	12/15/12	2y 11m 15d	0.00%	(2.70%)	(1.81%)	(0.91%)
ABS.013	981526AD8	11/15/12	2y 10m 15d	0.00%	(2.73%)	(1.83%)	(0.92%)
ABS.014	44920DAC0	4/15/11	1y 3m 15d	0.00%	(0.34%)	(0.22%)	(0.11%)
ABS.015	92867AAD8	7/22/13	3y 6m 22d	0.00%	(2.02%)	(1.35%)	(0.68%)
ABS.016	14042CAD6	7/15/12	2y 6m 15d	0.00%	(2.01%)	(1.35%)	(0.68%)
ABS.017	542391BW6	7/15/11	1y 6m 15d	0.00%	(1.19%)	(0.79%)	(0.40%)
ABS.018	98152DBZ3	10/17/11	1y 9m 17d	0.00%	(1.22%)	(0.82%)	(0.41%)
ABS.019	030610AD1	9/6/13	3y 8m 6d	0.00%	(2.92%)	(1.96%)	(0.99%)
ABS.020	055670AD5	8/25/11	1y 7m 25d	0.00%	(1.84%)	(1.23%)	(0.62%)

Credit Cards

⊟ Credit Card				0.00%	(5.01%)	(3.39%)	(1.72%)
ABS.021	161571AW4	12/17/12	2y 11m 17d	0.00%	(2.30%)	(1.54%)	(0.77%)
ABS.022	14041NBW0	8/15/14	4y 7m 15d	0.00%	(11.56%)	(7.87%)	(4.02%)
ABS.023	25466KFJ3	6/18/13	3y 5m 18d	0.00%	(2.82%)	(1.89%)	(0.95%)
ABS.024	254684AE3	1/19/16	6y 0m 19d	0.00%	(9.76%)	(6.62%)	(3.37%)
ABS.025	36159JAN1	6/15/13	3y 5m 15d	0.00%	(1.34%)	(0.90%)	(0.45%)
ABS.026	55264TAE1	12/16/13	3y 11m 16d	0.00%	(4.46%)	(3.00%)	(1.51%)
ABS.027	16151RCR2	1/15/16	6y 0m 15d	0.00%	(10.15%)	(6.89%)	(3.51%)
ABS.028	161571BB9	4/15/13	3y 3m 15d	0.00%	(3.31%)	(2.22%)	(1.11%)
ABS.029	55262NAL0	1/15/13	3y 0m 15d	0.00%	(1.85%)	(1.24%)	(0.62%)
ABS.030	14041NCM1	9/16/13	3y 8m 16d	0.00%	(9.48%)	(6.43%)	(3.27%)
ABS.031	635414AA3	8/15/12	2y 7m 15d	0.00%	(1.85%)	(1.24%)	(0.62%)
ABS.032	14041NCC3	3/15/13	3y 2m 15d	0.00%	(8.60%)	(5.82%)	(2.96%)
ABS.033	55262TCB7	8/15/14	4y 7m 15d	0.00%	(6.31%)	(4.25%)	(2.15%)
ABS.034	05522RAA6	11/15/13	3y 10m 15d	0.00%	(4.24%)	(2.85%)	(1.43%)
ABS.035	05522RAT5	6/15/12	2y 5m 15d	0.00%	(0.12%)	(0.08%)	(0.04%)
ABS.036	981464BD1	2/15/17	7y 1m 15d	0.00%	(9.13%)	(6.18%)	(3.14%)
ABS.037	55264TDL2	4/15/13	3y 3m 15d	0.00%	(2.58%)	(1.73%)	(0.87%)
ABS.038	36159JAG6	3/15/13	3y 2m 15d	0.00%	(0.61%)	(0.40%)	(0.20%)
ABS.039	14041NAX9	7/15/13	3y 6m 15d	0.00%	(8.58%)	(5.81%)	(2.95%)
ABS.040	161571AT1	10/15/12	2y 9m 15d	0.00%	(1.85%)	(1.24%)	(0.62%)

CMBS

⊟ CMBS				0.00%	(5.51%)	(3.75%)	(1.91%)
MBS.193	05947UBM9	4/15/36	26y 3m 15d	0.00%	(2.68%)	(1.80%)	(0.90%)
MBS.194	05947UCF3	5/11/35	25y 4m 11d	0.00%	(3.67%)	(2.47%)	(1.24%)
MBS.196	05947UDP0	4/11/37	27y 3m 11d	0.00%	(3.74%)	(2.51%)	(1.26%)
MBS.197	07383FGE2	11/15/16	6y 10m 15d	0.00%	(1.65%)	(1.10%)	(0.55%)
MBS.198	07383F7S1	6/11/41	31y 5m 11d	0.00%	(0.26%)	(0.18%)	(0.09%)
MBS.199	12513EAH7	7/15/44	34y 6m 15d	0.00%	(10.66%)	(7.28%)	(3.73%)
MBS.201	12513EAJ3	7/15/44	34y 6m 15d	0.00%	(13.66%)	(9.35%)	(4.80%)
MBS.202	20047MAE4	2/5/19	9y 1m 5d	0.00%	(3.14%)	(2.11%)	(1.06%)
MBS.203	20047MAF1	2/5/19	9y 1m 5d	0.00%	(3.24%)	(2.17%)	(1.09%)
MBS.205	20046FAA8	7/16/34	24y 6m 16d	0.00%	(3.03%)	(2.03%)	(1.02%)
MBS.206	225470NG4	12/15/40	30y 11m 15d	0.00%	(0.66%)	(0.44%)	(0.22%)
MBS.207	173067GK9	5/15/43	33y 4m 15d	0.00%	(0.12%)	(0.08%)	(0.04%)
MBS.208	337368AB0	3/15/33	23y 2m 15d	0.00%	(2.06%)	(1.38%)	(0.69%)
MBS.209	36828QNQ5	7/10/45	35y 6m 10d	0.00%	(0.54%)	(0.36%)	(0.18%)
MBS.213	36228CJT1	5/3/18	8y 4m 3d	0.00%	(0.51%)	(0.34%)	(0.17%)
MBS.214	46625YVR1	1/12/43	33y 0m 12d	0.00%	(0.63%)	(0.42%)	(0.21%)
MBS.215	46625YWG4	1/12/43	33y 0m 12d	0.00%	(11.61%)	(7.93%)	(4.06%)
MBS.216	46625YNS8	7/15/42	32y 6m 15d	0.00%	(8.00%)	(5.44%)	(2.77%)
MBS.217	46625YUP6	10/15/42	32y 9m 15d	0.00%	(10.46%)	(7.14%)	(3.65%)
MBS.218	46625YTY9	10/15/42	32y 9m 15d	0.00%	(1.55%)	(1.04%)	(0.52%)
MBS.219	46625YXL2	12/15/44	34y 11m 15d	0.00%	(0.61%)	(0.41%)	(0.20%)
MBS.220	46625YXR9	12/15/44	34y 11m 15d	0.00%	(10.43%)	(7.12%)	(3.64%)
MBS.221	59022HKZ4	11/12/37	27y 10m 12d	0.00%	(1.43%)	(0.96%)	(0.48%)
MBS.222	59022HLH3	11/12/37	27y 10m 12d	0.00%	(13.21%)	(9.04%)	(4.64%)
MBS.223	59022HNA6	1/12/44	34y 0m 12d	0.00%	(13.16%)	(9.01%)	(4.63%)
MBS.224	59022HMW9	1/12/44	34y 0m 12d	0.00%	(2.17%)	(1.45%)	(0.73%)
MBS.225	617451AA7	9/15/42	32y 8m 15d	0.00%	(1.35%)	(0.90%)	(0.45%)
MBS.226	617451AB5	9/15/42	32y 8m 15d	0.00%	(11.67%)	(7.97%)	(4.08%)
MBS.227	617451AF6	9/15/42	32y 8m 15d	0.00%	(13.02%)	(8.90%)	(4.56%)
MBS.228	356486AA8	7/12/16	6y 6m 12d	0.00%	(2.35%)	(1.58%)	(0.79%)
MBS.229	61746WGM6	3/11/16	6y 2m 11d	0.00%	(1.89%)	(1.27%)	(0.64%)
MBS.230	61746WGN4	3/11/16	6y 2m 11d	0.00%	(3.48%)	(2.34%)	(1.18%)
MBS.231	589929VX3	2/3/16	6y 1m 3d	0.00%	(1.90%)	(1.27%)	(0.64%)
MBS.232	901921AC0	2/3/16	6y 1m 3d	0.00%	(1.74%)	(1.17%)	(0.59%)
MBS.233	901921AG1	2/3/16	6y 1m 3d	0.00%	(3.21%)	(2.15%)	(1.08%)
MBS.234	929766W74	5/15/44	34y 4m 15d	0.00%	(1.33%)	(0.89%)	(0.44%)
MBS.235	929766X57	5/15/44	34y 4m 15d	0.00%	(13.92%)	(9.52%)	(4.88%)
MBS.236	929766X65	5/15/44	34y 4m 15d	0.00%	(13.13%)	(8.97%)	(4.60%)
MBS.237	9297664R1	5/15/44	34y 4m 15d	0.00%	(11.22%)	(7.67%)	(3.93%)
MBS.238	9297664K6	7/15/42	32y 6m 15d	0.00%	(1.51%)	(1.01%)	(0.51%)
MBS.239	9297667B3	10/15/44	34y 9m 15d	0.00%	(11.44%)	(7.81%)	(4.00%)
MBS.240	9297667C1	10/15/44	34y 9m 15d	0.00%	(1.71%)	(1.14%)	(0.57%)
MBS.241	9297667K3	10/15/44	34y 9m 15d	0.00%	(13.68%)	(9.36%)	(4.81%)
MBS.242	9297667J6	10/15/44	34y 9m 15d	0.00%	(13.57%)	(9.29%)	(4.77%)

RMBS- By Credit Rating and Rate Reset

⊟ RMBS PA				0.00%	(9.54%)	(6.55%)	(3.38%)
MBS.002	9292276V3	7/25/18	8y 6m 25d	0.00%	(9.31%)	(6.36%)	(3.26%)
MBS.003	36228FUT1	7/25/18	8y 6m 25d	0.00%	(6.86%)	(4.66%)	(2.38%)
MBS.005	55265KG60	9/25/33	23y 8m 25d	0.00%	(17.29%)	(11.99%)	(6.24%)
MBS.006	55265KK24	9/25/18	8y 8m 25d	0.00%	(8.02%)	(5.47%)	(2.79%)
MBS.007	32051DL34	9/25/18	8y 8m 25d	0.00%	(8.46%)	(5.77%)	(2.95%)
MBS.008	949762AA6	9/25/18	8y 8m 25d	0.00%	(7.95%)	(5.41%)	(2.77%)
MBS.009	949808AP4	10/25/33	23y 9m 25d	0.00%	(12.13%)	(8.41%)	(4.37%)
MBS.010	949768AA3	11/25/33	23y 10m 25d	0.00%	(11.28%)	(7.80%)	(4.05%)
MBS.011	949768AB1	11/25/33	23y 10m 25d	0.00%	(11.28%)	(7.80%)	(4.05%)
MBS.012	949769AB9	11/25/33	23y 10m 25d	0.00%	(10.29%)	(7.09%)	(3.67%)
MBS.013	22541QZT2	11/25/33	23y 10m 25d	0.00%	(12.12%)	(8.39%)	(4.36%)
MBS.014	55265KU31	11/25/18	8y 10m 25d	0.00%	(8.73%)	(5.95%)	(3.05%)
MBS.015	36228FYK6	10/25/33	23y 9m 25d	0.00%	(12.33%)	(8.54%)	(4.44%)
MBS.017	16162WAM1	11/25/18	8y 10m 25d	0.00%	(8.96%)	(6.12%)	(3.13%)
MBS.018	94979FAB2	11/25/18	8y 10m 25d	0.00%	(9.10%)	(6.21%)	(3.18%)
MBS.019	92922FGY8	11/25/33	23y 10m 25d	0.00%	(12.83%)	(8.77%)	(4.49%)
MBS.020	94980DAA6	12/25/33	23y 11m 25d	0.00%	(10.63%)	(7.33%)	(3.80%)
MBS.021	94980XAA2	12/25/33	23y 11m 25d	0.00%	(11.57%)	(8.01%)	(4.16%)
MBS.022	94980YAE2	12/25/18	8y 11m 25d	0.00%	(9.40%)	(6.42%)	(3.29%)
MBS.023	466247AZ6	11/25/33	23y 10m 25d	0.00%	(11.95%)	(8.27%)	(4.29%)
MBS.024	12669FJF1	2/25/34	24y 1m 25d	0.00%	(7.88%)	(5.39%)	(2.77%)
MBS.025	61748HAD3	2/25/34	24y 1m 25d	0.00%	(9.70%)	(6.67%)	(3.44%)
MBS.026	05948X5T4	4/25/34	24y 3m 25d	0.00%	(7.78%)	(5.32%)	(2.73%)
MBS.027	81744FAZ0	5/20/34	24y 4m 20d	0.00%	(4.79%)	(3.24%)	(1.64%)
MBS.028	949805AB1	5/25/34	24y 4m 25d	0.00%	(9.87%)	(6.79%)	(3.51%)
MBS.029	94981DAB3	5/25/34	24y 4m 25d	0.00%	(10.15%)	(6.99%)	(3.61%)
MBS.030	07384YTL0	3/25/44	34y 2m 25d	0.00%	(8.54%)	(5.85%)	(3.01%)
MBS.031	05948X7A3	6/25/19	9y 5m 25d	0.00%	(2.97%)	(1.99%)	(1.00%)
MBS.032	07384MS86	7/25/34	24y 6m 25d	0.00%	(10.31%)	(7.10%)	(3.67%)
MBS.033	576434SF2	7/25/19	9y 6m 25d	0.00%	(8.37%)	(5.71%)	(2.92%)
MBS.035	76111XLE1	7/25/34	24y 6m 25d	0.00%	(10.34%)	(7.12%)	(3.68%)
MBS.036	36228F4R4	6/25/34	24y 5m 25d	0.00%	(11.60%)	(8.02%)	(4.16%)
MBS.037	949788AE3	7/25/19	9y 6m 25d	0.00%	(9.54%)	(6.52%)	(3.35%)
MBS.038	61748HAW1	7/25/34	24y 6m 25d	0.00%	(10.18%)	(7.01%)	(3.62%)
MBS.039	949758AD8	8/25/34	24y 7m 25d	0.00%	(11.42%)	(7.90%)	(4.10%)
MBS.040	41161PFV0	8/19/34	24y 7m 19d	0.00%	(9.84%)	(6.77%)	(3.49%)
MBS.041	466247DZ3	9/25/34	24y 8m 25d	0.00%	(9.95%)	(6.85%)	(3.54%)
MBS.042	466247EH2	9/25/34	24y 8m 25d	0.00%	(9.95%)	(6.85%)	(3.54%)

MBS.043	61748HBQ3	8/25/34	24y 7m 25d	0.00%	(8.54%)	(5.85%)	(3.01%)
MBS.044	94978LAA2	9/25/34	24y 8m 25d	0.00%	(9.11%)	(6.26%)	(3.22%)
MBS.045	94980MAB4	9/25/34	24y 8m 25d	0.00%	(10.72%)	(7.39%)	(3.83%)
MBS.046	92922FYA0	10/25/34	24y 9m 25d	0.00%	(9.24%)	(6.35%)	(3.27%)
MBS.047	06051GBB4	5/20/34	24y 4m 20d	0.00%	(10.08%)	(6.93%)	(3.58%)
MBS.048	59020UHH1	5/25/34	24y 4m 25d	0.00%	(9.00%)	(6.17%)	(3.18%)
MBS.049	07384MY30	10/25/34	24y 9m 25d	0.00%	(8.66%)	(5.93%)	(3.05%)
MBS.050	94981GAF7	9/25/34	24y 8m 25d	0.00%	(9.99%)	(6.88%)	(3.55%)
MBS.052	12669F5S8	8/25/34	24y 7m 25d	0.00%	(15.22%)	(10.59%)	(5.53%)
MBS.053	12669GBY6	11/20/34	24y 10m 20d	0.00%	(7.53%)	(5.14%)	(2.64%)
MBS.054	12669GBZ3	11/20/34	24y 10m 20d	0.00%	(7.53%)	(5.14%)	(2.64%)
MBS.055	59020ULR4	8/25/34	24y 7m 25d	0.00%	(10.49%)	(7.23%)	(3.74%)
MBS.056	94982AAA0	11/25/34	24y 10m 25d	0.00%	(8.64%)	(5.92%)	(3.05%)
MBS.057	05946XKZ5	10/25/19	9y 9m 25d	0.00%	(9.79%)	(6.69%)	(3.44%)
MBS.058	22541SX29	12/25/19	9y 11m 25d	0.00%	(9.27%)	(6.33%)	(3.25%)
MBS.059	57643MHZ0	12/25/19	9y 11m 25d	0.00%	(9.38%)	(6.41%)	(3.29%)
MBS.060	81744FFJ1	12/20/34	24y 11m 20d	0.00%	(6.52%)	(4.44%)	(2.27%)
MBS.063	86359LFN4	4/19/35	25y 3m 19d	0.00%	(3.52%)	(2.37%)	(1.20%)
MBS.064	939336V91	1/25/35	25y 0m 25d	0.00%	(10.90%)	(7.52%)	(3.89%)
MBS.065	885220GB3	12/25/44	34y 11m 25d	0.00%	(4.51%)	(3.05%)	(1.55%)
MBS.066	81744FFY8	1/20/35	25y 0m 20d	0.00%	(7.23%)	(4.93%)	(2.52%)
MBS.067	59020UNZ4	1/25/30	20y 0m 25d	0.00%	(4.66%)	(3.15%)	(1.60%)
MBS.070	86359LGE3	5/19/35	25y 4m 19d	0.00%	(5.03%)	(3.41%)	(1.74%)
MBS.071	466247LU5	2/25/35	25y 1m 25d	0.00%	(11.64%)	(8.05%)	(4.18%)
MBS.075	225458AL2	2/25/35	25y 1m 25d	0.00%	(16.88%)	(11.68%)	(6.07%)
MBS.077	59020USJ5	2/25/35	25y 1m 25d	0.00%	(10.65%)	(7.34%)	(3.80%)
MBS.081	36185N7G9	6/19/35	25y 5m 19d	0.00%	(6.08%)	(4.12%)	(2.09%)
MBS.087	07387AEA9	8/25/35	25y 7m 25d	0.00%	(7.17%)	(4.85%)	(2.46%)
MBS.093	59020UL52	11/25/35	25y 10m 25d	0.00%	(11.86%)	(8.20%)	(4.26%)
MBS.099	86359BYF2	8/25/34	24y 7m 25d	0.00%	(9.67%)	(6.65%)	(3.43%)
MBS.100	863579AS7	9/25/34	24y 8m 25d	0.00%	(10.77%)	(7.43%)	(3.85%)
MBS.101	863579AW8	9/25/34	24y 8m 25d	0.00%	(10.00%)	(6.88%)	(3.55%)
MBS.113	59020UL45	11/25/35	25y 10m 25d	0.00%	(8.46%)	(5.80%)	(2.99%)
MBS.118	12669FA86	7/25/34	24y 6m 25d	0.00%	(11.10%)	(7.66%)	(3.97%)
MBS.133	59020UL37	11/25/35	25y 10m 25d	0.00%	(12.92%)	(8.96%)	(4.66%)
MBS.138	36242DFX6	9/25/34	24y 8m 25d	0.00%	(10.84%)	(7.48%)	(3.87%)
MBS.140	07387AAB1	3/25/35	25y 2m 25d	0.00%	(9.41%)	(6.47%)	(3.33%)

MBS Agency

Select to expand MBS Agency				0.00%	(8.31%)	(5.73%)	(2.97%)
MBS.143	31393ART6	3/25/17	7y 2m 25d	0.00%	(2.98%)	(2.00%)	(1.01%)
MBS.144	31395RAN8	4/15/15	5y 3m 15d	0.00%	(4.05%)	(2.72%)	(1.38%)
MBS.145	31394K4X9	10/15/33	23y 9m 15d	0.00%	(11.62%)	(8.02%)	(4.16%)
MBS.146	31393GDF8	12/15/17	7y 11m 15d	0.00%	(6.88%)	(4.68%)	(2.38%)
MBS.147	31393DDG3	7/25/33	23y 6m 25d	0.00%	(8.50%)	(5.82%)	(2.99%)
MBS.148	3136FASC5	9/1/32	22y 8m 1d	0.00%	(7.28%)	(4.97%)	(2.54%)
MBS.149	31395CQJ3	8/15/30	20y 7m 15d	0.00%	(5.50%)	(3.71%)	(1.88%)
MBS.150	3128HWJJ7	12/15/36	26y 11m 15d	0.00%	(12.21%)	(8.46%)	(4.40%)
MBS.151	3136FCBM7	12/1/33	23y 11m 1d	0.00%	(26.52%)	(18.92%)	(10.15%)
MBS.152	31393RSY7	10/15/26	16y 9m 15d	0.00%	(0.91%)	(0.61%)	(0.30%)
MBS.153	31396C3Q1	10/15/15	5y 9m 15d	0.00%	(4.44%)	(2.99%)	(1.51%)
MBS.154	31394TAA3	3/15/34	24y 2m 15d	0.00%	(9.19%)	(6.31%)	(3.25%)
MBS.155	31393BWD3	12/25/17	7y 11m 25d	0.00%	(5.59%)	(3.78%)	(1.92%)
MBS.156	3128HWCS4	11/15/36	26y 10m 15d	0.00%	(9.26%)	(6.36%)	(3.28%)
MBS.157	31395VCE7	6/15/35	25y 5m 15d	0.00%	(10.34%)	(7.11%)	(3.67%)
MBS.158	31393TSX5	10/25/33	23y 9m 25d	0.00%	(8.30%)	(5.68%)	(2.92%)
MBS.159	31394HAE1	8/15/33	23y 7m 15d	0.00%	(9.91%)	(6.82%)	(3.52%)
MBS.160	3136FCKK1	8/1/34	24y 7m 1d	0.00%	(29.01%)	(20.80%)	(11.22%)
MBS.161	31393KK95	12/15/21	11y 11m 15d	0.00%	(4.33%)	(2.92%)	(1.47%)
MBS.162	3136FAWR7	1/1/33	23y 0m 1d	0.00%	(9.55%)	(6.56%)	(3.39%)
MBS.163	31395LC41	1/15/35	25y 0m 15d	0.00%	(11.51%)	(7.95%)	(4.12%)
MBS.164	31394D2P4	10/25/29	19y 9m 25d	0.00%	(3.91%)	(2.63%)	(1.33%)
MBS.165	31394UAC6	10/25/35	25y 9m 25d	0.00%	(10.30%)	(7.09%)	(3.67%)
MBS.166	31393J5G9	12/15/28	18y 11m 15d	0.00%	(3.40%)	(2.29%)	(1.15%)
MBS.167	31393QST0	5/15/33	23y 4m 15d	0.00%	(11.55%)	(7.98%)	(4.14%)
MBS.168	31393HRJ3	6/15/22	12y 5m 15d	0.00%	(5.62%)	(3.80%)	(1.93%)
MBS.169	31393RYN4	10/15/26	16y 9m 15d	0.00%	(0.91%)	(0.61%)	(0.30%)
MBS.170	31393XB22	4/25/34	24y 3m 25d	0.00%	(10.52%)	(7.25%)	(3.75%)
MBS.171	31393DT50	8/25/18	8y 7m 25d	0.00%	(7.75%)	(5.28%)	(2.69%)
MBS.172	31393VDF5	6/15/18	8y 5m 15d	0.00%	(10.38%)	(7.08%)	(3.62%)
MBS.173	31393NYY9	3/15/17	7y 2m 15d	0.00%	(3.06%)	(2.06%)	(1.04%)
MBS.174	31395VTS8	7/15/15	5y 6m 15d	0.00%	(3.74%)	(2.52%)	(1.27%)
MBS.175	31393EVW6	9/25/33	23y 8m 25d	0.00%	(10.46%)	(7.21%)	(3.73%)
MBS.176	31396C3S7	3/15/31	21y 2m 15d	0.00%	(4.44%)	(2.99%)	(1.51%)
MBS.177	31394FNC5	9/25/35	25y 8m 25d	0.00%	(10.36%)	(7.13%)	(3.68%)
MBS.178	3136FCW93	7/1/36	26y 6m 1d	0.00%	(14.91%)	(10.41%)	(5.46%)
MBS.179	31392GPK5	4/25/16	6y 3m 25d	0.00%	(0.74%)	(0.50%)	(0.25%)
MBS.180	31396UAM2	7/15/36	26y 6m 15d	0.00%	(11.44%)	(7.89%)	(4.09%)
MBS.181	3136FC5W2	10/1/36	26y 9m 1d	0.00%	(13.98%)	(9.72%)	(5.07%)
MBS.182	31392WFM7	10/15/17	7y 9m 15d	0.00%	(5.60%)	(3.79%)	(1.93%)
MBS.183	31395VUK3	5/15/31	21y 4m 15d	0.00%	(3.74%)	(2.52%)	(1.27%)
MBS.184	31397AGJ6	5/15/29	19y 4m 15d	0.00%	(4.40%)	(2.96%)	(1.50%)
MBS.185	31395RBA5	4/15/20	10y 3m 15d	0.00%	(13.60%)	(9.33%)	(4.80%)
MBS.186	31392JTS8	10/25/16	6y 9m 25d	0.00%	(2.19%)	(1.47%)	(0.74%)
MBS.187	31396AP73	9/15/35	25y 8m 15d	0.00%	(10.17%)	(6.99%)	(3.61%)
MBS.188	31393GJQ8	5/15/22	12y 4m 15d	0.00%	(4.87%)	(3.29%)	(1.66%)
MBS.189	3136FCHB5	3/1/34	24y 2m 1d	0.00%	(10.76%)	(7.42%)	(3.84%)
MBS.190	31393YDE2	5/25/34	24y 4m 25d	0.00%	(10.23%)	(7.04%)	(3.64%)
MBS.191	31396NCJ3	9/15/33	23y 8m 15d	0.00%	(7.05%)	(4.79%)	(2.44%)
MBS.192	31396C2Y5	10/15/15	5y 9m 15d	0.00%	(4.42%)	(2.98%)	(1.51%)

Student Loan

⊟ Student Loan FFELP				0.00%	(3.95%)	(2.66%)	(1.35%)
ABS.042	194268AA6	1/25/23	13y 0m 25d	0.00%	(2.76%)	(1.85%)	(0.93%)
ABS.043	19458LAB6	9/28/20	10y 8m 28d	0.00%	(2.37%)	(1.59%)	(0.80%)
ABS.044	64031QAG6	9/25/24	14y 8m 25d	0.00%	(7.18%)	(4.87%)	(2.48%)
ABS.047	64031QAU5	7/25/22	12y 6m 25d	0.00%	(0.80%)	(0.53%)	(0.27%)
ABS.048	78443CAY0	9/15/16	6y 8m 15d	0.00%	(1.18%)	(0.79%)	(0.39%)
ABS.049	78442GPN0	10/25/21	11y 9m 25d	0.00%	(9.31%)	(6.32%)	(3.22%)
ABS.054	78442GNZ5	7/25/16	6y 6m 25d	0.00%	(5.40%)	(3.64%)	(1.84%)
ABS.055	64031RAY5	11/25/15	5y 10m 25d	0.00%	(2.34%)	(1.57%)	(0.79%)
ABS.058	78442GHG4	3/15/19	9y 2m 15d	0.00%	(2.89%)	(1.94%)	(0.98%)
ABS.059	00432CBU4	7/25/12	2y 6m 25d	0.00%	(5.27%)	(3.56%)	(1.80%)
⊟ Student Loan Private				0.00%	(4.51%)	(3.08%)	(1.57%)
ABS.041	78443CBY9	12/16/19	9y 11m 16d	0.00%	(0.61%)	(0.40%)	(0.20%)
ABS.045	78443CCE2	3/16/20	10y 2m 16d	0.00%	(0.88%)	(0.59%)	(0.29%)
ABS.046	78443CBF0	3/15/17	7y 2m 15d	0.00%	(1.56%)	(1.04%)	(0.52%)
ABS.050	63543XAE9	4/25/12	2y 3m 25d	0.00%	(4.74%)	(3.19%)	(1.61%)
ABS.051	63543PAV8	10/27/25	15y 9m 27d	0.00%	(0.45%)	(0.30%)	(0.15%)
ABS.052	28140XAB5	10/25/29	19y 9m 25d	0.00%	(11.20%)	(7.65%)	(3.93%)
ABS.053	66704JBP2	11/28/23	13y 10m 28d	0.00%	(3.33%)	(2.23%)	(1.12%)
ABS.056	00432CBG5	4/25/29	19y 3m 25d	0.00%	(16.01%)	(11.09%)	(5.77%)
ABS.057	78443DAA0	9/15/22	12y 8m 15d	0.00%	(3.99%)	(2.69%)	(1.35%)
ABS.060	63543XAA7	6/25/25	15y 5m 25d	0.00%	(2.26%)	(1.52%)	(0.76%)

Treasury Securities

⊟ Treasury Security				0.00%	(7.29%)	(4.98%)	(2.55%)
TR.001	912795R8	1/14/10	0y 0m 14d	0.00%	(0.12%)	(0.08%)	(0.04%)
TR.002	912795T4	2/25/10	0y 1m 25d	0.00%	(0.46%)	(0.31%)	(0.15%)
TR.003	912795UJ	11/18/10	0y 10m 18d	0.00%	(2.61%)	(1.75%)	(0.88%)
TR.004	912795U7	7/29/10	0y 6m 29d	0.00%	(1.71%)	(1.14%)	(0.57%)
TR.005	912795UT	6/10/10	0y 5m 10d	0.00%	(1.31%)	(0.88%)	(0.44%)
TR.006	912795U9	9/23/10	0y 8m 23d	0.00%	(2.16%)	(1.45%)	(0.73%)
TR.007	912795T5	3/4/10	0y 2m 4d	0.00%	(0.52%)	(0.34%)	(0.17%)
TR.008	912795UK	12/16/10	0y 11m 16d	0.00%	(2.84%)	(1.90%)	(0.95%)
TR.009	912795UL	4/1/10	0y 3m 1d	0.00%	(0.75%)	(0.50%)	(0.25%)
TR.010	912795T8	3/25/10	0y 2m 25d	0.00%	(0.69%)	(0.46%)	(0.23%)
TR.011	912795UU	6/17/10	0y 5m 17d	0.00%	(1.37%)	(0.92%)	(0.46%)
TR.012	912795T2	2/11/10	0y 1m 11d	0.00%	(0.34%)	(0.23%)	(0.12%)
TR.013	912795UQ	5/13/10	0y 4m 13d	0.00%	(1.09%)	(0.73%)	(0.36%)
TR.014	912795UP	4/29/10	0y 3m 29d	0.00%	(0.97%)	(0.65%)	(0.33%)
TR.015	912795UR	5/20/10	0y 4m 20d	0.00%	(1.14%)	(0.76%)	(0.38%)
TR.016	912795U6	7/1/10	0y 6m 1d	0.00%	(1.48%)	(0.99%)	(0.50%)
TR.017	912795R7	1/7/10	0y 0m 7d	0.00%	(0.06%)	(0.04%)	(0.02%)
TR.018	912795UN	4/22/10	0y 3m 22d	0.00%	(0.92%)	(0.61%)	(0.31%)
TR.019	912795S7	1/28/10	0y 0m 28d	0.00%	(0.23%)	(0.15%)	(0.08%)
TR.020	912795U5	6/3/10	0y 5m 3d	0.00%	(1.26%)	(0.84%)	(0.42%)
TR.021	912828KX	6/15/12	2y 5m 15d	0.00%	(6.97%)	(4.70%)	(2.38%)
TR.022	912828HH	11/15/17	7y 10m 15d	0.00%	(18.11%)	(12.51%)	(6.49%)
TR.023	912828JL	9/30/10	0y 9m 0d	0.00%	(2.20%)	(1.48%)	(0.74%)
TR.024	912828LH	8/15/12	2y 7m 15d	0.00%	(7.38%)	(4.99%)	(2.53%)
TR.025	912828CA	2/15/14	4y 1m 15d	0.00%	(10.74%)	(7.30%)	(3.72%)
TR.026	912828MD	12/31/16	7y 0m 0d	0.00%	(17.09%)	(11.77%)	(6.08%)
TR.027	912828DM	2/15/15	5y 1m 15d	0.00%	(12.90%)	(8.81%)	(4.51%)
TR.028	912828HQ	1/31/13	3y 1m 0d	0.00%	(8.43%)	(5.71%)	(2.90%)
TR.029	912828LP	9/30/16	6y 9m 0d	0.00%	(16.59%)	(11.42%)	(5.89%)
TR.030	912828EM	11/15/10	0y 10m 15d	0.00%	(2.56%)	(1.71%)	(0.86%)
TR.031	912828DX	6/15/10	0y 5m 15d	0.00%	(1.36%)	(0.91%)	(0.45%)
TR.032	912828GR	5/15/10	0y 4m 15d	0.00%	(1.10%)	(0.74%)	(0.37%)
TR.033	912828HA	8/15/17	7y 7m 15d	0.00%	(17.27%)	(11.92%)	(6.17%)
TR.034	912828KJ	3/31/14	4y 3m 0d	0.00%	(11.53%)	(7.84%)	(4.00%)
TR.035	912828DZ	7/15/10	0y 6m 15d	0.00%	(1.57%)	(1.05%)	(0.53%)
TR.036	912828JR	11/15/18	8y 10m 15d	0.00%	(20.03%)	(13.90%)	(7.24%)
TR.037	912828GG	2/15/10	0y 1m 15d	0.00%	(0.38%)	(0.25%)	(0.13%)

TR.038	912828JH	8/15/18	8y 7m 15d	0.00%	(19.29%)	(13.37%)	(6.96%)
TR.039	912828HE	9/30/12	2y 9m 0d	0.00%	(7.50%)	(5.07%)	(2.57%)
TR.040	912828KD	2/15/19	9y 1m 15d	0.00%	(20.99%)	(14.59%)	(7.61%)
TR.041	912828AP	11/15/12	2y 10m 15d	0.00%	(7.87%)	(5.32%)	(2.70%)
TR.042	912828JQ	10/31/13	3y 10m 0d	0.00%	(10.35%)	(7.03%)	(3.58%)
TR.043	912828CT	8/15/14	4y 7m 15d	0.00%	(11.77%)	(8.02%)	(4.10%)
TR.044	912828GK	2/29/12	2y 2m 0d	0.00%	(5.98%)	(4.03%)	(2.04%)
TR.045	912828LZ	11/30/14	4y 11m 0d	0.00%	(13.06%)	(8.92%)	(4.57%)
TR.046	912828LF	6/30/11	1y 6m 0d	0.00%	(4.36%)	(2.93%)	(1.48%)
TR.047	912828ME	12/31/14	5y 0m 0d	0.00%	(13.15%)	(8.98%)	(4.60%)
TR.048	912828JZ	1/31/14	4y 1m 0d	0.00%	(11.10%)	(7.55%)	(3.85%)
TR.049	912828LQ	9/30/14	4y 9m 0d	0.00%	(12.56%)	(8.57%)	(4.38%)
TR.050	912828GC	12/31/11	2y 0m 0d	0.00%	(5.64%)	(3.80%)	(1.92%)
TR.051	912828LY	11/15/19	9y 10m 15d	0.00%	(21.87%)	(15.24%)	(7.97%)
TR.052	912828HS	2/28/10	0y 2m 0d	0.00%	(0.48%)	(0.32%)	(0.16%)
TR.053	912828GW	6/30/12	2y 6m 0d	0.00%	(6.90%)	(4.66%)	(2.36%)
TR.054	912828FU	9/30/11	1y 9m 0d	0.00%	(4.93%)	(3.31%)	(1.67%)
TR.055	912828JA	5/31/10	0y 5m 0d	0.00%	(1.23%)	(0.82%)	(0.41%)
TR.056	912828FA	3/31/11	1y 3m 0d	0.00%	(3.57%)	(2.40%)	(1.21%)
TR.057	912828KE	2/28/11	1y 2m 0d	0.00%	(3.41%)	(2.28%)	(1.15%)
TR.058	912828FF	5/15/16	6y 4m 15d	0.00%	(15.14%)	(10.39%)	(5.35%)
TR.059	912828LG	7/31/11	1y 7m 0d	0.00%	(4.59%)	(3.08%)	(1.55%)
TR.060	912828KZ	6/30/16	6y 6m 0d	0.00%	(16.12%)	(11.08%)	(5.71%)
TR.061	912828EE	8/15/15	5y 7m 15d	0.00%	(13.84%)	(9.47%)	(4.86%)
TR.062	912828LW	9/30/11	1y 9m 0d	0.00%	(5.07%)	(3.41%)	(1.72%)
TR.063	912828DL	2/15/10	0y 1m 15d	0.00%	(0.38%)	(0.25%)	(0.13%)
TR.064	912828LM	9/15/12	2y 8m 15d	0.00%	(7.66%)	(5.17%)	(2.62%)
TR.065	912828EQ	12/15/10	0y 11m 15d	0.00%	(2.80%)	(1.87%)	(0.94%)
TR.066	912828HT	2/28/13	3y 2m 0d	0.00%	(8.66%)	(5.86%)	(2.98%)
TR.067	912828LK	8/31/14	4y 8m 0d	0.00%	(12.35%)	(8.42%)	(4.30%)
TR.068	912828FY	11/15/16	6y 10m 15d	0.00%	(16.21%)	(11.16%)	(5.76%)
TR.069	912828LR	10/15/12	2y 9m 15d	0.00%	(7.88%)	(5.33%)	(2.70%)
TR.070	912828KP	5/15/12	2y 4m 15d	0.00%	(6.77%)	(4.57%)	(2.31%)
TR.071	912828LD	7/31/16	6y 7m 0d	0.00%	(16.07%)	(11.05%)	(5.70%)
TR.072	912828JY	1/31/11	1y 1m 0d	0.00%	(3.18%)	(2.13%)	(1.07%)
TR.073	9128277B	8/15/11	1y 7m 15d	0.00%	(4.55%)	(3.06%)	(1.54%)
TR.074	912828GA	11/30/11	1y 11m 0d	0.00%	(5.40%)	(3.64%)	(1.83%)
TR.075	912828KC	2/15/12	2y 1m 15d	0.00%	(6.08%)	(4.10%)	(2.07%)
TR.076	912828ML	12/31/11	2y 0m 0d	0.00%	(5.78%)	(3.89%)	(1.97%)

TR.077	912828HG	10/31/12	2y 10m 0d	0.00%	(7.77%)	(5.25%)	(2.66%)
TR.078	912828DU	5/15/10	0y 4m 15d	0.00%	(1.10%)	(0.74%)	(0.37%)
TR.079	912828LU	10/31/16	6y 10m 0d	0.00%	(16.74%)	(11.52%)	(5.95%)
TR.080	912828DV	5/15/15	5y 4m 15d	0.00%	(13.50%)	(9.23%)	(4.73%)
TR.081	912828HU	3/31/10	0y 3m 0d	0.00%	(0.74%)	(0.49%)	(0.25%)
TR.082	912828HK	11/30/12	2y 11m 0d	0.00%	(8.04%)	(5.43%)	(2.76%)
TR.083	912828LX	11/15/12	2y 10m 15d	0.00%	(8.12%)	(5.49%)	(2.78%)
TR.084	912828FQ	8/15/16	6y 7m 15d	0.00%	(15.50%)	(10.66%)	(5.49%)
TR.085	912828JS	11/30/10	0y 11m 0d	0.00%	(2.70%)	(1.81%)	(0.91%)
TR.086	912828KN	4/30/14	4y 4m 0d	0.00%	(11.72%)	(7.98%)	(4.07%)
TR.087	912828GZ	7/31/12	2y 7m 0d	0.00%	(7.01%)	(4.73%)	(2.39%)
TR.088	912828FK	6/30/11	1y 6m 0d	0.00%	(4.28%)	(2.88%)	(1.45%)
TR.089	912828AU	2/15/13	3y 1m 15d	0.00%	(8.42%)	(5.70%)	(2.89%)
TR.090	9128277L	2/15/12	2y 1m 15d	0.00%	(5.86%)	(3.95%)	(1.99%)
TR.091	912828JF	7/31/10	0y 7m 0d	0.00%	(1.71%)	(1.14%)	(0.57%)
TR.092	912828HZ	5/15/18	8y 4m 15d	0.00%	(19.14%)	(13.25%)	(6.89%)
TR.093	912828FW	10/31/11	1y 10m 0d	0.00%	(5.16%)	(3.47%)	(1.75%)
TR.094	912828BR	11/15/13	3y 10m 15d	0.00%	(10.22%)	(6.94%)	(3.54%)
TR.095	912828HR	2/15/18	8y 1m 15d	0.00%	(18.78%)	(12.99%)	(6.75%)
TR.096	912828MA	11/30/16	6y 11m 0d	0.00%	(17.12%)	(11.79%)	(6.09%)
TR.097	912828KK	4/15/12	2y 3m 15d	0.00%	(6.54%)	(4.41%)	(2.23%)
TR.098	912828ES	1/15/11	1y 0m 15d	0.00%	(2.99%)	(2.00%)	(1.01%)
TR.099	912828JU	11/15/11	1y 10m 15d	0.00%	(5.39%)	(3.63%)	(1.83%)
TR.100	912828LT	10/31/11	1y 10m 0d	0.00%	(5.31%)	(3.57%)	(1.80%)

Corporates

⊟ BDX				0.00%	(11.19%)	(7.69%)	(3.96%)
BDX.01	BDX.01	12/1/10	0y 11m 1d	0.00%	(2.71%)	(1.81%)	(0.91%)
BDX.03	BDX.03	12/2/12	2y 11m 2d	0.00%	(8.16%)	(5.52%)	(2.80%)
BDX.05	BDX.05	12/4/14	4y 11m 4d	0.00%	(12.75%)	(8.70%)	(4.46%)
BDX.10	BDX.10	12/7/19	9y 11m 7d	0.00%	(20.98%)	(14.61%)	(7.64%)
⊟ CVX				0.00%	(11.34%)	(7.80%)	(4.02%)
CVX.01	CVX.01	12/7/10	0y 11m 7d	0.00%	(2.76%)	(1.85%)	(0.93%)
CVX.03	CVX.03	12/8/12	2y 11m 8d	0.00%	(8.23%)	(5.57%)	(2.83%)
CVX.05	CVX.05	12/9/14	4y 11m 9d	0.00%	(12.90%)	(8.80%)	(4.51%)
CVX.10	CVX.10	12/11/19	9y 11m 11d	0.00%	(21.34%)	(14.87%)	(7.78%)
⊟ DNA				0.00%	(11.33%)	(7.79%)	(4.02%)
DNA.01	DNA.01	12/4/10	0y 11m 4d	0.00%	(2.73%)	(1.83%)	(0.92%)
DNA.03	DNA.03	12/14/12	2y 11m 14d	0.00%	(8.27%)	(5.60%)	(2.84%)
DNA.05	DNA.05	12/15/14	4y 11m 15d	0.00%	(12.91%)	(8.81%)	(4.51%)
DNA.10	DNA.10	12/16/19	9y 11m 16d	0.00%	(21.28%)	(14.83%)	(7.75%)
⊟ JNJ				0.00%	(11.40%)	(7.84%)	(4.04%)
JNJ.01	JNJ.01	12/16/10	0y 11m 16d	0.00%	(2.83%)	(1.90%)	(0.95%)
JNJ.03	JNJ.03	12/18/12	2y 11m 18d	0.00%	(8.31%)	(5.62%)	(2.85%)
JNJ.05	JNJ.05	12/21/14	4y 11m 21d	0.00%	(12.97%)	(8.85%)	(4.53%)
JNJ.10	JNJ.10	12/21/19	9y 11m 21d	0.00%	(21.39%)	(14.91%)	(7.80%)
⊟ MDT				0.00%	(11.26%)	(7.74%)	(3.99%)
MDT.01	MDT.01	12/1/10	0y 11m 1d	0.00%	(2.71%)	(1.82%)	(0.91%)
MDT.03	MDT.03	12/4/12	2y 11m 4d	0.00%	(8.19%)	(5.54%)	(2.81%)
MDT.05	MDT.05	12/7/14	4y 11m 7d	0.00%	(12.82%)	(8.75%)	(4.48%)
MDT.10	MDT.10	12/7/19	9y 11m 7d	0.00%	(21.16%)	(14.74%)	(7.71%)
⊟ MMM				0.00%	(11.30%)	(7.77%)	(4.01%)
MMM.01	MMM.01	12/8/10	0y 11m 8d	0.00%	(2.77%)	(1.85%)	(0.93%)
MMM.03	MMM.03	12/9/12	2y 11m 9d	0.00%	(8.24%)	(5.58%)	(2.83%)
MMM.05	MMM.05	12/1/14	4y 11m 1d	0.00%	(12.83%)	(8.76%)	(4.48%)
MMM.10	MMM.10	12/2/19	9y 11m 2d	0.00%	(21.22%)	(14.78%)	(7.73%)

⊟ MSFT				0.00%	(11.33%)	(7.79%)	(4.02%)
MSFT.01	MSFT.01	12/4/10	0y 11m 4d	0.00%	(2.74%)	(1.83%)	(0.92%)
MSFT.03	MSFT.03	12/7/12	2y 11m 7d	0.00%	(8.22%)	(5.56%)	(2.82%)
MSFT.05	MSFT.05	12/7/14	4y 11m 7d	0.00%	(12.88%)	(8.79%)	(4.50%)
MSFT.10	MSFT.10	12/16/19	9y 11m 16d	0.00%	(21.37%)	(14.89%)	(7.79%)
⊟ PCAR				0.00%	(14.20%)	(9.78%)	(5.05%)
PCAR.03	PCAR.03	12/7/12	2y 11m 7d	0.00%	(8.23%)	(5.56%)	(2.82%)
PCAR.05	PCAR.05	12/8/14	4y 11m 8d	0.00%	(12.89%)	(8.80%)	(4.51%)
PCAR.10	PCAR.10	12/9/19	9y 11m 9d	0.00%	(21.41%)	(14.92%)	(7.80%)
⊟ PFE				0.00%	(11.37%)	(7.81%)	(4.03%)
PFE.01	PFE.01	12/18/10	0y 11m 18d	0.00%	(2.85%)	(1.91%)	(0.96%)
PFE.03	PFE.03	12/21/12	2y 11m 21d	0.00%	(8.33%)	(5.63%)	(2.86%)
PFE.05	PFE.05	12/21/14	4y 11m 21d	0.00%	(12.95%)	(8.84%)	(4.53%)
PFE.10	PFE.10	12/4/19	9y 11m 4d	0.00%	(21.19%)	(14.76%)	(7.72%)
⊟ PG				0.00%	(11.30%)	(7.77%)	(4.01%)
PG.01	PG.01	12/4/10	0y 11m 4d	0.00%	(2.74%)	(1.83%)	(0.92%)
PG.03	PG.03	12/7/12	2y 11m 7d	0.00%	(8.22%)	(5.56%)	(2.82%)
PG.05	PG.05	12/7/14	4y 11m 7d	0.00%	(12.86%)	(8.78%)	(4.49%)
PG.10	PG.10	12/8/19	9y 11m 8d	0.00%	(21.26%)	(14.81%)	(7.75%)

⊟ SYY				0.00%	(11.32%)	(7.78%)	(4.01%)
SYY.01	SYY.01	12/9/10	0y 11m 9d	0.00%	(2.78%)	(1.86%)	(0.93%)
SYY.03	SYY.03	12/11/12	2y 11m 11d	0.00%	(8.26%)	(5.59%)	(2.83%)
SYY.05	SYY.05	12/1/14	4y 11m 1d	0.00%	(12.83%)	(8.75%)	(4.48%)
SYY.10	SYY.10	12/2/19	9y 11m 2d	0.00%	(21.26%)	(14.81%)	(7.74%)

⊟ WFC				0.00%	(11.23%)	(7.72%)	(3.98%)
WFC.01	WFC.01	12/21/10	0y 11m 21d	0.00%	(2.87%)	(1.92%)	(0.97%)
WFC.03	WFC.03	12/21/12	2y 11m 21d	0.00%	(8.28%)	(5.60%)	(2.84%)
WFC.05	WFC.05	12/21/14	4y 11m 21d	0.00%	(12.82%)	(8.75%)	(4.48%)
WFC.10	WFC.10	12/4/19	9y 11m 4d	0.00%	(20.82%)	(14.50%)	(7.58%)

⊟ XOM				0.00%	(11.36%)	(7.81%)	(4.03%)
XOM.01	XOM.01	12/7/10	0y 11m 7d	0.00%	(2.76%)	(1.85%)	(0.93%)
Select to collapse	XOM.03	12/7/12	2y 11m 7d	0.00%	(8.23%)	(5.57%)	(2.82%)
XOM.05	XOM.05	12/8/14	4y 11m 8d	0.00%	(12.90%)	(8.80%)	(4.51%)
XOM.10	XOM.10	12/9/19	9y 11m 9d	0.00%	(21.42%)	(14.92%)	(7.80%)

2009 Spread +PP Stress Tests

NCUA

REPORTS | ADMINISTRATION

Portfolio | Interest Rate Risk | Liquidity Risk | Market Risk | Credit Risk | Economic Capital | Basel Capital | Financial Ratio Analysis | Other Reports | Report Finder | Help

Sensitivity - by Attribute

KRM Run: Assets 2009 Stress Test SPD shft + CPR (values in USD)

View By (Edit) Currently Selected: [Asset Type, Transaction]

Market Value | Change in MV | % Change in MV | by Shift

Expand All | Collapse All

				% Change in MV			
	CUSIP	Maturity Date	Remaining Maturity	Base Case	Upward 300bp	Upward 200bp	Upward 100bp
⊞ ABS Other				0.00%	(6.30%)	(4.29%)	(2.20%)
⊞ Auto Loan				0.00%	(1.88%)	(1.26%)	(0.63%)
⊞ BDX				0.00%	(11.19%)	(7.69%)	(3.96%)
⊞ CMBS				0.00%	(5.51%)	(3.75%)	(1.92%)
⊞ CVX				0.00%	(11.34%)	(7.80%)	(4.02%)
⊞ Credit Card				0.00%	(5.01%)	(3.39%)	(1.72%)
⊞ DNA				0.00%	(11.33%)	(7.79%)	(4.02%)
⊞ JNJ				0.00%	(11.40%)	(7.84%)	(4.04%)
⊞ MBS Agency				0.00%	(10.96%)	(7.60%)	(3.96%)
⊞ MDT				0.00%	(11.26%)	(7.74%)	(3.99%)
⊞ MMM				0.00%	(11.30%)	(7.77%)	(4.01%)
⊞ MSFT				0.00%	(11.33%)	(7.79%)	(4.02%)
⊞ PCAR				0.00%	(14.20%)	(9.78%)	(5.05%)
⊞ PFE				0.00%	(11.37%)	(7.81%)	(4.03%)
⊞ PG				0.00%	(11.30%)	(7.77%)	(4.01%)
⊞ RMBS PA				0.00%	(12.78%)	(8.86%)	(4.62%)
⊞ RMBS PF				0.00%	(11.10%)	(7.65%)	(3.95%)
⊞ RMBS SA				0.00%	(9.97%)	(6.88%)	(3.57%)
⊞ RMBS SF				0.00%	(10.12%)	(7.03%)	(3.67%)
⊞ SYY				0.00%	(11.32%)	(7.78%)	(4.01%)
⊞ Student Loan FFELP				0.00%	(4.75%)	(3.21%)	(1.63%)
⊞ Student Loan Private				0.00%	(5.26%)	(3.60%)	(1.85%)
⊞ Treasury Security				0.00%	(7.29%)	(4.98%)	(2.55%)
⊞ WFC				0.00%	(11.23%)	(7.72%)	(3.98%)
⊞ XOM				0.00%	(11.36%)	(7.81%)	(4.03%)

User: Sean Klein Kamakura Corporation

ABS Other

⊟ ABS Other				0.00%	(6.30%)	(4.29%)	(2.20%)
ABS.061	140554AA4	3/20/17	7y 2m 20d	0.00%	(4.54%)	(3.06%)	(1.54%)
ABS.062	00083EAA7	11/27/19	9y 10m 27d	0.00%	(7.69%)	(5.21%)	(2.65%)
ABS.064	64908QAA9	1/15/21	11y 0m 15d	0.00%	(16.15%)	(11.19%)	(5.82%)
ABS.065	140553CS5	8/22/16	6y 7m 22d	0.00%	(0.55%)	(0.37%)	(0.18%)
ABS.066	15132CAE2	5/20/13	3y 4m 20d	0.00%	(6.22%)	(4.19%)	(2.12%)
ABS.067	897790AC5	12/15/16	6y 11m 15d	0.00%	(1.34%)	(0.90%)	(0.45%)
ABS.068	36159LAR7	4/20/13	3y 3m 20d	0.00%	(8.80%)	(5.96%)	(3.03%)
ABS.069	12619DAD1	9/17/12	2y 8m 17d	0.00%	(2.27%)	(1.52%)	(0.77%)
ABS.070	36159WAD4	10/15/12	2y 9m 15d	0.00%	(1.86%)	(1.25%)	(0.63%)
ABS.071	649083AA0	3/15/19	9y 2m 15d	0.00%	(12.22%)	(8.39%)	(4.32%)
ABS.072	36828WAC7	8/26/19	9y 7m 26d	0.00%	(3.69%)	(2.48%)	(1.25%)
ABS.073	36159FAH2	1/25/18	8y 0m 25d	0.00%	(3.70%)	(2.49%)	(1.25%)
ABS.074	00080ABQ2	7/25/19	9y 6m 25d	0.00%	(4.59%)	(3.09%)	(1.56%)
ABS.075	64908PAA1	1/15/21	11y 0m 15d	0.00%	(14.69%)	(10.15%)	(5.26%)
ABS.076	12618PAD5	3/15/12	2y 2m 15d	0.00%	(1.86%)	(1.25%)	(0.63%)
ABS.077	125565AD3	4/20/14	4y 3m 20d	0.00%	(1.78%)	(1.19%)	(0.60%)
ABS.078	14056GAB4	9/20/22	12y 8m 20d	0.00%	(3.69%)	(2.48%)	(1.25%)
ABS.079	19716QAA5	3/20/21	11y 2m 20d	0.00%	(9.40%)	(6.37%)	(3.24%)
ABS.080	649085AA5	5/1/20	10y 4m 1d	0.00%	(14.28%)	(9.85%)	(5.09%)

Auto Loan

⊟ Auto Loan				0.00%	(1.88%)	(1.26%)	(0.63%)
ABS.001	233875AC7	11/8/11	1y 10m 8d	0.00%	(1.50%)	(1.01%)	(0.50%)
ABS.002	13973AAD5	5/15/11	1y 4m 15d	0.00%	(0.82%)	(0.55%)	(0.27%)
ABS.003	92977AAN3	4/20/12	2y 3m 20d	0.00%	(1.33%)	(0.89%)	(0.45%)
ABS.004	92977UAG4	3/20/12	2y 2m 20d	0.00%	(1.08%)	(0.72%)	(0.36%)
ABS.005	34528CAF2	2/15/12	2y 1m 15d	0.00%	(2.17%)	(1.45%)	(0.73%)
ABS.006	43812RAD0	4/15/12	2y 3m 15d	0.00%	(2.19%)	(1.46%)	(0.74%)
ABS.007	14042DAE2	11/15/13	3y 10m 15d	0.00%	(4.09%)	(2.75%)	(1.39%)
ABS.008	23383VDK3	1/8/11	1y 0m 8d	0.00%	(0.53%)	(0.35%)	(0.18%)
ABS.009	404285AC2	6/17/11	1y 5m 17d	0.00%	(0.49%)	(0.33%)	(0.16%)
ABS.010	92977FAD4	3/20/13	3y 2m 20d	0.00%	(2.04%)	(1.37%)	(0.69%)
ABS.011	14041GCR5	10/15/12	2y 9m 15d	0.00%	(2.72%)	(1.83%)	(0.92%)
ABS.012	14041GCV6	12/15/12	2y 11m 15d	0.00%	(2.97%)	(2.00%)	(1.01%)
ABS.013	981526AD8	11/15/12	2y 10m 15d	0.00%	(3.05%)	(2.05%)	(1.03%)
ABS.014	44920DAC0	4/15/11	1y 3m 15d	0.00%	(0.38%)	(0.26%)	(0.13%)
ABS.015	92867AAD8	7/22/13	3y 6m 22d	0.00%	(2.29%)	(1.54%)	(0.77%)
ABS.016	14042CAD6	7/15/12	2y 6m 15d	0.00%	(2.23%)	(1.49%)	(0.75%)
ABS.017	542391BW6	7/15/11	1y 6m 15d	0.00%	(1.24%)	(0.83%)	(0.42%)
ABS.018	98152DBZ3	10/17/11	1y 9m 17d	0.00%	(1.37%)	(0.92%)	(0.46%)
ABS.019	030610AD1	9/6/13	3y 8m 6d	0.00%	(3.20%)	(2.15%)	(1.08%)
ABS.020	055670AD5	8/25/11	1y 7m 25d	0.00%	(1.95%)	(1.31%)	(0.66%)

Credit Cards

⊟ Credit Card				0.00%	(5.01%)	(3.39%)	(1.72%)
ABS.021	161571AW4	12/17/12	2y 11m 17d	0.00%	(2.30%)	(1.54%)	(0.77%)
ABS.022	14041NBW0	8/15/14	4y 7m 15d	0.00%	(11.56%)	(7.87%)	(4.02%)
ABS.023	25466KFJ3	6/18/13	3y 5m 18d	0.00%	(2.82%)	(1.89%)	(0.95%)
ABS.024	254684AE3	1/19/16	6y 0m 19d	0.00%	(9.76%)	(6.62%)	(3.37%)
ABS.025	36159JAN1	6/15/13	3y 5m 15d	0.00%	(1.34%)	(0.90%)	(0.45%)
ABS.026	55264TAE1	12/16/13	3y 11m 16d	0.00%	(4.46%)	(3.00%)	(1.51%)
ABS.027	16151RCR2	1/15/16	6y 0m 15d	0.00%	(10.15%)	(6.89%)	(3.51%)
ABS.028	161571BB9	4/15/13	3y 3m 15d	0.00%	(3.31%)	(2.22%)	(1.11%)
ABS.029	55262NAL0	1/15/13	3y 0m 15d	0.00%	(1.85%)	(1.24%)	(0.62%)
ABS.030	14041NCM1	9/16/13	3y 8m 16d	0.00%	(9.48%)	(6.43%)	(3.27%)
ABS.031	635414AA3	8/15/12	2y 7m 15d	0.00%	(1.85%)	(1.24%)	(0.62%)
ABS.032	14041NCC3	3/15/13	3y 2m 15d	0.00%	(8.60%)	(5.82%)	(2.96%)
ABS.033	55262TCB7	8/15/14	4y 7m 15d	0.00%	(6.31%)	(4.25%)	(2.15%)
ABS.034	05522RAA6	11/15/13	3y 10m 15d	0.00%	(4.24%)	(2.85%)	(1.43%)
ABS.035	05522RAT5	6/15/12	2y 5m 15d	0.00%	(0.12%)	(0.08%)	(0.04%)
ABS.036	981464BD1	2/15/17	7y 1m 15d	0.00%	(9.13%)	(6.18%)	(3.14%)
ABS.037	55264TDL2	4/15/13	3y 3m 15d	0.00%	(2.58%)	(1.73%)	(0.87%)
ABS.038	36159JAG6	3/15/13	3y 2m 15d	0.00%	(0.61%)	(0.40%)	(0.20%)
ABS.039	14041NAX9	7/15/13	3y 6m 15d	0.00%	(8.58%)	(5.81%)	(2.95%)
ABS.040	161571AT1	10/15/12	2y 9m 15d	0.00%	(1.85%)	(1.24%)	(0.62%)

CMBS

⊟ CMBS				0.00%	(5.51%)	(3.75%)	(1.92%)
MBS.193	05947UBM9	4/15/36	26y 3m 15d	0.00%	(2.68%)	(1.80%)	(0.90%)
MBS.194	05947UCF3	5/11/35	25y 4m 11d	0.00%	(3.68%)	(2.47%)	(1.24%)
MBS.196	05947UDP0	4/11/37	27y 3m 11d	0.00%	(3.74%)	(2.51%)	(1.26%)
MBS.197	07383FGE2	11/15/16	6y 10m 15d	0.00%	(1.65%)	(1.10%)	(0.55%)
MBS.198	07383F7S1	6/11/41	31y 5m 11d	0.00%	(0.26%)	(0.18%)	(0.09%)
MBS.199	12513EAH7	7/15/44	34y 6m 15d	0.00%	(10.66%)	(7.28%)	(3.73%)
MBS.201	12513EAJ3	7/15/44	34y 6m 15d	0.00%	(13.66%)	(9.35%)	(4.80%)
MBS.202	20047MAE4	2/5/19	9y 1m 5d	0.00%	(3.14%)	(2.11%)	(1.06%)
MBS.203	20047MAF1	2/5/19	9y 1m 5d	0.00%	(3.24%)	(2.17%)	(1.09%)
MBS.205	20046FAA8	7/16/34	24y 6m 16d	0.00%	(3.03%)	(2.03%)	(1.02%)
MBS.206	225470NG4	12/15/40	30y 11m 15d	0.00%	(0.66%)	(0.44%)	(0.22%)
MBS.207	173067GK9	5/15/43	33y 4m 15d	0.00%	(0.12%)	(0.08%)	(0.04%)
MBS.208	337368AB0	3/15/33	23y 2m 15d	0.00%	(2.06%)	(1.38%)	(0.69%)
MBS.209	36828QNQ5	7/10/45	35y 6m 10d	0.00%	(0.54%)	(0.36%)	(0.18%)
MBS.213	36228CJT1	5/3/18	8y 4m 3d	0.00%	(0.51%)	(0.34%)	(0.17%)
MBS.214	46625YVR1	1/12/43	33y 0m 12d	0.00%	(0.63%)	(0.42%)	(0.21%)
MBS.215	46625YWG4	1/12/43	33y 0m 12d	0.00%	(11.61%)	(7.93%)	(4.06%)
MBS.216	46625YNS8	7/15/42	32y 6m 15d	0.00%	(8.00%)	(5.44%)	(2.77%)
MBS.217	46625YUP6	10/15/42	32y 9m 15d	0.00%	(10.48%)	(7.15%)	(3.66%)
MBS.218	46625YTY9	10/15/42	32y 9m 15d	0.00%	(1.55%)	(1.04%)	(0.52%)
MBS.219	46625YXL2	12/15/44	34y 11m 15d	0.00%	(0.61%)	(0.41%)	(0.20%)
MBS.220	46625YXR9	12/15/44	34y 11m 15d	0.00%	(10.43%)	(7.12%)	(3.64%)
MBS.221	59022HKZ4	11/12/37	27y 10m 12d	0.00%	(1.43%)	(0.96%)	(0.48%)
MBS.222	59022HLH3	11/12/37	27y 10m 12d	0.00%	(13.21%)	(9.04%)	(4.64%)
MBS.223	59022HNA6	1/12/44	34y 0m 12d	0.00%	(13.16%)	(9.01%)	(4.63%)
MBS.224	59022HMW9	1/12/44	34y 0m 12d	0.00%	(2.17%)	(1.45%)	(0.73%)
MBS.225	617451AA7	9/15/42	32y 8m 15d	0.00%	(1.35%)	(0.90%)	(0.45%)
MBS.226	617451AB5	9/15/42	32y 8m 15d	0.00%	(11.67%)	(7.97%)	(4.08%)
MBS.227	617451AF6	9/15/42	32y 8m 15d	0.00%	(13.02%)	(8.90%)	(4.56%)
MBS.228	356486AA8	7/12/16	6y 6m 12d	0.00%	(2.35%)	(1.58%)	(0.79%)
MBS.229	61746WGM6	3/11/16	6y 2m 11d	0.00%	(1.89%)	(1.27%)	(0.64%)
MBS.230	61746WGN4	3/11/16	6y 2m 11d	0.00%	(3.48%)	(2.34%)	(1.18%)
MBS.231	589929VX3	2/3/16	6y 1m 3d	0.00%	(1.90%)	(1.27%)	(0.64%)
MBS.232	901921AC0	2/3/16	6y 1m 3d	0.00%	(1.74%)	(1.17%)	(0.59%)
MBS.233	901921AG1	2/3/16	6y 1m 3d	0.00%	(3.21%)	(2.15%)	(1.08%)
MBS.234	929766W74	5/15/44	34y 4m 15d	0.00%	(1.33%)	(0.89%)	(0.44%)
MBS.235	929766X57	5/15/44	34y 4m 15d	0.00%	(13.92%)	(9.52%)	(4.88%)
MBS.236	929766X65	5/15/44	34y 4m 15d	0.00%	(13.13%)	(8.97%)	(4.60%)
MBS.237	9297664R1	5/15/44	34y 4m 15d	0.00%	(11.28%)	(7.70%)	(3.95%)
MBS.238	9297664K6	7/15/42	32y 6m 15d	0.00%	(1.52%)	(1.02%)	(0.51%)
MBS.239	9297667B3	10/15/44	34y 9m 15d	0.00%	(11.51%)	(7.86%)	(4.02%)
MBS.240	9297667C1	10/15/44	34y 9m 15d	0.00%	(1.72%)	(1.15%)	(0.58%)
MBS.241	9297667K3	10/15/44	34y 9m 15d	0.00%	(13.68%)	(9.37%)	(4.81%)
MBS.242	9297667J6	10/15/44	34y 9m 15d	0.00%	(13.57%)	(9.29%)	(4.77%)

RMBS- By Credit Rating and Rate Reset

⊟ RMBS PA				0.00%	(12.78%)	(8.86%)	(4.62%)
MBS.002	9292276V3	7/25/18	8y 6m 25d	0.00%	(10.03%)	(6.85%)	(3.51%)
MBS.003	36228FUT1	7/25/18	8y 6m 25d	0.00%	(8.57%)	(5.85%)	(2.99%)
MBS.005	55265KG60	9/25/33	23y 8m 25d	0.00%	(22.41%)	(15.75%)	(8.31%)
MBS.006	55265KK24	9/25/18	8y 8m 25d	0.00%	(9.38%)	(6.41%)	(3.28%)
MBS.007	32051DL34	9/25/18	8y 8m 25d	0.00%	(9.59%)	(6.55%)	(3.36%)
MBS.008	949762AA6	9/25/18	8y 8m 25d	0.00%	(9.34%)	(6.38%)	(3.27%)
MBS.009	949808AP4	10/25/33	23y 9m 25d	0.00%	(15.96%)	(11.17%)	(5.87%)
MBS.010	949768AA3	11/25/33	23y 10m 25d	0.00%	(15.22%)	(10.63%)	(5.58%)
MBS.011	949768AB1	11/25/33	23y 10m 25d	0.00%	(15.22%)	(10.63%)	(5.58%)
MBS.012	949769AB9	11/25/33	23y 10m 25d	0.00%	(14.30%)	(9.96%)	(5.22%)
MBS.013	22541QZT2	11/25/33	23y 10m 25d	0.00%	(14.70%)	(10.24%)	(5.36%)
MBS.014	55265KU31	11/25/18	8y 10m 25d	0.00%	(9.87%)	(6.75%)	(3.46%)
MBS.015	36228FYK6	10/25/33	23y 9m 25d	0.00%	(15.67%)	(10.94%)	(5.74%)
MBS.017	16162WAM1	11/25/18	8y 10m 25d	0.00%	(9.96%)	(6.81%)	(3.49%)
MBS.018	94979FAB2	11/25/18	8y 10m 25d	0.00%	(10.06%)	(6.88%)	(3.53%)
MBS.019	92922FGY8	11/25/33	23y 10m 25d	0.00%	(18.66%)	(12.94%)	(6.74%)
MBS.020	94980DAA6	12/25/33	23y 11m 25d	0.00%	(14.58%)	(10.17%)	(5.33%)
MBS.021	94980XAA2	12/25/33	23y 11m 25d	0.00%	(15.45%)	(10.80%)	(5.67%)
MBS.022	94980YAE2	12/25/18	8y 11m 25d	0.00%	(10.27%)	(7.02%)	(3.60%)
MBS.023	466247AZ6	11/25/33	23y 10m 25d	0.00%	(15.69%)	(10.95%)	(5.74%)
MBS.024	12669FJF1	2/25/34	24y 1m 25d	0.00%	(11.19%)	(7.73%)	(4.01%)
MBS.025	61748HAD3	2/25/34	24y 1m 25d	0.00%	(13.08%)	(9.08%)	(4.73%)
MBS.026	05948X5T4	4/25/34	24y 3m 25d	0.00%	(10.69%)	(7.37%)	(3.81%)
MBS.027	81744FAZ0	5/20/34	24y 4m 20d	0.00%	(8.18%)	(5.59%)	(2.86%)
MBS.028	949805AB1	5/25/34	24y 4m 25d	0.00%	(13.57%)	(9.44%)	(4.93%)
MBS.029	94981DAB3	5/25/34	24y 4m 25d	0.00%	(13.62%)	(9.47%)	(4.95%)
MBS.030	07384YTL0	3/25/44	34y 2m 25d	0.00%	(11.09%)	(7.66%)	(3.97%)
MBS.031	05948X7A3	6/25/19	9y 5m 25d	0.00%	(4.35%)	(2.93%)	(1.48%)
MBS.032	07384MS86	7/25/34	24y 6m 25d	0.00%	(13.55%)	(9.42%)	(4.92%)
MBS.033	576434SF2	7/25/19	9y 6m 25d	0.00%	(9.18%)	(6.27%)	(3.22%)
MBS.035	76111XLE1	7/25/34	24y 6m 25d	0.00%	(13.68%)	(9.51%)	(4.96%)
MBS.036	36228F4R4	6/25/34	24y 5m 25d	0.00%	(14.19%)	(9.87%)	(5.16%)
MBS.037	949788AE3	7/25/19	9y 6m 25d	0.00%	(10.68%)	(7.32%)	(3.76%)
MBS.038	61748HAW1	7/25/34	24y 6m 25d	0.00%	(14.23%)	(9.90%)	(5.18%)
MBS.039	949758AD8	8/25/34	24y 7m 25d	0.00%	(15.48%)	(10.82%)	(5.69%)
MBS.040	41161PFV0	8/19/34	24y 7m 19d	0.00%	(13.44%)	(9.33%)	(4.87%)
MBS.041	466247DZ3	9/25/34	24y 8m 25d	0.00%	(13.34%)	(9.26%)	(4.83%)
MBS.042	466247EH2	9/25/34	24y 8m 25d	0.00%	(13.34%)	(9.26%)	(4.83%)

MBS.043	61748HBQ3	8/25/34	24y 7m 25d	0.00%	(11.88%)	(8.22%)	(4.27%)
MBS.044	94978LAA2	9/25/34	24y 8m 25d	0.00%	(12.35%)	(8.56%)	(4.45%)
MBS.045	94980MAB4	9/25/34	24y 8m 25d	0.00%	(15.43%)	(10.78%)	(5.65%)
MBS.046	92922FYA0	10/25/34	24y 9m 25d	0.00%	(13.47%)	(9.36%)	(4.88%)
MBS.047	06051GBB4	5/20/34	24y 4m 20d	0.00%	(14.23%)	(9.90%)	(5.18%)
MBS.048	59020UHH1	5/25/34	24y 4m 25d	0.00%	(12.38%)	(8.57%)	(4.46%)
MBS.049	07384MY30	10/25/34	24y 9m 25d	0.00%	(12.04%)	(8.33%)	(4.33%)
MBS.050	94981GAF7	9/25/34	24y 8m 25d	0.00%	(14.81%)	(10.33%)	(5.42%)
MBS.052	12669F5S8	8/25/34	24y 7m 25d	0.00%	(23.62%)	(16.75%)	(8.92%)
MBS.053	12669GBY6	11/20/34	24y 10m 20d	0.00%	(10.76%)	(7.42%)	(3.84%)
MBS.054	12669GBZ3	11/20/34	24y 10m 20d	0.00%	(10.76%)	(7.42%)	(3.84%)
MBS.055	59020ULR4	8/25/34	24y 7m 25d	0.00%	(14.21%)	(9.89%)	(5.17%)
MBS.056	94982AAA0	11/25/34	24y 10m 25d	0.00%	(12.53%)	(8.69%)	(4.52%)
MBS.057	05946XKZ5	10/25/19	9y 9m 25d	0.00%	(10.69%)	(7.32%)	(3.76%)
MBS.058	22541SX29	12/25/19	9y 11m 25d	0.00%	(10.28%)	(7.04%)	(3.61%)
MBS.059	57643MHZ0	12/25/19	9y 11m 25d	0.00%	(10.49%)	(7.18%)	(3.69%)
MBS.060	81744FFJ1	12/20/34	24y 11m 20d	0.00%	(10.52%)	(7.24%)	(3.74%)
MBS.063	86359LFN4	4/19/35	25y 3m 19d	0.00%	(6.58%)	(4.48%)	(2.29%)
MBS.064	939336V91	1/25/35	25y 0m 25d	0.00%	(14.50%)	(10.10%)	(5.29%)
MBS.065	885220GB3	12/25/44	34y 11m 25d	0.00%	(7.65%)	(5.23%)	(2.68%)
MBS.066	81744FFY8	1/20/35	25y 0m 20d	0.00%	(12.48%)	(8.63%)	(4.49%)
MBS.067	59020UNZ4	1/25/30	20y 0m 25d	0.00%	(8.12%)	(5.55%)	(2.85%)
MBS.070	86359LGE3	5/19/35	25y 4m 19d	0.00%	(8.70%)	(5.97%)	(3.07%)
MBS.071	466247LU5	2/25/35	25y 1m 25d	0.00%	(15.28%)	(10.67%)	(5.59%)
MBS.075	225458AL2	2/25/35	25y 1m 25d	0.00%	(24.71%)	(17.45%)	(9.26%)
MBS.077	59020USJ5	2/25/35	25y 1m 25d	0.00%	(14.11%)	(9.82%)	(5.14%)
MBS.081	36185N7G9	6/19/35	25y 5m 19d	0.00%	(9.60%)	(6.56%)	(3.37%)
MBS.087	07387AEA9	8/25/35	25y 7m 25d	0.00%	(11.11%)	(7.57%)	(3.87%)
MBS.093	59020UL52	11/25/35	25y 10m 25d	0.00%	(15.84%)	(11.06%)	(5.80%)
MBS.099	86359BYF2	8/25/34	24y 7m 25d	0.00%	(13.12%)	(9.11%)	(4.75%)
MBS.100	863579AS7	9/25/34	24y 8m 25d	0.00%	(14.37%)	(10.01%)	(5.23%)
MBS.101	863579AW8	9/25/34	24y 8m 25d	0.00%	(13.74%)	(9.55%)	(4.99%)
MBS.113	59020UL45	11/25/35	25y 10m 25d	0.00%	(13.37%)	(9.32%)	(4.89%)
MBS.118	12669FA86	7/25/34	24y 6m 25d	0.00%	(14.03%)	(9.76%)	(5.10%)
MBS.133	59020UL37	11/25/35	25y 10m 25d	0.00%	(16.52%)	(11.55%)	(6.07%)
MBS.138	36242DFX6	9/25/34	24y 8m 25d	0.00%	(13.78%)	(9.58%)	(5.00%)
MBS.140	07387AAB1	3/25/35	25y 2m 25d	0.00%	(13.76%)	(9.57%)	(5.00%)

MBS Agency

⊟ MBS Agency				0.00%	(10.96%)	(7.60%)	(3.96%)
MBS.143	31393ART6	3/25/17	7y 2m 25d	0.00%	(3.99%)	(2.68%)	(1.35%)
MBS.144	31395RAN8	4/15/15	5y 3m 15d	0.00%	(5.41%)	(3.65%)	(1.85%)
MBS.145	31394K4X9	10/15/33	23y 9m 15d	0.00%	(15.19%)	(10.59%)	(5.54%)
MBS.146	31393GDF8	12/15/17	7y 11m 15d	0.00%	(8.23%)	(5.61%)	(2.86%)
MBS.147	31393DDG3	7/25/33	23y 6m 25d	0.00%	(13.12%)	(9.11%)	(4.75%)
MBS.148	3136FASC5	9/1/32	22y 8m 1d	0.00%	(11.87%)	(8.21%)	(4.27%)
MBS.149	31395CQJ3	8/15/30	20y 7m 15d	0.00%	(8.00%)	(5.44%)	(2.78%)
MBS.150	3128HWJJ7	12/15/36	26y 11m 15d	0.00%	(17.81%)	(12.50%)	(6.60%)
MBS.151	3136FCBM7	12/1/33	23y 11m 1d	0.00%	(26.99%)	(19.27%)	(10.34%)
MBS.152	31393RSY7	10/15/26	16y 9m 15d	0.00%	(1.63%)	(1.09%)	(0.55%)
MBS.153	31396C3Q1	10/15/15	5y 9m 15d	0.00%	(7.27%)	(4.94%)	(2.51%)
MBS.154	31394TAA3	3/15/34	24y 2m 15d	0.00%	(11.52%)	(7.93%)	(4.10%)
MBS.155	31393BWD3	12/25/17	7y 11m 25d	0.00%	(6.96%)	(4.72%)	(2.40%)
MBS.156	3128HWCS4	11/15/36	26y 10m 15d	0.00%	(14.16%)	(9.87%)	(5.17%)
MBS.157	31395VCE7	6/15/35	25y 5m 15d	0.00%	(12.69%)	(8.76%)	(4.54%)
MBS.158	31393TSX5	10/25/33	23y 9m 25d	0.00%	(12.60%)	(8.73%)	(4.55%)
MBS.159	31394HAE1	8/15/33	23y 7m 15d	0.00%	(14.18%)	(9.87%)	(5.16%)
MBS.160	3136FCKK1	8/1/34	24y 7m 1d	0.00%	(29.62%)	(21.24%)	(11.46%)
MBS.161	31393KK95	12/15/21	11y 11m 15d	0.00%	(6.54%)	(4.43%)	(2.25%)
MBS.162	3136FAWR7	1/1/33	23y 0m 1d	0.00%	(13.85%)	(9.63%)	(5.03%)
MBS.163	31395LC41	1/15/35	25y 0m 15d	0.00%	(13.60%)	(9.42%)	(4.90%)
MBS.164	31394D2P4	10/25/29	19y 9m 25d	0.00%	(5.23%)	(3.53%)	(1.79%)
MBS.165	31394UAC6	10/25/35	25y 9m 25d	0.00%	(14.32%)	(9.97%)	(5.22%)
MBS.166	31393J5G9	12/15/28	18y 11m 15d	0.00%	(5.75%)	(3.89%)	(1.97%)
MBS.167	31393QST0	5/15/33	23y 4m 15d	0.00%	(15.26%)	(10.64%)	(5.58%)
MBS.168	31393HRJ3	6/15/22	12y 5m 15d	0.00%	(8.09%)	(5.51%)	(2.81%)
MBS.169	31393RYN4	10/15/26	16y 9m 15d	0.00%	(1.63%)	(1.09%)	(0.55%)
MBS.170	31393XB22	4/25/34	24y 3m 25d	0.00%	(14.72%)	(10.26%)	(5.37%)
MBS.171	31393DT50	8/25/18	8y 7m 25d	0.00%	(8.42%)	(5.74%)	(2.93%)
MBS.172	31393VDF5	6/15/18	8y 5m 15d	0.00%	(11.60%)	(7.93%)	(4.07%)
MBS.173	31393NYY9	3/15/17	7y 2m 15d	0.00%	(4.12%)	(2.78%)	(1.40%)
MBS.174	31395VTS8	7/15/15	5y 6m 15d	0.00%	(6.33%)	(4.29%)	(2.18%)
MBS.175	31393EVW6	9/25/33	23y 8m 25d	0.00%	(14.49%)	(10.09%)	(5.28%)
MBS.176	31396C3S7	3/15/31	21y 2m 15d	0.00%	(7.28%)	(4.94%)	(2.52%)
MBS.177	31394FNC5	9/25/35	25y 8m 25d	0.00%	(11.91%)	(8.21%)	(4.25%)
MBS.178	3136FCW93	7/1/36	26y 6m 1d	0.00%	(20.72%)	(14.67%)	(7.81%)
MBS.179	31392GPK5	4/25/16	6y 3m 25d	0.00%	(1.02%)	(0.68%)	(0.34%)
MBS.180	31396UAM2	7/15/36	26y 6m 15d	0.00%	(13.51%)	(9.37%)	(4.88%)
MBS.181	3136FC5W2	10/1/36	26y 9m 1d	0.00%	(18.69%)	(13.16%)	(6.96%)
MBS.182	31392WFM7	10/15/17	7y 9m 15d	0.00%	(7.05%)	(4.79%)	(2.44%)
MBS.183	31395VUK3	5/15/31	21y 4m 15d	0.00%	(6.33%)	(4.29%)	(2.18%)
MBS.184	31397AGJ6	5/15/29	19y 4m 15d	0.00%	(7.06%)	(4.79%)	(2.44%)
MBS.185	31395RBA5	4/15/20	10y 3m 15d	0.00%	(15.35%)	(10.56%)	(5.45%)
MBS.186	31392JTS8	10/25/16	6y 9m 25d	0.00%	(2.97%)	(1.99%)	(1.00%)
MBS.187	31396AP73	9/15/35	25y 8m 15d	0.00%	(12.01%)	(8.28%)	(4.28%)
MBS.188	31393GJQ8	5/15/22	12y 4m 15d	0.00%	(7.30%)	(4.95%)	(2.52%)
MBS.189	3136FCHB5	3/1/34	24y 2m 1d	0.00%	(15.14%)	(10.56%)	(5.54%)
MBS.190	31393YDE2	5/25/34	24y 4m 25d	0.00%	(14.45%)	(10.07%)	(5.27%)
MBS.191	31396NCJ3	9/15/33	23y 8m 15d	0.00%	(10.98%)	(7.54%)	(3.88%)
MBS.192	31396C2Y5	10/15/15	5y 9m 15d	0.00%	(7.22%)	(4.90%)	(2.50%)

Student Loan

⊟ Student Loan FFELP				0.00%	(4.75%)	(3.21%)	(1.63%)
ABS.042	194268AA6	1/25/23	13y 0m 25d	0.00%	(2.76%)	(1.85%)	(0.93%)
ABS.043	19458LAB6	9/28/20	10y 8m 28d	0.00%	(3.01%)	(2.02%)	(1.02%)
ABS.044	64031QAG6	9/25/24	14y 8m 25d	0.00%	(10.24%)	(7.01%)	(3.60%)
ABS.047	64031QAU5	7/25/22	12y 6m 25d	0.00%	(1.20%)	(0.80%)	(0.40%)
ABS.048	78443CAY0	9/15/16	6y 8m 15d	0.00%	(1.33%)	(0.89%)	(0.45%)
ABS.049	78442GPN0	10/25/21	11y 9m 25d	0.00%	(11.24%)	(7.66%)	(3.92%)
ABS.054	78442GNZ5	7/25/16	6y 6m 25d	0.00%	(6.05%)	(4.08%)	(2.06%)
ABS.055	64031RAY5	11/25/15	5y 10m 25d	0.00%	(2.92%)	(1.96%)	(0.98%)
ABS.058	78442GHG4	3/15/19	9y 2m 15d	0.00%	(3.68%)	(2.47%)	(1.25%)
ABS.059	00432CBU4	7/25/12	2y 6m 25d	0.00%	(5.27%)	(3.56%)	(1.80%)
⊟ Student Loan Private				0.00%	(5.26%)	(3.60%)	(1.85%)
ABS.041	78443CBY9	12/16/19	9y 11m 16d	0.00%	(0.61%)	(0.40%)	(0.20%)
ABS.045	78443CCE2	3/16/20	10y 2m 16d	0.00%	(1.11%)	(0.74%)	(0.37%)
ABS.046	78443CBF0	3/15/17	7y 2m 15d	0.00%	(1.87%)	(1.25%)	(0.63%)
ABS.050	63543XAE9	4/25/12	2y 3m 25d	0.00%	(4.74%)	(3.19%)	(1.61%)
ABS.051	63543PAV8	10/27/25	15y 9m 27d	0.00%	(0.57%)	(0.38%)	(0.19%)
ABS.052	28140XAB5	10/25/29	19y 9m 25d	0.00%	(15.86%)	(10.96%)	(5.69%)
ABS.053	66704JBP2	11/28/23	13y 10m 28d	0.00%	(4.43%)	(2.98%)	(1.51%)
ABS.056	00432CBG5	4/25/29	19y 3m 25d	0.00%	(16.01%)	(11.09%)	(5.77%)
ABS.057	78443DAA0	9/15/22	12y 8m 15d	0.00%	(4.83%)	(3.25%)	(1.64%)
ABS.060	63543XAA7	6/25/25	15y 5m 25d	0.00%	(2.76%)	(1.85%)	(0.93%)

Treasury Securities

⊟ Treasury Security				0.00%	(7.29%)	(4.98%)	(2.55%)
TR.001	912795R8	1/14/10	0y 0m 14d	0.00%	(0.12%)	(0.08%)	(0.04%)
TR.002	912795T4	2/25/10	0y 1m 25d	0.00%	(0.46%)	(0.31%)	(0.15%)
TR.003	912795UJ	11/18/10	0y 10m 18d	0.00%	(2.61%)	(1.75%)	(0.88%)
TR.004	912795U7	7/29/10	0y 6m 29d	0.00%	(1.71%)	(1.14%)	(0.57%)
TR.005	912795UT	6/10/10	0y 5m 10d	0.00%	(1.31%)	(0.88%)	(0.44%)
TR.006	912795U9	9/23/10	0y 8m 23d	0.00%	(2.16%)	(1.45%)	(0.73%)
TR.007	912795T5	3/4/10	0y 2m 4d	0.00%	(0.52%)	(0.34%)	(0.17%)
TR.008	912795UK	12/16/10	0y 11m 16d	0.00%	(2.84%)	(1.90%)	(0.95%)
TR.009	912795UL	4/1/10	0y 3m 1d	0.00%	(0.75%)	(0.50%)	(0.25%)
TR.010	912795T8	3/25/10	0y 2m 25d	0.00%	(0.69%)	(0.46%)	(0.23%)
TR.011	912795UU	6/17/10	0y 5m 17d	0.00%	(1.37%)	(0.92%)	(0.46%)
TR.012	912795T2	2/11/10	0y 1m 11d	0.00%	(0.34%)	(0.23%)	(0.12%)
TR.013	912795UQ	5/13/10	0y 4m 13d	0.00%	(1.09%)	(0.73%)	(0.36%)
TR.014	912795UP	4/29/10	0y 3m 29d	0.00%	(0.97%)	(0.65%)	(0.33%)
TR.015	912795UR	5/20/10	0y 4m 20d	0.00%	(1.14%)	(0.76%)	(0.38%)
TR.016	912795U6	7/1/10	0y 6m 1d	0.00%	(1.48%)	(0.99%)	(0.50%)
TR.017	912795R7	1/7/10	0y 0m 7d	0.00%	(0.06%)	(0.04%)	(0.02%)
TR.018	912795UN	4/22/10	0y 3m 22d	0.00%	(0.92%)	(0.61%)	(0.31%)
TR.019	912795S7	1/28/10	0y 0m 28d	0.00%	(0.23%)	(0.15%)	(0.08%)
TR.020	912795U5	6/3/10	0y 5m 3d	0.00%	(1.26%)	(0.84%)	(0.42%)
TR.021	912828KX	6/15/12	2y 5m 15d	0.00%	(6.97%)	(4.70%)	(2.38%)
TR.022	912828HH	11/15/17	7y 10m 15d	0.00%	(18.11%)	(12.51%)	(6.49%)
TR.023	912828JL	9/30/10	0y 9m 0d	0.00%	(2.20%)	(1.48%)	(0.74%)
TR.024	912828LH	8/15/12	2y 7m 15d	0.00%	(7.38%)	(4.99%)	(2.53%)
TR.025	912828CA	2/15/14	4y 1m 15d	0.00%	(10.74%)	(7.30%)	(3.72%)
TR.026	912828MD	12/31/16	7y 0m 0d	0.00%	(17.09%)	(11.77%)	(6.08%)
TR.027	912828DM	2/15/15	5y 1m 15d	0.00%	(12.90%)	(8.81%)	(4.51%)
TR.028	912828HQ	1/31/13	3y 1m 0d	0.00%	(8.43%)	(5.71%)	(2.90%)
TR.029	912828LP	9/30/16	6y 9m 0d	0.00%	(16.59%)	(11.42%)	(5.89%)
TR.030	912828EM	11/15/10	0y 10m 15d	0.00%	(2.56%)	(1.71%)	(0.86%)
TR.031	912828DX	6/15/10	0y 5m 15d	0.00%	(1.36%)	(0.91%)	(0.45%)
TR.032	912828GR	5/15/10	0y 4m 15d	0.00%	(1.10%)	(0.74%)	(0.37%)
TR.033	912828HA	8/15/17	7y 7m 15d	0.00%	(17.27%)	(11.92%)	(6.17%)
TR.034	912828KJ	3/31/14	4y 3m 0d	0.00%	(11.53%)	(7.84%)	(4.00%)
TR.035	912828DZ	7/15/10	0y 6m 15d	0.00%	(1.57%)	(1.05%)	(0.53%)
TR.036	912828JR	11/15/18	8y 10m 15d	0.00%	(20.03%)	(13.90%)	(7.24%)
TR.037	912828GG	2/15/10	0y 1m 15d	0.00%	(0.38%)	(0.25%)	(0.13%)

TR.038	912828JH	8/15/18	8y 7m 15d	0.00%	(19.29%)	(13.37%)	(6.96%)
TR.039	912828HE	9/30/12	2y 9m 0d	0.00%	(7.50%)	(5.07%)	(2.57%)
TR.040	912828KD	2/15/19	9y 1m 15d	0.00%	(20.99%)	(14.59%)	(7.61%)
TR.041	912828AP	11/15/12	2y 10m 15d	0.00%	(7.87%)	(5.32%)	(2.70%)
TR.042	912828JQ	10/31/13	3y 10m 0d	0.00%	(10.35%)	(7.03%)	(3.58%)
TR.043	912828CT	8/15/14	4y 7m 15d	0.00%	(11.77%)	(8.02%)	(4.10%)
TR.044	912828GK	2/29/12	2y 2m 0d	0.00%	(5.98%)	(4.03%)	(2.04%)
TR.045	912828LZ	11/30/14	4y 11m 0d	0.00%	(13.06%)	(8.92%)	(4.57%)
TR.046	912828LF	6/30/11	1y 6m 0d	0.00%	(4.36%)	(2.93%)	(1.48%)
TR.047	912828ME	12/31/14	5y 0m 0d	0.00%	(13.15%)	(8.98%)	(4.60%)
TR.048	912828JZ	1/31/14	4y 1m 0d	0.00%	(11.10%)	(7.55%)	(3.85%)
TR.049	912828LQ	9/30/14	4y 9m 0d	0.00%	(12.56%)	(8.57%)	(4.38%)
TR.050	912828GC	12/31/11	2y 0m 0d	0.00%	(5.64%)	(3.80%)	(1.92%)
TR.051	912828LY	11/15/19	9y 10m 15d	0.00%	(21.87%)	(15.24%)	(7.97%)
TR.052	912828HS	2/28/10	0y 2m 0d	0.00%	(0.48%)	(0.32%)	(0.16%)
TR.053	912828GW	6/30/12	2y 6m 0d	0.00%	(6.90%)	(4.66%)	(2.36%)
TR.054	912828FU	9/30/11	1y 9m 0d	0.00%	(4.93%)	(3.31%)	(1.67%)
TR.055	912828JA	5/31/10	0y 5m 0d	0.00%	(1.23%)	(0.82%)	(0.41%)
TR.056	912828FA	3/31/11	1y 3m 0d	0.00%	(3.57%)	(2.40%)	(1.21%)
TR.057	912828KE	2/28/11	1y 2m 0d	0.00%	(3.41%)	(2.28%)	(1.15%)
TR.058	912828FF	5/15/16	6y 4m 15d	0.00%	(15.14%)	(10.39%)	(5.35%)
TR.059	912828LG	7/31/11	1y 7m 0d	0.00%	(4.59%)	(3.08%)	(1.55%)
TR.060	912828KZ	6/30/16	6y 6m 0d	0.00%	(16.12%)	(11.08%)	(5.71%)
TR.061	912828EE	8/15/15	5y 7m 15d	0.00%	(13.84%)	(9.47%)	(4.86%)
TR.062	912828LW	9/30/11	1y 9m 0d	0.00%	(5.07%)	(3.41%)	(1.72%)
TR.063	912828DL	2/15/10	0y 1m 15d	0.00%	(0.38%)	(0.25%)	(0.13%)
TR.064	912828LM	9/15/12	2y 8m 15d	0.00%	(7.66%)	(5.17%)	(2.62%)
TR.065	912828EQ	12/15/10	0y 11m 15d	0.00%	(2.80%)	(1.87%)	(0.94%)
TR.066	912828HT	2/28/13	3y 2m 0d	0.00%	(8.66%)	(5.86%)	(2.98%)
TR.067	912828LK	8/31/14	4y 8m 0d	0.00%	(12.35%)	(8.42%)	(4.30%)
TR.068	912828FY	11/15/16	6y 10m 15d	0.00%	(16.21%)	(11.16%)	(5.76%)
TR.069	912828LR	10/15/12	2y 9m 15d	0.00%	(7.88%)	(5.33%)	(2.70%)
TR.070	912828KP	5/15/12	2y 4m 15d	0.00%	(6.77%)	(4.57%)	(2.31%)
TR.071	912828LD	7/31/16	6y 7m 0d	0.00%	(16.07%)	(11.05%)	(5.70%)
TR.072	912828JY	1/31/11	1y 1m 0d	0.00%	(3.18%)	(2.13%)	(1.07%)
TR.073	9128277B	8/15/11	1y 7m 15d	0.00%	(4.55%)	(3.06%)	(1.54%)
TR.074	912828GA	11/30/11	1y 11m 0d	0.00%	(5.40%)	(3.64%)	(1.83%)
TR.075	912828KC	2/15/12	2y 1m 15d	0.00%	(6.08%)	(4.10%)	(2.07%)
TR.076	912828ML	12/31/11	2y 0m 0d	0.00%	(5.78%)	(3.89%)	(1.97%)

TR.077	912828HG	10/31/12	2y 10m 0d	0.00%	(7.77%)	(5.25%)	(2.66%)
TR.078	912828DU	5/15/10	0y 4m 15d	0.00%	(1.10%)	(0.74%)	(0.37%)
TR.079	912828LU	10/31/16	6y 10m 0d	0.00%	(16.74%)	(11.52%)	(5.95%)
TR.080	912828DV	5/15/15	5y 4m 15d	0.00%	(13.50%)	(9.23%)	(4.73%)
TR.081	912828HU	3/31/10	0y 3m 0d	0.00%	(0.74%)	(0.49%)	(0.25%)
TR.082	912828HK	11/30/12	2y 11m 0d	0.00%	(8.04%)	(5.43%)	(2.76%)
TR.083	912828LX	11/15/12	2y 10m 15d	0.00%	(8.12%)	(5.49%)	(2.78%)
TR.084	912828FQ	8/15/16	6y 7m 15d	0.00%	(15.50%)	(10.66%)	(5.49%)
TR.085	912828JS	11/30/10	0y 11m 0d	0.00%	(2.70%)	(1.81%)	(0.91%)
TR.086	912828KN	4/30/14	4y 4m 0d	0.00%	(11.72%)	(7.98%)	(4.07%)
TR.087	912828GZ	7/31/12	2y 7m 0d	0.00%	(7.01%)	(4.73%)	(2.39%)
TR.088	912828FK	6/30/11	1y 6m 0d	0.00%	(4.28%)	(2.88%)	(1.45%)
TR.089	912828AU	2/15/13	3y 1m 15d	0.00%	(8.42%)	(5.70%)	(2.89%)
TR.090	9128277L	2/15/12	2y 1m 15d	0.00%	(5.86%)	(3.95%)	(1.99%)
TR.091	912828JF	7/31/10	0y 7m 0d	0.00%	(1.71%)	(1.14%)	(0.57%)
TR.092	912828HZ	5/15/18	8y 4m 15d	0.00%	(19.14%)	(13.25%)	(6.89%)
TR.093	912828FW	10/31/11	1y 10m 0d	0.00%	(5.16%)	(3.47%)	(1.75%)
TR.094	912828BR	11/15/13	3y 10m 15d	0.00%	(10.22%)	(6.94%)	(3.54%)
TR.095	912828HR	2/15/18	8y 1m 15d	0.00%	(18.78%)	(12.99%)	(6.75%)
TR.096	912828MA	11/30/16	6y 11m 0d	0.00%	(17.12%)	(11.79%)	(6.09%)
TR.097	912828KK	4/15/12	2y 3m 15d	0.00%	(6.54%)	(4.41%)	(2.23%)
TR.098	912828ES	1/15/11	1y 0m 15d	0.00%	(2.99%)	(2.00%)	(1.01%)
TR.099	912828JU	11/15/11	1y 10m 15d	0.00%	(5.39%)	(3.63%)	(1.83%)
TR.100	912828LT	10/31/11	1y 10m 0d	0.00%	(5.31%)	(3.57%)	(1.80%)

Corporates

⊟ BDX				0.00%	(11.19%)	(7.69%)	(3.96%)
BDX.01	BDX.01	12/1/10	0y 11m 1d	0.00%	(2.71%)	(1.81%)	(0.91%)
BDX.03	BDX.03	12/2/12	2y 11m 2d	0.00%	(8.16%)	(5.52%)	(2.80%)
BDX.05	BDX.05	12/4/14	4y 11m 4d	0.00%	(12.75%)	(8.70%)	(4.46%)
BDX.10	BDX.10	12/7/19	9y 11m 7d	0.00%	(20.98%)	(14.61%)	(7.64%)

⊟ CVX				0.00%	(11.34%)	(7.80%)	(4.02%)
CVX.01	CVX.01	12/7/10	0y 11m 7d	0.00%	(2.76%)	(1.85%)	(0.93%)
CVX.03	CVX.03	12/8/12	2y 11m 8d	0.00%	(8.23%)	(5.57%)	(2.83%)
CVX.05	CVX.05	12/9/14	4y 11m 9d	0.00%	(12.90%)	(8.80%)	(4.51%)
CVX.10	CVX.10	12/11/19	9y 11m 11d	0.00%	(21.34%)	(14.87%)	(7.78%)

⊟ DNA				0.00%	(11.33%)	(7.79%)	(4.02%)
DNA.01	DNA.01	12/4/10	0y 11m 4d	0.00%	(2.73%)	(1.83%)	(0.92%)
DNA.03	DNA.03	12/14/12	2y 11m 14d	0.00%	(8.27%)	(5.60%)	(2.84%)
DNA.05	DNA.05	12/15/14	4y 11m 15d	0.00%	(12.91%)	(8.81%)	(4.51%)
DNA.10	DNA.10	12/16/19	9y 11m 16d	0.00%	(21.28%)	(14.83%)	(7.75%)
⊟ JNJ				0.00%	(11.40%)	(7.84%)	(4.04%)
JNJ.01	JNJ.01	12/16/10	0y 11m 16d	0.00%	(2.83%)	(1.90%)	(0.95%)
JNJ.03	JNJ.03	12/18/12	2y 11m 18d	0.00%	(8.31%)	(5.62%)	(2.85%)
JNJ.05	JNJ.05	12/21/14	4y 11m 21d	0.00%	(12.97%)	(8.85%)	(4.53%)
JNJ.10	JNJ.10	12/21/19	9y 11m 21d	0.00%	(21.39%)	(14.91%)	(7.80%)

⊟ MDT				0.00%	(11.26%)	(7.74%)	(3.99%)
MDT.01	MDT.01	12/1/10	0y 11m 1d	0.00%	(2.71%)	(1.82%)	(0.91%)
MDT.03	MDT.03	12/4/12	2y 11m 4d	0.00%	(8.19%)	(5.54%)	(2.81%)
MDT.05	MDT.05	12/7/14	4y 11m 7d	0.00%	(12.82%)	(8.75%)	(4.48%)
MDT.10	MDT.10	12/7/19	9y 11m 7d	0.00%	(21.16%)	(14.74%)	(7.71%)

⊟ MMM				0.00%	(11.30%)	(7.77%)	(4.01%)
MMM.01	MMM.01	12/8/10	0y 11m 8d	0.00%	(2.77%)	(1.85%)	(0.93%)
Select to collapse	MMM.03	12/9/12	2y 11m 9d	0.00%	(8.24%)	(5.58%)	(2.83%)
MMM.05	MMM.05	12/1/14	4y 11m 1d	0.00%	(12.83%)	(8.76%)	(4.48%)
MMM.10	MMM.10	12/2/19	9y 11m 2d	0.00%	(21.22%)	(14.78%)	(7.73%)
⊟ MSFT				0.00%	(11.33%)	(7.79%)	(4.02%)
MSFT.01	MSFT.01	12/4/10	0y 11m 4d	0.00%	(2.74%)	(1.83%)	(0.92%)
MSFT.03	MSFT.03	12/7/12	2y 11m 7d	0.00%	(8.22%)	(5.56%)	(2.82%)
MSFT.05	MSFT.05	12/7/14	4y 11m 7d	0.00%	(12.88%)	(8.79%)	(4.50%)
MSFT.10	MSFT.10	12/16/19	9y 11m 16d	0.00%	(21.37%)	(14.89%)	(7.79%)
⊟ PCAR				0.00%	(14.20%)	(9.78%)	(5.05%)
PCAR.03	PCAR.03	12/7/12	2y 11m 7d	0.00%	(8.23%)	(5.56%)	(2.82%)
PCAR.05	PCAR.05	12/8/14	4y 11m 8d	0.00%	(12.89%)	(8.80%)	(4.51%)
PCAR.10	PCAR.10	12/9/19	9y 11m 9d	0.00%	(21.41%)	(14.92%)	(7.80%)
⊟ PFE				0.00%	(11.37%)	(7.81%)	(4.03%)
PFE.01	PFE.01	12/18/10	0y 11m 18d	0.00%	(2.85%)	(1.91%)	(0.96%)
PFE.03	PFE.03	12/21/12	2y 11m 21d	0.00%	(8.33%)	(5.63%)	(2.86%)
PFE.05	PFE.05	12/21/14	4y 11m 21d	0.00%	(12.95%)	(8.84%)	(4.53%)
PFE.10	PFE.10	12/4/19	9y 11m 4d	0.00%	(21.19%)	(14.76%)	(7.72%)
⊟ PG				0.00%	(11.30%)	(7.77%)	(4.01%)
PG.01	PG.01	12/4/10	0y 11m 4d	0.00%	(2.74%)	(1.83%)	(0.92%)
PG.03	PG.03	12/7/12	2y 11m 7d	0.00%	(8.22%)	(5.56%)	(2.82%)
PG.05	PG.05	12/7/14	4y 11m 7d	0.00%	(12.86%)	(8.78%)	(4.49%)
PG.10	PG.10	12/8/19	9y 11m 8d	0.00%	(21.26%)	(14.81%)	(7.75%)

⊟ SYY				0.00%	(11.32%)	(7.78%)	(4.01%)
SYY.01	SYY.01	12/9/10	0y 11m 9d	0.00%	(2.78%)	(1.86%)	(0.93%)
SYY.03	SYY.03	12/11/12	2y 11m 11d	0.00%	(8.26%)	(5.59%)	(2.83%)
SYY.05	SYY.05	12/1/14	4y 11m 1d	0.00%	(12.83%)	(8.75%)	(4.48%)
SYY.10	SYY.10	12/2/19	9y 11m 2d	0.00%	(21.26%)	(14.81%)	(7.74%)

⊟ WFC				0.00%	(11.23%)	(7.72%)	(3.98%)
WFC.01	WFC.01	12/21/10	0y 11m 21d	0.00%	(2.87%)	(1.92%)	(0.97%)
Select to collapse	WFC.03	12/21/12	2y 11m 21d	0.00%	(8.28%)	(5.60%)	(2.84%)
WFC.05	WFC.05	12/21/14	4y 11m 21d	0.00%	(12.82%)	(8.75%)	(4.48%)
WFC.10	WFC.10	12/4/19	9y 11m 4d	0.00%	(20.82%)	(14.50%)	(7.58%)
⊟ XOM				0.00%	(11.36%)	(7.81%)	(4.03%)
XOM.01	XOM.01	12/7/10	0y 11m 7d	0.00%	(2.76%)	(1.85%)	(0.93%)
XOM.03	XOM.03	12/7/12	2y 11m 7d	0.00%	(8.23%)	(5.57%)	(2.82%)
XOM.05	XOM.05	12/8/14	4y 11m 8d	0.00%	(12.90%)	(8.80%)	(4.51%)
XOM.10	XOM.10	12/9/19	9y 11m 9d	0.00%	(21.42%)	(14.92%)	(7.80%)

Liability Stress Tests

Liability Scenarios are replicated again here for reference:

Scenario Number					1	2	3	4	5	6	7	8	9	10	11	12
Scenario Name					25% with 0.25 WAL	25% with 0.50 WAL	25% with 0.75 WAL	25% with 1.00 WAL	50% with 0.25 WAL	50% with 0.50 WAL	50% with 0.75 WAL	50% with 1.00 WAL	75% with 0.25 WAL	75% with 0.50 WAL	75% with 0.75 WAL	75% with 1.00 WAL
Target Overnight Percentage					25.00%	25.00%	25.00%	25.00%	50.00%	50.00%	50.00%	50.00%	75.00%	75.00%	75.00%	75.00%
Target Weighted Average Life (Years)					0.25	0.50	0.75	1.00	0.25	0.50	0.75	1.00	0.25	0.50	0.75	1.00
		Adjusted Distributions with Overnight Funding														
Original Maturity	Typical MCCU Distribution of Term Funds	Typical Profile with Overnight Funding of 25%	Typical Profile with Overnight Funding of 50%	Typical Profile with Overnight Funding of 75%	Scenario Profile	Scenario Profile	Scenario Profile	Scenario Profile	Scenario Profile	Scenario Profile	Scenario Profile	Scenario Profile	Scenario Profile	Scenario Profile	Scenario Profile	Scenario Profile
Overnight		25.00%	50.00%	75.00%	25.000%	25.000%	25.000%	25.000%	50.000%	50.000%	50.000%	50.000%	75.000%	75.000%	75.000%	75.000%
1 Month	7.01%	5.26%	3.51%	1.75%	11.748%	4.772%	2.722%	1.491%	3.091%	0.500%	0.500%	0.500%	0.500%	0.500%	0.500%	0.500%
2 Month	4.99%	3.74%	2.50%	1.25%	10.273%	3.742%	2.232%	1.040%	4.003%	0.889%	0.500%	0.500%	0.500%	0.500%	0.500%	0.500%
3 Month	5.13%	3.85%	2.56%	1.28%	9.538%	3.865%	2.432%	1.279%	3.660%	0.902%	0.500%	0.500%	0.500%	0.500%	0.500%	0.500%
6 Month	15.37%	11.53%	7.69%	3.84%	16.455%	13.498%	12.281%	11.261%	12.182%	7.770%	7.190%	5.839%	5.475%	0.500%	0.500%	0.500%
9 Month	10.85%	8.14%	5.42%	2.71%	8.541%	8.039%	7.066%	6.148%	5.627%	3.761%	2.176%	0.500%	0.950%	0.500%	0.500%	0.500%
1 Year	11.18%	8.38%	5.59%	2.79%	6.735%	8.818%	8.075%	7.275%	5.299%	4.888%	3.401%	1.325%	1.165%	0.500%	0.500%	0.500%
2 Year	28.82%	21.61%	14.41%	7.20%	11.710%	24.166%	24.278%	24.013%	16.138%	21.259%	20.412%	17.882%	11.869%	13.758%	7.425%	1.313%
3 Year	11.35%	8.51%	5.68%	2.84%	0.000%	6.278%	7.369%	7.514%	0.000%	5.048%	4.420%	4.847%	1.361%	0.500%	0.500%	0.500%
5 Year	5.20%	3.90%	2.60%	1.30%	0.000%	1.823%	4.742%	5.839%	0.000%	3.159%	3.510%	4.967%	1.681%	1.126%	0.500%	0.500%
7 Year	0.10%	0.08%	0.05%	0.03%	0.000%	0.000%	1.088%	3.141%	0.000%	1.323%	1.563%	3.893%	0.500%	0.863%	2.129%	1.761%
10 Year	0.00%	0.00%	0.00%	0.00%	0.000%	0.000%	2.715%	5.998%	0.000%	0.500%	5.827%	9.246%	0.500%	5.752%	11.446%	17.926%
Total Liability Components	100.00%	100.00%	100.00%	100.00%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

2007 Liability Scenario Stress Tests

Note that as all of the liability scenarios are fixed rate, the yield, spread, and spread+ prepayment tests will all produce the same result. For this reason, Kamakura presents only one test (yields), and we also include the results from a 100 bp and 200 bp shock to yields for reference.

NCUA

Exit full screen (F11)

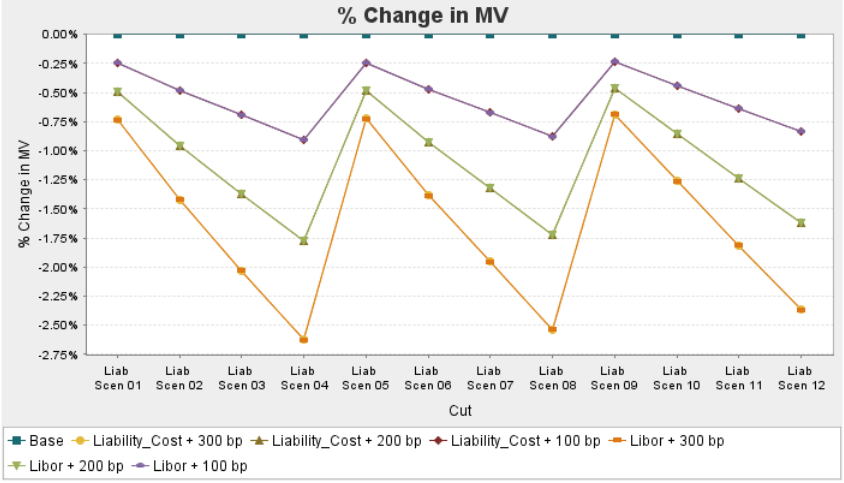
REPORTS | ADMINISTRATION

Portfolio | Interest Rate Risk | Liquidity Risk | Market Risk | Credit Risk | Economic Capital | Basel Capital | Financial Ratio Analysis | Other Reports | Report Finder | Help

Sensitivity - by Cut

KRM Run: Liab 2007 MV Stress Total All Scen (values in USD)

Market Value | Change in MV | % Change in MV



Cut	Base	Liability_Cost + 300 bp	Liability_Cost + 200 bp	Liability_Cost + 100 bp	Libor + 300 bp	Libor + 200 bp	Libor + 100 bp
Liab Scen 01	(0.00%)	(0.73%)	(0.49%)	(0.25%)	(0.73%)	(0.49%)	(0.25%)
Liab Scen 02	(0.00%)	(1.42%)	(0.96%)	(0.48%)	(1.42%)	(0.96%)	(0.48%)
Liab Scen 03	(0.00%)	(2.03%)	(1.37%)	(0.69%)	(2.03%)	(1.37%)	(0.69%)
Liab Scen 04	(0.00%)	(2.63%)	(1.78%)	(0.90%)	(2.63%)	(1.78%)	(0.90%)
Liab Scen 05	(0.00%)	(0.73%)	(0.49%)	(0.24%)	(0.73%)	(0.49%)	(0.24%)
Liab Scen 06	(0.00%)	(1.38%)	(0.93%)	(0.47%)	(1.38%)	(0.93%)	(0.47%)
Liab Scen 07	(0.00%)	(1.95%)	(1.32%)	(0.67%)	(1.95%)	(1.32%)	(0.67%)
Liab Scen 08	(0.00%)	(2.54%)	(1.73%)	(0.88%)	(2.54%)	(1.73%)	(0.88%)
Liab Scen 09	(0.00%)	(0.69%)	(0.46%)	(0.23%)	(0.69%)	(0.46%)	(0.23%)
Liab Scen 10	(0.00%)	(1.26%)	(0.86%)	(0.44%)	(1.26%)	(0.86%)	(0.44%)
Liab Scen 11	(0.00%)	(1.82%)	(1.24%)	(0.64%)	(1.82%)	(1.24%)	(0.64%)
Liab Scen 12	(0.00%)	(2.37%)	(1.62%)	(0.83%)	(2.37%)	(1.62%)	(0.83%)

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2009 Liability Scenario Stress Tests

NCUA

Exit full screen (F11)

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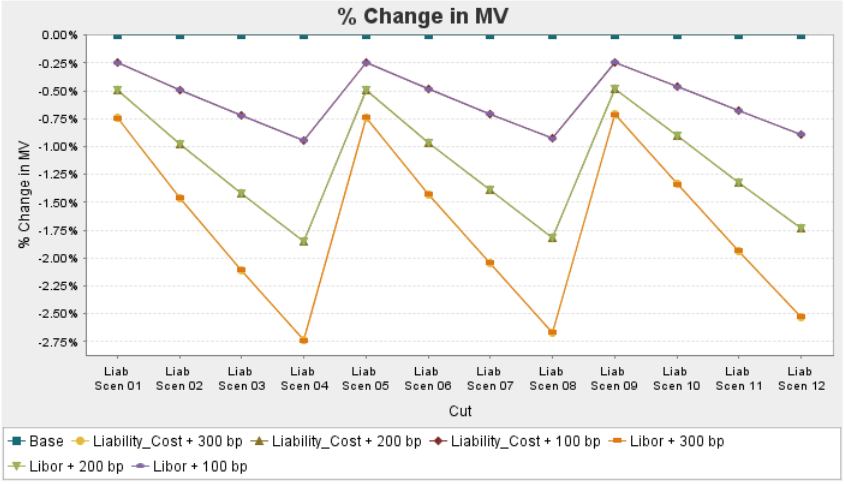
Sensitivity - by Cut

KRM Run: Liab 2009 MV Stress Total All Scen (values in USD)

Market Value | Change in MV | % Change in MV



Cut	Base	Liability_Cost + 300 bp	Liability_Cost + 200 bp	Liability_Cost + 100 bp	Libor + 300 bp	Libor + 200 bp	Libor + 100 bp
Liab Scen 01	(0.00%)	(0.74%)	(0.50%)	(0.25%)	(0.74%)	(0.50%)	(0.25%)
Liab Scen 02	(0.00%)	(1.46%)	(0.98%)	(0.49%)	(1.46%)	(0.98%)	(0.49%)
Liab Scen 03	(0.00%)	(2.11%)	(1.42%)	(0.72%)	(2.11%)	(1.42%)	(0.72%)
Liab Scen 04	(0.00%)	(2.74%)	(1.86%)	(0.94%)	(2.74%)	(1.86%)	(0.94%)
Liab Scen 05	(0.00%)	(0.74%)	(0.50%)	(0.25%)	(0.74%)	(0.50%)	(0.25%)
Liab Scen 06	(0.00%)	(1.43%)	(0.96%)	(0.49%)	(1.43%)	(0.96%)	(0.49%)
Liab Scen 07	(0.00%)	(2.04%)	(1.39%)	(0.71%)	(2.04%)	(1.39%)	(0.71%)
Liab Scen 08	(0.00%)	(2.67%)	(1.81%)	(0.93%)	(2.67%)	(1.81%)	(0.93%)
Liab Scen 09	(0.00%)	(0.71%)	(0.48%)	(0.24%)	(0.71%)	(0.48%)	(0.24%)
Liab Scen 10	(0.00%)	(1.34%)	(0.91%)	(0.46%)	(1.34%)	(0.91%)	(0.46%)
Liab Scen 11	(0.00%)	(1.94%)	(1.32%)	(0.68%)	(1.94%)	(1.32%)	(0.68%)
Liab Scen 12	(0.00%)	(2.53%)	(1.73%)	(0.89%)	(2.53%)	(1.73%)	(0.89%)

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Simulation Assumptions

Macro Economic Factors and Yield Curves used in Simulation

For the simulation carried out in this analysis, Kamakura Corporation selected several key risk factors as the basis for a macroeconomic factor based simulation, consistent with the SCAP program, the FDIC Loss Distribution Model, and the best practices of Kamakura's clients in 32 countries. The factors are as follows:

- Case Shiller 10 City Home Price Index;
- Standard & Poor's 500 Equity Index;
- Transactions Based Commercial Real Estate Index maintained by the Massachusetts Institute of Technology;
- Real Gross Domestic Product as measured by the Bureau of Economic Analysis;
- United States Treasuries of 3 month, 3 year, 10 year, and 30 year maturities; Fixed/Floating Swaps of 1 year, 5 year, and 10 year maturities; and
- National Unemployment Rates as measured by the Bureau of Labor Statistics.

The randomness of these factors was analyzed twice to ensure that information regarding the movements of underlying factors during the crisis could not bias the results of the 2007 analysis. First, the statistical studies were done using only information that would have been available as of March 31, 2007. Second, the same studies were repeated using data that would have been available as of December 31, 2009. The time series of the risk factors modeled were downloaded from the Bloomberg information system. Kamakura strongly believes in complete transparency in their analysis and consulting. To this end, the statistical relationships fitted for both dates and underlying the monte carlo simulation for this project are described in detail throughout this section. One should feel free to move on to subsequent discussions if this detail is not of interest.

The statistical relationships above are used to create 1000 120 month long paths for each macro factor. The error term in the statistical relationships was explicitly included in the simulation and simulated with the correlation with error terms of other macro factors that is consistent with the historical periods used for benchmarking (the variance covariance matrix of residuals is provided for reference at the end of this section).

Kamakura endeavored to model the time series properties of twelve separate macroeconomic factors to incorporate into simulations of performance of various portfolios as mandated by the National Credit Union Administration. The data was downloaded by Kamakura from the Bloomberg data service on January 12, 2010.

Kamakura modeled the stationary analogues to each series: for the S&P 500, Case Shiller Index (CSXR), TBI, and Real GDP, Kamakura modeled the percentage return from period to period. For Swaps, Treasuries, and Unemployment Rates, Kamakura modeled the absolute differences in each variable from period to period. The residuals from these estimations are then used to estimate a fully specified

variance covariance matrix that is then used in simulation. Real Gross Domestic Product (Real GDP) and the Transactions Based Commercial Real Estate Index (TBI) are available at a quarterly frequency, while the rest of the data is available at a monthly (or higher) frequency.

As Kamakura intends to jointly simulate the macro factors in models of default and recovery as of March 31, 2007 and December 31, 2009, it is critical that their time series properties are all estimated over the historical time period that is consistent with the valuation date. To that end, Kamakura restricted the sample of interest to periods where data for each of the twelve macro economic factors was available. The entire time series estimation process was completed twice: once on data through the first quarter of 2007, and again incorporating data through the fourth quarter of 2009. This process ensured that the resulting simulation algorithms reflected only the information available in the market as of the simulation date.

Kamakura also believes that high frequency data is extremely useful. For example, the CSXR Index and the Unemployment Rate in the United States both exhibit pronounced seasonal variation at a monthly frequency: estimating the quarterly returns in these series destroys substantively important information. For these reasons, Kamakura models the monthly innovations in each series.[32] Finally, the residuals from each model are predicted, and a joint variance covariance matrix is estimated.

Mathematical Background

This section details some necessary mathematical background behind these processes. This is by no means a complete introduction, even to conditional mean processes. Note that there are several ways that series can exhibit time dependence. This document focuses on time dependence in the first moment alone.

First, we define some terms:[33]

We're interested in processes for a given variable, *y,* with the following data generating process:

$$y_t = \mu + \varepsilon_t$$

where μ is the unconditional mean of y, and ε_t is a "white noise process" which for the moment, we'll assume is given by:

$$E(\varepsilon_t) = 0 \; and \; E({\varepsilon_t}^2) = \sigma^2$$

For the moment, we will also assume that ε_t has the property that E($\varepsilon_t \varepsilon_s$)=0 for any *t* not equal to *s.*

[32] For the quarterly series (TBI and Real GDP), Kamakura infers the monthly coefficients and standard errors of the residuals based on the quarterly estimation. More details are available upon request.

[33] Note: We largely skip over stationarity and ergodicity here. They don't impart too much helpful information, so we will assume that the mean of Y and all of the auto-covariances do not depend on the date. This means that series cannot "blow up" over time. Ergodicity can be thought of as "asymptotic independence": as two observations get further and further apart, their dependence on one another goes to zero.

This means that the process defined by *y* has the following properties:

Mean:

$$E(y_t) = E(\mu + \varepsilon_t) = \mu + E(\varepsilon_t) = \mu$$

Variance:

$$E(y_t - \mu)^2 = E(\varepsilon_t)^2 = \sigma^2$$

Auto-covariance:

$$E[(y_t - \mu)(y_{t-1} - \mu)] = E(\varepsilon_t \varepsilon_{t-1}) = 0$$

Note that the same logic tells us that all further auto-covariances are zero since E($\varepsilon_t \varepsilon_s$)=0 for any *t* not equal to *s*

Moving Average Processes

Imagine that y_t is given by the following relationship:

$$y_t = \mu + \varepsilon_t + a\varepsilon_{t-1}$$

where *a* is some scalar constant. This is called a "first order moving average process", often abbreviated MA(1). The process is called "first order" because the time dependence is only on one lag of the white noise process, and "moving average" because the error term in period t, $\varepsilon_t + a\varepsilon_{t-1}$ is a weighted average of the realizations of the white noise process this period and the previous period.

The mean and variance of this process are given by:

Mean:

$$E(y_t) = E(\mu + \varepsilon_t + a\varepsilon_{t-1}) = \mu + E(\varepsilon_t + a\varepsilon_{t-1}) = \mu + 0 + a * 0 = \mu$$

Variance:

$$E(y_t - \mu)^2 = E(\varepsilon_t + a\varepsilon_{t-1})^2 = E({\varepsilon_t}^2 + 2a\varepsilon_{t-1}\varepsilon_t + a^2{\varepsilon_{t-1}}^2) = E({\varepsilon_t}^2) + 2aE(\varepsilon_{t-1}\varepsilon_t) + a^2E({\varepsilon_{t-1}}^2)$$

$$= \sigma^2 + 2a * 0 + a^2 * \sigma^2 = (1 + a^2)\sigma^2$$

Auto-covariance:

$$\begin{aligned} E[(y_t - \mu)(y_{t-1} - \mu)] &= E[(\varepsilon_t + a\varepsilon_{t-1})(\varepsilon_{t-1} + a\varepsilon_{t-2})] \\ &= E(\varepsilon_t\varepsilon_{t-1} + a^2\varepsilon_{t-1}\varepsilon_{t-2} + a\varepsilon_{t-1}^2 + a^2\varepsilon_{t-1}\varepsilon_{t-2}) = 0 + a^2 * 0 + a^2 * \sigma^2 + a^2 * 0 \\ &= a^2\sigma^2 \end{aligned}$$

since only the ε_{t-1} terms can multiply together and have a non-zero expectation. This means that any higher autocovariances are equal to zero (as the $(\varepsilon_{t-1} + a\varepsilon_{t-2})$ term would no longer have any ε_{t-1} terms at higher lags).

This is a critical distinction between moving average and autoregressive processes. The autocovariance of a moving average process immediately goes to zero once the number of lags exceeds the order of the series. This is *not the case* with autoregressive series (as the autocovariances die off exponentially).

Auto Regressive Processes

Imagine that y_t is given by the following relationship:

$$y_t = \mu + py_{t-1} + \varepsilon_t$$

where *p* is some scalar constant. This is called a "first order autoregressive process". If we recursively substitute for the y_{t-1} term, we get:
$y_t = \mu + p(\mu + py_{t-2} + \varepsilon_{t-1})+\varepsilon_t$

We can repeat this process to get:

$$y_t = \mu + \varepsilon_t + p(\mu + \varepsilon_{t-1}) + p^2(\mu + \varepsilon_{t-2}) + p^3(\mu + \varepsilon_{t-3}) + \cdots = \sum_{i=0}^{\infty} \mu p^i + \sum_{i=0}^{\infty} p^i\, \varepsilon_{t-i}$$

which is exactly the same format as our old MA process, but with "μ" $= \sum_{i=0}^{\infty} \mu p^i$ and with a longer time dependence. This should suggest that the AR processes have the same properties as MA processes (with a very long tail). To be precise:

Mean:

$$E(y_t) = E\left(\sum_{i=0}^{\infty} \mu p^i + \sum_{i=0}^{\infty} p\, \varepsilon_{t-i}\right)$$

$$= \sum_{i=0}^{\infty} \mu p^i + \sum_{i=0}^{\infty} p^i\, E(\varepsilon_{t-i}) = \sum_{i=0}^{\infty} \mu p^i + \sum_{i=0}^{\infty} p^i * 0$$

$$= \sum_{i=0}^{\infty} \mu p^i = \frac{\mu}{1-p}$$

where the last step makes the *critical* assumption that *p is less than one*. Otherwise, the summation goes off to infinity and the mean of y dependent on time (this is one way to get a "non-stationary" process). This will manifest often as series "blowing up" during simulations.

Variance:

$$E(y_t - \frac{\mu}{1-p})^2 = E(\sum_{i=0}^{\infty} p^i\, \varepsilon_{t-i})^2$$

Recall that E($\varepsilon_t \varepsilon_s$)=0 for any *t* not equal to *s.* This means that all of the terms that are not of the same time index drop in the above summation, so we are left with:

$$E(\sum_{i=0}^{\infty} p^i \, \varepsilon_{t-i})^2 = \sum_{i=0}^{\infty} p^i \, E(\varepsilon_{t-i})^2 = \sum_{i=0}^{\infty} p^i \, \sigma^2 = \frac{\sigma^2}{1-p}$$

Auto-covariance:

$$E[(y_t - \frac{\mu}{1-p})(y_{t-1} - \frac{\mu}{1-p})] = E\left[\left(\sum_{i=0}^{\infty} p^i \, \varepsilon_{t-i}\right)\left(\sum_{i=0}^{\infty} p^i \, \varepsilon_{t-i-1}\right)\right]$$

Only the terms with the same time index will yield a non-zero expectation. Those terms will be:

$$(p + p^3 + p^5 + \cdots)\sigma^2 = p\sigma^2\left(\sum_{i=0}^{\infty} p^{2i}\right) = \frac{p\sigma^2}{1-p^2}$$

For longer lags, the only change will be the order of the p in the numerator, so that we have the j-th autocovariance given by:

$$\frac{p^j \sigma^2}{1-p^2}$$

Differences between AR and MA processes

There are several differences between AR and MA processes, as detailed above. First, note that the expectation of an MA process does not depend on the parameter of that process, but that the mean of an AR process does. This means (among several other things) that we will not have the problems of MA processes becoming non-stationary the way that we may with AR processes.

Second, and possibly most important, note that the autocovariance structure is different. AR processes have the feature that the covariances slowly move towards zero, while MA processes suddenly fall to zero once the number of lags exceeds the order of the MA series. This final fact is very helpful when trying to think about whether a given series has AR or MA properties: usually we will have some sort of intuition with respect to the autocovariance structure of the process (how long a shock to the system will affect future realizations).

These series also perform differently under estimation:

Imagine that we run a regression of the series y_t on the lagged values y_{t-1} (and let μ=0 for simplicity).

$$y_t = \beta y_{t-1} + \varepsilon_t$$

The estimated β will be unbiased if $E(y_{t-1}\varepsilon_t) = 0$. Under an AR process, this reduces to:

$E(y_{t-1}\varepsilon_t) = E\big((py_{t-2} + \varepsilon_{t-1})\varepsilon_t\big) = E((p(py_{t-3} + \varepsilon_{t-2}) + \varepsilon_{t-1})\varepsilon_t)\ldots$

Since E($\varepsilon_t\varepsilon_s$)=0 for any *t* not equal to *s,* this expectation will eventually reduce to zero as desired.

Under an MA process though, we have "ε_t" $= u_t = \varepsilon_t + a\varepsilon_{t-1}$:

$E(y_{t-1}u_t) = E(y_{t-1}(\varepsilon_t + a\varepsilon_{t-1})) = E((\varepsilon_{t-1} + a\varepsilon_{t-2})(\varepsilon_t + a\varepsilon_{t-1})) = a\sigma^2$

Autoregressive Moving Average Processes

Autoregressive Moving Average processes are a combination of the AR and MA processes above:

$y_t = \mu + py_{t-1} + \varepsilon_t + a\varepsilon_{t-1}$

This is an ARMA(1,1) with parameters *(p,a)*

ARMA processes have much more complicated calculations for autocovariances, but the autocovariance structure will look like a mixture of AR and MA processes: there will be a drop in the autocovariance rates once the MA terms disappear, and then the residual autocovariance will asymptotically approach zero. ARMA processes are quite susceptible to over-parameterization. Consider the following:

$y_t = \varepsilon_t$

$y_t - by_{t-1} = \varepsilon_t - by_{t-1} = \varepsilon_t - b\varepsilon_{t-1} \Rightarrow y_t = by_{t-1} + \varepsilon_t - b\varepsilon_{t-1}$

which looks like an ARMA(1,1) with parameters *(b,-b) for any value of b—even though this process started as simple white noise.* If estimated ARMA parameters appear to be opposites of one another, then we are likely to be better off describing the series as white noise.

This erroneous ARMA specification can be done with any AR or MA process as well (unsurprisingly). In general, we should be *very* cautious when estimating ARMA processes, and ensure that they add a substantial amount of predictive power over standard AR or MA methods.

Model Selection Methodology

Kamakura generates time series models according to the following steps:

1. The time series of interest is inspected for stationarity and unusual jumps or periods
2. The time series of interest is tested and inspected for seasonality at the highest available frequency
3. The time series of interest is inspected and tested for autocorrelation of varying types and functional forms through Breusch-Godfrey tests, partial autocorrelation and autocorrelation plots, and skewness and kurtosis tests of the residuals.

4. A given model is applied, and the residuals are inspected for further autocorrelation of the forms detailed in the preceding section.

Steps (2), (3), and (4) are repeated until no residual autocorrelation is found. The structure of the autocorrelation is then compared to similar series for consistency and cohesiveness. The residual series is then inspected and the final specification is used on the largest joint estimation sample to estimate the variance covariance matrix implemented in joint simulation.

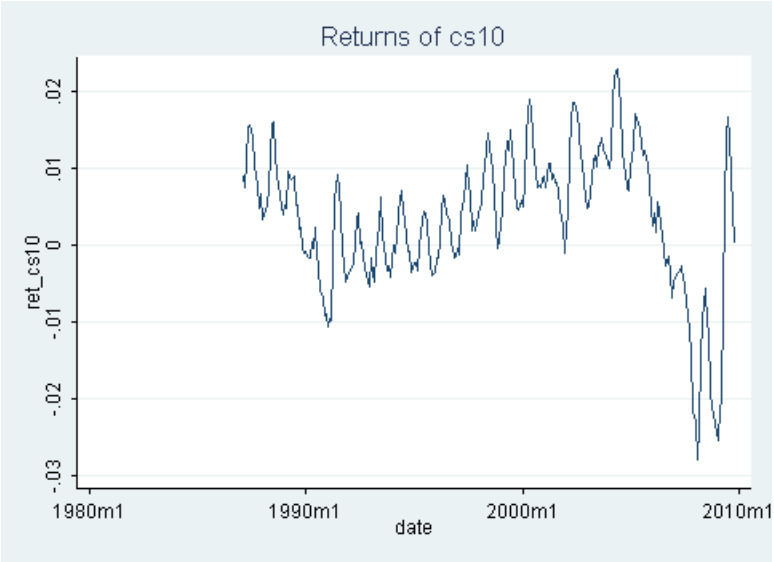
Finally, Kamakura inspects test series of macro factors simulated according to the model in (5), and modifies coefficients to ensure stability and realistic simulation.[34]

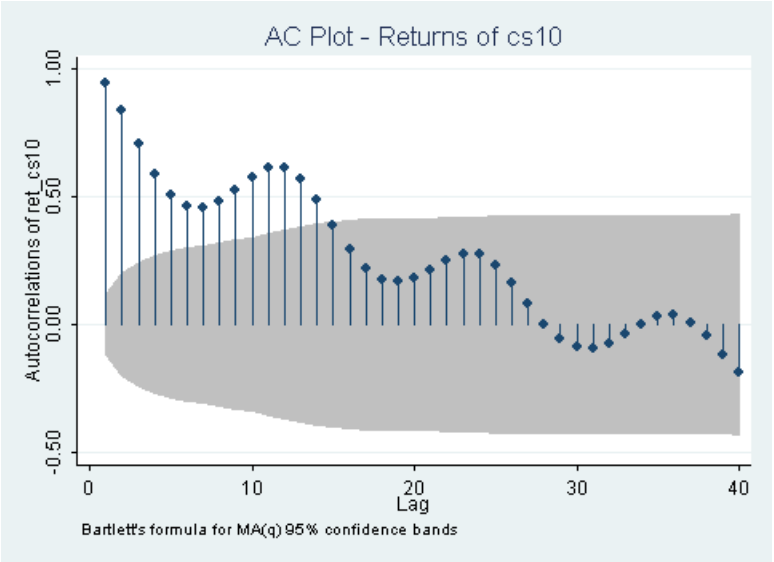
For reference, we include graphs of the raw time series of interest along with the corresponding autocorrelation plot below. The statistical output from all of the models in step (5) is included for estimation as of the end of March, 2007 and the end of December, 2009. Comments are often included with the series.

[34] An excellent example of such a modification is replacing a slightly negative and statistically insignificant constant term in a regression of differences in treasury yields with a zero value to remove any drift from the simulated series.

Case Shiller 10 City Home Price Index

The monthly percentage changes in the Case-Shiller 10 City Home Price Index are shown in the following graph:

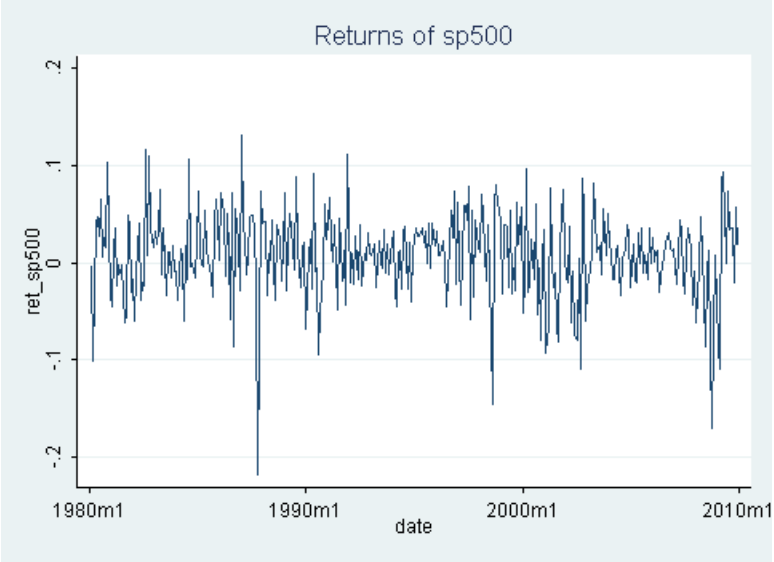


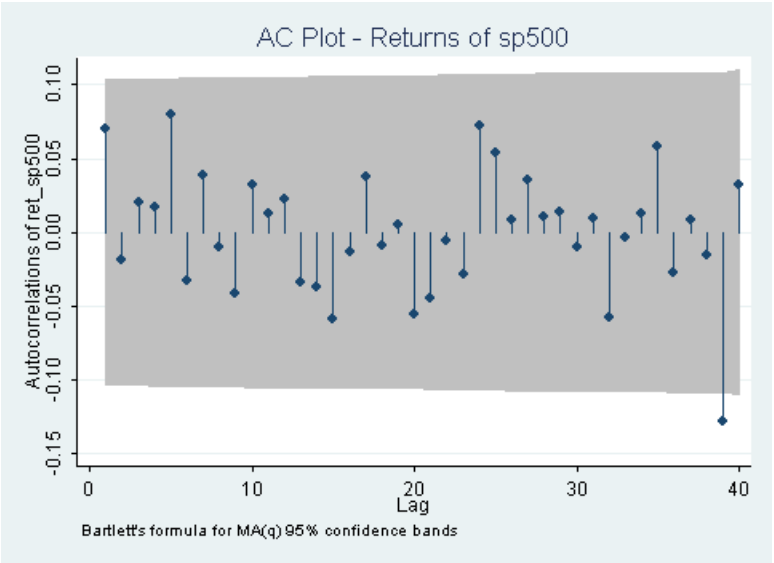


The Case Shiller 10 City Composite Index is a textbook example of monthly seasonality and autoregressive effects. We can clearly see the wave-like pattern of seasonality and around that point, the exponentially declining autocorrelegram suggesting an autoregressive process is at work.

Standard & Poor's 500 Equity Index

The first graph shows the monthly percentage changes in the Standard & Poor's 500 Equity Index:



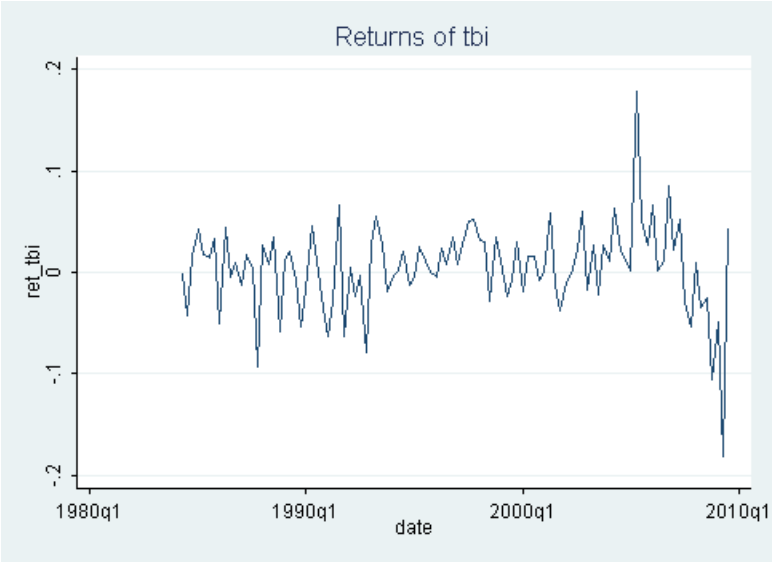


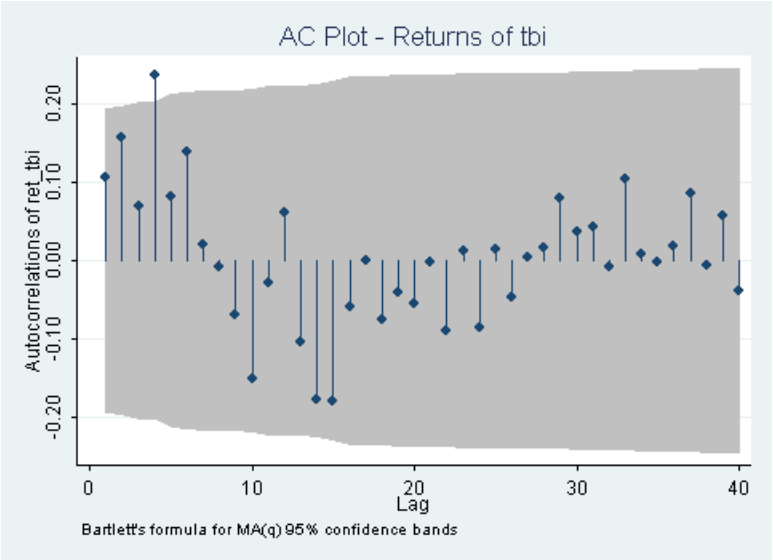
Just as the Case-Shiller 10 City Home Price Index (CSXR) suggests seasonality and autoregression, the S&P 500 is a textbook example of white noise.[35] There are no significant points on the autocorrelegram, and it is free of the periodic oscillations that suggest seasonal effects.

[35] At least in the first moment. Higher moments are known to cluster as in conditional heteroskedasticity.

The MIT Transactions Based Commercial Real Estate Index

Quarterly percentage changes in the MIT Transactions Based Commercial Real Estate Index are shown in this graph:

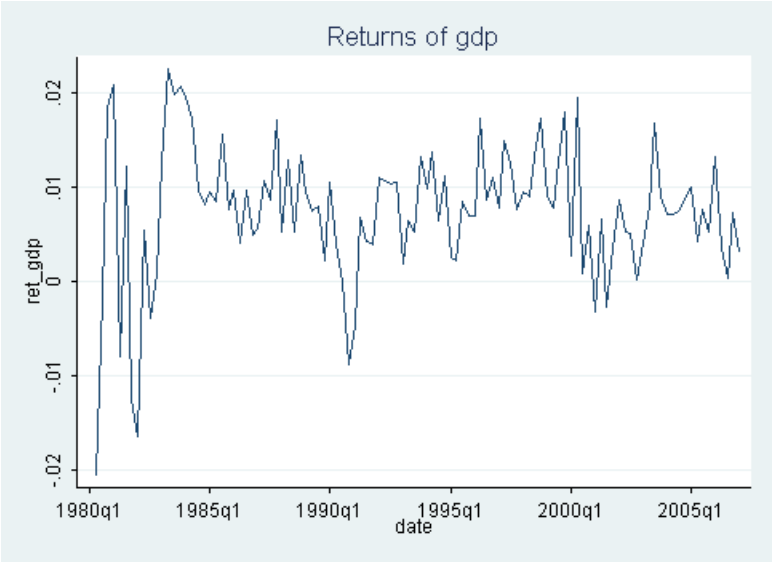


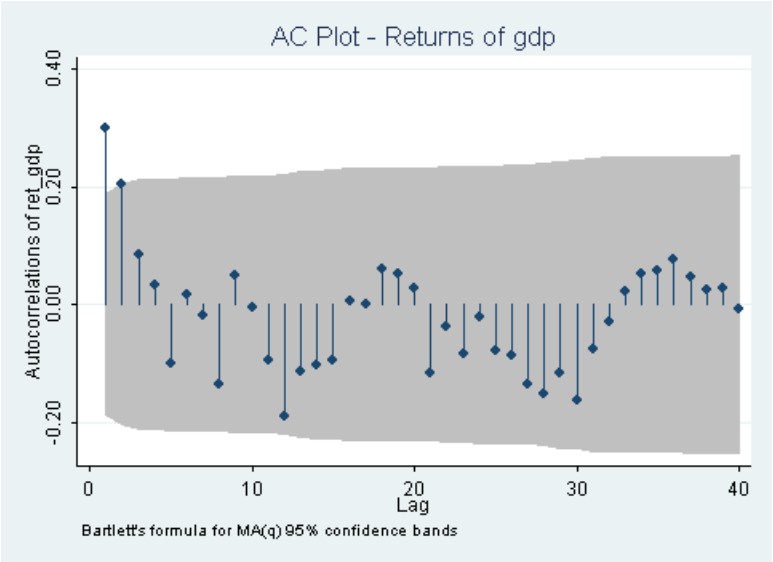


The TBI is one of two series that is available only on a quarterly frequency. There could possibly be some mild time dependence, but nothing on the order of the Case-Shiller 10 City Home Price Index, CSXR.

Real Gross Domestic Product

Quarterly changes in real Gross Domestic Product are given in this graph:

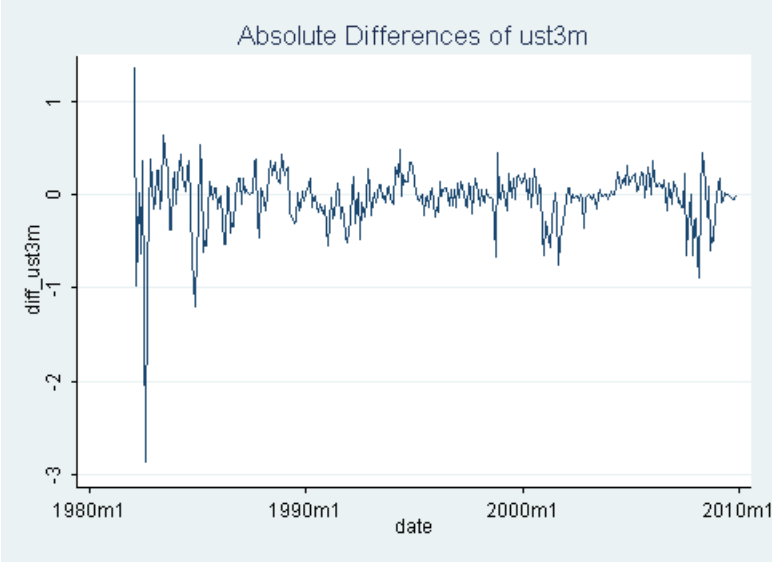


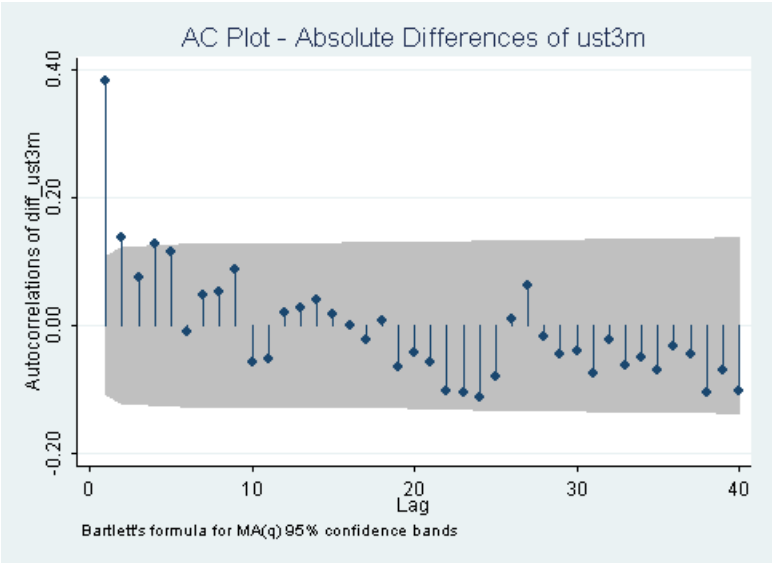


Real GDP is the other series that is only available quarterly. We can see significant lags that suggest autoregressive decay (which has been well established in the empirical literature on Gross Domestic Product), and some oscillation at a lower frequency which likely reflects the business cycle (but is too long for seasonal effects).

United States Treasuries: 3 month

Monthly changes in the level of 3 month US Treasury bill yields are as follows:

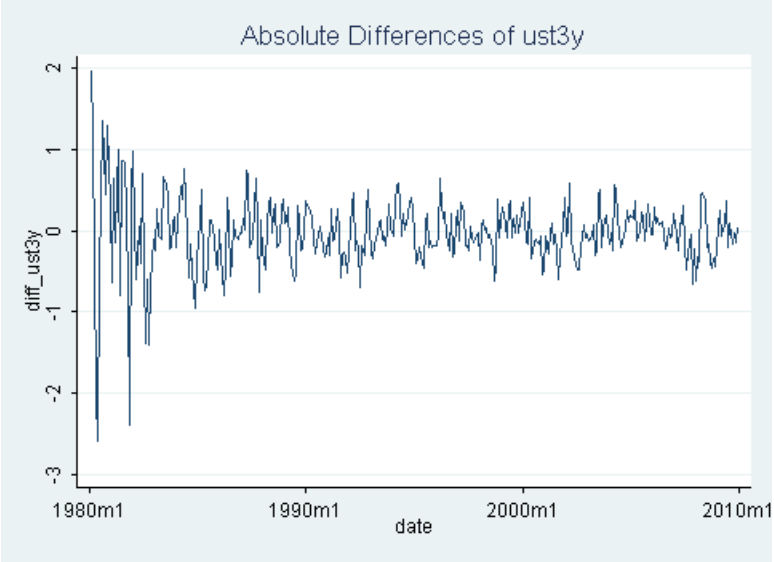


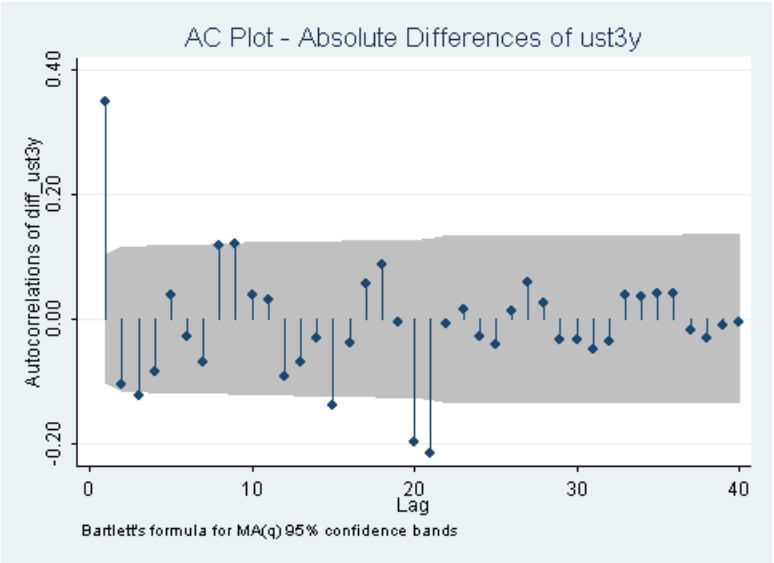


There is some significant time dependence in Treasuries. We can clearly see the first significant lag. The other notable conclusion is the decrease in the volatility of the series over time. The early 1980's appear to be substantively different than the recent series. Because of the requirements for a common sample, this portion of the data will ultimately not be used in estimation.

United States Treasuries: 3 year

The monthly changes in 3 year U.S. Treasury yields are given in this chart:

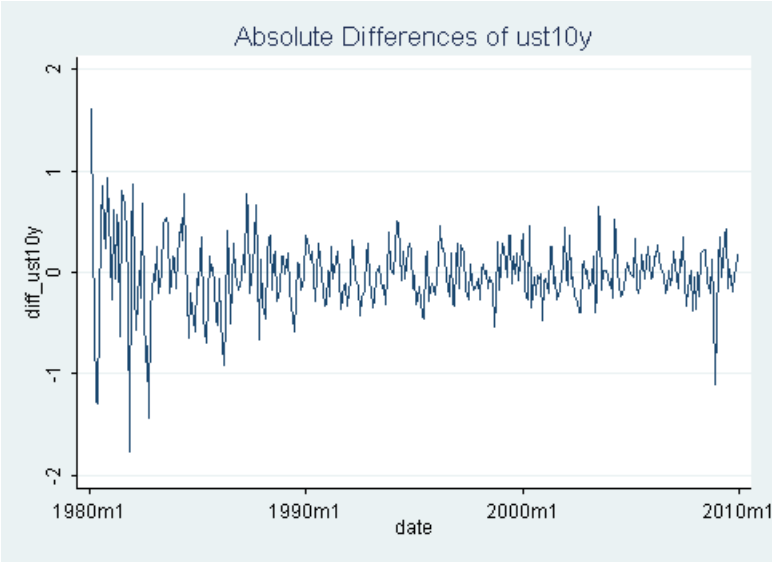


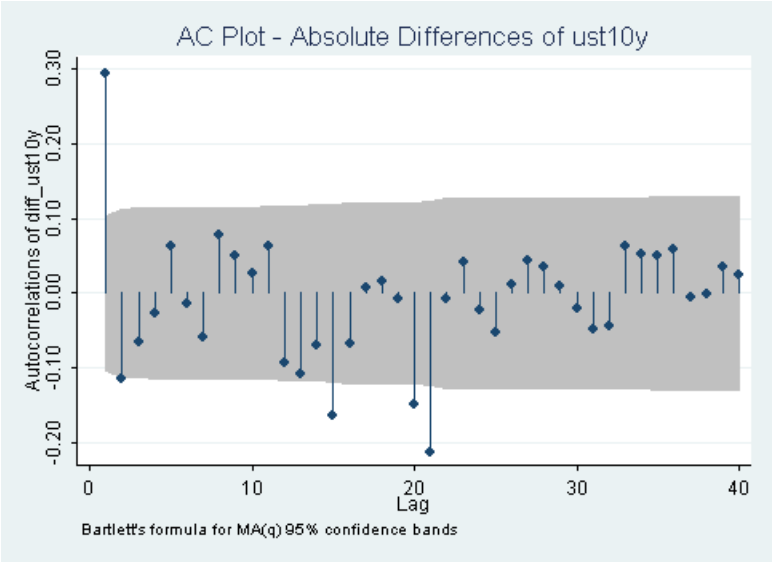


Three year Treasuries look very similar to three month issues.

United States Treasuries: 10 year

Monthly changes in 10 year U.S. Treasuries show a similar pattern as changes in 3 month and 3 year yields:

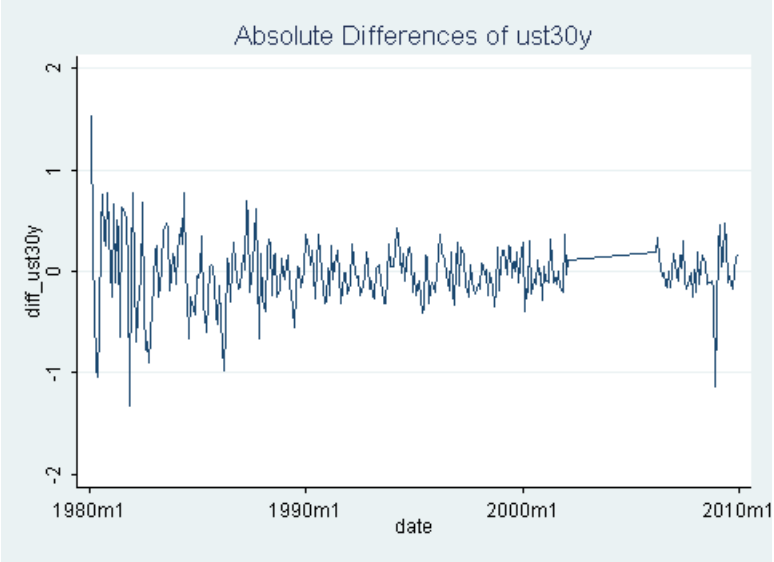


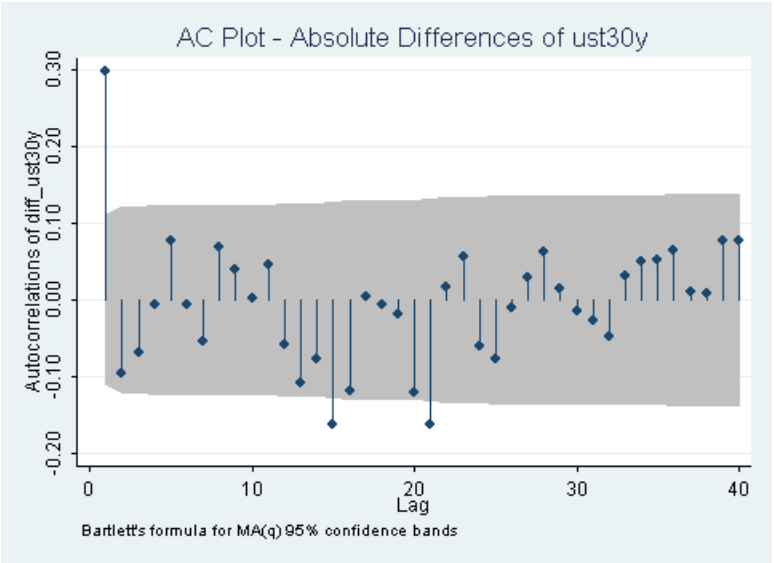


Ten year Treasuries also look similar to three month and three year issues.

United States Treasuries: 30 year

Monthly changes in 30 year U.S. Treasury yields show the following pattern:

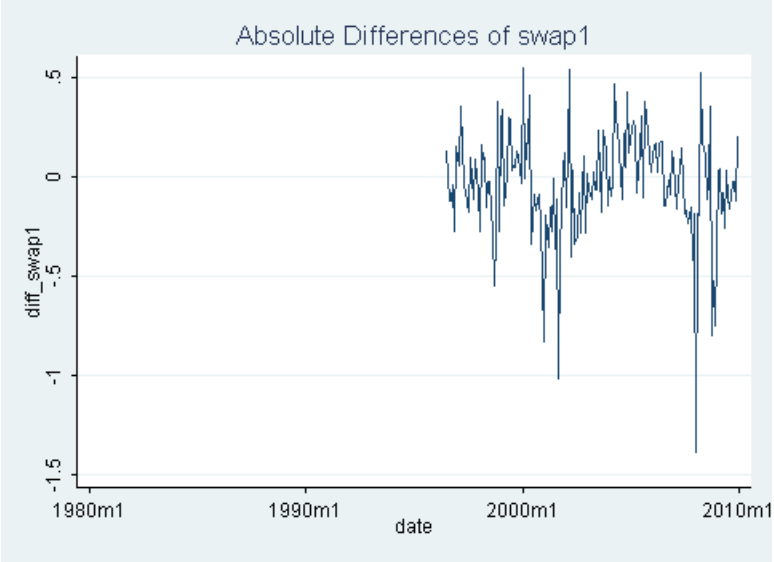


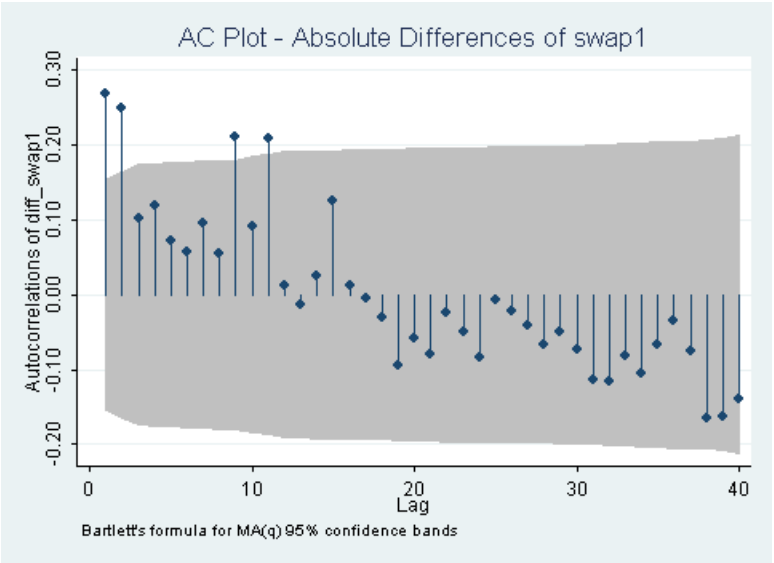


Thirty year Treasuries have a similar autocorrelegram, but there was a substantial period where this maturity was not traded. This introduces some complications into the analysis, but given the stability of the 3 month, 3 year, and 10 year issues, Kamakura feels confident in accurate modeling of this series, despite the lack of data in the last decade.

Swap: 1 year

Monthly differences in the one year swap yield are shown in this graph:



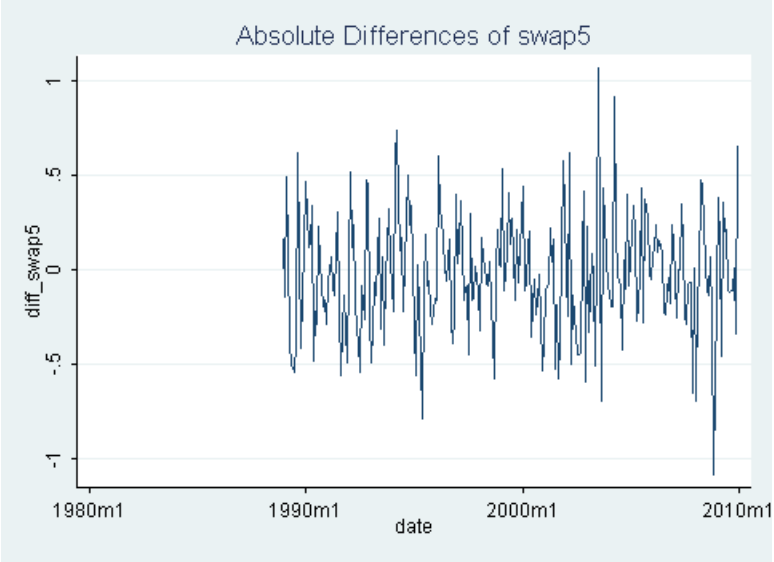


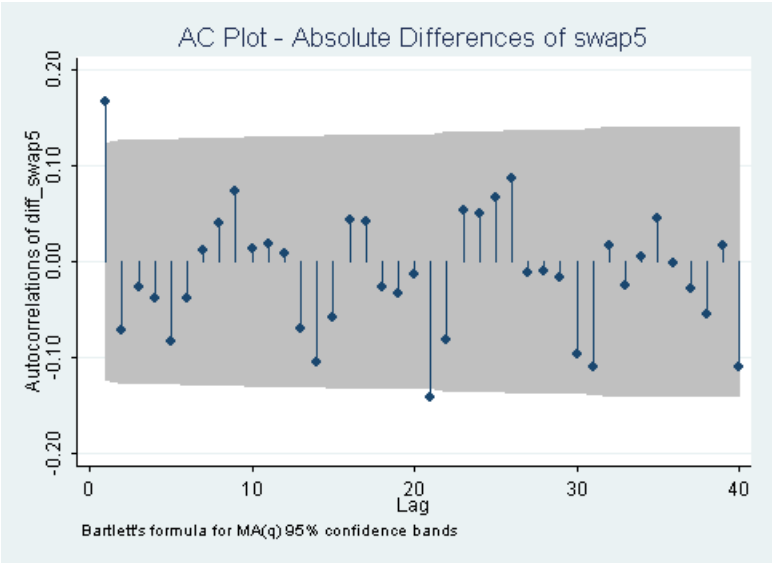
One year swaps have the shortest available time horizon. There appears to be some mild autoregressive properties in the data, though as these are Bartlett confidence bands[36], these points may not be significant.

[36] And as such they are only accurate pointwise. That is, they are not adjusted for the 40 different hypothesis tests being run on the data with the 40 point autocorrelegram.

Swap: 5 year

Monthly changes in the five year swap yield are shown in this graph:

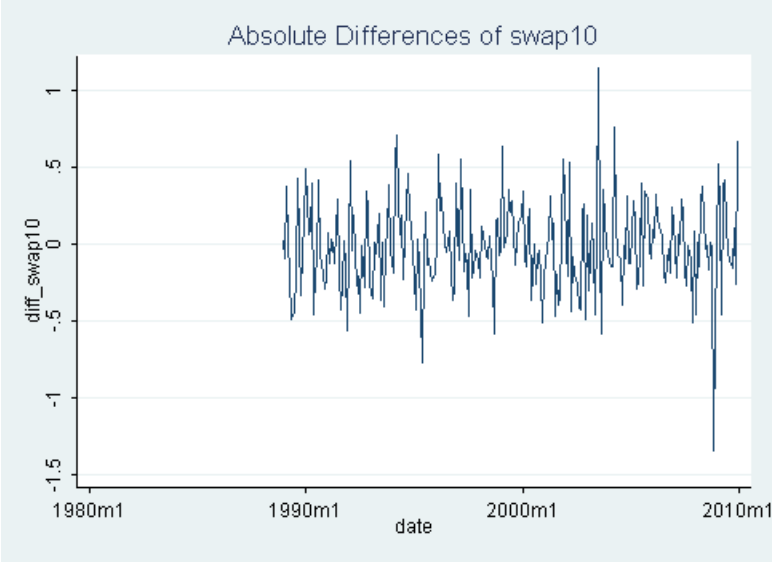


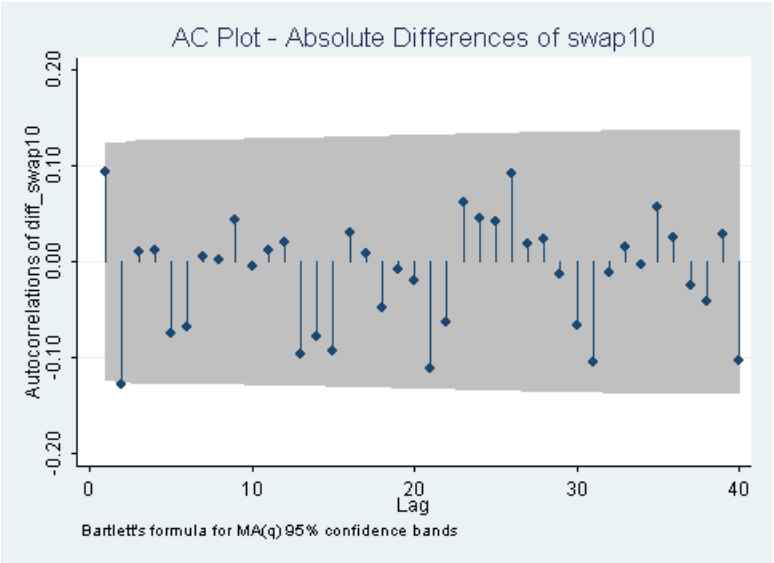


The five year swap looks much like the one year swap. Once again, there appears to be some mild autocorrelation, but significance is a question.

Swap: 10 year

This graph shows the monthly changes in the 10 year swap rate:

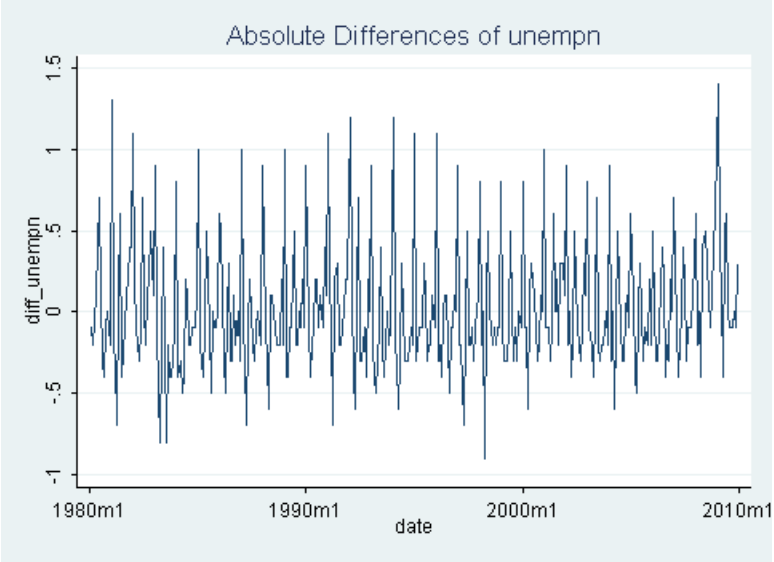


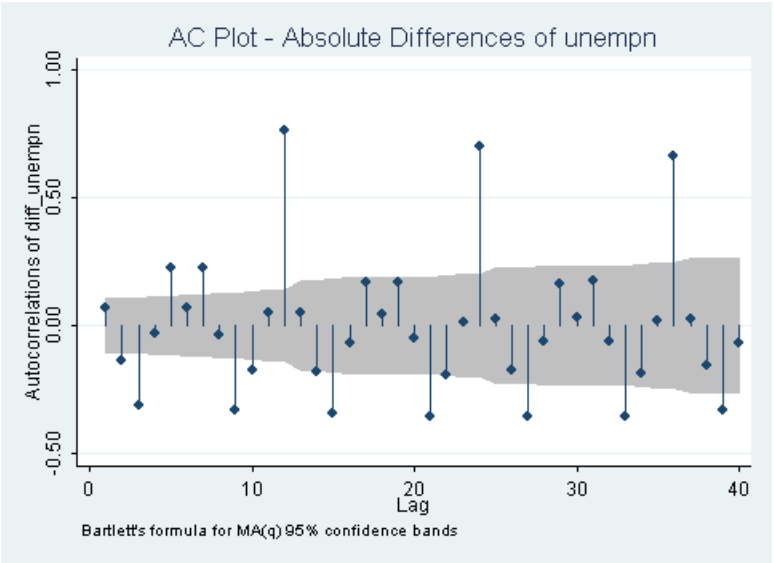


The ten year swap rate fails to exhibit even the mild autocorrelation of the one and five year swaps, which further suggests that those points are insignificant.

Unemployment Rate

Monthly changes in the unemployment rate show this pattern:

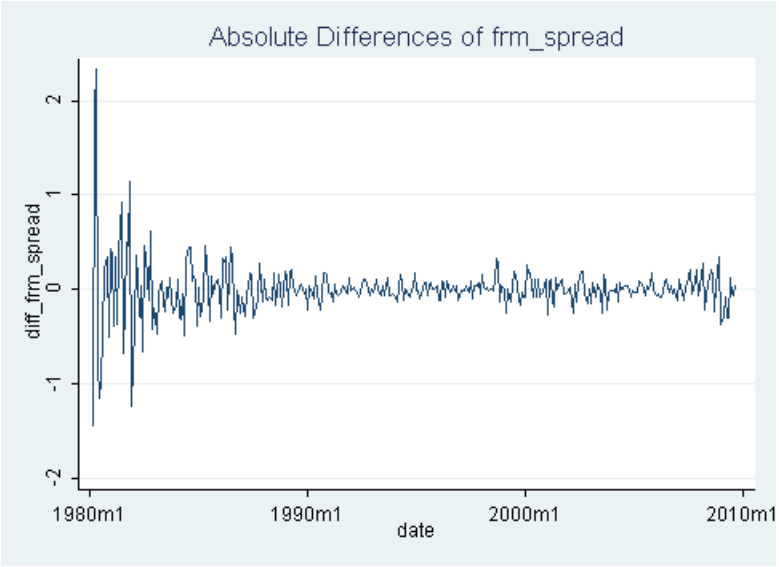


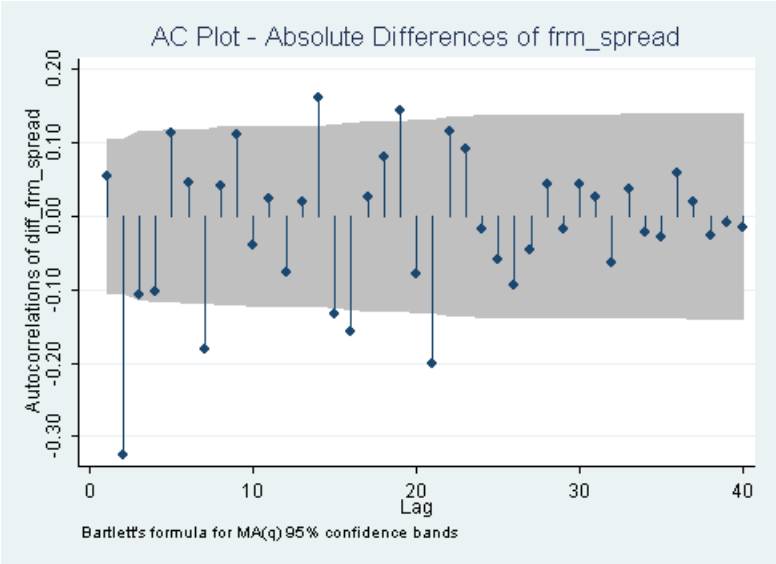


Unemployment rates have some clear autoregressive structure, though it appears to be more complicated than the structure for the Case Shiller Index. Note also that the peaks are spaced about one year apart, which suggests seasonality may be at play in this series as well (though given the strange autoregressive structure, it is much harder to see from any preliminary exploration).

30 Year Fixed Rate Mortgage-10 Year Treasury Spread

The monthly changes in the spread between the 30 year fixed rate mortgage yield and 10 year Treasury yields are shown in this graph:





Note again the increased volatility in the early 1980s. This is largely due to the higher interest rates seen in that period, but it is important to once again note that this period will not be included in the joint estimation procedure. As for the autocorrelegram, aside from the fairly negative second lag, there really aren't any notable autoregressive effects.[37]

[37] Given the negative autocorrelation, and the lack of anything in the first lag, we are very skeptical of this point.

Clearly, there are very important autoregressive and seasonal effects present in the data over the estimation period. The Case-Shiller 10 City Index (CSXR) is one notable example, which exhibits almost textbook examples of monthly seasonality and the long tail of an autoregressive process. Note also the differences in data availability. Given the desire to jointly simulate these variables and the corresponding requirement of a common timeframe for estimation, data preceding 1996 is not incorporated into the estimation (as 1996 is the earliest available data for 1 year swap quotes). Importantly, this excludes plausibly relevant and large variation in the Real GDP and Treasuries data that may serve to underestimate their true volatility.

Kamakura repeated the entire model selection process for two separate subsamples: once for data from 1996Q3-2007Q1 for the simulation exercises as of March 31, 2007; and once more for data spanning 1996Q3-2009Q3 for the simulation exercises as of December 31, 2009.[38] This process involved iterative introduction and removal of potential time series effects until a stable model and autocorrelation structure was found. The intermediate output is omitted. The next section details the final model recommendations for 2007Q1 models.

Final Recommendations for Models as of 2007Q1

The final models have the following form:

$$y_t = \beta y_{t-1} + \alpha_t + \varepsilon_t$$

where y_t is the variable of interest (generally either monthly returns or monthly absolute differences), βy_{t-1} includes any autoregressive terms (sometimes set to zero), α_t are a series of seasonal controls (sometimes set to zero), and ε_t is an uncorrelated innovation term. Finally, the models are used to generate a series of predicted innovation terms, $\widehat{\varepsilon_t}$, which then are used to generate a joint variance covariance matrix of the innovation terms for all series. This is similar to, but distinct from, a vector autoregression framework: Kamakura does not make the claim that changes in GDP Granger cause changes in Home Prices or vice versa, but we do impose that the two factors are likely to move together in an autocorrelated fashion.

NOTE: The constant terms in these models serve only to de-mean the historical time series. They identify where the series stood when estimation began (1996) and where the series stood when estimation ended (2007 or 2009). Often, the wisest strategy is to replace statistically insignificant estimates of the constant term with a zero (or other chosen) value.[39]

[38] Note that 2009Q3 is used as this is the most recent available observation for Real GDP, Case Shiller, and the TBI.

[39] This is especially true when modeling differences in interest rates, as any non-zero term will force a trend in the simulation. Kamakura has adjusted the relevant point estimates where appropriate. For ease of replicability and auditing, the coefficients in this document represent the exact, unadjusted point estimates from the indicated specification.

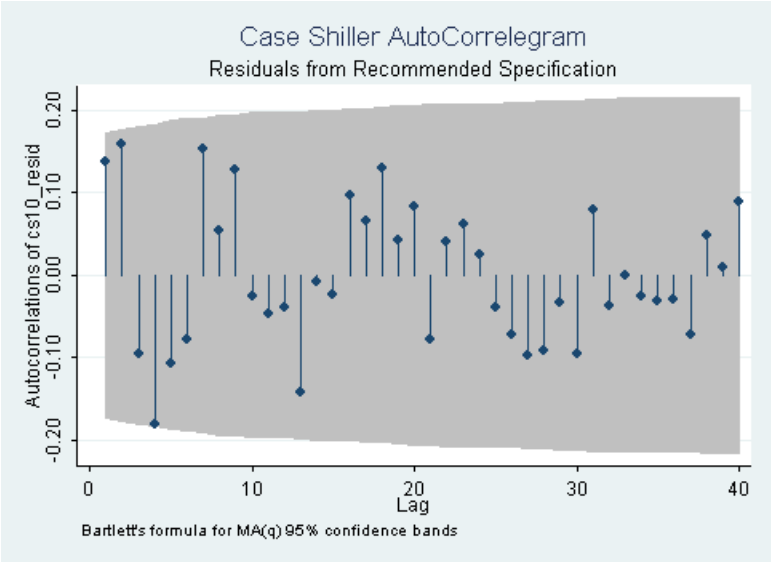
Case Shiller 10 City Home Price Index

The regression results for the Case Shiller 10 City Home Price Index are given here:

Monthly Returns in Case Shiller 10 City Composite
Model Estimated on data from 1996Q3-2007Q1
Monthly Frequency

				Number of obs	128
				F(12, 115)	102.83
Source	**SS**	**df**	**MS**	**Prob > F**	0
Model	0.00445083	12	0.0003	**R-squared**	0.9148
Residual	0.00041479	115	3.606	**Adj R-squared**	0.9059
Total	0.00486562	127	0	**Root MSE**	0.0019

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Lagged Dependent Variable	0.9533305	0.03417	27.9	0	0.8856461	1.021015
February	0.0005795	0.00081	0.72	0.476	-0.0010251	0.0021842
March	0.0033362	0.00081	4.11	0	0.0017275	0.004945
April	0.0020615	0.00086	2.39	0.019	0.0003516	0.0037715
May	0.0003687	0.00088	0.41	0.679	-0.0013921	0.0021294
June	-0.0000801	0.0008	-0.09	0.929	-0.0018548	0.0016946
July	-0.0023616	0.00089	-2.63	0.01	-0.0041385	-0.0005847
August	-0.0020852	0.00084	-2.47	0.015	-0.0037601	-0.0004103
September	-0.0022458	0.0008287	-2.71	0.008	-0.0038899	-0.0006017
October	-0.0015989	0.00081	-1.95	0.053	-0.00322	0.0000222
November	-0.0021635	0.00081	-2.66	0.009	-0.0037753	-0.0005517
December	-0.0012786	0.00081	-1.58	0.117	-0.0028834	0.0003261
Constant	0.0007919	0.00058	1.35	0.179	-0.0003672	0.0019511



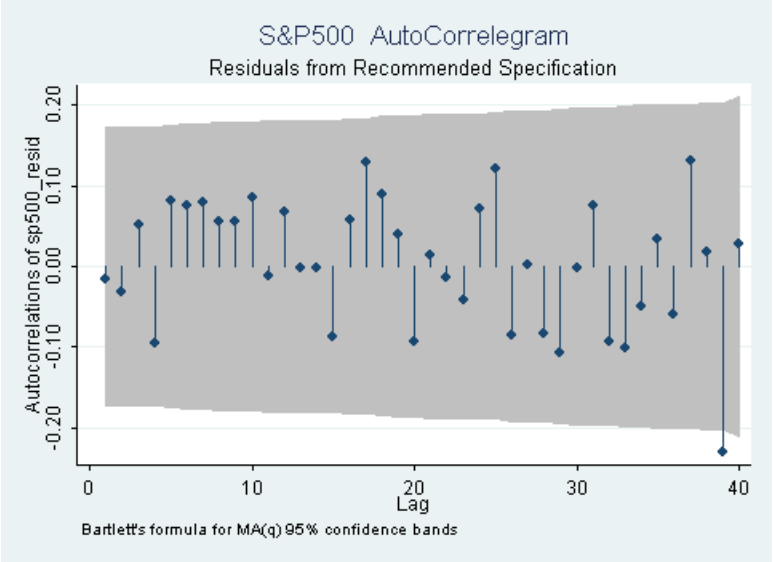
Note how the model has absorbed essentially all of the autoregressive and seasonal structure noted in the previous section. Indeed, there are no residual significant autoregressive effects. This suggests that the seasonally adjusted AR(1) model is an excellent choice for simulation of home prices.

S&P 500 Equity Index

Monthly Returns in S&P 500
Model Estimated on data from 1996Q3-2007Q1
Monthly Frequency

				Number of obs	129
				F(0, 128)	0
Source	**SS**	**df**	**MS**	**Prob > F**	.
Model	0	0		**R-squared**	0
Residual	0.24456836	128	0.001	**Adj R-squared**	0
Total	0.24456836	128	0.001	**Root MSE**	0.04371

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Constant	0.0067954	0.00384	1.77	0.08	-0.0008196	0.0144105



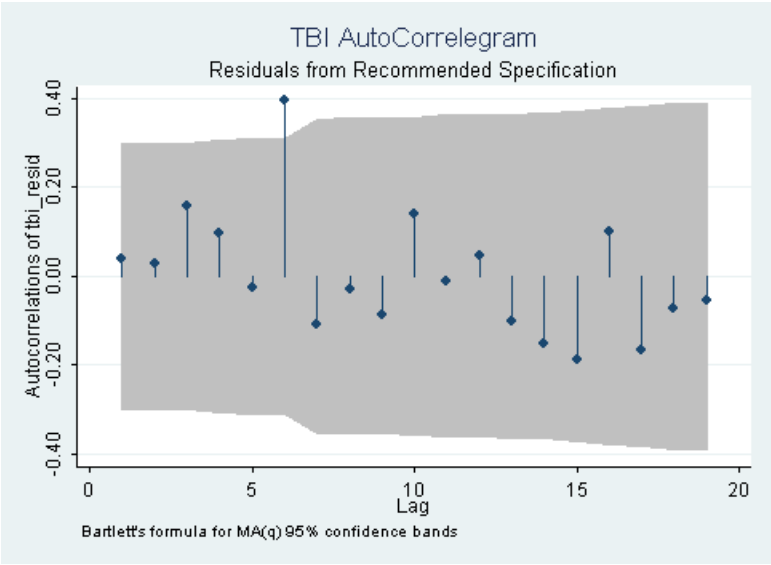
As the S&P 500 does not exhibit any autocorrelation or seasonal effects, its simulation is simply a series of de-meaned residuals. Despite the apparent simplicity of this approach, it was by far the best performing method, and the implied distribution of errors fits the data fairly well.

The Transactions Based Commercial Real Estate Index

Quarterly Returns in TBI
Model Estimated on data from 1996Q3-2007Q1
Quarterly Frequency

				Number of obs	43
				F(0, 42)	0
Source	**SS**	**df**	**MS**	**Prob > F**	.
Model	0	0		**R-squared**	0
Residual	0.05803661	42	0.0013	**Adj R-squared**	0
Total	0.05803661	42	0.0013	**Root MSE**	0.03717

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Constant	0.0212196	0.00566	3.74	0.001	0.0097795	0.0326597



Commercial Real Estate Prices failed to exhibit any stable, statistically significant time-series effects in the data. The most appropriate model is random movements from period to period, just like the S&P 500.

Note: This relationship was estimated with quarterly data as that is the highest frequency data available. To recover the monthly values used in Monte Carlo Simulation, take the following steps:

$$\boldsymbol{Constant_m = (1 + Constant_q)^{\frac{1}{3}} - 1}$$

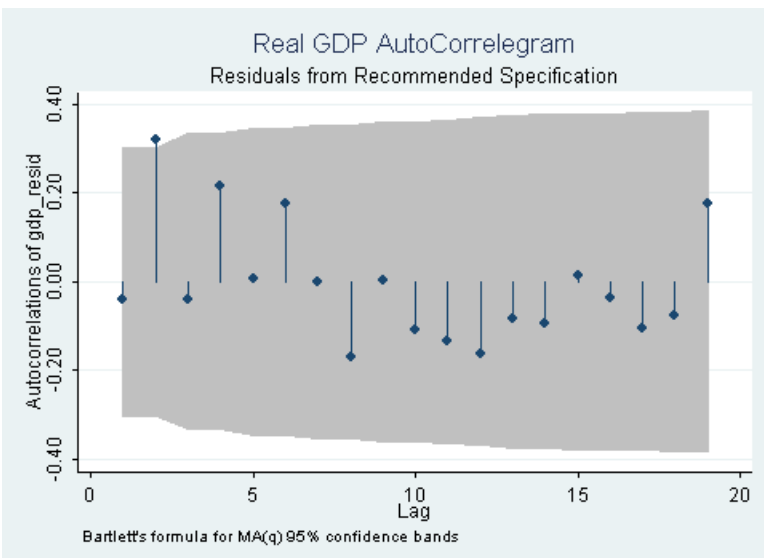
$$\boldsymbol{RMSE_m = \frac{RMSE_q}{\sqrt{3}}}$$

Real Gross Domestic Product

Quarterly Returns in Real GDP
Model Estimated on data from 1996Q3-2007Q1
Quarterly Frequency

				Number of obs	42
				F(1, 40)	0.51
Source	**SS**	**df**	**MS**	**Prob > F**	0.4799
Model	1.4123E-05	1	0	**R-squared**	0.0126
Residual	0.0011106	40	0	**Adj R-squared**	-0.0121
Total	0.00112472	41	0	**Root MSE**	0.00527

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Lagged Dependent Variable	0.1131753	0.15868	0.71	0.48	-0.2075381	0.4338887
Constant	0.0068318	0.00148	4.59	0	0.0038236	0.00984



Despite the lack of significance of the autoregressive term, Kamakura believes that this reflects sample size issues rather than the absence of such a process (especially as there is such strong evidence in the public domain of an AR(1) process for Real GDP on larger datasets[40]).

Note: This relationship was estimated with quarterly data as that is the highest frequency data available. To recover the monthly values used in Monte Carlo Simulation, take the following steps:

$$\boldsymbol{Constant_m = (1 + Constant_q)^{\frac{1}{3}} - 1}$$

$$\boldsymbol{RMSE_m = \frac{RMSE_q}{\sqrt{3}}}$$

$$\boldsymbol{Lag_m = (Lag_q)^{\frac{1}{3}}}$$

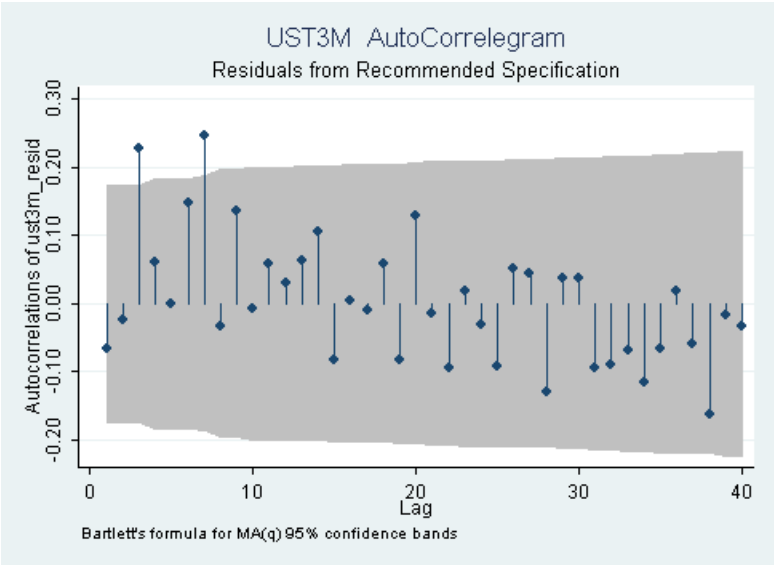
[40] This is an excellent example of a Bayesian application of Classical Statistics.

United States Treasuries: 3 month

Monthly Absolute Differences in Log 3 Month Treasuries
Model Estimated on data from 1996Q3-2007Q1
Monthly Frequency

				Number of obs	128
				F(1, 126)	45.37
Source	**SS**	**df**	**MS**	Prob > F	0
Model	0.1405118	1	0.1405	R-squared	0.2648
Residual	0.39020522	126	0.003	Adj R-squared	0.2589
Total	0.53071703	127	0.0041	Root MSE	0.05565

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Lagged Dependent Variable	0.5145734	0.076393	6.74	0	0.3633943	0.6657524
Constant	-0.000277	0.004919	-0.06	0.955	-0.0100112	0.0094571



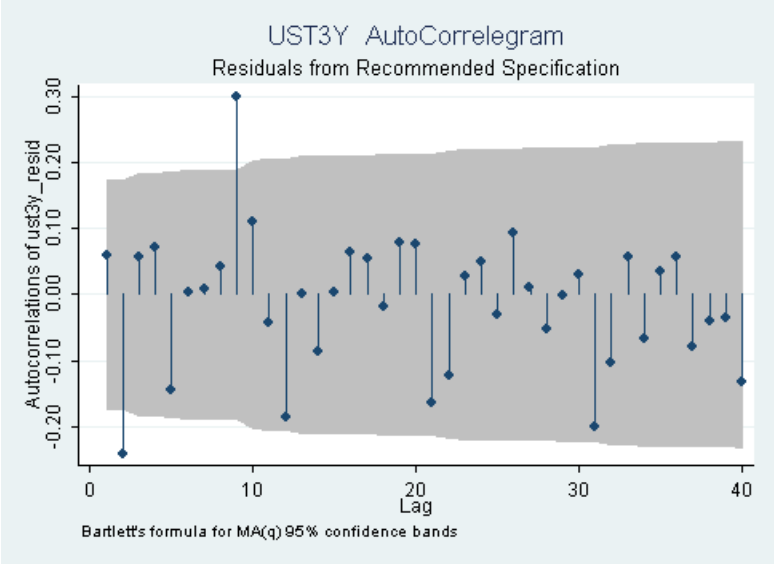
A single lag AR(1) process was capable of removing the large spike in the autocorrelegram at one month noted in the preceding section. The small residual autocorrelation a three and seven months is mildly significant relative to a pointwise confidence band, but is very unlikely to be significant relative to uniform bands. Kamakura recommends against estimation and implementation of autoregressive structures with gaps in the estimated lags.

United States Treasuries: 3 year

Monthly Absolute Differences in Log 3 Year Treasuries
Model Estimated on data from 1996Q3-2007Q1
Monthly Frequency

				Number of obs	128
				F(1, 126)	9.83
Source	**SS**	**df**	**MS**	**Prob > F**	0.0021
Model	0.04570476	1	0.0457	**R-squared**	0.0724
Residual	0.5859108	126	0.0046	**Adj R-squared**	0.065
Total	0.63161556	127	0.0049	**Root MSE**	0.06819

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Lagged Dependent Variable	0.2695161	0.085968	3.14	0.002	0.0993889	0.4396434
Constant	-0.002138	0.006031	-0.35	0.724	-0.0140731	0.0097972

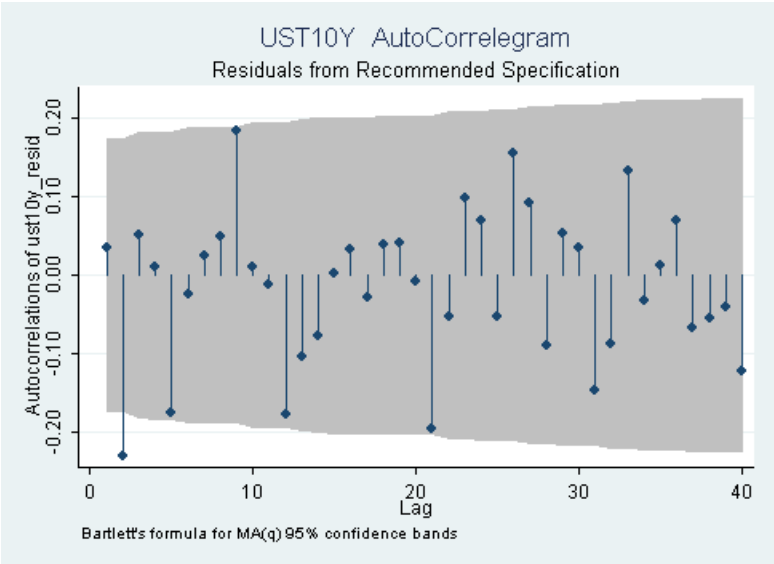


United States Treasuries: 10 year

Monthly Absolute Differences in Log 10 Year Treasuries
Model Estimated on data from 1996Q3-2007Q1
Monthly Frequency

				Number of obs	128
				F(1, 126)	3.24
Source	**SS**	**df**	**MS**	**Prob > F**	0.0741
Model	0.00665724	1	0.0066	**R-squared**	0.0251
Residual	0.25864193	126	0.002	**Adj R-squared**	0.0174
Total	0.26529917	127	0.0028	**Root MSE**	0.04531

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Lagged Dependent Variable	0.1587016	0.088125	1.8	0.074	-0.0156949	0.3330981
Constant	-0.0027293	0.004013	-0.68	0.498	-0.0106713	0.0052127



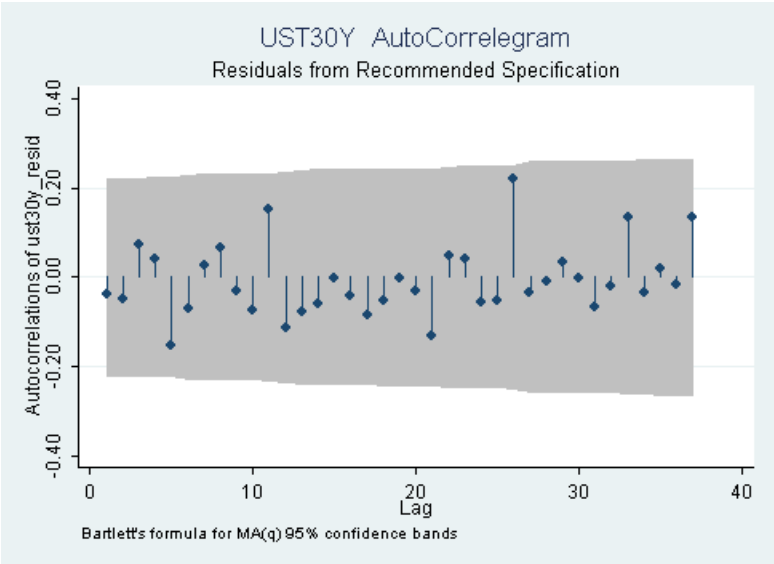
Though slightly insignificant at a 5% level of confidence, Kamakura recommends simulation of 10 year Treasuries following the same structure (AR(1)) as three month and three year issues. This is an example of the final consistency and coherency checks overruling a simple application of significance boundaries.

United States Treasuries: 30 year

Monthly Absolute Differences in Log 30 Year Treasuries
Model Estimated on data from 1996Q3-2007Q1
Monthly Frequency

				Number of obs	79
				F(1, 77)	0.32
Source	**SS**	**df**	**MS**	**Prob > F**	0.5756
Model	0.00030118	1	0.00031	**R-squared**	0.0041
Residual	0.07338501	77	0.00095	**Adj R-squared**	-0.0088
Total	0.0736862	78	0.000944	**Root MSE**	0.03087

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Lagged Dependent Variable	0.063474	0.112912	0.56	0.576	-0.1613625	0.2883105
Constant	-0.0028364	0.003485	-0.81	0.418	-0.0097758	0.004103



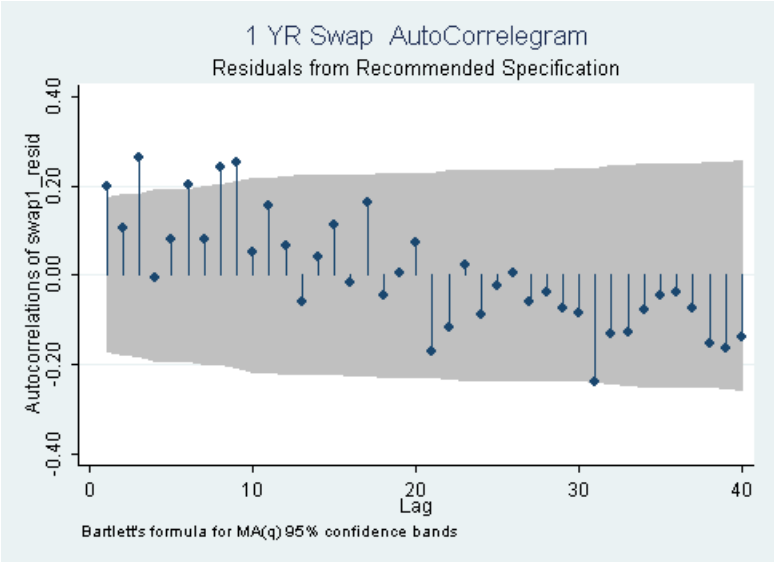
While the autocorrelation structure for 30 year maturities appears insignificant, this likely reflects the lack of data (and the large gap in the data), particularly as the 3 month, 3 year, and 10 year maturities all exhibited autoregressive behavior. For these reasons, Kamakura advocates inclusion of an AR(1) structure for 30 year Treasuries.

Swap: 1 year

Monthly Absolute Differences in Log 1 Year Swaps
Model Estimated on data from 1996Q3-2007Q1
Monthly Frequency

				Number of obs	129
				F(0, 128)	0
Source	**SS**	**df**	**MS**	**Prob > F**	.
Model	0	0	.	**R-squared**	0
Residual	0.75177805	128	0.0058	**Adj R-squared**	0
Total	0.75177805	128	0.0058	**Root MSE**	0.07664

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Constant	-0.0011447	0.006748	-0.17	0.866	-0.0144959	0.0122064



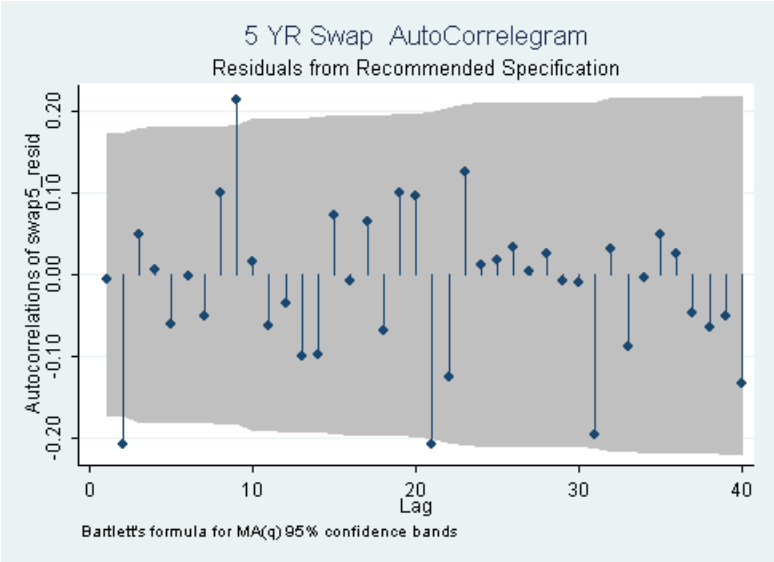
Swaps do not have a clear, stable significant autoregressive structure across the different issues. Kamakura recommends simulation of swaps similar to the simulation of the equities index from the previous section.

Swap: 5 year

Monthly Absolute Differences in Log 5 Year Swaps
Model Estimated on data from 1996Q3-2007Q1
Monthly Frequency

				Number of obs	129
				F(0, 128)	0
Source	**SS**	**df**	**MS**	**Prob > F**	.
Model	0	0	.	**R-squared**	0
Residual	0.62383817	128	0.0048	**Adj R-squared**	0
Total	0.62383817	128	0.0048	**Root MSE**	0.06981

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Constant	-0.0024739	0.006147	-0.4	0.688	-0.014636	0.0096883

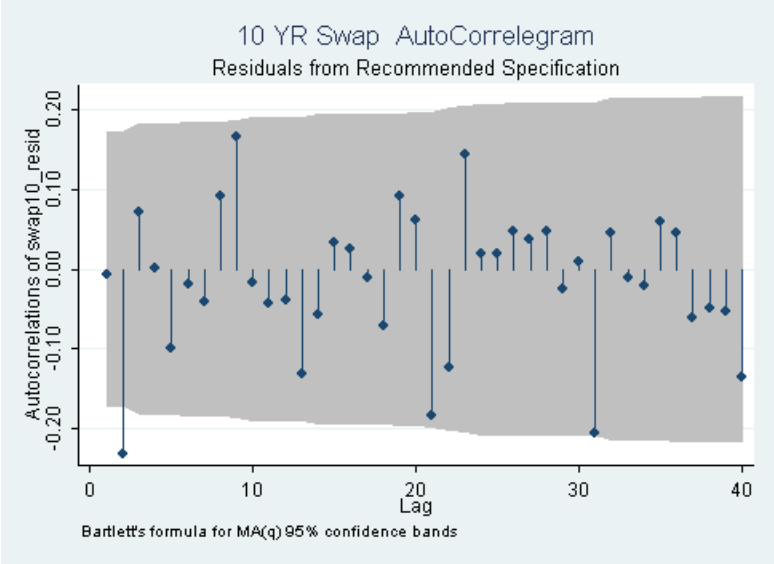


Swap: 10 year

Monthly Absolute Differences in Log 10 Year Swaps
Model Estimated on data from 1996Q3-2007Q1
Monthly Frequency

				Number of obs	129
				F(0, 128)	0
Source	**SS**	**df**	**MS**	**Prob > F**	.
Model	0	0	.	**R-squared**	0
Residual	0.37428818	128	0.0029	**Adj R-squared**	0
Total	0.37428818	128	0.0029	**Root MSE**	0.05408

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Constant	-0.00256	0.004761	-0.54	0.592	-0.0119806	0.0068605

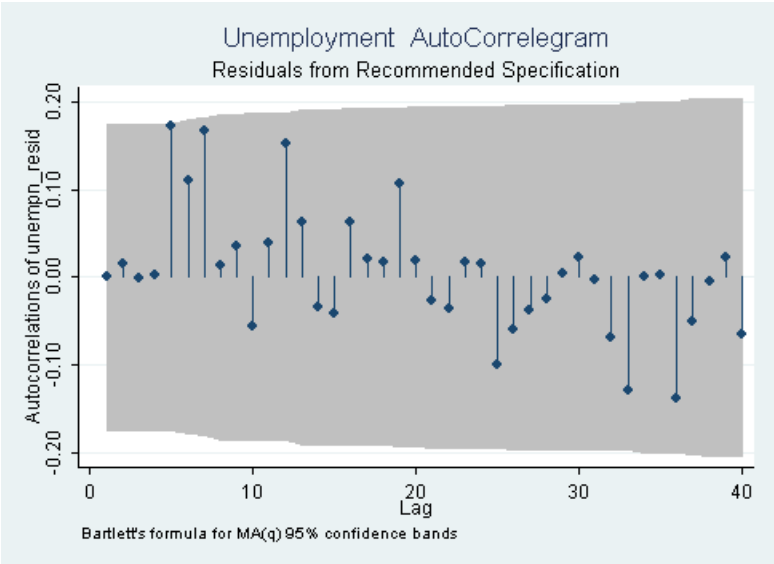


Unemployment Rates

Monthly Absolute Differences in Log Unemployment Rates
Model Estimated on data from 1996Q3-2007Q1
Monthly Frequency

				Number of obs	127
				F(13, 113)	48.93
Source	**SS**	**df**	**MS**	**Prob > F**	0
Model	0.55690006	13	0.0428	**R-squared**	0.8491
Residual	0.09894098	113	0.0008	**Adj R-squared**	0.8318
Total	0.65584104	126	0.0052	**Root MSE**	0.02959

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Lagged Dependent Variable	-0.1331672	0.093387	-1.43	0.157	-0.3181829	0.0518486
2 mo. Lagged Dependent Variable	0.1395786	0.093189	1.5	0.137	-0.0450463	0.3242035
February	-0.1548494	0.019947	-7.76	0	-0.194367	-0.1153317
March	-0.2167076	0.017991	-12.05	0	-0.2523514	-0.1810638
April	-0.2592909	0.013779	-18.82	0	-0.2865899	-0.2319919
May	-0.1745186	0.016784	-10.4	0	-0.2077715	-0.1412658
June	-0.0444029	0.017288	-2.57	0.012	-0.0786535	-0.0101523
July	-0.1451585	0.016261	-8.93	0	-0.177375	-0.112942
August	-0.2114083	0.014862	-14.23	0	-0.240852	-0.1819646
September	-0.1992366	0.013365	-14.91	0	-0.2257142	-0.172759
October	-0.1875943	0.014526	-12.91	0	-0.2163736	-0.158815
November	-0.1344623	0.01408	-9.55	0	-0.1623569	-0.1065677
December	-0.1564315	0.013674	-11.44	0	-0.1835219	-0.1293412
Constant	0.1555925	0.009126	17.05	0	0.1375116	0.1736735



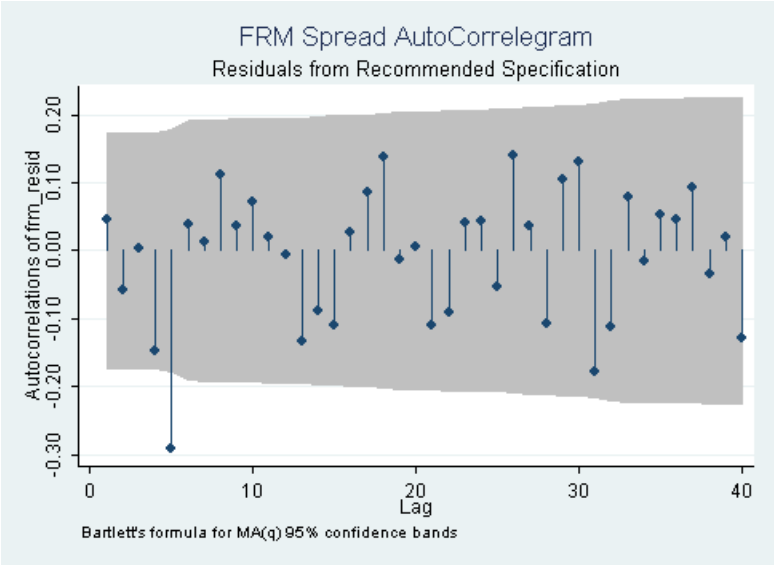
Unemployment rates have a slightly unusual (but very stable) autoregressive structure along with their seasonal nature.

30 Year Fixed Rate Mortgage-10 Year Treasury Spread

Monthly Absolute Differences in Log FRM-10Y Spread
Model Estimated on data from 1996Q3-2007Q1
Monthly Frequency

				Number of obs	129
				F(0, 128)	0
Source	**SS**	**df**	**MS**	**Prob > F**	.
Model	0	0	.	**R-squared**	0
Residual	0.44363832	128	0.0034	**Adj R-squared**	0
Total	0.44363832	128	0.0034	**Root MSE**	0.05887

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Constant	0.00098	0.005183	0.19	0.85	-0.0092763	0.0112362



Covariance Matrix of Residuals

Note: This Matrix was constructed based on Quarterly Regressions. To Recover the Monthly values used in Monte Carlo Simulation, take the following steps : $\sum_m = \frac{\sum_q}{3}$

Variance Covariance Matrix of Residuals from Models Described Above
Model Estimated on data from 1996Q3-2007Q1
Quarterly Frequency

	cs10_resid	sp500_resid	unempn_resid	ust3m_resid	ust3y_resid	ust10y_resid	ust30y_resid	swap1_resid	swap5_resid	swap10_resid	tbi_resid	gdp_resid	frm_resid
cs10_resid	0.000055												
sp500_resid	-0.000225	0.008533											
unempn_resid	0.000022	-0.001629	0.002676										
ust3m_resid	0.000113	0.001937	-0.003784	0.013819									
ust3y_resid	0.000092	0.004636	-0.001094	0.006647	0.009333								
ust10y_resid	-6.80E-07	0.002613	0.000162	0.002598	0.006031	0.005164							
ust30y_resid	-0.000037	0.001331	0.000053	0.001137	0.00297	0.003023	0.002288						
swap1_resid	0.000153	0.005986	-0.002519	0.010847	0.011564	0.005881	0.002401	0.017408					
swap5_resid	-0.000087	0.005083	-0.000284	0.003235	0.007662	0.005465	0.002963	0.009119	0.008135				
swap10_resid	-0.000088	0.003823	0.000078	0.002054	0.006208	0.004808	0.002862	0.006898	0.006825	0.005948			
tbi_resid	-0.000071	0.001252	-0.000773	0.000721	-7.60E-06	-0.000239	-3.70E-08	0.000476	0.000267	0.000143	0.000948		
gdp_resid	7.20E-06	0.000268	-0.000188	0.0002	0.000201	0.000075	0.000038	0.000359	0.000205	0.00014	0.000051	0.000039	
frm_resid	0.000131	-0.002912	0.000528	-0.003276	-0.004849	-0.004566	-0.003459	-0.003884	-0.004742	-0.004326	-0.000768	0.000019	0.01143

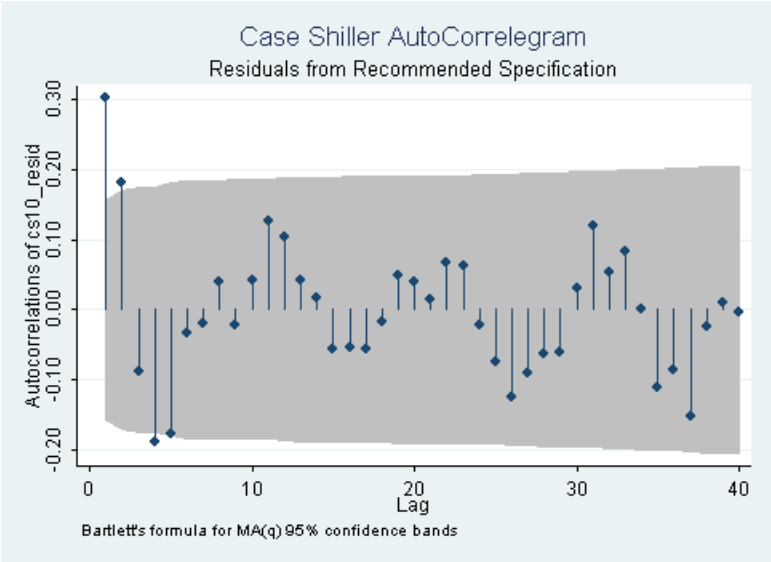
Final Recommendations for Models 2009Q3

Case Shiller 10 City Home Price Index

Monthly Returns in Case Shiller 10 City Composite
Model Estimated on data from 1996Q3-2009Q3
Monthly Frequency

				Number of obs	158
				F(12, 145)	203.98
Source	**SS**	**df**	**MS**	**Prob > F**	0
Model	0.01694524	12	0.0014	**R-squared**	0.9441
Residual	0.00100381	145	6.922	**Adj R-squared**	0.9394
Total	0.01794905	157	0.0001	**Root MSE**	0.00263

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Lagged Dependent Variable	0.9665017	0.0211	45.79	0	0.9247867	1.008217
February	0.000636	0.001	0.62	0.539	-0.0014037	0.0026758
March	0.0034099	0.00103	3.3	0.001	0.0013695	0.0054503
April	0.0033986	0.00103	3.28	0.001	0.0013484	0.0054487
May	0.0017359	0.00104	1.66	0.1	-0.0003343	0.0038062
June	0.000997	0.00105	0.95	0.346	-0.0010871	0.0030812
July	-0.0018374	0.00105	-1.74	0.085	-0.0039302	0.0002555
August	-0.0018717	0.00103	-1.82	0.072	-0.0039095	0.0001662
September	-0.002869	0.00102	-2.8	0.006	-0.004894	-0.000844
October	-0.0016907	0.001	-1.63	0.105	-0.0037383	0.0003569
November	-0.0022543	0.00103	-2.18	0.031	-0.0042973	-0.0002113
December	-0.0010382	0.00103	-1.01	0.316	-0.0030781	0.0010018
Constant	0.0002993	0.00072	0.41	0.682	-0.0011432	0.0017417



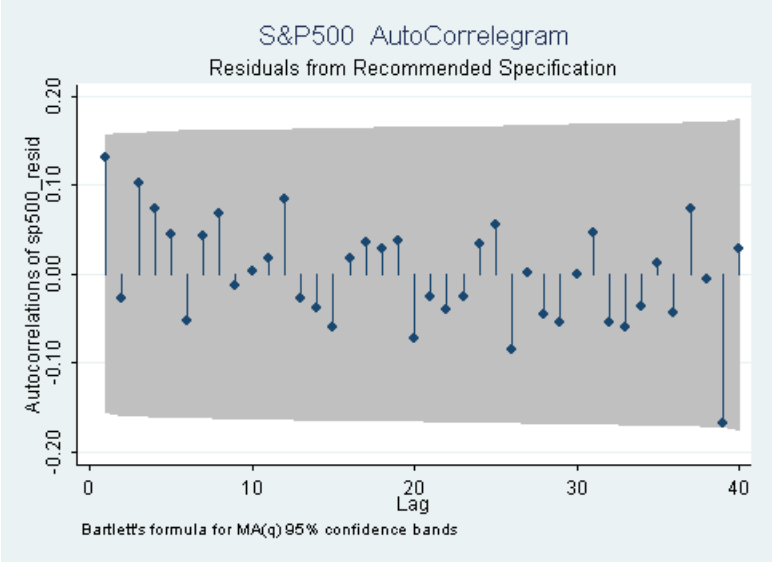
There is some small indication of further autoregressive effects in the Case Shiller 10 City Composite index, though estimation with these terms led to model instability. A single lagged, seasonally adjusted process had the best model performance.

S&P 500 Equity Index

Monthly Returns in S&P 500
Model Estimated on data from 1996Q3-2009Q3
Monthly Frequency

				Number of obs	159
				F(0, 158)	0
Source	**SS**	**df**	**MS**	**Prob > F**	.
Model	0	0		**R-squared**	0
Residual	0.35976988	158	0.0022	**Adj R-squared**	0
Total	0.35976988	158	0.0022	**Root MSE**	0.04772

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Constant	0.0040212	0.00378	1.06	0.29	-0.0034532	0.0114955



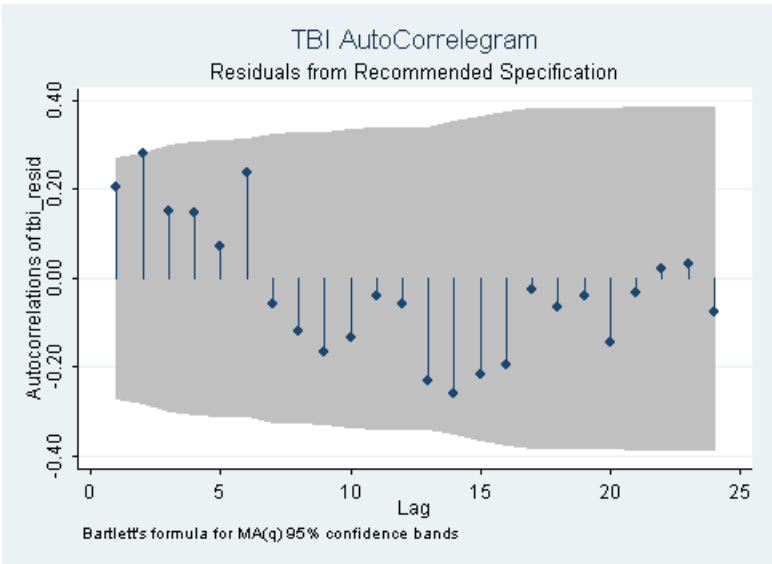
Unsurprisingly, the S&P 500 exhibits no strong autocorrelation or other predictability on the 1996-2009 sample.

The MIT Transactions Based Commercial Real Estate Index

Quarterly Returns in TBI
Model Estimated on data from 1996Q3-2009Q3
Quarterly Frequency

				Number of obs	53
				F(0, 52)	0
Source	**SS**	**df**	**MS**	**Prob > F**	.
Model	0	0		**R-squared**	0
Residual	0.12866217	52	0.002474	**Adj R-squared**	0
Total	0.12866217	52	0.002474	**Root MSE**	0.04974

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Constant	0.0102092	0.00683	1.49	0.141	-0.0035014	0.0239198



In contrast to the Residential Real Estate Price Index, the Commercial Real Estate focused TBI shows no signs of autocorrelation or seasonality.

Note: This relationship was estimated with quarterly data as that is the highest frequency data available. To recover the monthly values used in Monte Carlo Simulation, take the following steps:

$$\boldsymbol{Constant_m = (1 + Constant_q)^{\frac{1}{3}} - 1}$$

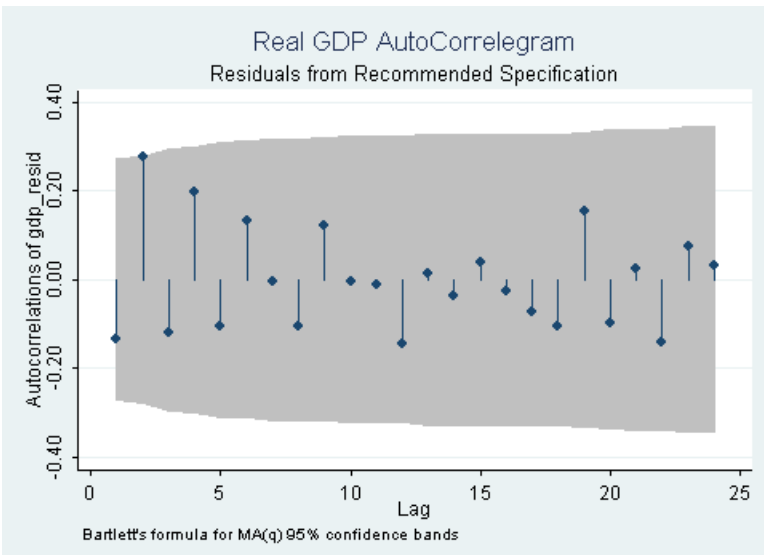
$$\boldsymbol{RMSE_m = \frac{RMSE_q}{\sqrt{3}}}$$

Real Gross Domestic Product

Quarterly Returns in Real GDP
Model Estimated on data from 1996Q3-2009Q3
Quarterly Frequency

				Number of obs	52
				F(1, 50)	15.29
Source	**SS**	**df**	**MS**	**Prob > F**	0.0003
Model	0.00057294	1	0.000572	**R-squared**	0.2342
Residual	0.00187358	50	0.000037	**Adj R-squared**	0.2189
Total	0.00244653	51	0.000047	**Root MSE**	0.00612

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Lagged Dependent Variable	0.4832857	0.12359	3.91	0	0.2350388	0.7315325
Constant	0.0030999	0.00113	2.73	0.009	0.0008167	0.0053831



Now, we see that the autoregressive term for Real GDP is indeed significant.

Note: This relationship was estimated with quarterly data as that is the highest frequency data available. To recover the monthly values used in Monte Carlo Simulation, take the following steps:

$$\boldsymbol{Constant_m = (1 + Constant_q)^{\frac{1}{3}} - 1}$$

$$\boldsymbol{RMSE_m = \frac{RMSE_q}{\sqrt{3}}}$$

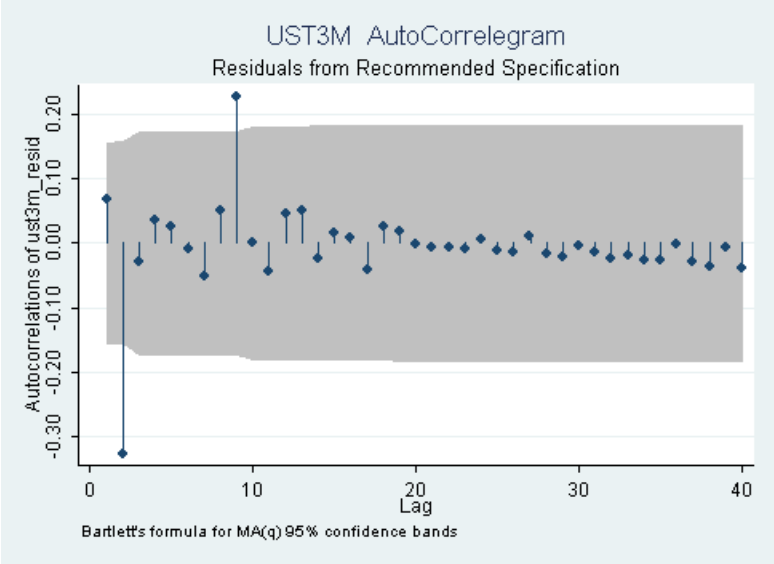
$$\boldsymbol{Lag_m = (Lag_q)^{\frac{1}{3}}}$$

United States Treasuries: 3 month

Monthly Absolute Differences in Log 3 Month Treasuries
Model Estimated on data from 1996Q3-2009Q3
Monthly Frequency

				Number of obs	158
				F(1, 156)	6.7
Source	**SS**	**df**	**MS**	**Prob > F**	0.0106
Model	0.39808273	1	0.398	**R-squared**	0.0412
Residual	9.27009431	156	0.0594	**Adj R-squared**	0.035
Total	9.66817703	157	0.0615	**Root MSE**	0.24377

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Lagged Dependent Variable	0.2040221	0.078826	2.59	0.011	0.0483178	0.3597264
Constant	-0.0195501	0.019469	-1	0.317	-0.0580059	0.0189057



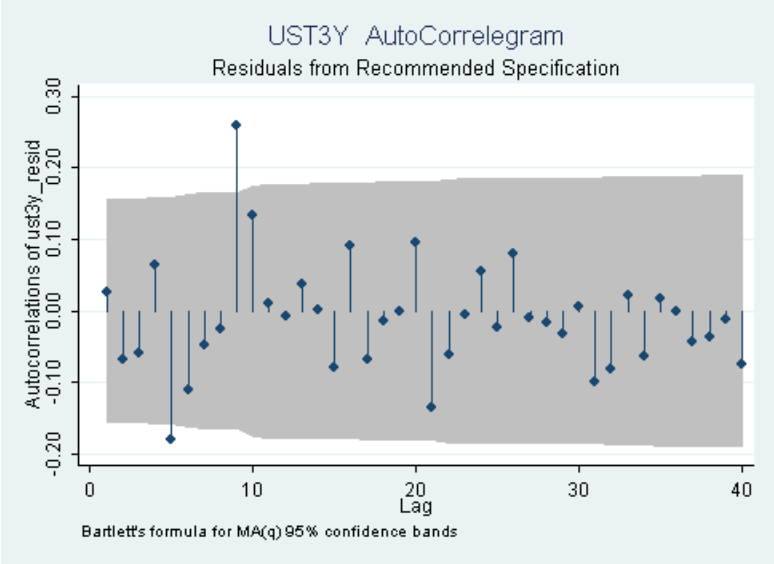
The large negative AR effect appearing at 2 months out leads to instability when included in the simulation (and inconsistency with the other Treasury issues, as well as with the 3 month issue from 2007).

United States Treasuries: 3 year

Monthly Absolute Differences in Log 3 Year Treasuries
Model Estimated on data from 1996Q3-2009Q3
Monthly Frequency

				Number of obs	158
				F(1, 156)	16.12
Source	**SS**	**df**	**MS**	**Prob > F**	0.0001
Model	0.11783716	1	0.1178	**R-squared**	0.0937
Residual	1.14005381	156	0.0073	**Adj R-squared**	0.0879
Total	1.25789097	157	0.008	**Root MSE**	0.08549

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Lagged Dependent Variable	0.3072858	0.076525	4.02	0	0.1561275	0.4584441
Constant	-0.0066533	0.006833	-0.97	0.332	-0.0201509	0.0068444

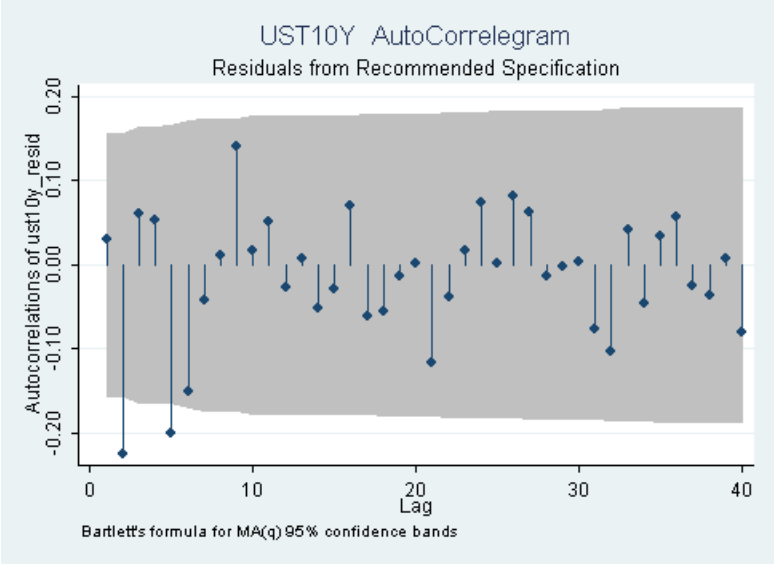


United States Treasuries: 10 year

Monthly Absolute Differences in Log 10 Year Treasuries
Model Estimated on data from 1996Q3-2009Q3
Monthly Frequency

				Number of obs	158
				F(1, 156)	3.19
Source	**SS**	**df**	**MS**	**Prob > F**	0.0759
Model	0.01025896	1	0.0102	**R-squared**	0.0201
Residual	0.50111524	156	0.0032	**Adj R-squared**	0.0138
Total	0.5113742	157	0.0032	**Root MSE**	0.05668

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Lagged Dependent Variable	0.141987	0.079452	1.79	0.076	-0.0149531	0.2989272
Constant	-0.0038634	0.004521	-0.85	0.394	-0.0127936	0.0050669

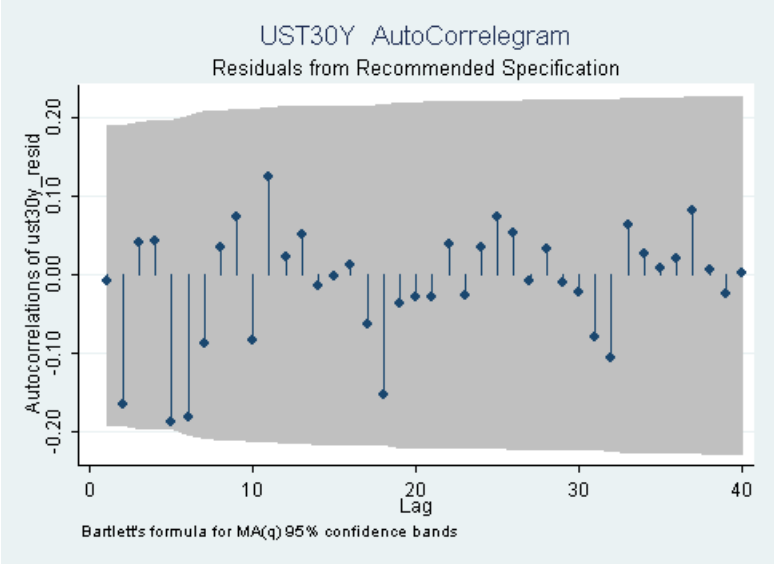


United States Treasuries: 30 year

Monthly Absolute Differences in 30 Year Treasuries
Model Estimated on data from 1996Q3-2009Q3
Monthly Frequency

				Number of obs	106
				F(1, 104)	0.3
Source	**SS**	**df**	**MS**	**Prob > F**	0.5865
Model	0.00071633	1	0.0007	**R-squared**	0.0029
Residual	0.25031236	104	0.002	**Adj R-squared**	-0.0067
Total	0.25102869	105	0.0023	**Root MSE**	0.04906

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Lagged Dependent Variable	0.0534521	0.097979	0.55	0.587	-0.1408433	0.2477475
Constant	-0.0023901	0.004769	-0.5	0.617	-0.0118468	0.0070665



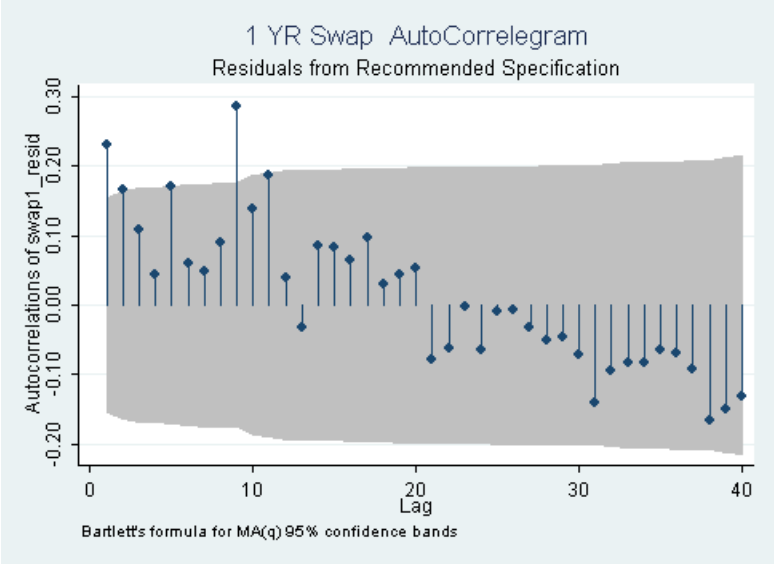
While 30 year treasuries fail to have significant AR(1) terms, the presence of this effect in the other maturities, combined with the gaps in the 30 year series, suggest the inclusion of these terms despite their relatively small point estimation and apparent lack of statistical significance.

Swap: 1 year

Monthly Absolute Differences in Log 1 Year Swaps
Model Estimated on data from 1996Q3-2009Q3
Monthly Frequency

				Number of obs	159
				F(0, 158)	0
Source	**SS**	**df**	**MS**	**Prob > F**	.
Model	0	0		**R-squared**	0
Residual	1.48471779	158	0.0093	**Adj R-squared**	0
Total	1.48471779	158	0.0093	**Root MSE**	0.09694

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Constant	-0.0144972	0.007688	-1.89	0.061	-0.0296811	0.0006866

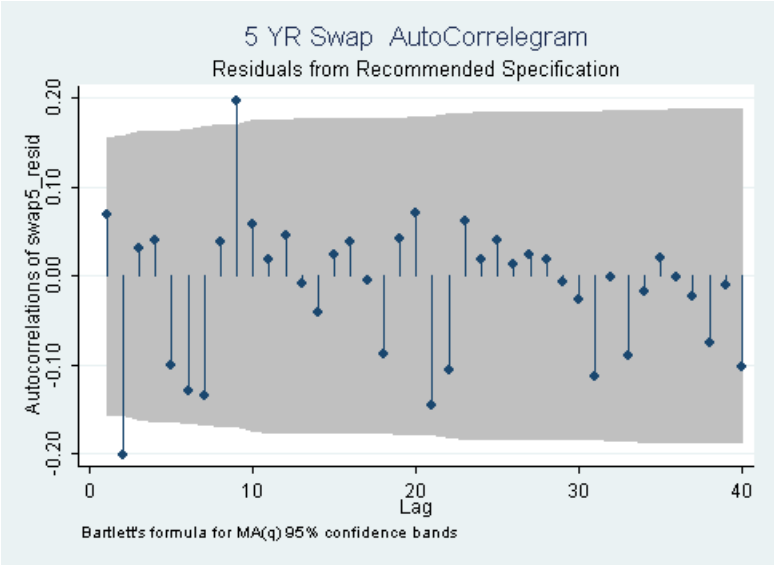


Swap: 5 year

Monthly Absolute Differences in Log 5 Year Swaps
Model Estimated on data from 1996Q3-2009Q3
Monthly Frequency

				Number of obs	159
				F(0, 158)	0
Source	**SS**	**df**	**MS**	**Prob > F**	.
Model	0	0		**R-squared**	0
Residual	1.00121358	158	0.0063	**Adj R-squared**	0
Total	1.00121358	158	0.0063	**Root MSE**	0.0796

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Constant	-0.0059912	0.006313	-0.95	0.344	-0.01846	0.0064775

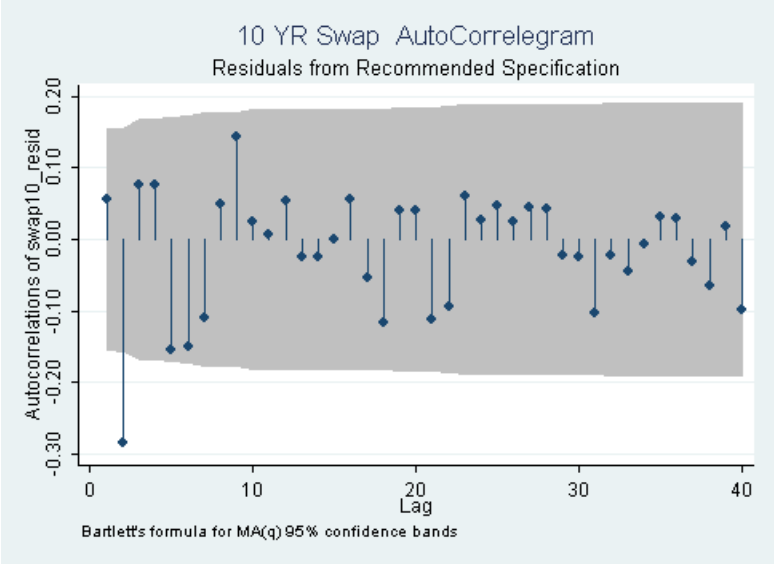


Swap: 10 year

Monthly Absolute Differences in Log 10 Year Swaps
Model Estimated on data from 1996Q3-2009Q3
Monthly Frequency

				Number of obs	159
				F(0, 158)	0
Source	**SS**	**df**	**MS**	**Prob > F**	.
Model	0	0		**R-squared**	0
Residual	0.6799649	158	0.0043	**Adj R-squared**	0
Total	0.6799649	158	0.0043	**Root MSE**	0.0656

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Constant	-0.0046071	0.005203	-0.89	0.377	-0.0148826	0.0056684

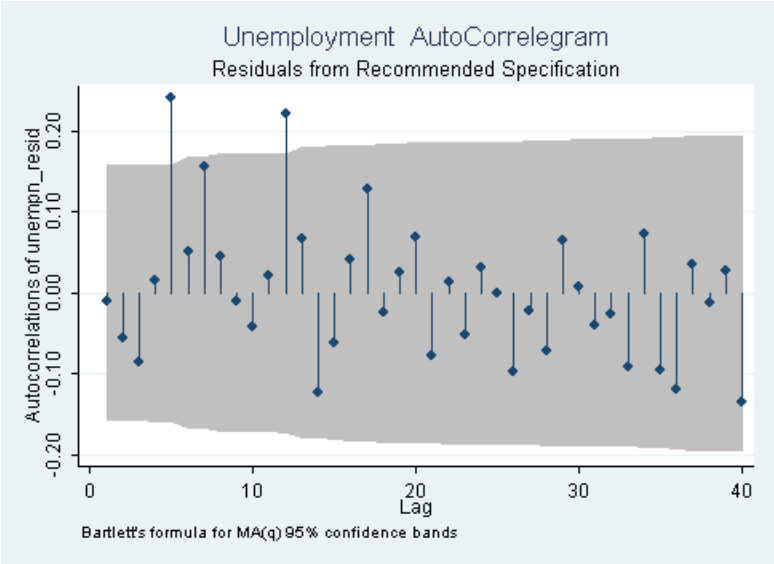


Unemployment Rates

Monthly Absolute Differences in Log Unemployment Rates
Model Estimated on data from 1996Q3-2009Q3
Monthly Frequency

				Number of obs	156
				F(14, 141)	44.75
Source	**SS**	**df**	**MS**	**Prob > F**	0
Model	0.62877447	14	0.0449	**R-squared**	0.8163
Residual	0.14152524	141	0.001	**Adj R-squared**	0.03168
Total	0.77029972	155	0.0049	**Root MSE**	0.155

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Lagged Dependent Variable	-0.0425848	0.083057	-0.51	0.609	-0.206782	0.1216124
2 mo. Lagged Dependent Variable	0.2585332	0.079676	3.24	0.001	0.1010194	0.416047
3 mo. Lagged Dependent Variable	0.1744658	0.082478	2.12	0.036	0.0114126	0.337519
February	-0.1733048	0.017553	-9.87	0	-0.2080058	-0.1386038
March	-0.2289347	0.016816	-13.61	0	-0.2621785	-0.195691
April	-0.2732627	0.020794	-13.14	0	-0.3143708	-0.2321546
May	-0.1470186	0.015564	-9.45	0	-0.1777868	-0.1162505
June	-0.03354	0.015483	-2.17	0.032	-0.0641482	-0.0029318
July	-0.1335839	0.016122	-8.29	0	-0.1654564	-0.1017114
August	-0.2180801	0.013902	-15.69	0	-0.2455643	-0.190596
September	-0.2102017	0.017012	-12.36	0	-0.2438334	-0.17657
October	-0.177086	0.014358	-12.33	0	-0.2054702	-0.1487018
November	-0.1178854	0.013564	-8.69	0	-0.144701	-0.0910698
December	-0.1376058	0.013232	-10.4	0	-0.1637645	-0.1114471
Constant	0.1569508	0.009327	16.83	0	0.1385115	0.1753901



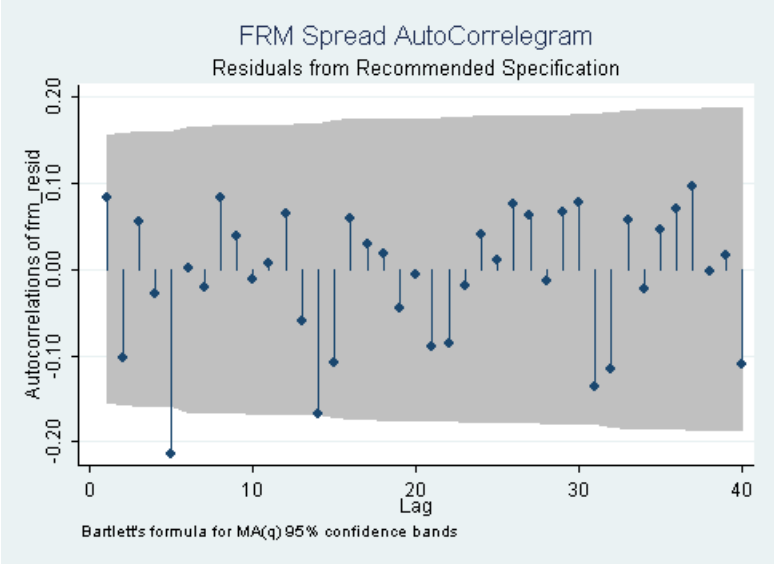
Unemployment rates on the 2009 sample appeared to have a slightly different autoregressive structure than on the 2007 sample. Therefore, the simulations from 2009 follow a slightly different approach from 2007 (again, the desire to avoid data mining for the 2007 valuations preclude the use of this model at that date).

30 Year Fixed Rate Mortgage-10 Year Treasury Spread

Monthly Absolute Differences in Log FRM-10Y Spread
Model Estimated on data from 1996Q3-2009Q3
Monthly Frequency

				Number of obs	159
				F(0, 128)	0
Source	**SS**	**df**	**MS**	**Prob > F**	.
Model	0	0	.	**R-squared**	0
Residual	0.65430586	128	0.0041	**Adj R-squared**	0
Total	0.65430586	128	0.0041	**Root MSE**	0.06435

	Coef.	**Std. Error**	**t-statistic**	**P>|t|**	**95% Conf. Min**	**95% Conf. Max**
Constant	0.0010266	0.005103	0.2	0.841	-0.0090532	0.0111064



Variance Covariance Matrix of Residuals

Note: This Matrix was constructed based on Quarterly Regressions. To Recover the Monthly values used in Monte Carlo Simulation, take the following steps: $\sum_m = \frac{\sum_q}{3}$

Variance Covariance Matrix of Residuals from Models Described Above
Model Estimated on data from 1996Q3-2009Q3
Quarterly Frequency

	cs10_resid	sp500_resid	unempn_resid	ust3m_resid	ust3y_resid	ust10y_resid	ust30y_resid	swap1_resid	swap5_resid	swap10_resid	tbi_resid	gdp_resid	frm_resid
cs10_resid	0.000212												
sp500_resid	0.000471	0.01012											
unempn_resid	-0.000116	-0.002234	0.00305										
ust3m_resid	0.002923	0.029208	-0.011955	0.496472									
ust3y_resid	0.001578	0.011624	-0.001612	0.122096	0.050414								
ust10y_resid	0.000751	0.00645	-0.000808	0.0622	0.024864	0.014782							
ust30y_resid	0.000426	0.004082	-0.00104	0.057291	0.018313	0.011705	0.010684						
swap1_resid	0.000483	0.009714	-0.001536	0.12339	0.042201	0.018123	0.012632	0.054166					
swap5_resid	0.000921	0.009526	-0.001278	0.087699	0.033932	0.018589	0.014116	0.029413	0.026127				
swap10_resid	0.000695	0.007553	-0.001131	0.075737	0.027107	0.01584	0.012801	0.022623	0.02155	0.018444			
tbi_resid	-0.000191	0.001597	-0.000985	0.008629	0.000466	-0.000424	-0.000263	0.004081	0.000436	0.000195	0.002504		
gdp_resid	0.000028	0.000414	-0.000189	0.001514	0.000622	0.000281	0.000156	0.000621	0.000475	0.000345	0.000106	0.000048	
frm_resid	-0.000596	-0.004223	0.000869	-0.041421	-0.0188	-0.011542	-0.009792	-0.01069	-0.013296	-0.01176	0.000534	-0.000062	0.016495

In summary, the time series used to estimate the statistical relationships used for the March 31, 2007 simulations were as follows:

Macro Factor	Estimation Transformation	Available Dates	Estimation Dates	Estimation Frequency
Case Shiller 10 City	Monthly Returns	1987Q1-2009Q3	1996Q3-2007Q1	Monthly
S&P 500	Monthly Returns	1980Q1-2009Q4	1996Q3-2007Q1	Monthly
MIT TBI	Quarterly Returns	1984Q1-2009Q3	1996Q3-2007Q1	Quarterly
Real GDP	Quarterly Returns	1980Q1-2009Q4	1996Q3-2007Q1	Quarterly
UST 3 MO	Monthly Absolute Difference	1982Q1-2009Q4	1996Q3-2007Q1	Monthly
UST 3 YR	Monthly Absolute Difference	1980Q1-2009Q4	1996Q3-2007Q1	Monthly
UST 10Y	Monthly Absolute Difference	1980Q1-2009Q4	1996Q3-2007Q1	Monthly
UST 30Y	Monthly Absolute Difference	1980Q1-2001Q4, 2006Q2-2009Q4	1996Q3-2007Q1	Monthly
SWAP 1Y	Monthly Absolute Difference	1996Q3-2009Q4	1996Q3-2007Q1	Monthly
SWAP 5Y	Monthly Absolute Difference	1988Q4-2009Q4	1996Q3-2007Q1	Monthly
SWAP 10Y	Monthly Absolute Difference	1988Q4-2009Q4	1996Q3-2007Q1	Monthly
Unemployment Rates	Monthly Absolute Difference	1980Q1-2009Q4	1996Q3-2007Q1	Monthly

Note:
The covariance matrix is based on the models enclosed applied to quarterly data from 1996Q3-2009Q3
To recover the monthly values for the variance covariance matrix, simply divide the entries by three.
To recover monthly values for the GDP AR coefficient, simply take the cube root
To recover monthly values for the GDP and TBI Root Mean Squared Error, divide by the square root of three
To recover monthly values for the mean return of GDP and TBI,take the cube root of one plus the intercept and then subtract one.

The time series used to estimate the statistical relationships for the December 31, 2009 simulations are given in this table:

Macro Factor	Estimation Transformation	Available Dates	Estimation Dates	Estimation Frequency
Case Shiller 10 City	Monthly Returns	1987Q1-2009Q3	1996Q3-2009Q3	Monthly
S&P 500	Monthly Returns	1980Q1-2009Q4	1996Q3-2009Q3	Monthly
MIT TBI	Quarterly Returns	1984Q1-2009Q3	1996Q3-2009Q3	Quarterly
Real GDP	Quarterly Returns	1980Q1-2009Q4	1996Q3-2009Q3	Quarterly
UST 3 MO	Monthly Absolute Difference	1982Q1-2009Q4	1996Q3-2009Q3	Monthly
UST 3 YR	Monthly Absolute Difference	1980Q1-2009Q4	1996Q3-2009Q3	Monthly
UST 10Y	Monthly Absolute Difference	1980Q1-2009Q4	1996Q3-2009Q3	Monthly
UST 30Y	Monthly Absolute Difference	1980Q1-2001Q4, 2006Q2-2009Q4	1996Q3-2009Q3	Monthly
SWAP 1Y	Monthly Absolute Difference	1996Q3-2009Q4	1996Q3-2009Q3	Monthly
SWAP 5Y	Monthly Absolute Difference	1988Q4-2009Q4	1996Q3-2009Q3	Monthly
SWAP 10Y	Monthly Absolute Difference	1988Q4-2009Q4	1996Q3-2009Q3	Monthly
Unemployment Rates	Monthly Absolute Difference	1980Q1-2009Q4	1996Q3-2009Q3	Monthly

Note:
The covariance matrix is based on the models enclosed applied to quarterly data from 1996Q3-2009Q3
To recover the monthly values for the variance covariance matrix, simply divide the entries by three.
To recover monthly values for the GDP AR coefficient, simply take the cube root
To recover monthly values for the GDP and TBI Root Mean Squared Error, divide by the square root of three
To recover monthly values for the mean return of GDP and TBI,take the cube root of one plus the intercept and then subtract one.

Key Assumptions Regarding Rollover of Assets and Liabilities

In the Kamakura Risk Manager simulation, rollover assumptions were applied to all principal cash flows in excess of $1,000. For the simulation of liabilities, it was assumed that deposits/shares of a given maturity were reissued at the same original maturity. Rollover of assets proceeds in two different ways depending on the asset class. For corporate bonds, cash thrown off was reinvested in bonds issued by the same issuer with the same original tenor as the bonds maturing. However, for all structured product asset classes, it is impossible to know what characteristics an asset backed security issued in the future will take. Rather than speculate in that regard and confound the interpretation of the simulations, it is assumed that cash thrown off will be invested in 3 month US Treasury Securities. This has the impact of reducing the risk profile of the simulated portfolio over time and presumably reducing both credit losses and net interest margin.

Impact of Net Income on the Balance Sheet

Kamakura Risk Manager can handle the cash flow from profits or losses in two ways. The first method, called "auto balancing," is standard in asset and liability management. Excess cash is either invested in a specific asset or used to pay down a liability with a specific maturity. Cash deficits are made up by issuing a specific liability. Note that with a non-constant or stochastic yield curve, this process will almost surely change the maturity profile of assets and liabilities over time. For this reason, this method is not available for purposes of this report as the liability structure of the model corporate union constantly maintain an specific overnight funding percentage and precise weighted average life, rather than allowing those parameters to evolve dynamically. The method for achieving these requirements is to assume that all profits are paid out to holders of the model corporate credit union capital. In the event of losses, it is assumed that the losses are made up by the issuance of new capital to members. In this way, the required overnight funding percentage and weighted average life can remain constant through any simulation.

Models Used in Simulation

Default Models Used

The default models used in the analysis are as follows:

Home mortgages and Residential Mortgage-Backed Securities:

Standard Kamakura Risk Information Services Mortgage Bankers Association default models disaggregated into the following loan categories:

- Prime fixed rate mortgages
- Prime adjustable rate mortgages
- Subprime fixed rate mortgages
- Subprime adjustable rate mortgages

Commercial Real Estate: Standard KRIS commercial real estate default model

Corporate Bonds:	In KRIS a different macro factor driven default model is available for each of the 29,200 public firms in 32 countries covered by the KRIS default service. This relationship was used for every corporate name simulated.
U.S. Treasuries:	For simplicity, a zero default probability was assumed in spite of positive credit default swaps on the credit of the U.S. government.
ABS–Auto:	Standard Kamakura auto loan default model.
ABS–Credit Card:	Standard Kamakura credit card default model
ABS–Student Loan:	Kamakura student loan default models, disaggregated into FFELP and private.
ABS Other:	Because this class is not homogeneous, the actual historical default rate on each security was collected from Bloomberg and Intex and held constant for the simulation
MBS Agency	For the same reasons as with U.S. Treasuries, a zero default probability was assumed in spite of positive credit default swaps on the credit of the U.S. government.

Prepayment Models Used

A wide array of prepayment modeling techniques are available in Kamakura Risk Manager. The Proposed Regulations frequently discuss constant prepayment speeds, so Kamakura elected to use this approach for consistency and simplicity. To this end, we collected Constant Prepayment Speed (CPR) for the life of the security[41] and used them as best estimate for prepayment speed of the remaining term for asset backed securities and mortgage backed securities. However, we note that this is a simplification and implies a symmetry of interest rate risk when rates rise or fall, though was intended to replicate the spirit of the proposed regulations.

Of course, simulated U.S. Treasury issues, corporate issues and liabilities were non-callable and therefore the prepayment rate is fixed at zero.

Recovery Rate in the Event of Simulated Default Events

For simplicity, Kamakura assumed a constant recovery rate of 40% for all asset classes based on the common market assumption for investment grade bonds. Many alternative assumptions are available in Kamakura Risk Manager.

[41] From origination to the current date from Bloomberg and Intex for each CUSIP

Structured Products Tranche Libraries

Kamakura used the libraries of Markit Partners and Intex in the simulation of asset backed securities and mortgage backed securities. In each period, and in each scenario, these libraries allocate collateral cash flow by tranche given the interest rate, prepayment and default rates simulated in Kamakura Risk Manager.

System Used for Simulation

The risk management system used for the simulation is Kamakura Risk Manager, version 7.1 (released in fourth quarter of 2009), 32 bit version. Part I of the Impact Analysis was completed using common spreadsheet software as Kamakura believes that its transparency and clarity are enhanced by replicability. Of course, Kamakura believes it is helpful to supplement such analysis with a richer and much more complex simulation as a validation of the conclusions one can draw from the simpler analysis using spreadsheet software.

The next section provides an introduction to Kamakura Risk Manager, which has been under continuous development since 1990. The system, first offered commercially in 1993, contains more than 250,000 lines of computer code. The calculations are consistent with the book *Advanced Financial Risk Management*, which is incorporated by reference in this report. Kamakura Risk Manager user documentation is only available in electronic form. Kamakura Corporation welcomes a review of this user documentation by the NCUA at any time.

An Overview of Kamakura Risk Manager

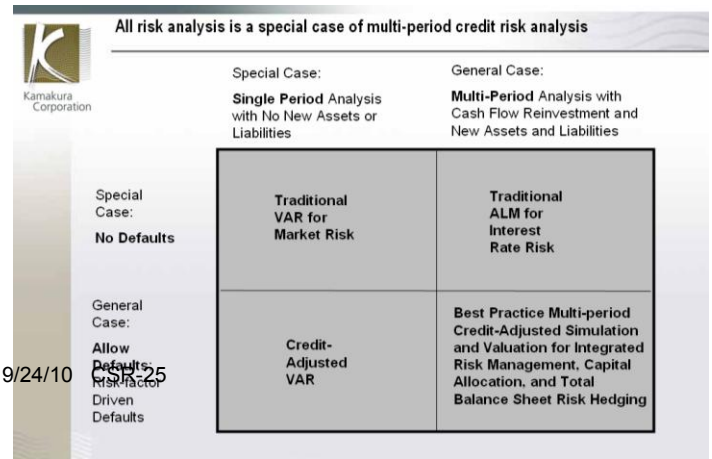
An In Depth Overview of

Kamakura Risk Manager, Version 7.0, October, 2008

ALM, Credit Risk, Market Risk, Basel II, FAS 157 and FAS 133 Integrated Risk System

Introduction

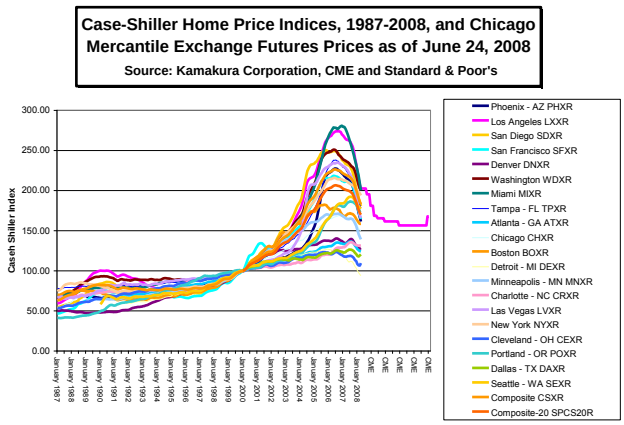
In the credit crisis of 2007-2008, the chief executive officers of Citigroup, Merrill Lynch, Bear Stearns, Wachovia and UBS were fired because of risk management failures at their organizations. Countrywide Financial was sold to Bank of America in a distress sale for the same reason. Without exception, these institutions relied on legacy interest rate risk, market risk, and credit risk systems that were simply unable to answer one basic question: What happens to our institution if home prices drop by 20%? Kamakura Risk Manager (KRM) is designed to answer this and many closely related questions in order to give management, the Board of Directors, shareholders and regulators an accurate view of the total risk of the organization, including traditional narrowly defined risk "silos". KRM is a total risk system that is used for asset and liability management, interest rate risk, transfer pricing, liquidity risk, credit risk, Basel II capital ratios, capital allocation, risk-adjusted return on capital, and market-oriented accounting calculations like FAS 133/IAS 39 and FAS 157.



The Rationale for an Integrated Approach to Risk Management

It's now widely understood that traditional approaches to "silo" risk management are

simply special cases of best practice integrated risk management: a multi-period simulation of random changes in the macro-economic environment where the default probabilities of all counterparties, from retail to corporate to sovereign, move up and down with the economy. All cash flows, financial accruals, defaults and recoveries are captured through this multi-period simulation, and embedded options are exercised with the user-specified degree of rationality. As the graph shows, the risk silos for the most part differ in only two dimensions: whether the simulation is multi-period (the general case) or single period (a special case), and whether or not defaults are "turned on" (the general case) or "turned off" (the special case).



Why Macro Factors Matter in Enterprise Risk Management

After peaking in late 2006, home prices in the United States began to drop at a rate that is unprecedented in modern U.S. financial history. The graph below shows the Case-Shiller home price indices for the major metropolitan areas in the United States. On June 24, 2008, the futures contracts on the same indices were showing home price declines from the September 2006 peak in Los Angeles, for example, of 39% through the November 2012 futures contract. The fact that home prices were a critical risk factor for major financial institutions was not a surprise. On December 10, 2003, Kamakura Managing Director for Research Professor Robert Jarrow and four co-authors published the Loss Distribution Model mandated by the U.S. Congress for the Federal Deposit Insurance Corporation. That study explicitly identified home prices as one of three macro-factors driving correlated default of U.S. banks.

Some of the financial institutions with the largest losses from the 2007-2008 credit crisis have explicitly admitted that the losses stemmed from a lack of understanding of the exposure that the companies had to home prices. For example, Ann Reese, chairwoman of Merrill Lynch's audit committee, said the board had had "numerous discussions'' with management about its investments in the months before the credit crisis. "The board initially didn't realize that prices of CDOs were linked to the U.S. housing market," she said. "The CDO position did not come to the board's attention until late in the process,'' said Reese, a former chief financial officer of ITT Corp. who now is co-executive director of the non-profit Center for Adoption Policy. ``For reasons that we have subsequently explored, there was not a sense that these triple-A securities should be included in the overall exposure to residential real estate.''[42] Another example comes from the Shareholders' Report on UBS's Write-Downs (April 18, 2008) on the reasons for UBS's massive losses in real-estate-related CDO tranches: ""Whilst there were a number of credit spread RFL [risk factor limits] limits in place, there was no RFL [risk factor limit] that specifically addressed certain factors relevant to Subprime exposure, such as delinquency rates or residential real estate price developments."

[42] Bloomberg.com, April 24, 2008.

Kamakura Risk Manager gives risk managers, senior management, the Board of Directors, shareholders, and regulators the capability to explicitly analyze the total risk impact of macro-economic factors like home prices, interest rates, foreign exchange rates, stock prices, oil prices, commercial real estate, and commodity prices.

Why Transaction and Loan Level Detail Matter in Enterprise Risk Management

Kamakura Risk Manager is designed to operate at any level of granularity in portfolio data, but the "best practice" users of KRM use the most detailed portfolio data possible: loan and transaction level data. In the *New York Times* on April 27, 2008, a senior Moody's official was quoted as saying the rating agencies did not look at individual loan files in its ratings of CDOs. Kamakura's view is that a clear understanding of total risk can only be obtained by assembling the total risk of the institution, transaction by transaction. That is what KRM is designed to do.

Why Risk Management is More Than VAR and Credit-Adjusted VAR

Bloomberg.com reported on January 28, 2008 that Merrill Lynch's value at risk was calculated at $92 million compared to actual losses from the credit crisis of $18 billion, 200 times larger than measured risk levels. Kamakura Risk Manager includes the traditional value at risk calculations, both historical VAR and variance-covariance based value at risk, but KRM also includes important extensions to the concept to avoid the kind of risk measurement errors that Merrill Lynch experienced. KRM includes a full multi-period value at risk calculation that allows for dynamic changes in portfolio or balance sheet composition and VAR on a fully default adjusted basis. Cash flows are re-invested, options are exercised, and so on. Standard VAR and credit VAR make an unrealistic assumption that there is only one time period in the analysis and that the beginning balance sheet stays unchanged. Users have this option in KRM but the best practice multi-period VAR calculation is much more realistic, because the balance sheet evolves over time as some transactions mature and new transactions are added in a predictable fashion.

KRM for Interest Rate Risk and Asset and Liability Management

Kamakura's senior management team has more than 100 years experience as ALM and interest rate risk managers. Kamakura Risk Manager's powerful ALM capabilities include user-defined multi-factor interest rate models, multiple approaches to prepayment analysis including state of the art logistic probabilities of prepayment, dynamic movements in new business, state of the art options models consistent with the work of Professor Robert Jarrow, and modern valuation techniques for valuing complex assets and liabilities like life insurance policies, bank owned life insurance, non-maturity deposits, servicing rights, and so on. KRM allows up to 999 user-defined time periods of any length.

- **KRM Data**: Either transaction level data (best practice) or summarized data
- **KRM Term Structure Models**: N-factor term structure models (up to 999 factors) can be defined by the user
- **KRM Fixed Income Options**: Closed form solutions, lattice solutions, and monte carlo solutions are available
- **KRM Prepayment Models**: Logistic prepayment (KRM version 7.2), prepayment functions, prepayment tables, and a wide range of prepayment speed models

- **KRM Options Exercise**: Fixed income options can be exercised rationally or "irrationally" subject to transactions costs to be mimic actual consumer behavior
- **KRM Non-Maturity Deposit Modeling**: Modeling can be done either using the no-arbitrage approach of Jarrow-van Deventer (1996, 1998) or by using specific user defined formulas for rate and balance evolution as a function of interest rates
- **KRM Default Modeling**: KRM ALM analysis can use a wide range of default models as outlined below in the KRM for credit risk section
- **KRM Yield Curve Smoothing**: KRM provides the user with the choice of six yield curve smoothing methods and six credit spread methods for fitting current market yield curves. Among the choices are the maximum smoothness forward rate method of Adams and van Deventer (1993).
- **KRM Yield Data Format**: KRM accommodates a wide array of interest rate data formats from raw bond prices to common libor and swap market conventions
- **KRM Roll-over and New Business Modeling**: KRM allows dynamic balance sheet evolution using a rich array of user choices regarding the investment of scheduled and unscheduled cash flows, the amount and nature of new business, and the dynamic evolution of deposit balances.
- **KRM Matched Maturity Margin Simulation**: As noted in the next section, KRM can simulate net income on both a gross basis and a matched maturity basis, recognizing the transfer pricing strategy followed by the institution.

KRM for Transfer Pricing and Performance Measurement

As Kamakura's van Deventer, Imai and Mesler noted in their 2004 book *Advanced Financial Risk Management*, performance measurement and transfer pricing have changed enormously since Wm. Mack Terry and his team at Bank of America invented the transfer pricing concept at Bank of America in 1973. Kamakura Risk Manager uses the exact date of cash flow, adjusted for holidays, weekends, business day conventions and so on, to assign a cost of funds to each asset and a credit for funds for each liability. Users define which yield curve is the basis for transfer pricing, so appropriate adjustments can be made for the underlying liquidity and credit risks of the instrument being transfer priced. Kamakura Risk Manager comes with a wide array of yield curve and credit spread smoothing techniques and methodologies for transfer pricing assets and liabilities with embedded options.

- **KRM Transfer Pricing Techniques**: KRM allows the user to select from multiple transfer pricing techniques. The best practice technique is an exact day count matched maturity funds transfer pricing cost based on current yield curves using one of the yield curve smoothing techniques outlined in the KRM for interest Rate Risk Management Section. Other techniques include transfer pricing based on constant duration or weighted average interest rate approaches
- **KRM Transfer Pricing for Historical Data**: Transfer prices can be "recreated" on historical yield curve data and assets originated in the past by applying the technique selected by the user to data which existed at the historical point in time.
- **KRM Simulation of Transfer Pricing Margins**: KRM can simulate net income forward on both a traditional basis and on a transfer pricing basis, allowing the user to see clearly how much of the variation in net interest income is due to funding mismatches and how much is due to a matched maturity funding strategy.

KRM for Market Risk

As noted above, Kamakura Risk Manager includes both traditional approaches to value at risk and credit adjusted value at risk and a much more modern approach: a dynamic multi-period credit-adjusted value at

risk. This flexibility allows market risk managers to replicate legacy systems while moving forward to a more modern approach that allows multiple VAR horizons and an analysis period as far beyond the traditional 10-day VAR calculation as the user thinks is appropriate. Many KRM users, for example, look at VAR analysis where the time horizon is many years.

- **KRM Multi-period Dynamic VAR**: KRM employs the asset and liability market practice of dynamic balance sheet modeling and monte carlo simulation to generate a dynamic multi-period value at risk that recognizes both portfolio evolution and the potential default of counterparties. Many Kamakura clients regard this as the best practice VAR calculation.
- **KRM Historical VAR**: KRM also calculates traditional historical value at risk based on historical movements in the yields on securities currently held by the institution. This common calculation, of course, will only be correct if the future has the same risk characteristics of the historical period used for modeling. Historical VAR can be calculated either using relative changes in asset prices (percentage changes) or absolute changes in asset prices (i.e. the dollar, yen or Euro change in price).
- **KRM "Matrix" or Variance-Covariance VAR**: KRM also includes the selection of the traditional variance-covariance approach to VAR, which assumes that returns on assets held by the institution are normally distributed. This common calculation understates risk because of its implicit assumption that default will not occur.
- **KRM Single Period Monte Carlo Simulation VAR**: KRM can be used for a single period monte carlo-driven value at risk in addition to the multi-period approach outlined above.
- **KRM Marginal VAR**: KRM Version 7.0 includes the output of the marginal contribution to VAR from taking an additional dollar of exposure to a particular asset or liability.

KRM for Credit Risk and Credit Portfolio Management

Kamakura Risk Manager provides credit risk managers with a steady way forward from traditional reliance on internal and external ratings to a full multi-period macro-factor driven simulation where default probabilities for all counterparties (from retail to small business to listed companies to sovereigns) rise and fall with the economy. It is the latter approach that provides true "see through" risk assessments of exposure to macro factors like home prices, avoiding the losses that Merrill Lynch and UBS incurred because of the lack of transparency in macro-factor risk. Kamakura Risk Manager users can derive "delta hedges" on total portfolios and full balance sheets for each macro factor. Kamakura Risk Manager allows the use of internal ratings, internal default models, third party ratings and default models, and the Kamakura Risk Information Services public firm and sovereign default models.

- **KRM Logistic Default Models**: KRM can use user-defined or third party default models based on logistic regression and user-defined variables to simulate default/no default on a multi-period basis for retail, small business, corporate, and sovereign counterparties. Because this approach allows the explicit incorporation of macro-factors like home prices, oil prices, interest rates, and so on, many KRM users regard this approach as the only methodology which would have allowed the losses of the 2007-2008 credit crisis to be avoided.
- **KRM and Logistic Regression**: KRM has the logistic regression calculation built in, so that users with particularly large modeling data bases can employ the powerful relational data base management capability in KRM for maximum modeling accuracy. Common statistical packages rely heavily on text files for inputs and have a relatively small tolerance for large data sets, so the KRM logistic regression calculation is an attractive alternative. If logistic regression models are derived outside

of KRM, their coefficients are simply loaded into KRM for simulation of forward default probabilities.

- **KRM and KRIS Default Models**: KRM can seamlessly load and use the corporate and sovereign default probabilities that Kamakura provides as part of its Kamakura Risk Information Services default probability service. The KRIS service also includes the correlation between default probabilities for any pair of companies of the 20,000 global companies covered by the KRIS service.
- **KRM and Merton/Copula Default Models**: KRM can also use the traditional Merton approach to risky debt and the related copula approach to simulate default/no default as an alternative to the logistic regression approach. Although many analysts have cited the copula approach as a contributor to valuation errors in the current crisis, it remains a popular modeling choice among market participants.
- **KRM and Internal Ratings**: KRM allows internal ratings and the default probabilities associated with the ratings to be simulated forward. From the evolution of the ratings "transition matrix," default probabilities and credit spreads of all classes of borrowers can be simulated forward. This is also a popular choice among market participants.
- **KRM and Rating Agency Ratings**: KRM also allows third party rating agency ratings and transition matrices to be used to simulate default and credit spreads on a forward-looking basis.
- **KRM and Third Party Default Probabilities**: KRM allows the user to supply KRM with default probabilities from any source, whether they be from internal models or from third party vendors.
- **KRM and Loss Given Default Derived from Collateral Values**: KRM provides the user with many choices for modeling loss given default. The best practice technique, in the view of many KRM users, is to allow the user to specify how the collateral underlying the loan (say the home price or automobile price) evolves in response to changes in other macro factors. In a default scenario, KRM takes the collateral value for that loan in that point of time in the given scenario and then assumes the collateral is liquidated subject to transactions costs with a user-specified time lag from the event of default. This approach can be used even for unsecured debt instruments by modeling the "value of company assets" in the Merton style as effective collateral.
- **KRM and Random Loss Given Default**: Loss given default or the recovery rate can also be modeling in KRM as a random risk factor without modeling collateral explicitly.
- **KRM and Exposure at Default**: Basel II requires a detailed analysis of the potential exposure at default of many classes of credits. The exposure at default will be random if the transaction allows for prepayment (a "call" by the issuer of the debt) or additional drawdown (a "put" of the debt instrument to the lender by the borrower). KRM includes embedded rational and "irrational" exercise of these options by all classes of borrower so that the exposure at default is calculated in a very realistic way.
- **KRM and Credit Default Swaps**: KRM includes valuation, cash flow generation, and financial accrual calculations for credit default swaps and a very wide array of other credit risky instruments.
- **KRM and Collateralized Debt Obligations**: KRM includes the capability to model both "cash flow" and "synthetic" collateralized debt obligations down to the individual collateral level. KRM also has links to the Intex CDO libraries for automated access to the waterfalls on individual CDO deals. For CDO transactions that are new or are not included in the Intex libraries, users can overlay their own waterfalls on the transaction level cash flow generated by KRM to get realistic cash flows and valuations for a particular tranche and waterfall structure.
- **KRM and Guarantees**: KRM allows the user to analyze the guarantee or "wrap" of a given credit instrument as a separate and distinct transaction, recognizing that the guarantor itself may default in a way that is correlated with the default of the underlying borrower whose credit has been guaranteed.

KRM for Basel II Capital Calculations

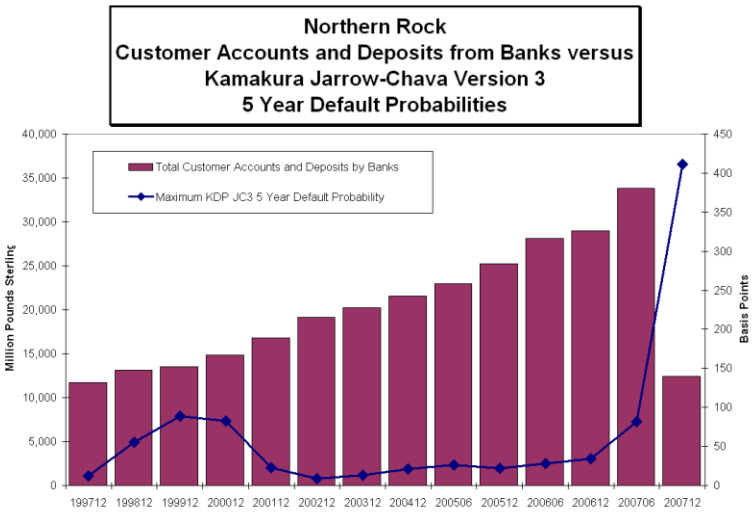
Many financial institutions have learned that Basel II requires more than a "risk weight multiplier." The Capital Accords from the Basel Committee on Banking Supervision incorporate a complex set of rules as to what risk weight should be assigned to a particular asset. Kamakura Risk Manager includes the full set of rules to make these calculations in a very efficient and accurate manner. Kamakura and its distributors have installed KRM for Basel II purposes from Warsaw to Hong Kong, with the appropriate modifications through the KRM-rp web based reports portal for unique national Basel II implementations. Besides the Basel II calculations within Kamakura Risk Manager, Kamakura's risk experts provide advisory services to clients around the world on credit modeling, Basel II-compliant model audits, and other key Basel II-related topics. Version 7.0 of KRM includes several updates to enable expeditious implementation of the Basel Standardized approach, as outlined in the Capital Requirements Directive (CRD) and the Prudential Sourcebook for banks, building societies and investment firms (BIPRU). KRM-rp's Basel II reports adhere to the Common Reporting Standards (COREP) specified for Basel II.

- **KRM for Simulating Basel II Capital Ratios Forward**: KRM is much more than a simple report on Basel II capital ratios at the current point of time. The full power of KRM interest rate and credit simulation capabilities can be used to simulate Basel II capital ratios forward in time on a realistic basis so that management gets maximum early warning of potential regulatory capital shortfalls.
- **KRM for Standard Basel II Capital Ratios**: KRM calculates the standard Basel II capital ratios as part of the normal "mark to market" calculation in KRM.
- **KRM for the Advanced Internal Ratings Based Basel II Calculations**: KRM's powerful credit risk modeling capabilities make KRM the ideal vehicle for institutions pursuing the "Advanced IRB" approach to Basel II. From model building to exposure at default simulation, KRM has the richness to produce Basel Capital Ratios with maximum accuracy.
- **KRM and Kamakura Consulting for Basel II**: From Hong Kong to Warsaw, Kamakura has consulted with the modeling and risk management teams of some of the world's most sophisticated financial institutions on a number of Basel II techniques: default model construction, model audits and measures of model accuracy, linking internal ratings to default probabilities, linking third party ratings to default probabilities, linking credit scores to default probabilities, and insuring that the business cycle and macro-economic factors are properly linked to default probabilities in order to create realistic evolution of default probabilities at every point in the business cycle.
- **KRM and Local Basel II Rules and Reporting**: Using the web-based reports of KRM-rp, Kamakura has worked with clients all over the world to insure that differences in individual country Basel II calculations and reporting formats are correctly produced in KRM-rp, including local language reporting.

KRM for Capital Allocation

Kamakura Risk Manager's dynamic balance sheet simulation capabilities make it very clear that capital requirements have a term structure. Bank capital needs grow as the time horizon lengthens and when the business cycle turns down. Kamakura's multi-period simulation show the period by period picture of that capital needed to achieve a target institutional rating, default probability and likelihood of survival. Stress testing of economic capital in Kamakura Risk Manager demonstrates clearly that macro-economic factors like interest rates, home prices, oil prices, stock market prices, foreign exchange rates, and commercial real estate prices impact capital requirements.

- **KRM Dynamic Multi-period Credit-Adjusted Capital Simulation**: As noted in the asset and liability management and credit risk sections above, KRM allows users to simulate capital needs for an institution that recognize cyclical default probabilities, cash flow reinvestment, and the sensitivity of liability suppliers to the credit risk of the institution. See the section below for more in that regard. The result of these powerful capabilities is a realistic term structure of capital needs of unsurpassed accuracy. Many KRM users regard this approach as the best practice calculation for capital requirements.
- **KRM Single Period Credit-Adjusted VAR for Capital Allocation**: Many institutions have a capital allocation policy that is based on a single period credit adjusted value at risk calculation. KRM provides this special case in addition to the multi-period approach outlined above.
- **KRM Capital Allocation at the Transaction Level**: KRM can calculate transaction-level capital requirements in two ways. The first way is via the sophisticated monte carlo simulation techniques above, where the nth percentile transaction value determines the capital required in accordance with the policy of the institution doing the analysis. The second way is more general. In many institutions, the capital required often includes considerations above and beyond the monte carlo outputs. For institutions with this kind of capital allocation policy, KRM takes the user-supplied capital allocation formula and applies this formula to each individual transaction to get required capital.
- **KRM Calculation of the Institution's Own "Inside Out" Default Probability**: As a by-product of the capital allocation calculation over N user defined periods, KRM can also produce the probability that the institution will default in each period. The institution's default probability can be defined in various ways. A common choice is to measure the percentage of scenarios in period J in which the institution has mark to market capital that is negative. An alternative definition is the percentage of scenarios in period J in which the firm has both exhausted its marginal borrowing capabilities and its cash reserves. Kamakura calls this "inside out" default probability analysis because the institution is using its "inside" knowledge of the full balance sheet to estimate the default probability, which it can then compare to the "outside" world's estimate of the default probability using only publicly available information.



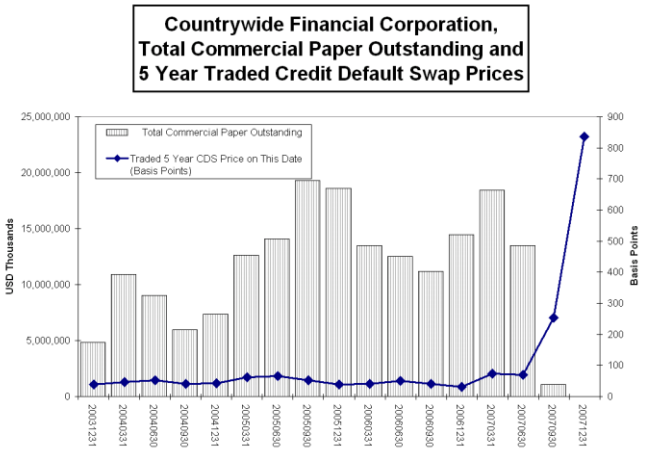
KRM for Non-Maturity Deposits

On September 14, 2007, the Bank of England was forced to intervene to protect Northern Rock against the first bank run in the United Kingdom in more than a century. The chart at the left shows that Northern Rock, based in Newcastle, lost 63% of its customer accounts and deposits from banks as the bank's default probability rose approaching December 31, 2007. Many bankers overlook the fact that demand and savings deposit volumes are highly sensitive to the credit risk of the bank itself. Kamakura Risk Manager allows users to model "non-maturity" deposit volumes and their link to macro-economic factors and bank risk with maximum accuracy.

Kamakura executives Professor Robert Jarrow and Dr. Donald R. van Deventer have published extensively (1996, 1998, 1999, 2004) on how modern derivatives technology can be used to measure the profitability and risk profile of ordinary deposits.

- **KRM's Multiple Models Approach to Non-Maturity Deposits**: KRM allows the user to choose between two basis approach to the simulation and valuation of non-maturity deposits. The first is a user-supplied formulaic approach, where the user specifies both the deposit rate function and deposit balance function. Monte carlo simulation is then used to value the non-maturity deposits. The second approach is to use the functional form in publications by Professor Robert Jarrow and Kamakura's founder Donald R. van Deventer. If this functional form is fitted to the bank's own deposit rate and balance history, KRM can derive a valuation directly without use of monte carlo simulation.
- **KRM and Lessons from Northern Rock**: The example of Northern Rock above shows that the supply of deposits to the institution depends not only on the interest rate offered by the bank but also the bank's own riskiness. At a certain level of default risk, many depositors will not supply deposits to the bank regardless of the rate that the bank offers. This "backward bending supply curve" has been much studied in economics. In this case, the mere willingness to offer a high deposit rate on the part of the bank is a sign to depositors that the bank is near failure. KRM allows the user to link deposit volumes to macro factors like home prices, which were the relevant driver of the problems at Northern Rock. This phenomenon was noted in the U.S. Federal Deposit Insurance Corporation Loss Distribution Model (Jarrow et al, December 10, 2003), where bank quality was shown to have an impact on the volume of non-maturity deposits.
- **KRM and Modeling Early Withdrawal of Term Deposits**: Kamakura has worked extensively with two financial institutions with more than one trillion dollars in assets to model the behavior of both "non-maturity" deposits and those with an explicit maturity. In the latter case, depositors can withdraw early either because interest rates have risen on new deposits of the same type or because the credit risk of the bank has risen. KRM has many alternatives that allow users to mimic accurately the early withdrawal of term deposits for either interest rate risk or credit risk reasons. The depositors have a "put option" that allow them to cancel the transaction, often with the payment of some penalty for early withdrawal. This put option can be modeled as being either exercised with a high degree of rationality or with a user-defined "irrational" aspect.

KRM for Liquidity Risk Management



In January 2008 it was announced that Bank of America would buy mortgage lender Countrywide Financial Corporation. Like the case of Northern Rock, home price declines were devastating for Countrywide's mortgage business. As investors perceived higher default risk for Countrywide, 5 year credit default swaps on Countrywide broke out of a narrow range between 50 and 100 basis points and climbed to almost 300 basis points by September 30, 2007. The result was a 94% decline in Countrywide's ability to issue commercial paper. By December 31, 2007, credit default swap quotes exceeded 800 basis points and

Countrywide was completely shut out of the commercial paper market. Kamakura Risk Manager allows users to carefully measure how movements in macro-economic factors like home prices and interest rates can affect liquidity risk and the institution's ability to fund itself with both retail and wholesale deposits.

- **KRM for Liquidity Risk Analysis**: By modeling the transmission of risk from the asset side of an institution (like the mortgages at Countrywide which dropped in value when home prices fell) to the liability side, KRM can very accurately measure an institution's own risk of failure. "Liquidity risk" is like the high body temperature of a patient with an illness. The high body temperature in and of itself, just as "liquidity risk" is not an independent risk. Liquidity risk is the process by which some other type of risk (credit risk, interest rate risk, operational risk, foreign exchange risk) that devastates the value of assets leads to the failure of the institution.
- **KRM and the Timing of Default**: As mentioned in the non-maturity deposit section, even retail depositors fled Northern Rock as falling home prices devastated the value of the mortgages held by the bank. Within KRM, users have a rich array of modeling techniques by which to simulate the supply of liabilities and the pricing of liabilities to the institution as its risk changes. In addition, users can look at the timing of failure in multiple ways. Two of the most common ways are to define the timing of failure as the time when (a) the mark to market value of capital becomes negative or (b) the available sources of additional borrowings and cash reserves are exhausted.
- **KRM and Liquidity Risk Management**: Liquidity risk management is the process of structuring the liability side's maturity profile in such a way as to insure survival for a specific length of time using the second definition of failure in the prior paragraph. Given the survival time policies set by management, KRM can show what liability strategy (if any) provides the ability to survive for the desired length of time in the face of deteriorated asset values. Clearly in the case of Countrywide and Northern Rock, the survival times were very short for the sharp drop in home prices that occurred.

KRM for Insurance

Kamakura Risk Manager allows users to simulate a rich array of insurance events. Using modern probability techniques, users can simulate the probability of occurrence of events like default/no default, prepay/don't prepay, pay on a life insurance policy or don't pay, and so on. Using Kamakura Risk Manager, leading edge actuaries can explicitly incorporate the impact of the economy on mortality rates, as recent economic developments in Russia and Japan make so clear. Similarly, the advance of medical technology and the impact on mortality of new diseases can be simulated in a rich and realistic way, consistent with the most recent developments in medical statistics.

- **KRM and the Mathematics of Mortality Rate Modeling:** In 1971, D.R. Cox published a famous paper on the use of continuous time mortality rates for the pricing of life insurance policies. These probabilities, known as "Cox processes," are the basis for modern credit risk modeling known as the reduced form approach. Robert Jarrow, Stuart Turnbull, David Lando, and many others have employed this approach in credit risk research. Because of their common basis on the same mathematics, the links between insurance and credit risk modeling are very strong. KRM fully exploits these links.
- **KRM and Mortality Tables**: Traditional mortality tables show the mortality rate for a relatively small number of attributes of the underlying insured, such as age, male/female, smoker/non-smoker, and so on. Mortality tables have the identical structure to the user-defined prepayment tables discussed in the asset and liability management section of this report. Kamakura would be very pleased to work with KRM users to incorporate mortality tables in KRM.
- **KRM and the Use of Logistic Mortality Rates**: Logistic regression has long been used in medical science to predict mortality as a function of the current health condition of the underlying subject, the exposure to various diseases, and the exposure to various treatment regimes. KRM has the ability to model mortality both as a function of medical and health inputs and economic conditions (as Japan and Russia have proven is relevant) in a realistic way.
- **KRM and Internal Mortality Models**: KRM can load internal mortality models directly for modeling forward, in a manner exactly parallel to the default modeling capabilities outlined in the credit risk section of this overview.
- **KRM and Customizing Mortality Models**: KRM's capabilities for modeling mortality can be most fully exploited when Kamakura experts work on a consulting basis with clients to customize mortality rate models based on the user's mortality rate data base. Best practice modeling normally uses a monthly mortality data base so that the impact of medical and macro-economic factors can be captured most clearly.
- **KRM and Property and Casualty Insurance Models**: KRM's logistic regression capability can also be used to model accident/no accident, fire/no fire, and so on for property and insurance casualty liability valuation. Depending on the nature of the insurance contract, macro-economic variables may or may not be relevant. In weather derivatives, for example, the probability of a hurricane is independent of macro factors, but the occurrence of a hurricane can have a powerful effect on the credit risk of many counterparties (as in the New Orleans case). KRM can model this linkage.

KRM for FAS 157 "Level 3" Valuations

Financial Accounting Standard 157 requires institutions to accurately model thinly traded "hard to value" assets. Kamakura Risk Manager provides a state of the art framework that generates completely transparent valuations and an understanding of how bid-offered spreads in thinly traded markets reflect

sampling error and other uncertainties in the valuation process. Kamakura consultants are actively engaged in valuation services using KRM for sophisticated financial institutions around the world.

- **KRM and FAS 157 Accuracy**: The recent credit crisis has made it clear that aggregated data and unrealistic modeling assumptions were at the heart of inaccurate valuations both at the point of origination and after origination. KRM directly addresses these problems in a concrete way, outlined in the points below.
- **KRM and Transaction Level Data**: KRM can model at the most granular level of collateral, such as the individual mortgage loans underlying a mortgage backed security that in turn is one of the instruments in a collateralized debt obligation.
- **KRM and Macro-Factor Drivers of Default**: KRM, because it can handle transaction level granularity, can show directly what impact is unleashed from the change in a macro factor like home prices. A fall in home prices first increases the probability of the default on the mortgage. The volatility and rise in the mortgage default probability results in a fall in value of each individual mortgage and the mortgage-backed security. The fall in the value of the mortgage backed security and the subsequent defaults impact the value of a CDO tranche. Without this "see through" valuation capability, one would make the mistakes in valuation that Merrill Lynch and UBS noted in the introduction to this document.
- **KRM and Full Disclosure**: All Kamakura calculations are open and transparent to users and key advisors to the user, such as consultants and auditors. For this reason, KRM calculations are fully reconcilable, as required by best practice under FAS 157.

KRM for FAS 133/IAS 39 Hedge Accounting Calculations

Both U.S. and international accounting standards require that institutions seeking hedge accounting treatment justify a hedge by showing that market values of the assets being hedged are appropriately correlated with the hedging instrument. Kamakura Risk Manager automates the process of showing both prospective and historical hedge-related correlations.

- **KRM and Hedge Ratios**: As discussed extensively above, KRM links macro factors and the values of all instruments. Because this link applies both to the asset being hedged and the hedging instrument, KRM will accurately simulate forward the true economics that makes the hedge work.
- **KRM and Hedge Effectiveness Tests**: Looking backward, KRM incorporates the hedge effectiveness tests required by FAS 133/IAS 39 to show that there has been a historical (negative) correlation between the value of the asset being hedged and the value of the hedging position. KRM Version 7.0 generates results for three types of hedge effectiveness tests: value offset, regression, and correlation.

KRM-lm for Limits Management

KRM Limits Manager is a web-based add-on to KRM that allows users to specify complex rules and limits for credit and trading risk exposure. Like all of Kamakura's web based applications, KRM-lm is designed on a multi-lingual basis and can display and logo of the KRM-lm user's institution.

- **KRM-lm and Market Valuations**: Best practice limits management supplements notional exposure limits with market valuation-based limits. KRM-lm exploits KRM's valuation capabilities for maximum accuracy in exposure management. For example, KRM-lm can correctly measure the home price risk in the super senior CDO tranches mentioned in the Merrill Lynch commentary above, given an accurate assessment of "home price" exposure in a macro factor limit, for example.

- **KRM-lm and Default Probabilities**: KRM-lm and KRM work together to incorporate daily updated default probabilities for corporate counterparties from Kamakura Risk Information Services for maximum accuracy.
- **KRM-lm and User-Supplied Limits Formulas**: KRM-lm flexibly incorporates user-supplied limits formulations so that each installation reflects the policies and risk culture of that installation, not a "lowest common denominator" approach to risk management.

KRM-lp for Loan Pricing

The KRM Loan Pricing module is also a web-based add-on to Kamakura Risk Manager which allows KRM's sophisticated capital allocation simulations to be used to price individual loans according to the financial institution's pricing policies. It is currently used by hundreds of lending officers world-wide. Like all of Kamakura's web based applications, KRM-lp is designed on a multi-lingual basis and can display and logo of the KRM-lp user's institution.

- **KRM-lp and Risk-Adjusted Return on Capital**: KRM-lp incorporates the pricing model of the user to rapidly communicate to loan officers whether a proposed transaction meets institutional return on capital targets. If the target return is VAR based, KRM-lp reads VAR output from Kamakura Risk Manager to calculate target returns per the institution's pricing policy.
- **KRM-lp and Dynamic Loan Pricing**: As market risks change and the VAR associated with different asset classes changes, KRM-lp dynamically is updated with the latest VAR figures from Kamakura Risk Manager.
- **KRM-lp and Corporate Pricing Policy**: KRM-lp is easily updated as institutional pricing policies are updated and modified.

KRM-dm for Data Mapping

The KRM Data Mapping module is another web-based tool which is used to automate the mapping of market data and client portfolio data to standard KRM table formats. The efficiency of the KRM-dm tool is one of the many reasons why Kamakura has a flawless installation record for KRM and an excellent reputation for fast and efficient installations.

- **KRM-dm and Reuters**: KRM-dm includes a standard interface for Reuters data.
- **KRM-dm and Markit Partners**: KRM-dm includes a standard interface for Markit partners data
- **KRM-dm and Bloomberg**: KRM-dm includes a standard interface for Bloomberg data as well.
- **KRM-dm and Proprietary Client Data**: KRM-dm is easily customized to interface with proprietary data bases maintained by the client. Kamakura's client services experts are able to do this customization easily because of their many years experience in the data base architecture of the system receiving the mapped data, Kamakura Risk Manager.

KRM-rp for Web-based Reporting

The KRM Risk Portal KRM-rp is a rich array of standard web-based reports designed for the "read only" KRM user, those analysts who need to view and analyze the risk management information produced by KRM without the need to run the KRM system themselves. KRM-rp is used by sophisticated clients around the world. KRM-rp has recently been expanded to allow users to view proprietary data in client-defined tables in addition to reading and displaying data in the standard KRM data architecture. KRM-rp is also the vehicle for the display of risk reporting defined by national financial institutions regulators around the world. KRM

Version 7.0 is compatible with version 2.1 of KRM-rp. KRM-rp allows reporting of risk views by user-defined aggregations and hierarchies with complete "drill-down" capability to the transaction level. KRM-rp also includes a wide variety of graphing and charting options.

KRM Security Features

Kamakura Risk Manager includes the KRM-sa Security Administrator module. KRM-sa controls the rights of various uses to access selected input data bases, output data bases, and assumption sets. KRM Version 7.0 includes new, more secure encryption of client-specific information in KRM-sa related tables and in the KRM license file.

KRM Processing Volumes

Because of the flexibility of the Kamakura Risk Manager architecture, KRM is used by clients to process portfolios that range in size from a few hundred transactions to more than 92 million, a volume record currently held by one of the largest banks in China. It is very common for KRM to be used on portfolios with millions of transactions because of the high speed processing that KRM is able to achieve.

KRM Processing Speed

KRM Version 7.0 is a fully multi-threaded application that is designed to work either in a desktop or server environment for maximum speed. Because of the multi-threading capability, "worker threads" can be designated for either analysis or data base tasks in a way that takes full advantage of state of the art multi-CPU computers. KRM can easily be deployed in cluster environments if the transaction volumes require it. Without using multi-threading, the average KRM Version 7.0 calculation takes 32.98% less time to run than the equivalent calculation in version 6.4. See page 9 of the Kamakura Risk Manager Release Notes, Version 7.0 for more details.

KRM Securities Coverage

Kamakura Risk Manager has an extraordinarily comprehensive ability to value and produce cash flows and financial accruals for a very wide range of transaction types. KRM has steadily grown in its ability to handle complex securities as the market place has evolved. KRM can process equities, all standard fixed income instruments, insurance liabilities, odd-amortization "one of a kind" securities, collateralized debt obligations, foreign currency derivatives, interest rate derivatives, mortgage-backed securities and much more.

KRM Modeling Choices

Kamakura is firmly committed to a multiple models approach to risk analysis. The user's ability to change modeling assumptions with a mouse click is essential for understanding potential model risk. It is also critical in allowing the user both to replicate existing "common practice" risk calculations while the user evolves from "best practice" to "emerging best practice." KRM includes a full range of alternative techniques for interest rate simulation, options valuation, yield curve smoothing, default modeling, prepayment modeling, insurance event modeling, foreign exchange rate simulation, and so on.

- **Default modeling**: Merton default models, reduced form default models, ratings based default models and transition matrices

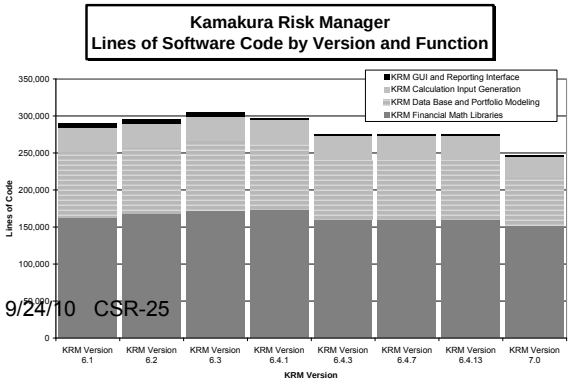
- **Simulation of random default probabilities**: Historical sampling, correlated default probability simulation, macro-factor and other factor driven default probability simulation, time-based drifts in default probabilities
- **Simulation of credit spreads**: linear credit spread functions, logistic credit spread functions (see RISK Magazine, Jarrow, Li, Mesler and Van Deventer, September 2007), and random simulation of credit spreads on a correlated basis.
- **Fixed income options valuation**: closed form solutions, lattice solutions, and monte carlo solutions. Options can be exercised rationally or irrationally. Options can also be modeled as if the user is subject to transactions costs rather than assuming fully rational zero-transactions cost options exercise. Models employed include both term structure model-based options formulas and Black options formulas. All standard options types are included, such as European, American and Bermudan options.
- **Equity and foreign exchange options valuation**: The full range of Black-Scholes variations is included in KRM.
- **Futures contract valuation**: Futures valuations are fully consistent with the term structure of interest rates and modern no arbitrage financial theory
- **Prepayment modeling**: prepayment functions, prepayment tables, logistic probabilistic prepayment (KRM 7.2), and third party models like Andrew Davidson & Co.
- **Yield curve smoothing**: linear smoothing, four variations of cubic spline smoothing, and the Adams and van Deventer (1994) maximum smoothness forward rate smoothing. Data inputs for yield curve smoothing may be observable yields or raw bond prices, for both callable and non-callable bonds.
- **Credit spread smoothing**: the same six choices listed above for yield curve smoothing also apply to credit spread smoothing, where yields are calculated by smoothing relative to a user-specified risk free curve.

KRM Links to Kamakura Risk Information Services Default Probabilities

Kamakura Risk Manager links seamlessly to the Kamakura Risk Information Services default models. This link allows clients with KRM and KRIS licenses to load KRIS default probabilities, default formulas, and default correlations into KRM for analysis with the click of a mouse. No other enterprise wide risk systems vendor offers these capabilities. Kamakura Risk Information Services was launched in 2002. KRIS now includes default probabilities on more than 20,000 public firms in 30 countries. KRIS also includes default probabilities for 180 sovereign nations. In addition to the default probabilities themselves, KRIS includes the pair wise correlation in the default probabilities for any pair of companies for accurate modeling of correlation in the events of default. See Jarrow and van Deventer (RISK Magazine, 2005) for use of this correlation in simulating random defaults.

About Kamakura Risk Manager, Version 7.0

Kamakura Risk Manager, first offered commercially in 1993, has been under continuous expansion and improvement since the first lines of code were written in 1990. The KRM system is written in modern C++ class libraries that are constantly being improved from a speed and accuracy point of view. KRM version 7.0, for example, contains much more functionality but 19%



fewer lines of code than KRM version 6.3 as shown in the graph below. KRM comes with a rich data base architecture that is Open Data Base Connectivity compliant with proper security. KRM runs on both Windows and UNIX, and relational data bases like MS SQL Server, Oracle, and Sybase can all be used with KRM. KRM currently supports the following data bases for use on 64-bit servers: MS SQL 2000 and 2005 and Oracle 10G R2. Beginning with KRM Version 7.0, the KRM application server will run only on Windows, but the data base servers can be run on both UNIX and Windows platforms. Kamakura Risk Manager is designed as a multiple-models risk management system, featuring a rich array of interest rate simulation techniques, default modeling approaches, prepayment simulation alternatives, and embedded options valuation methodologies. Kamakura Risk Manager is delivered with an optional set of Java-based web tools including the KRM-Risk Portal (rp) for wide dissemination of risk reports around the organization, KRM-Data Manager (dm) for easy data loading to KRM tables, KRM-Limits Manager (lm) for state of the art risk limits monitoring, and KRM-Loan Pricing (lp) for modern risk-adjusted return on capital loan pricing. KRM produces cash flows, financial accruals, and valuations at all user-defined forward time periods for the full range of financial instruments, from collateralized debt obligation tranches to mortgage backed securities to simpler instruments like bonds, deposits, loans, credit default swaps, options, interest rate swaps, life insurance policies, non-maturity deposits, foreign exchange transactions, and so on.

About Default Probabilities in Kamakura Risk Manager, Version 7.0

Kamakura Risk Manager allows users to specify default probabilities and related formulas for retail, small business, corporate and sovereign counterparties using either a traditional ratings-based transition matrix approach, the legacy Merton-style approach, or the state of the art reduced form modeling approach.

About Kamakura Corporation Risk Technology and Innovation

Kamakura is the leader in modern integrated risk management because of the 1995 insights of Kamakura's Managing Director for Research, Professor Robert Jarrow. Professor Jarrow, who also serves as senior research fellow at the Federal Deposit Insurance Corporation and Professor at Cornell University, linked credit risk with a random interest rates framework in his seminal paper with Stuart Turnbull. From that point in time, Kamakura has been dedicated to a completely integrated approach to risk management software design. Professor Jarrow is assisted in research efforts by Kamakura founder Dr. Donald R. van Deventer, named to the RISK Hall of Fame with Prof. Jarrow in 2002, and Professor Jens Hilscher, named senior research fellow in 2008. More than ten Kamakura staff members have contributed to 7 risk management books and over 140 published research papers.

About Kamakura Corporation

Founded in 1990, Honolulu-based Kamakura Corporation is a leading provider of risk management information, processing and software. The Kamakura Risk Manager system has been offered commercially since 1993. Kamakura has been a provider of daily default probabilities and default correlations for listed companies since November, 2002. Kamakura announced the KRIS Sovereign Default Probability Service on May 19, 2008. Kamakura launched its collateralized debt obligation (CDO) pricing service KRIS-CDO in April 2007. Kamakura is also the first company in the world to develop and install a fully integrated enterprise risk management system that analyzes credit risk, market risk, asset and liability management, transfer pricing, and capital allocation. Kamakura has served more than 185 clients ranging in size from $3 billion in assets to $1.6 trillion in assets. Kamakura's risk management products are currently used in 27 countries, including

the United States, Canada, Germany, the Netherlands, France, Austria, Switzerland, the United Kingdom, Russia, Eastern Europe, the Middle East, Africa, Australia, Japan, China, Korea and many other countries in Asia. Kamakura has world-wide distribution alliances with IPS-Sendero (www.fiservips-sendero.com) and Unisys (www.unisys.com), making Kamakura products available in almost every major city around the globe.

For more information contact
Kamakura Corporation
2222 Kalakaua Avenue, 14th Floor, Honolulu, Hawaii 96815
Telephone: 1-808-791-9888
Facsimile: 1-808-791-9898
Information: info@kamakuraco.com
Web site: www.kamakuraco.com

Simulation Results

Outputs of the simulation can be made available in more detail via KRM-rp (Risk Portal), the web-based reporting system for Kamakura Risk Manager. For the purposes of this analysis, Kamakura will focus largely on three reports, the Financial Ratio Report, the Income Statement Forecast, and the Balance Sheet Forecast. Kamakura provided these three reports to the NCUA as separate excel workbooks for the 2007 deterministic simulation, 2007 stochastic simulation, and 2009 stochastic simulation. They contain the output for each of the twelve liability scenarios.

Financial Ratio Report

The Financial Ratio Report contains many different entries and ratios. It is designed as a useful summary report, without the asset class level reporting one will find in the Income Statement Forecast or Balance Sheet Forecast. Entries include the Total Period End Assets, End Liabilities, and End Net Economic Value (the difference) according the "Financial Accounting Basis" and "Market Value Basis". While all entries in this table are calculated at market values, financial accounting basis includes the value of accrued interest, and market value basis does not. The entries in the Balance Sheet Forecast (described below) are calculated via the financial accounting basis.

The Financial Ratio Report also contains summary detail on the Income and Earnings of the Model Corporate Credit Union: including cumulative retained earnings, interest income, interest expense, net interest income, and net income. Cumulative retained earnings is equal to the sum of the net income figures from the start date of the simulation. Interest income, interest expense, and net interest income are replications of the aggregate numbers in the Income Statement Forecast (below). Net Income is equal to Net Interest Income with the following adjustments:

$$NI_t = NII_t + Unreal_t + Real_t = NII_t + (Mktval_t - Mktval_{t-1}) - (AcrInt_t - AcrInt_{t-1}) - (Am_cost_t - Am_cost_{t-1})$$

Where:

NI_t: Net Income in period *t.*

NII_t: Net Interest Income in period *t* (detailed below).

$Unreal_t$: Unrealized income in period *t.*

$Real_t$: Realized income in period *t.*

$Mktval_t$: Market value in period *t.*

$AcrInt_t$: Accrued interest in period *t.*

Am_cost_t: Amortized cost calculated based on prior period book balance and yield.

Note that these changes will include all expected and unexpected outcomes above and beyond interest: credit losses, prepayments, changes in accrued interest, changes in interest rates, etc.

Finally, the Financial Ratio Report contains several ratios calculated based on the above entries. They should largely be self explanatory.

Income Statement Forecast

The Income Statement Forecast contains estimated interest income and interest expenses by asset class. The individual entries in the Income Statement Forecast are calculated according to the following logic:

$$Int_Inc_t = PP_flow_t + (Acr_Int_t - AcrInt_{t-1}) + PP_prin_t + (Am_cost_t - Am_cost_{t-1})$$

Where:

Int_Inc_t: Interest Income (Expense) Entry for period t.

PP_flow_t: Interest cashflow received at t.

Acr_Int_t: Accrued interest at the end of period t.

PP_prin_t: Principal cashflow received in period t.

Am_cost_t: Amortized cost calculated based on prior period book balance and yield.

Note that with large changes in amortized costs, the interest income generated by a given asset class in a given accounting period can be negative. This is an artifact of the trading securities-based approach to accounting requested in the proposed rule.[43]

Balance Sheet Forecast

The Balance Sheet Forecast contains the end of period balances in each asset class. The individual entries are calculated according to the "Financial Accounting Basis" listed in the Financial Ratio Report.

Kamakura Impact Analysis- Part III: 2007 Simulations

2007 Portfolios

This section contains summary statistics on the portfolios employed in the 2007 simulations. The vast majority of structured products available for purchase on March 31, 2007 fail to meet the stress test requirements in parts 704 (d), 704 (e), and 704 (f) of the proposed rule and are thus cannot be included

[43] Negative income flows are present for one asset class in one of the simulations. Specifically, they occur in the 2009 simulations for Auto loans. During February-April 2010, roughly ¼ of the scenarios have increases in the probability of default that are large enough to yield large negative income flows. These changes yield negative income flows on average during these months. More detail will be included in the "2009 Results" section.

in the "Maximum Diversification" portfolios detailed in the preceding sections. To address this issue, Kamakura includes an additional set of 2007 analysis that gradually expands the stress test limits until portfolios that meet certain requirements can be constructed, and compares the actual historical performance of these securities to the securities that did not meet the (expanded) stress test thresholds. However, this section retains the base plus stress test limits in the proposed rule.

Liability Strategy 1

Sector	Port Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	0.00%	0.0000	0.0000	0
RMBS	0.00%	0.0000	0.0000	0
MBS Agency	0.00%	0.0000	0.0000	0
CMBS	0.00%	0.0000	0.0000	0
Credit Card	0.00%	0.0000	0.0000	0
Student Loan Private	0.00%	0.0000	0.0000	0
Student Loan FFELP	0.00%	0.0000	0.0000	0
Treasury Security	77.78%	0.0000	0.4025	35
Corporate	22.22%	0.0000	0.9393	10
ABS Other	0.00%	0.0000	0.0000	0

1	Stress Test Outcomes		
Test	YC300	SPR300	SPR300+
Change NEV	-19.42%	-19.42%	-19.42%
NEV Constraint	20.00%	20.00%	30.00%

In-Portfolio Return		Count	45
Non-Port Return	0.020	Structured	0
Max Stress Loss	-0.039	WAL	0.522

Strategy 01 permits zero structured product purchases: it is composed entirely of fixed rate Treasury and Corporate securities, and represents 45 of the 534 assets in the 2007 universe. The average life is equal to almost exactly one half of one year, and only securities with stress losses of 3.9 percent or less are admitted into the portfolio.

Liability Strategy 2

Sector	Port Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	0.00%	0.0000	0.0000	0
RMBS	0.00%	0.0000	0.0000	0
MBS Agency	0.00%	0.0000	0.0000	0
CMBS	7.02%	0.0000	2.0062	4
Credit Card	0.00%	0.0000	0.0000	0
Student Loan Private	0.00%	0.0000	0.0000	0
Student Loan FFELP	0.00%	0.0000	0.0000	0
Treasury Security	73.68%	0.0000	0.5917	42
Corporate	17.54%	0.0000	0.9393	10
ABS Other	1.75%	0.0000	1.6098	1

2	Stress Test Outcomes		
Test	YC300	SPR300	SPR300+
Change NEV	-17.75%	-17.75%	-17.64%
NEV Constraint	20.00%	20.00%	30.00%

In-Portfolio			
Return	0.003	Count	57
Non-Port Return	0.021	Structured	5
Max Stress Loss	-0.049	WAL	0.770

Strategy 2 can accommodate a stress test threshold of a full percentage point lower than strategy 1, and the weighted average life increases to over ¾ of one year. Some structured products are able to fit into the portfolio, but less than 2% of the entire structured product universe in 2007. Structured products within the portfolio appear to do slightly worse through the credit crisis than the structured products that are in the universe, but were not included in the portfolio.

Liability Strategy 3

Sector	Port Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	1.35%	0.0000	1.5583	1
RMBS	0.00%	0.0000	0.0000	0
MBS Agency	1.35%	0.0000	1.3081	1
CMBS	17.57%	0.0000	1.9860	13
Credit Card	0.00%	0.0000	0.0000	0
Student Loan Private	0.00%	0.0000	0.0000	0
Student Loan FFELP	0.00%	0.0000	0.0000	0
Treasury Security	64.86%	0.0000	0.7507	48
Corporate	13.51%	0.0000	0.9393	10
ABS Other	1.35%	0.0000	1.6098	1

3	Stress Test Outcomes		
Test	YC300	SPR300	SPR300+
Change NEV	-19.86%	-19.86%	-20.74%
NEV Constraint	20.00%	20.00%	30.00%

In-Portfolio			
Return	0.026	Count	74
Non-Port Return	0.020	Structured	16
Max Stress Loss	-0.058	WAL	1.023

The third strategy lowers the threshold by another full percentage point, increases the weighted average life to one full year, and purchases three times as many structured products as scenario two, though there are still no RMBS securities eligible for purchase.

Liability Strategy 4

Sector	Port Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	5.26%	0.0000	2.0434	5
RMBS	5.26%	0.0000	0.9854	5
MBS Agency	2.11%	0.0000	1.5511	2
CMBS	15.79%	0.0000	2.0195	15
Credit Card	0.00%	0.0000	0.0000	0
Student Loan Private	0.00%	0.0000	0.0000	0
Student Loan FFELP	0.00%	0.0000	0.0000	0
Treasury Security	60.00%	0.0000	0.9954	57
Corporate	10.53%	0.0000	0.9393	10
ABS Other	1.05%	0.0000	1.6098	1

4	Stress Test Outcomes		
Test	YC300	SPR300	SPR300+
Change NEV	-13.41%	-18.73%	-26.24%
NEV Constraint	20.00%	20.00%	30.00%

In-Portfolio			
Return	0.028	Count	95
Non-Port Return	0.020	Structured	28
Max Stress Loss	-0.074	WAL	1.224

Weighted average life increases by another 0.22 years, and there are now 28 structured products purchased (7.9% of universe) including RMBS securities. However, the portfolio is still over 70% US Treasuries and Corporate bonds. There is essentially no difference between in-portfolio and out-of-portfolio performance of structured products.

Liability Strategy 5

Sector	Port Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	0.00%	0.0000	0.0000	0
RMBS	0.00%	0.0000	0.0000	0
MBS Agency	0.00%	0.0000	0.0000	0
CMBS	0.00%	0.0000	0.0000	0
Credit Card	0.00%	0.0000	0.0000	0
Student Loan Private	0.00%	0.0000	0.0000	0
Student Loan FFELP	0.00%	0.0000	0.0000	0
Treasury Security	77.78%	0.0000	0.4025	35
Corporate	22.22%	0.0000	0.9393	10
ABS Other	0.00%	0.0000	0.0000	0

5	Stress Test Outcomes		
Test	YC300	SPR300	SPR300+
Change NEV	-19.59%	-19.59%	-19.59%
NEV Constraint	20.00%	20.00%	30.00%

In-Portfolio Return	#DIV/0!	Count	45
Non-Port Return	0.020	Structured	0
Max Stress Loss	-0.039	WAL	0.522

Portfolio five is essentially identical to portfolio one. To the extent that these liability strategies generate portfolios that are substantively the same as the liability strategies that share the same weighted average life, further comment will be suppressed.

Liability Strategy 6

Sector	Portfolio Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	0.00%	0.0000	0.0000	0
RMBS	0.00%	0.0000	0.0000	0
MBS Agency	0.00%	0.0000	0.0000	0
CMBS	6.90%	0.0000	2.0062	4
Credit Card	0.00%	0.0000	0.0000	0
Student Loan Private	0.00%	0.0000	0.0000	0
Student Loan FFELP	0.00%	0.0000	0.0000	0
Treasury Security	74.14%	0.0000	0.6177	43
Corporate	17.24%	0.0000	0.9393	10
ABS Other	1.72%	0.0000	1.6098	1

6	Stress Test Outcomes		
Test	YC300	SPR300	SPR300+
Change NEV	-19.90%	-19.90%	-19.78%
NEV Constraint	20.00%	20.00%	30.00%

In-Portfolio			
Return	0.003	Count	58
Non-Port Return	0.021	Structured	5
Max Stress Loss	-0.049	WAL	0.786

Liability Strategy 7

Sector	Port Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	1.39%	0.0000	1.5583	1
RMBS	0.00%	0.0000	0.0000	0
MBS Agency	1.39%	0.0000	1.3081	1
CMBS	16.67%	0.0000	1.9719	12
Credit Card	0.00%	0.0000	0.0000	0
Student Loan Private	0.00%	0.0000	0.0000	0
Student Loan FFELP	0.00%	0.0000	0.0000	0
Treasury Security	65.28%	0.0000	0.7232	47
Corporate	13.89%	0.0000	0.9393	10
ABS Other	1.39%	0.0000	1.6098	1

7	Stress Test Outcomes		
Test	YC300	SPR300	SPR300+
Change NEV	-19.98%	-19.98%	-20.89%
NEV Constraint	20.00%	20.00%	30.00%

In-Portfolio Return	0.025	Count	72
Non-Port Return	0.020	Structured	15
Max Stress Loss	-0.057	WAL	0.993

Liability Strategy 8

Sector	Port Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	4.40%	0.0000	1.9846	4
RMBS	3.30%	0.0000	0.9399	3
MBS Agency	2.20%	0.0000	1.5511	2
CMBS	16.48%	0.0000	2.0195	15
Credit Card	0.00%	0.0000	0.0000	0
Student Loan Private	0.00%	0.0000	0.0000	0
Student Loan FFELP	0.00%	0.0000	0.0000	0
Treasury Security	61.54%	0.0000	0.9663	56
Corporate	10.99%	0.0000	0.9393	10
ABS Other	1.10%	0.0000	1.6098	1

8	Stress Test Outcomes		
Test	YC300	SPR300	SPR300+
Change NEV	-16.52%	-19.52%	-24.68%
NEV Constraint	20.00%	20.00%	30.00%

In-Portfolio			
Return	0.028	Count	91
Non-Port Return	0.020	Structured	25
Max Stress Loss	-0.071	WAL	1.201

Liability Strategy 9

Sector	Port Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	0.00%	0.0000	0.0000	0
RMBS	0.00%	0.0000	0.0000	0
MBS Agency	0.00%	0.0000	0.0000	0
CMBS	0.00%	0.0000	0.0000	0
Credit Card	0.00%	0.0000	0.0000	0
Student Loan Private	0.00%	0.0000	0.0000	0
Student Loan FFELP	0.00%	0.0000	0.0000	0
Treasury Security	77.27%	0.0000	0.3751	34
Corporate	22.73%	0.0000	0.9393	10
ABS Other	0.00%	0.0000	0.0000	0

9	Stress Test Outcomes		
Test	YC300	SPR300	SPR300+
Change NEV	-19.19%	-19.19%	-19.19%
NEV Constraint	20.00%	20.00%	30.00%

In-Portfolio			
Return	#DIV/0!	Count	44
Non-Port Return	0.020	Structured	0
Max Stress Loss	-0.038	WAL	0.503

Liability Strategy 10

Sector	Port Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	0.00%	0.0000	0.0000	0
RMBS	0.00%	0.0000	0.0000	0
MBS Agency	0.00%	0.0000	0.0000	0
CMBS	3.64%	0.0000	1.6557	2
Credit Card	0.00%	0.0000	0.0000	0
Student Loan Private	0.00%	0.0000	0.0000	0
Student Loan FFELP	0.00%	0.0000	0.0000	0
Treasury Security	76.36%	0.0000	0.5917	42
Corporate	18.18%	0.0000	0.9393	10
ABS Other	1.82%	0.0000	1.6098	1

10	Stress Test Outcomes		
Test	YC300	SPR300	SPR300+
Change NEV	-19.48%	-19.48%	-19.38%
NEV Constraint	20.00%	20.00%	30.00%

In-Portfolio Return	0.033	Count	55
Non-Port Return	0.020	Structured	3
Max Stress Loss	-0.047	WAL	0.712

Liability Strategy 11

Sector	Port Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	0.00%	0.0000	0.0000	0
RMBS	0.00%	0.0000	0.0000	0
MBS Agency	0.00%	0.0000	0.0000	0
CMBS	12.12%	0.0000	1.9184	8
Credit Card	0.00%	0.0000	0.0000	0
Student Loan Private	0.00%	0.0000	0.0000	0
Student Loan FFELP	0.00%	0.0000	0.0000	0
Treasury Security	71.21%	0.0000	0.7232	47
Corporate	15.15%	0.0000	0.9393	10
ABS Other	1.52%	0.0000	1.6098	1

11	Stress Test Outcomes		
Test	YC300	SPR300	SPR300+
Change NEV	-18.24%	-18.24%	-18.15%
NEV Constraint	20.00%	20.00%	30.00%

In-Portfolio			
Return	0.016	Count	66
Non-Port Return	0.020	Structured	9
Max Stress Loss	-0.054	WAL	0.914

Liability Strategy 12

Sector	Port Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	2.38%	0.0000	1.8130	2
RMBS	2.38%	0.0000	0.8863	2
MBS Agency	1.19%	0.0000	1.3081	1
CMBS	17.86%	0.0000	2.0195	15
Credit Card	0.00%	0.0000	0.0000	0
Student Loan Private	0.00%	0.0000	0.0000	0
Student Loan FFELP	0.00%	0.0000	0.0000	0
Treasury Security	63.10%	0.0000	0.8849	53
Corporate	11.90%	0.0000	0.9393	10
ABS Other	1.19%	0.0000	1.6098	1

12	Stress Test Outcomes		
Test	YC300	SPR300	SPR300+
Change NEV	-16.70%	-19.14%	-22.32%
NEV Constraint	20.00%	20.00%	30.00%

In-Portfolio Return	0.027	Count	84
Non-Port Return	0.020	Structured	21
Max Stress Loss	-0.065	WAL	1.130

Overall, there appear to be very little structured products purchases permitted under the base-plus authority in the proposed regulations, and the structured products that are eligible for purchase given these liability strategies do not appear to have had systematically different performance during the credit crisis. Interestingly, the spread stress test seems to be the most binding at current levels, though this will be investigated more fully in subsequent sections.

Kamakura has provided electronic versions of the Financial Ratio Report, Income Statement Forecast, and Balance Sheet Forecast to the NCUA. For reference, we include the first several entries for liability scenario twelve below.

Sample Reports: Liability Scenario 12

Financial Ratio Report

Kamakura RiskPortal - Convert Report Table to Excel

Report Name: Financial Ratio Summary(FRA001)
Table Name: FinancialRatioAnalysisTable

Report Environment Properties

Property	Value
Report Name	Financial Ratio Summary(FRA001)
Excel Spreadsheet Generated Date:	6/17/2010
Table Name	FinancialRatioAnalysisTable
View Name	SummaryView
User Name	Sean Klein
Shock	Base
Database	MCCU
KRM Run Date:	3/31/2007
Scenario	[D712] 2007 All Stochstic NI with Rollover mc 1000x1000 A7/L12

Objective	4/30/2007 30 Days	5/31/2007 31 Days	6/30/2007 30 Days	7/31/2007 31 Days
FINANCIAL ACCOUNTING BASIS				
Total Period End Assets (Financial Accounting Basis)	9,989,251,253.31	9,993,376,661.68	9,995,849,702.69	9,996,351,891.98
Average Assets (Financial Accounting Basis)	7,576,682,296.92	7,443,522,462.36	7,627,238,324.55	7,596,440,407.71
Total Period End Liabilities (Financial Accounting Basis)	(9,600,285,004.76)	(9,600,618,242.71)	(9,601,062,913.16)	(9,601,328,492.95)
Net Economic Value (Financial Accounting Basis)	388,966,248.55	392,758,418.97	394,786,789.53	395,023,399.02
Basel II Risk-weighted Assets (Financial Accounting Basis)	484,455,765.06	472,037,740.37	460,424,529.17	448,427,481.18
INCOME AND EARNINGS				
Cumulative Retained Earnings	10,181,820.39	37,156,217.74	64,289,599.88	92,258,274.82
Interest Income	38,874,923.08	37,645,935.54	38,232,477.14	38,564,050.67
Interest Expense	(10,645,318.80)	(10,850,195.98)	(10,766,355.78)	(11,068,035.60)
Net Interest Income	28,229,604.28	26,795,739.55	27,466,121.36	27,496,015.08
Net Income	10,181,820.39	26,974,397.35	27,133,382.14	27,968,674.94
MARKET VALUE BASIS				
Total Period End Assets (Market Value Basis)	10,049,702,301.55	10,046,033,313.26	10,061,959,355.15	10,073,305,160.50
Total Period End Liabilities (Market Value Basis)	(9,604,177,981.61)	(9,604,325,974.88)	(9,604,645,796.64)	(9,604,993,970.09)
Net Economic Value (Market Value Basis)	445,524,319.94	441,707,338.38	457,313,558.51	468,311,190.41
FINANCIAL RATIOS				
Cumulative Return on Assets (Annualized)	0.01	0.03	0.03	0.03
Return on Average Assets (Annualized)	0.02	0.04	0.04	0.04
Return on Equity (Annualized)	0.32	0.81	0.84	0.83
Leverage Ratio	25.68	25.44	25.32	25.31
Capital Ratio	0.04	0.04	0.04	0.04
Basel II Tier 1 Capital Ratio	0.80	0.83	0.86	0.88
Net Economic Value (MVB) / Assets (FAB)	0.04	0.04	0.05	0.05
Net Economic Value (MVB) / Average Assets (FAB)	0.06	0.06	0.06	0.06
Net Interest Margin (FAB) / Average Assets (FAB)	0.00	0.00	0.00	0.00
Cumulative Retained Earnings (FAB) / Average Assets (FAB)	0.00	0.00	0.01	0.01

Income Statement Forecast

Kamakura RiskPortal - Convert Report Table to Excel

Report Name: Income Statement Forecast(EAR003.NCUA)
Table Name: IncomeStatementTree

Report Environment Properties

Property	Value
Report Name	Income Statement Forecast(EAR003.NCUA)
Excel Spreadsheet Gen	6/17/2010
Table Name	IncomeStatementTree
View Name	defaultView
User Name	Sean Klein
Shock	Base
Database	MCCU
KRM Run Date:	3/31/2007
Scenario	[D712] 2007 All Stochstic NI with Rollover mc 1000x1000 A7/L12
Chart of Accounts	None

	4/30/07	5/31/07	6/30/07	7/31/07
Income	28,229,604.28	26,795,739.55	27,466,121.36	27,496,015.05
Interest Margin	28,229,604.28	26,795,739.55	27,466,121.36	27,496,015.05
Interest Income	38,874,923.08	37,645,935.54	38,232,477.13	38,564,050.66
ABS Other	455,859.52	440,791.67	425,886.90	411,095.24
Auto Loan	927,814.29	862,554.31	886,880.32	895,766.53
BAC2	484,436.90	500,584.52	484,436.90	500,584.52
C	483,883.33	500,002.38	483,872.62	500,002.38
CMBS	6,937,439.29	5,313,761.17	6,077,804.27	5,289,360.53
JPM	483,791.67	499,908.33	483,782.14	499,908.33
MBS Agency	464,400.00	446,457.14	428,814.29	411,470.24
MDT	484,076.19	500,176.19	484,041.67	500,176.19
MMM	482,794.05	498,852.38	482,760.71	498,852.38
PFE	484,083.33	500,171.43	484,036.90	500,171.43
PG	483,710.71	499,802.38	483,679.76	499,802.38
RMBS SA	1,068,650.00	908,718.84	670,113.73	625,713.73
Treasury Security	24,183,506.43	24,675,403.61	24,905,963.35	25,932,395.59
USB	483,985.71	500,083.33	483,951.19	500,083.33
WB	483,430.95	499,523.81	483,409.52	499,523.81
WFC	483,060.71	499,144.05	483,042.86	499,144.05
Interest Expense	(10,645,318.80)	(10,850,195.99)	(10,766,355.77)	(11,068,035.61)
Deposit 10Y	(6,872,925.50)	(7,181,246.81)	(6,913,998.03)	(7,224,859.48)
Deposit 1D	(1,085,544.00)	(1,057,248.00)	(1,064,952.00)	(1,056,312.00)
Deposit 1M	(211,586.60)	(7,053.19)	(214,184.38)	(210,333.38)
Deposit 1Y	(213,662.96)	(218,525.33)	(209,131.53)	(213,439.52)
Deposit 2M	(146,509.44)	(220,740.32)	(213,137.92)	(218,638.04)
Deposit 2Y	(505,561.02)	(513,878.89)	(500,528.94)	(509,492.15)
Deposit 3M	(163,762.32)	(170,552.80)	(213,640.71)	(166,040.02)
Deposit 3Y	(192,253.61)	(195,780.62)	(191,079.91)	(194,792.85)
Deposit 5Y	(193,910.32)	(200,426.40)	(193,328.04)	(199,945.08)
Deposit 6M	(186,764.55)	(193,055.51)	(184,453.83)	(189,201.64)
Deposit 7Y	(678,295.58)	(691,780.70)	(676,797.68)	(690,708.04)
Deposit 9M	(194,542.90)	(199,907.42)	(191,122.80)	(194,273.41)

Balance Sheet Forecast

Kamakura RiskPortal - Convert Report Table to Excel

Report Name: Balance Sheet Forecast(EAR004.NCUA)
Table Name: BalanceSheetTree

Report Environment Properties

Property	Value
Report Name	Balance Sheet Forecast(EAR004.NCUA)
Excel Spreadsheet Gen	6/17/2010
Table Name	BalanceSheetTree
View Name	treeView
User Name	Sean Klein
Shock	Base
Database	MCCU
KRM Run Date:	3/31/2007
Scenario	[D712] 2007 All Stochstic NI with Rollover mc 1000x1000 A7/L12
Chart of Accounts	None

			3/31/07	4/30/07	5/31/07	6/30/07	7/31/07
Assets			10,000,000,000.03	9,989,251,253.32	9,993,376,661.67	9,995,849,702.69	9,996,351,891.98
	ABS Other		119,047,619.05	115,139,159.03	111,292,764.37	107,469,847.40	103,681,856.71
	Auto Loan		238,095,238.10	236,885,442.52	237,104,108.21	237,072,660.70	237,079,387.52
	BAC2		119,047,619.05	119,018,095.25	118,994,615.81	118,978,690.60	118,969,833.03
	C		119,047,619.05	119,021,387.07	119,001,292.02	118,988,644.81	118,983,128.08
	CMBS		1,785,714,285.71	1,740,626,257.34	1,707,320,737.07	1,675,847,900.76	1,640,513,396.86
	JPM		119,047,619.05	119,021,020.70	119,000,833.61	118,987,959.98	118,982,201.08
	MBS Agency		119,047,619.05	114,447,152.29	109,938,243.06	105,492,429.34	101,135,013.98
	MDT		119,047,619.05	119,024,619.20	119,007,870.94	118,998,463.25	118,996,310.37
	MMM		119,047,619.05	119,022,414.50	119,003,346.67	118,991,708.80	118,987,130.11
	PFE		119,047,619.05	119,025,548.96	119,009,760.27	119,001,281.56	119,000,088.82
	PG		119,047,619.05	119,023,722.43	119,006,035.79	118,995,721.73	118,992,599.87
	RMBS SA		238,095,238.10	215,180,814.13	194,532,849.18	176,239,807.71	159,727,750.84
	Treasury Security		6,309,523,809.52	6,376,747,872.74	6,443,157,465.79	6,503,810,174.80	6,564,339,417.74
	USB		119,047,619.05	119,024,395.91	119,005,223.56	118,997,706.64	118,995,383.16
	WB		119,047,619.05	119,022,122.63	119,002,773.84	118,990,853.34	118,986,045.74
	WFC		119,047,619.05	119,021,228.62	118,998,741.48	118,985,851.27	118,982,348.07
Liability and Equity			9,600,000,096.00	9,600,285,004.76	9,600,618,242.71	9,601,062,913.15	9,601,328,492.95
	Liability		9,600,000,096.00	9,600,285,004.76	9,600,618,242.71	9,601,062,913.15	9,601,328,492.95
		Deposit 10'	1,720,878,720.00	1,720,929,317.67	1,721,018,102.78	1,721,184,745.05	1,721,225,043.05
		Deposit 1D	7,200,000,000.00	7,199,996,040.00	7,199,982,720.00	7,199,977,069.44	7,199,962,772.18
		Deposit 1M	48,000,480.00	48,000,463.20	48,000,489.12	48,002,977.32	48,001,616.47
		Deposit 1Y	48,000,000.00	48,012,666.80	48,027,528.64	48,045,273.46	48,061,521.03
		Deposit 2M	48,000,000.00	47,999,911.20	48,002,086.40	48,008,190.68	48,009,749.97
		Deposit 2Y	126,015,360.00	126,066,427.73	126,116,496.24	126,166,332.81	126,203,082.56
		Deposit 3M	48,000,000.00	47,999,082.00	47,999,203.20	48,002,084.88	48,001,684.34
		Deposit 3Y	48,002,784.00	48,038,016.76	48,072,737.55	48,106,847.19	48,136,722.87
		Deposit 5Y	48,000,000.00	48,051,761.40	48,105,725.82	48,159,801.58	48,211,194.50
		Deposit 6M	48002496	48001505.57	48002564.92	48006763.51	48009010.18
		Deposit 7Y	169100256	169185944.8	169279751.9	169381535.1	169476110.1
		Deposit 9M	48000000	48003867.6	48010836.1	48021292.17	48029985.75

Discussion of 2007 Stochastic Results

This section discusses the electronic results found in the 2007 simulations. These results are contained in three workbooks entitled "Income Statement Forecast_2007Stochastic", "Balance Sheet Forecast_2007Stochastic", and "Financial Ratio Report_2007Stochastic".

The complete list of candidate assets is listed in the "2007 Stress Test Results" section. The list of included and excluded assets is given in the prior section. The most striking conclusion from the 2007 analysis is that it is extremely difficult for the corporate credit union to purchase a non-trivial amount of structured products at the proposed levels of stress test limits. The proposed regulations eliminate the corporate credit unions ability to invest in structured products.[44] Aside from this conclusion, there are several other notable outcomes. The 2007 Monte Carlo simulation results using one million scenarios (1,000 macroeconomic factor scenarios, combined with 1,000 default/no default simulations for each of the macro factor scenarios) were ideal for the simulated model corporate credit union:

- Random interest rate movements, beginning from levels at March 31, 2007, produced by the simulation were **on average** much higher rates than observed during the actual period from March 31, 2007. As explained at the outset, this makes the ROA target in the proposed regulations easier to hit, since a zero funding margin produces an annualized ROA of 0.15% or better when liability costs are at a constant 4% or higher.
- The average yield curve shape was fairly steep on average, producing steady mis-match profits
- No mortgage-backed securities were included in the model corporate credit union portfolio, so there were no simulated defaults

The result, on average, indicated very steady profit margins at rate levels that over one million scenarios averaged near 5% on the asset side and about 1.50% on the liability side because of the upward sloping yield curve. As one would expect with a simulation without forward looking modeling, this is within the range of actual experience during the 1990 to 2007 experience, but differs dramatically from the actual experience during the crisis.

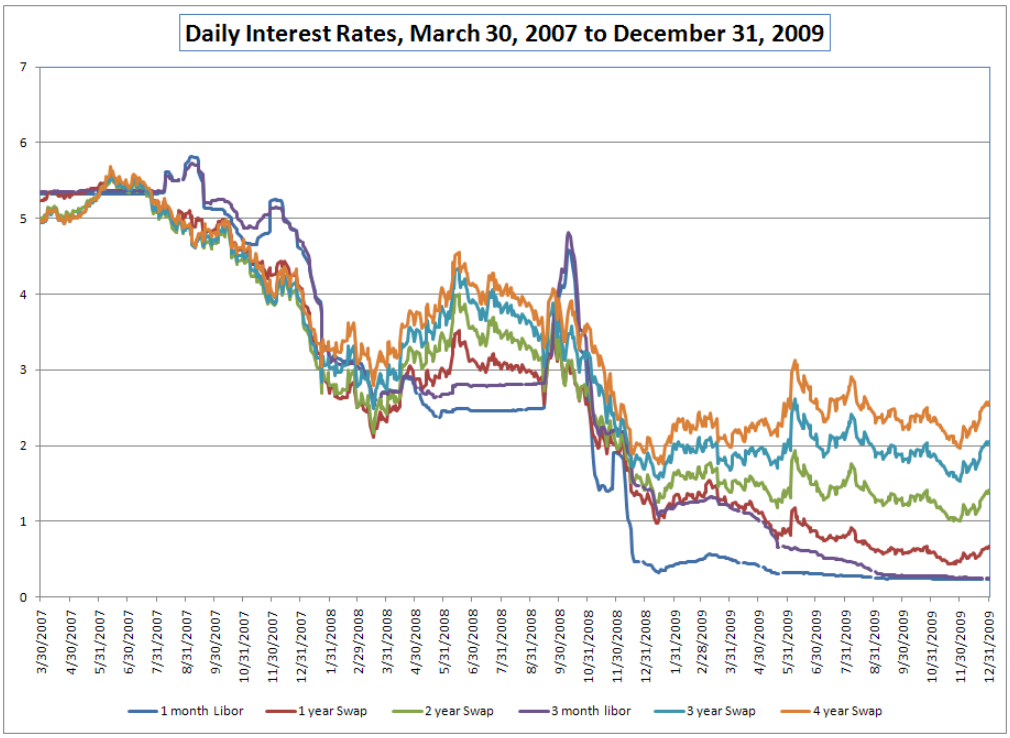
The stochastic scenarios appear to perform quite well. After three years, cumulative retained earnings for the model corporate credit union varies from $400 Million to $1 Billion. However, as there is very little purchase of structured products, this is almost entirely due to the spread earned by the credit union due to 3 months of interest rate mismatching (recall that the yield curve was fairly steeply sloped at the onset of this simulation), and the low simulated funding costs for the corporate credit union. Credit gains and losses[45] are quite small, though this is somewhat difficult to interpret given the restrictions that the proposed rule placed on the corporate credit union's ability to purchase a meaningful amount of structured products. In short, the average simulated performance of the model

[44] Of course, this has the effect of essentially eliminating credit losses during this period as well.
[45] Measured by the difference between Net Interest Income and Net Income on the Financial Ratio Report.

corporate credit union during this period is almost entirely determined by the relative position and slope of their funding yield curves relative to US Treasuries.

2007 Deterministic Scenarios

Before we review the results of the 2007 deterministic simulation, it is important to remind oneself of the movements in interest rates that took place from March 2007 to December 31, 2009 in the wake of the government's extraordinary efforts to stave off a credit crisis of larger magnitude. This is especially relevant given the relative absence of structured products and the corresponding critical role that the shape and slope of the yield curve plays in determining performance in 2007. The graph below shows that short term LIBOR-swap rates were higher than long term rates for most of the first year from March 2007. The source of these interest rate series is the Board of Governors of the Federal Reserve, H15 statistical release.



In September 2008, when Lehman Brothers collapsed and AIG, FHLMC and FNMA were rescued, short rates again spiked higher than long term rates. This spike in rates has a very harmful effect on the model corporate credit unions in all 12 liability scenarios modeled. Thereafter short term rates fell rapidly toward zero in one of the most unusual periods in the monetary history of the United States.

In addition, recall that the weighted average lives mandated by the analysis range from 3 months to 1 year, but some of the liabilities have maturities of many years in order to be realistically compared to a typical profile for a model corporate credit union. We assume that the Proposed Regulations were imposed immediately on March 31, 2007. This would require a restructuring of investments on that date, but thereafter liabilities would remain unchanged and consistent with the maturity profile mandated by the NCUA.

In a declining interest rate environment, the date of the imposition of the Proposed Regulations leaves the model corporate credit union burdened with a non-trivial amount of relatively long dated set of legacy liabilities. **This has a significant impact on the modeling of actual outcomes from March 31, 2007 to December 31, 2009.**

Many factors are working against the model corporate credit union in the March 31, 2007 to December 31, 2009 period:

- Interest rate changes were dramatic because of the credit crisis.
- The Lehman-FNMA-FHLMC-AIG spike in short term rates in September, 2008 had a very adverse affect on short term rates and October 2008 income.
- Long-term and short term rate spreads compressed over much of the period.
- As discussed previously, the Proposed Regulations eliminated as potential investments almost all credits that could be funded at a profit versus the swap curve.
- The Proposed Regulations eliminated as potential investments many longer term assets where the process of maturity intermediation would leave a profit margin.

Again, the full set of reports is delivered in electronic form to the NCUA within three workbooks: “Income Statement Forecast_2007Deterministic”, “Balance Sheet Forecast_2007 Deterministic”, and “Financial Ratio Report_2007Deterministic”.

Sample Reports: Liability Scenario 12

Financial Ratio Report

Kamakura RiskPortal - Convert Report Table to Excel

Report Name: Financial Ratio Summary(FRA001)
Table Name: FinancialRatioAnalysisTable

Report Environment Properties

Property	Value
Report Name	Financial Ratio Summary(FRA001)
Excel Spreadsheet Generated Date:	6/17/2010
Table Name	FinancialRatioAnalysisTable
View Name	SummaryView
User Name	Sean Klein
Shock	Base
Database	MCCU
KRM Run Date:	3/31/2007
Scenario	[7B7C] 2007-2009 deterministic base plus 0712

Objective	4/30/2007 30 Days	5/31/2007 31 Days	6/30/2007 30 Days	7/31/2007 31 Days
FINANCIAL ACCOUNTING BASIS				
Total Period End Assets (Financial Accounting Basis)	10,119,377,619.00	10,121,047,389.62	10,112,142,334.33	10,117,785,166.31
Average Assets (Financial Accounting Basis)	10,116,147,865.51	10,115,521,124.75	10,116,168,776.30	10,108,561,545.92
Total Period End Liabilities (Financial Accounting Basis)	(9,599,828,237.49)	(9,600,490,048.17)	(9,601,539,348.21)	(9,601,622,806.54)
Net Economic Value (Financial Accounting Basis)	519,549,381.51	520,557,341.45	510,602,986.12	516,162,359.77
Basel II Risk-weighted Assets (Financial Accounting Basis)	510,473,278.05	496,956,821.25	483,510,871.59	471,417,342.98
INCOME AND EARNINGS				
Cumulative Retained Earnings	111,154,661.80	105,849,955.49	92,113,672.31	95,316,545.53
Interest Income	45,550,109.84	45,796,957.42	45,339,773.57	45,642,991.93
Interest Expense	(41,485,639.57)	(43,005,845.02)	(41,833,458.97)	(42,701,942.44)
Net Interest Income	4,064,470.27	2,791,112.40	3,506,314.60	2,941,049.49
Net Income	111,154,661.80	(5,304,706.31)	(13,736,283.18)	3,202,873.22
MARKET VALUE BASIS				
Total Period End Assets (Market Value Basis)	10,181,437,573.65	10,177,042,120.14	10,182,586,455.12	10,200,171,949.89
Total Period End Liabilities (Market Value Basis)	(9,604,093,212.04)	(9,604,749,474.25)	(9,605,778,162.89)	(9,606,056,561.06)
Net Economic Value (Market Value Basis)	577,344,361.61	572,292,645.89	576,808,292.23	594,115,388.83
FINANCIAL RATIOS				
Cumulative Return on Assets (Annualized)	0.13	(0.01)	(0.02)	0.00
Return on Average Assets (Annualized)	0.13	(0.01)	(0.02)	0.00
Return on Equity (Annualized)	2.60	(0.12)	(0.33)	0.07
Leverage Ratio	19.48	19.44	19.80	19.60
Capital Ratio	0.05	0.05	0.05	0.05
Basel II Tier 1 Capital Ratio	1.02	1.05	1.06	1.09
Net Economic Value (MVB) / Assets (FAB)	0.06	0.06	0.06	0.06
Net Economic Value (MVB) / Average Assets (FAB)	0.06	0.06	0.06	0.06
Net Interest Margin (FAB) / Average Assets (FAB)	0.00	0.00	0.00	0.00
Cumulative Retained Earnings (FAB) / Average Assets (FAB)	0.01	0.01	0.01	0.01

Income Statement Forecast

Kamakura RiskPortal - Convert Report Table to Excel

Report Name: Income Statement Forecast(EAR003.NCUA)
Table Name: IncomeStatementTree

Report Environment Properties

Property	Value
Report Name	Income Statement Forecast(EAR003.NCUA)
Excel Spreadsheet Gen	6/17/2010
Table Name	IncomeStatementTree
View Name	defaultView
User Name	Sean Klein
Shock	Base
Database	MCCU
KRM Run Date:	3/31/2007
Scenario	[7B7C] 2007-2009 deterministic base plus 0712
Chart of Accounts	None

	4/30/07	5/31/07	6/30/07	7/31/07
Income	4,064,470.27	2,791,112.40	3,506,314.60	2,941,049.49
Interest Margin	4,064,470.27	2,791,112.40	3,506,314.60	2,941,049.49
Interest Income	45,550,109.84	45,796,957.42	45,339,773.57	45,642,991.93
ABS Other	1,093,645.67	1,059,379.61	1,025,381.70	991,516.37
Auto Loan	927,675.42	927,417.90	927,040.52	926,565.49
BAC2	484,437.30	500,584.65	484,436.76	500,584.65
C	483,882.96	500,002.24	483,873.13	500,002.24
CMBS	11,893,784.61	11,022,302.56	11,561,913.88	10,676,519.12
JPM	483,791.57	499,908.29	483,782.21	499,908.29
MBS Agency	464,400.42	446,456.73	428,814.76	411,469.86
MDT	484,076.23	500,176.17	484,041.46	500,176.17
MMM	482,794.12	498,852.91	482,760.88	498,852.91
PFE	484,082.78	500,171.55	484,036.99	500,171.55
PG	483,711.19	499,802.33	483,679.68	499,802.33
RMBS SA	1,068,859.01	909,966.91	670,886.29	626,175.77
Treasury Security	25,264,491.97	26,433,184.19	25,888,720.76	27,012,495.80
USB	483,985.31	500,083.08	483,951.36	500,083.08
WB	483,430.45	499,523.75	483,410.08	499,523.75
WFC	483,060.83	499,144.55	483,043.11	499,144.55
Interest Expense	(41,485,639.57)	(43,005,845.02)	(41,833,458.97)	(42,701,942.44)
Deposit 10Y	(6,929,247.28)	(7,237,503.91)	(6,912,331.00)	(7,224,378.24)
Deposit 1D	(31,670,629.41)	(32,807,540.32)	(32,058,706.62)	(32,538,674.17)
Deposit 1M	(211,586.58)	(223,251.51)	(207,366.24)	(224,193.18)
Deposit 1Y	(213,719.47)	(218,615.99)	(209,174.52)	(213,520.09)
Deposit 2M	(212,491.39)	(220,356.85)	(213,135.84)	(218,851.55)
Deposit 2Y	(526,053.34)	(534,318.44)	(520,583.99)	(530,617.17)
Deposit 3M	(213,467.69)	(221,010.40)	(214,178.33)	(220,922.75)
Deposit 3Y	(197,449.27)	(200,936.12)	(196,185.70)	(200,148.89)
Deposit 5Y	(193,953.33)	(200,372.33)	(193,368.97)	(199,891.66)
Deposit 6M	(215,409.69)	(221,800.18)	(212,972.15)	(217,494.24)
Deposit 7Y	(686,296.77)	(699,502.35)	(684,608.61)	(698,745.11)
Deposit 9M	(215,335.35)	(220,636.62)	(210,847.00)	(214,505.39)

Balance Sheet Forecast

Kamakura RiskPortal - Convert Report Table to Excel

Report Name: Balance Sheet Forecast(EAR004.NCUA)
Table Name: BalanceSheetTree

Report Environment Properties

Property	Value
Report Name	Balance Sheet Forecast(EAR004.NCUA)
Excel Spreadsheet Gen	6/17/2010
Table Name	BalanceSheetTree
View Name	treeView
User Name	Sean Klein
Shock	Base
Database	MCCU
KRM Run Date:	3/31/2007
Scenario	[7B7C] 2007-2009 deterministic base plus 0712
Chart of Accounts	None

			3/31/07	4/30/07	5/31/07	6/30/07	7/31/07
Assets			10,000,000,000.20	10,119,377,619.00	10,121,047,389.62	10,112,142,334.33	10,117,785,166.31
	ABS Other		119,047,619.05	126,468,337.25	122,147,815.89	117,642,366.88	113,690,313.97
	Auto Loan		238,095,238.10	237,686,469.35	237,373,988.90	236,697,466.74	236,991,678.88
	BAC2		119,047,619.05	118,994,864.01	119,025,629.87	119,022,099.57	118,975,112.78
	C		119,047,619.05	118,997,075.02	119,030,334.82	119,028,478.56	118,986,796.76
	CMBS		1,785,714,285.75	1,858,738,413.57	1,820,938,021.06	1,782,045,074.70	1,746,187,504.62
	JPM		119,047,619.05	118,996,669.17	119,029,536.77	119,027,175.42	118,985,592.95
	MBS Agency		119,047,619.05	114,361,894.09	109,801,967.33	105,196,449.70	100,968,115.92
	MDT		119,047,619.05	119,000,667.90	119,037,586.21	119,039,507.91	119,000,520.93
	MMM		119,047,619.05	118,995,877.34	119,028,119.37	119,023,667.52	118,987,296.26
	PFE		119,047,619.05	119,001,597.26	119,039,476.25	119,042,324.52	119,004,298.10
	PG		119,047,619.05	118,999,044.45	119,034,398.27	119,034,306.89	118,995,707.83
	RMBS SA		238,095,238.10	215,111,276.01	194,522,313.08	175,972,999.93	159,249,101.48
	Treasury Security		6,309,523,809.65	6,377,033,019.22	6,445,944,493.62	6,504,282,530.49	6,570,792,075.37
	USB		119,047,619.05	119,000,263.86	119,036,794.51	119,038,218.40	118,999,321.99
	WB		119,047,619.05	118,996,893.92	119,030,089.88	119,027,524.06	118,988,300.89
	WFC		119,047,619.05	118,995,256.58	119,026,823.79	119,022,143.04	118,983,427.58
Liability and Equity			9,600,001,941.89	9,599,828,237.49	9,600,490,048.17	9,601,539,348.21	9,601,622,806.54
	Liability		9,600,001,941.89	9,599,828,237.49	9,600,490,048.17	9,601,539,348.21	9,601,622,806.54
		Deposit 10'	1,720,878,619.20	1,720,929,016.27	1,721,018,105.70	1,721,190,680.11	1,721,232,783.79
		Deposit 1D	7,200,000,000.00	7,199,533,998.11	7,199,840,760.39	7,200,424,462.77	7,200,230,552.16
		Deposit 1M	48,000,499.20	48,000,482.50	48,003,959.37	48,013,461.89	48,012,161.18
		Deposit 1Y	48,001,296.00	48,013,975.89	48,028,849.82	48,046,437.24	48,062,022.95
		Deposit 2M	47,999,875.20	47,999,595.17	48,001,472.60	48,007,175.60	48,009,140.84
		Deposit 2Y	126,017,856.00	126,070,936.17	126,123,405.75	126,174,157.73	126,208,726.60
		Deposit 3M	48,000,153.60	47,998,834.98	47,998,931.31	48,001,767.18	48,001,138.24
		Deposit 3Y	47,999,539.20	48,035,642.90	48,071,424.95	48,106,165.33	48,135,821.03
		Deposit 5Y	47,996,044.80	48,047,819.93	48,101,804.50	48,155,889.15	48,207,086.81
		Deposit 6M	48,001,920.00	48,000,785.80	48,001,840.34	48,006,210.29	48,007,944.72
		Deposit 7Y	169,105,658.69	169,192,341.88	169,287,226.16	169,389,786.67	169,483,849.13
		Deposit 9M	48,000,480.00	48,004,807.89	48,012,267.28	48,023,154.25	48,031,579.09

Discussion of 2007 Deterministic Results

As the 2007 portfolios contain largely US Treasuries and Corporate Securities, the simulation is very sensitive to the height and shape of the yield curve. This is particularly relevant as interest rates plummeted during the period in question.

At the end of three years, cumulative retained earnings are between -$400 million and -$600 million dollars depending on the liability scenario. Despite the widespread credit losses throughout the credit

crisis, credit losses are relatively minor during this period (the largest values are on the order of $40 million dollars in a single month) as the structured products holdings are so limited and the small amount of structured products eligible for purchase are generally very senior, very high performing securities. Still, the movements in interest rates were sufficient to more than eliminate the Net Economic Value of these institutions after three years. Kamakura finds it very unlikely, even if they purchased a portfolio of almost exclusively non-structured securities, that the model corporate credit union simulated in the 2007 analysis would have survived the credit crisis due to the dramatic changes in the shape of the yield curve. Note that this suggests an additional stress test: changes in the Net Economic Value of the institution due to changes in the slope of the yield curve. For example, how much would the NEV change if the yield curve increased linearly such that the ten year tenor increased by 300 bps? Decreased by 300 bps? One could conduct similar analysis with spreads as well. While Kamakura fervently believes that macro-economic factor based evaluation is best practice for risk assessment, these stress tests may have been more useful in eliminating securities with poor performance during the crisis (even amongst securities with essentially zero credit losses).

2007 Extension

One of the most apparent conclusions from Kamakura's analysis of the proposed rule is the extent to which the stress tests mandated in 704.d, 704.e, and 704.f restrict a corporate credit union's ability to purchase structured products. To this end, the NCUA has asked Kamakura to engage in some additional consulting work designed to address two principal questions: how much would the stress test limits need to be relaxed until a model corporate credit union could purchase a substantial amount of structured products, and do the stress tests appear to filter out securities with below-average performance during the credit crisis? This section addresses these two questions using actual CUSIP performance data from March 31, 2007 through December 31,2009 on the 2007 universe of candidate securities.

This discussion is organized into three main pieces: the first looks at the portfolios that can be constructed under a variety of relaxed stress test limits for liability scenario six (50% Overnight, 0.50 Y weighted average life); the second section contains similar detail for liability scenario twelve (75% Overnight, 1.00 Y weighted average life); and the final section contains an analysis of the relationship between stress test performance and historical cash flows through the credit crisis.

Expanding Stress Test Limits

Once the asset universe was finalized, the first requirement was calculation of the change in value of the securities with respect to the three stress tests mandated in the proposed rule. These included a 300 basis point increase in yields, a 300 basis point increase in spreads, and a 300 bp increase in spreads combined with a 50% decrease in prepayment speeds. Kamakura has included the stress test performance of every CUSIP in 2007 in the "2007 Stress Tests" section, and has also constructed a detailed walkthrough of precisely how the stress tests results are calculated in Kamakura Risk Manager for fixed and floating rate securities. This spreadsheet is contained in "StressTestExampleKamakura20100302zipfile.xls", which is itself contained in "Kamakura Results and MBS Example.zip" sent to the NCUA staff on March 09, 2010.

Annualized returns calculated via data provided by the Intex libraries. Historical values for prices, interest rates, periodic cash flows, and accrued interest are provided by Intex through their "horizon return" functionality in their analytic reports. Kamakura used all available known data according to the Intex libraries. This functionality reports the semi-annualized returns through 12/31/2009 or the maturity / settlement date of the securities, whichever comes first. Kamakura then transformed the semi-annualized returns (1%= 1.00) into annualized returns (1% = 0.01) using the following relationship:

$$r_a = (1 + \frac{r_{sa}}{200})^2 - 1$$

Where r_a is the annualized return and r_{sa} is the semi-annualized return as reported by Intex. While the NCUA is particularly interested in credit losses alone in 2007, this information is not accessible from the Intex information libraries, and as such total return is provided. It is Kamakura's view that total return is a measure that is much easier to interpret, particularly when the market prices securities more likely to have credit losses as precisely the securities with likely higher yields.[46]

Portfolio 06: 50% Overnight, 0.50YWAL

Liability scenario six was chosen as it appears to be a very useful "baseline": the distribution of liability weights across different maturities looks very similar to the distribution of liability weights on the balance sheets of the corporate credit unions. We will present the portfolios constructed by the approach outlined above with a variety of stress test limits from the proposed rule, as well as the performance of the structured product securities that were and were not able to be included in the final portfolio at the specified limits.

We inspect four different levels of stress test limits: the "base-plus" limits in the rule itself of a 20% change in Net Economic Value with a 300 bp increase in yields, a 20% change in Net Economic Value with a 300 bp increase in Spreads, and a 30% change in Net Economic Value with a 300 bp increase in spreads combined with a 50% reduction in prepayment speeds, which we abbreviate 20%, 20%, 30%[47] ; an expansion of the limits to 40%, 40%, 50%; an expansion of the limits to 100%, 100%, 125%; and finally, an expansion of the limits until the model corporate credit union can construct a portfolio of 20% non-agency RMBS (recall the universe proportion was roughly 37%): this required limits of 150%, 150%, 180%.

[46] That is, a credit loss of 20% in and of itself is difficult to interpret: if the security otherwise would have yielded 25%, then the conclusions is substantively different than if the security otherwise yielded 6%. In short, market compensation for credit risk makes total return calculations more appealing in this context.
[47] The base plus portfolios are the actual portfolios that were used in the fully detailed KRM simulation.

Baseline: 20%, 20%, 30%

Sector	Portfolio Concentration	Subordinated Concentration in Sector	Violated Sector Concentration Limits?
Auto Loan	0.000	0.000	0.000
RMBS	0.000	0.000	0.000
MBS Agency	0.000	0.000	0.000
CMBS	0.069	0.000	0.000
Credit Card	0.000	0.000	0.000
Student Loan Private	0.000	0.000	0.000
Student Loan FFELP	0.000	0.000	0.000
Treasury Security	0.741	0.000	0.000
Corporate	0.172	0.000	0.000
ABS Other	0.017	0.000	0.000

The base-plus portfolio contains essentially nothing in the way of structured products. Indeed, it was the absence of structured products in these portfolios that led to discussions between Kamakura and the NCUA regarding relaxing the stress test limits.

0706 Base		Stress Test Outcomes		
Test		YC300	SPR300	SPR300+
Change NEV		-0.199	-0.199	-0.198
NEV Constraint		0.200	0.200	0.300
In-Portfolio Return	0.008		Count	58
Non-Port Return	0.021		Structured	5
Max Stress Loss	-0.049		WAL	0.786

The base-plus portfolio contains 58 securities (10.8% of the universe), 5 of which are structured products (1.3% of the structured products universe). The overall portfolio has a weighted average life of 0.786 years. Due primarily to the absence of structured products, the binding stress tests in the base plus scenario are actually the yield and spread stress tests rather than the spread and prepayment test: this portfolio included all securities that had stress test performance of a 4.9% decline in value or higher.

Note that the structured products that were purchased in this portfolio had a lower return than the structured products that were not purchased (0.80% versus 2.1%), however, both groups of structured products had positive annualized returns on average.

Extension 1: 40%, 40%, 50%

For the first extension, Kamakura doubled the yield and spread stress test limits from 20% to 40%, and kept the same ten percentage point difference between the spread and spread + prepayment stress test.

Sector	Portfolio Concentration	Subordinated Concentration within Sector	Violated Sector Concentration Limits?
Auto Loan	0.0128	0.0000	0.0000
RMBS	0.0000	0.0000	0.0000
MBS Agency	0.0128	0.0000	0.0000
CMBS	0.1795	0.0000	0.0000
Credit Card	0.0000	0.0000	0.0000
Student Loan Private	0.0000	0.0000	0.0000
Student Loan FFELP	0.0000	0.0000	0.0000
Treasury Security	0.6538	0.0000	0.0000
Corporate	0.1282	0.0000	0.0000
ABS Other	0.0128	0.0000	0.0000

This portfolio includes 20 additional securities than the base plus portfolio, 12 of which are structured products. Many of these additional structured products were CMBS securities. However, the portfolio constructed according to the algorithm detailed above still cannot contain and non-agency RMBS, Credit Cards, or Student Loan securities, and consists of over 65% safe and secure assets (US Treasury Securities).

0706 Ext 1		Stress Test Outcomes		
Test		YC300	SPR300	SPR300+
Change NEV		-39.89%	-39.89%	-40.74%
NEV Constraint		40.00%	40.00%	50.00%
In-Portfolio Return	0.027		Count	78
Non-Port Return	0.020		Structured	17
Max Stress Loss	-0.060		WAL	1.081

With the increase in stress test limits, the weighted average life has also increased to 1.08 years, and the in and out of portfolio returns are almost identical at 2.7% and 2.0% respectively. All securities with stress test losses of 6% or less are included in the 40%, 40%, 50% portfolio.

Extension 2: 100%, 100%, 125%

The second portfolio extension is to 100%, 100%, 125%. That is, a 300 bp increase in yields or spreads will completely eliminate the Net Economic Value of our model corporate credit union, while a 300 bp increase in spreads combined with a 50% decrease in prepayment speeds will eliminate all of the net economic value plus an additional one-quarter.

Sector	Portfolio Concentration	Subordinated Concentration within Sector	Violated Sector Concentration Limits?
Auto Loan	0.0595	0.0000	0.0000
RMBS	0.0655	0.0060	0.0000
MBS Agency	0.0417	0.0000	0.0000
CMBS	0.1429	0.0000	0.0000
Credit Card	0.0417	0.0000	0.0000
Student Loan Private	0.0238	0.0000	0.0000
Student Loan FFELP	0.0179	0.0000	0.0000
Treasury Security	0.4048	0.0000	0.0000
Corporate	0.1488	0.0000	0.0000
ABS Other	0.0536	0.0000	0.0000

Here we begin to see a much more diversified portfolio. There are holdings in every asset class, though the RMBS and MBS agency holdings are still relatively small given the prominence of those securities in the overall universe. We also see the very first subordinated securities begin to appear (in non-agency RMBS). However, the portfolio still consists of 40% Treasury securities: that seems quite a bit too high, even when the Treasury holdings are interpreted as “safe, liquid assets” rather than US Treasuries specifically.

0706 Ext 2		Stress Test Outcomes		
Test		YC300	SPR300	SPR300+
Change NEV		-65.96%	-99.27%	-110.78%
NEV Constraint		100.00%	100.00%	125.00%
In-Portfolio Return	0.033		Count	168
Non-Port Return	0.017		Structured	75
Max Stress Loss	-0.094		WAL	1.979

Interestingly, it is once again the spread stress test that is the binding constraint. The portfolio now includes 90 additional securities relative to the 40%, 40%, 50% limits, 58 of which are new structured products. The weighted average life has increased all the way to 1.98 years, essentially equal to the limit expressed in the proposed regulations. At this point, the stress test limits are five times the levels in the proposed regulations, and only now is the weighted average life constraint coming in to play.

Extension 3: 150%, 150%, 180%

Finally, Kamakura elected to expand the limits until the model corporate credit union constructed a portfolio with 20% of the holdings in non-agency RMBS securities as directed by representatives from the NCUA. These limits represent a 7.5x increase over the yield and stress test limits in base plus (10x from base), and a 6x increase for the spread and prepayment test (9x from base).

Sector	Portfolio Concentration	Subordinated Concentration within Sector	Violated Sector Concentration Limits?
Auto Loan	0.0658	0.0000	0.0000
RMBS	0.2007	0.0362	1.0000
MBS Agency	0.0954	0.0000	0.0000
CMBS	0.0987	0.0000	0.0000
Credit Card	0.0493	0.0000	0.0000
Student Loan Private	0.0164	0.0000	0.0000
Student Loan FFELP	0.0164	0.0000	0.0000
Treasury Security	0.2730	0.0000	0.0000
Corporate	0.1316	0.0000	0.0000
ABS Other	0.0526	0.0000	0.0000

The portfolio now looks fairly well diversified across the universe. As stated above, the holdings in non agency RMBS are now 20%, there appear to be non-trivial holdings in all of the asset classes, as well as

4% subordinated securities in the RMBS asset class. Importantly, the holdings in liquid and secure assets are down to roughly 25% of the portfolio, which Kamakura believes is a much more reasonable figure.

0706 Ext 3		Stress Test Outcomes		
Test		YC300	SPR300	SPR300+
Change NEV		-85.32%	-146.20%	-178.64%
NEV Constraint		150.00%	150.00%	180.00%
In-Portfolio Return	0.033		Count	304
Non-Port Return	0.009		Structured	181
Max Stress Loss	-0.133		WAL	2.745

The portfolio now contains 304 individual CUSIPs (57% of the universe), and 181 structured products (48% of the structured products universe), up from 58 total securities and 5 structured product securities under the base plus authority detailed in the current regulations. At the expanded 150%, 150%, 180% limits, both the spread and spread and prepayment stress tests are binding at these revised limits, and the weighted average life of the overall portfolio is 2.75 years, exceeding the 2 year limit in the proposed rule. However, the return of structured products within the portfolio appears to be a few percentage points higher than the return of structured products outside of the portfolio, though this difference is not statistically significant.

Portfolio 12: 75% Overnight, 1.00Y WAL

The next portfolio that Kamakura considered was liability scenario twelve (75% Overnight and 1.00 Y weighted average life). In general, this portfolio was the most diverse across the 2007 and 2009 simulations, and it is included to detail the most diversified positions possible given a particular set of stress test limits, rather than for the realism present in the maturity structure as in the previous section.

Baseline: 20%, 20%, 30%

Sector	Port Concentration	Subordinated Concentration within Sector	Violated Limits?
Auto Loan	0.024	0.000	0.000
RMBS	0.024	0.000	0.000
MBS Agency	0.012	0.000	0.000
CMBS	0.179	0.000	0.000
Credit Card	0.000	0.000	0.000
Student Loan Private	0.000	0.000	0.000
Student Loan FFELP	0.000	0.000	0.000
Treasury Security	0.631	0.000	0.000
Corporate	0.119	0.000	0.000
ABS Other	0.012	0.000	0.000

The base-plus stress test limits for scenario twelve generate portfolios with more structured product asset holdings than they did for portfolio six: there are small structured product holdings for a variety of asset classes, as well as fairly large holdings of CMBS securities, though the portfolio is still extremely concentrated in low-risk US Treasuries.

0712 Base		Stress Test Outcomes		
Test		YC300	SPR300	SPR300+
Change NEV		-16.70%	-19.14%	-22.32%
NEV Constraint		20.00%	20.00%	30.00%
In-Portfolio Return	0.027		Count	84
Non-Port Return	0.020		Structured	21
Max Stress Loss	-0.065		WAL	1.130

The base plus portfolio for scenario twelve includes 84 total securities (15.7%) and 21 structured products (5.5% of the structured products in the universe). Again, the spread stress test in the binding constraint, though the weighted average life for scenario twelve is quite a bit higher than it was for scenario six. The in portfolio and out of portfolio returns on structured products are essentially identical at 2.7% and 2.0% respectively.

Extension 1: 40%, 40%, 50%

Sector	Port Concentration	Subordinated Concentration within Sector	Violated Limits?
Auto Loan	0.0541	0.0000	0.0000
RMBS	0.0450	0.0000	0.0000
MBS Agency	0.0450	0.0000	0.0000
CMBS	0.1351	0.0000	0.0000
Credit Card	0.0090	0.0000	0.0000
Student Loan Private	0.0000	0.0000	0.0000
Student Loan FFELP	0.0000	0.0000	0.0000
Treasury Security	0.5495	0.0000	0.0000
Corporate	0.1532	0.0000	0.0000
ABS Other	0.0090	0.0000	0.0000

0712 Ext 1		Stress Test Outcomes		
Test		YC300	SPR300	SPR300+
Change NEV		-33.44%	-39.83%	-48.14%
NEV Constraint		40.00%	40.00%	50.00%
In-Portfolio Return	0.029		Count	111
Non-Port Return	0.019		Structured	33
Max Stress Loss	-0.080		WAL	1.436

Extending the stress test limits to 40%, 40%, 60% under liability scenario twelve allows the model corporate credit union to purchase 27 additional securities, 12of which are structured products. The weighted average life of the portfolio has increased to 1.44 years, and both the spread and the spread and prepayment stress tests appear to be binding or very close to binding. The RMBS, MBS Agency, and Auto Loan concentrations have increased slightly, and we also see our first Credit Card securities. However, just like with liability scenario six, there is far too high of a concentration in US Treasury securities. The in portfolio and out of portfolio annualized returns on structured products appears essentially identical.

Extension 2: 100%, 100%, 125%

Sector	Port Concentration	Subordinated Concentration within Sector	Violated Limits?
Auto Loan	0.0795	0.0000	0.0000
RMBS	0.1297	0.0209	0.0000
MBS Agency	0.0879	0.0000	0.0000
CMBS	0.1255	0.0000	0.0000
Credit Card	0.0586	0.0000	0.0000
Student Loan Private	0.0209	0.0000	0.0000
Student Loan FFELP	0.0167	0.0000	0.0000
Treasury Security	0.3264	0.0000	0.0000
Corporate	0.1046	0.0000	0.0000
ABS Other	0.0502	0.0000	0.0000

0712 Ext 2	Stress Test Outcomes		
Test	YC300	SPR300	SPR300+
Change NEV	-47.34%	-99.58%	-122.49%
NEV Constraint	100.00%	100.00%	125.00%

In-Portfolio Return	0.034	Count	239
Non-Port Return	0.013	Structured	136
Max Stress Loss	-0.115	WAL	2.381

The 100%, 100%, 125% portfolio contains 128 additional securities above and beyond the 40%, 40%, 50% portfolio, 103 of which are structured products. Here we see fairly substantial holdings in almost every asset class, as well as the first subordinated RMBS purchases. There is still a fairly large portion of the portfolio in liquid, low risk securities, though in general, liability scenario twelve appears able to generate more diversified portfolios at a given set of stress test limits. Here we see that both the spread and spread and prepayment tests are binding, and that the weighted average life of the portfolio now exceeds the two year limit present in the existing rule. There is also a four percentage point difference between the in-portfolio and out-of-portfolio structured product returns, with securities that pass the extended stress test thresholds experiencing an average annualized return of 3.4%, and securities that do not pass experiencing a 1.3% return through the crisis.

Extension 3: 150%, 150%, 180%

Sector	Port Concentration	Subordinated Concentration within Sector	Violated Limits?
Auto Loan	0.0559	0.0000	0.0000
RMBS	0.2626	0.0587	1.0000
MBS Agency	0.1117	0.0000	0.0000
CMBS	0.0866	0.0000	0.0000
Credit Card	0.0531	0.0000	0.0000
Student Loan Private	0.0140	0.0000	0.0000
Student Loan FFELP	0.0140	0.0000	0.0000
Treasury Security	0.2430	0.0000	0.0000
Corporate	0.1117	0.0000	0.0000
ABS Other	0.0475	0.0000	0.0000

0712 Ext 3		Stress Test Outcomes		
Test		YC300	SPR300	SPR300+
Change NEV		-57.55%	-135.25%	-178.79%
NEV Constraint		150.00%	150.00%	180.00%
In-Portfolio Return	0.031		Count	358
Non-Port Return	0.002		Structured	231
Max Stress Loss	-0.154		WAL	3.027

The final extension to 150%, 150%, 180% generates a portfolio that has more than a 20% concentration in RMBS securities, though these limits were held fixed for consistent comparison with liability scenario twelve. With these limits, we can see there are substantial holdings in every structured product asset class, and less than 25% of the portfolio remains in low-risk securities. The final portfolio contains 358 assets (67%), an increase of 274 securities above and beyond the limits defined by the base-plus authority and 231 structured products (61%), 202 more than in the base-plus portfolio. The weighted average life of the resulting portfolio is also roughly 50% higher than is allowed under the proposed regulations (3.03 years), though the in-portfolio structured products appear to have nearly doubled the return of the out of portfolio securities.

Relationship Between Stress Test Performance and Annualized Return

This section is designed to address the appropriateness of the stress tests from 704.d 704.e and 704.f of the proposed rule. That is, the previous section details how tightly the stress tests in the current rule bind, and provide a sense of how much the constraints need to be relaxed in order to produce portfolios

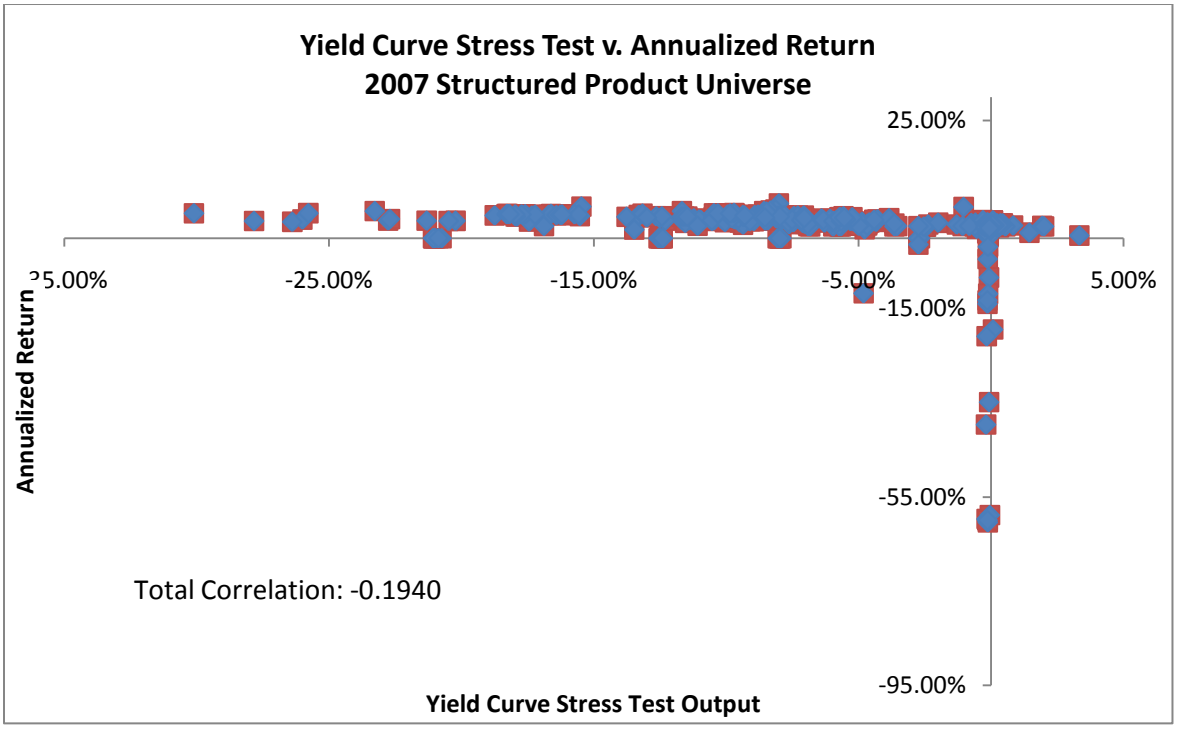
with particular asset allocations; this section is designed to address whether or not an assets performance on a given stress test is related to how those assets performed during the credit crisis.

If the stress tests were effective at filtering out assets with poor credit crisis performance, it would be the case that poor stress test performance (large, negative numbers) is associated with lower returns, while good stress test performance (small, negative numbers, or zero) is associated with higher returns. In other words, the stress test performance should be positively correlated with the actual historical annualized returns through the credit crisis.

Kamakura presents five graphs in this section: the actual stress test performance of all 379 structured products against the annualized return from 03/31/2007 through 12/31/2009 for the yield, spread, and spread + prepayment speed stress tests, as well as two additional macroeconomic factor based stress tests.

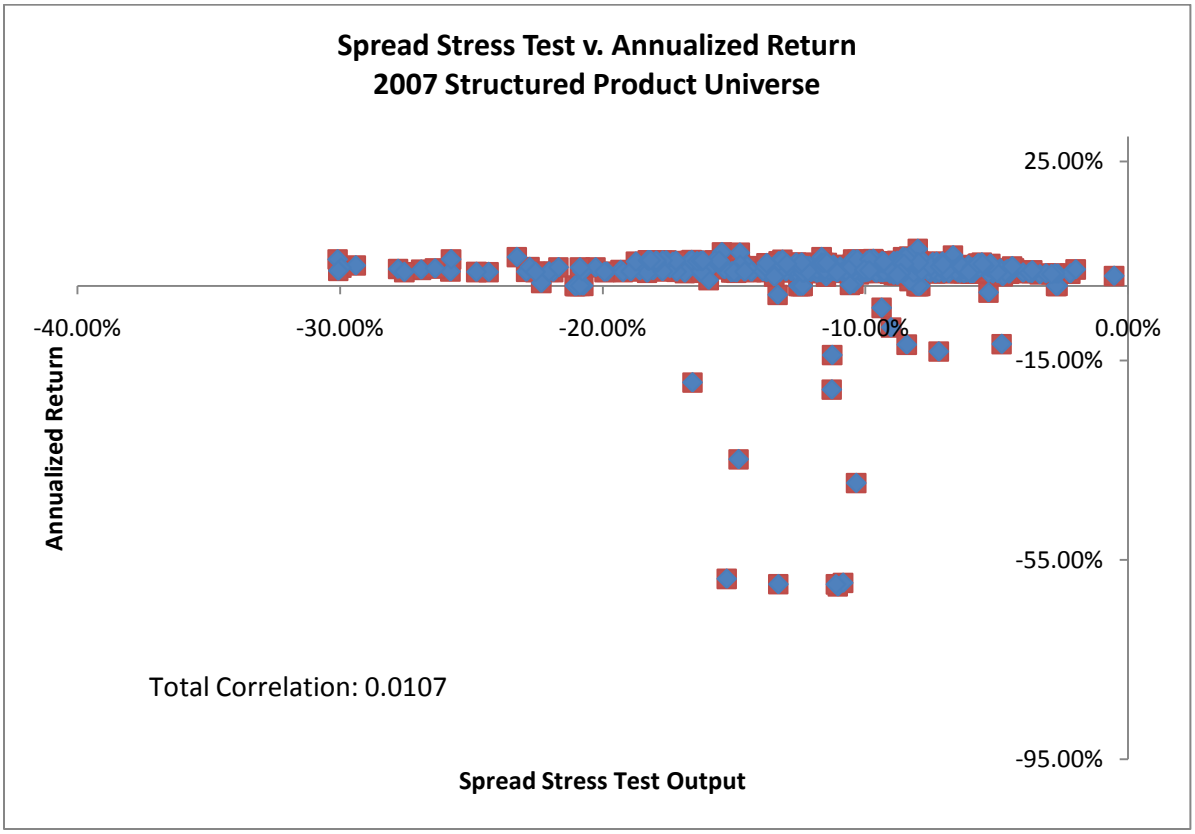
300 bp Yield Curve Stress Test

The following graph depicts the annualized return against the performance on the stress test mandated in 704.d: a 300 bp increase in yields. Recall that an effective filter would manifest as a positive correlation between realized return and stress test performance.



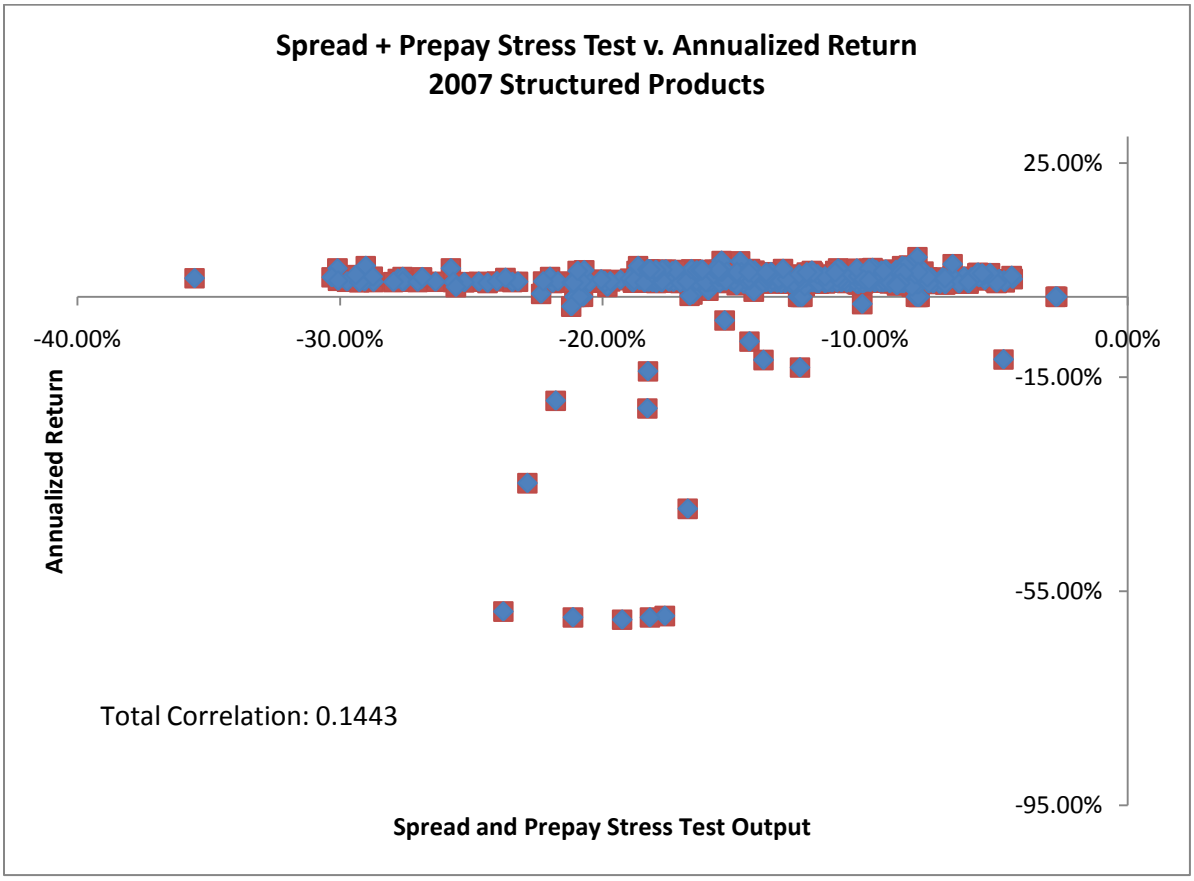
There does not appear to be any such relationship. On the contrary, there is a small, negative correlation between performance on the yield stress tests and annualized return through the credit crisis. When restricted to only assets with negative annualized returns through the crisis, the correlation falls further to -0.307.

300 bp Spread Stress Test



Again, there is essentially no relationship between performance on the spread stress test and on the annualized return of a given CUSIP during the credit crisis. However, when restricted to only securities with negative returns during the crisis, the correlation rises to 0.4406.

300 bp Spread Stress Test + 50% Prepayment Slowdown



There is a small positive correlation between performance on the spread and prepayment speed stress test and annualized return. The positive relationship seems to be driven in large part by a few outliers with large, negative annualized returns. The correlation excluding the 14 securities with annualized returns under -15% falls to 0.0107, suggesting that this relationship is driven by a handful of outliers rather than any underlying model. The correlation amongst securities with negative returns during the crisis rises to 0.505. Kamakura finds this stress test appealing because of its joint nature: negative shocks are quite likely to occur together, and this stress test widens spreads and lowers prepayment speeds at the same time, often greatly compounding losses.[48]

[48] It is also quite likely that spread widening (due to deterioration in credit quality) is associated with prepayment slowdown. Stress testing realistic, correlated, and jointly occurring scenarios is extremely useful and Kamakura applauds the NCUA's efforts in this regard.

2007 Extension Recommendations and Alternative Stress Tests

The standard stress test limits under the proposed rule call for no more than a 15% decline in Net Economic Value with a 300 bp increase in yields, a 15% decline with a 300 bp increase in spreads, and a 25% decline with a 300 bp increase in spreads and a 50% decrease in prepayment speeds. The expanded base-plus authority limits are a 20% decline in Net Economic Value with a 300 bp increase in yields, a 20% decline with a 300 bp increase in spreads, and a 30% decline with a 300 bp increase in spreads and a 50% decrease in prepayment speeds. One of Kamakura's primary conclusions from their analysis of the proposed rule is that these limits are too restrictive[49] and it is extremely difficult for a corporate credit union to generate a portfolio that satisfies these requirements and remains profitable and well diversified. Indeed, under the base-plus authority, corporate credit unions appeared able to purchase from at most 5% of the previously attainable structured product universe in 2007. Such enormous restrictions are likely to generate heavy concentrations of corporate credit union holdings amongst very few securities in the marketplace, which may further increase systemic risks to the industry particularly when new security issuance is allowed to behave endogenously with respect to the concentration of corporate credit unions and their governing regulations.[50] Such an outcome would put the credit unions at great risk if investment banks were likely to camouflage untested and unregulated risks in these securities. Finally, as the securities that perform well enough on these tests are often extremely short-dated products (recall there are structured products with weighted average lives of 0.18 years in the dataset that are insufficiently short to meet these tests), the corporate credit union would have to roll over a tremendous portion of their balance sheet quite often, which increases exposure to reinvestment risk and general market fluctuations. This last point is of great concern, especially since the process to determine if a given security in a given amount can be purchased and held involves so much computation at the whole-portfolio level.

For all of these reasons, the NCUA staff asked Kamakura to further evaluate their stress tests, by investigating 1) how much the stress tests would have to be relaxed until realistic portfolios could be constructed (for example: one with 20% holdings in non-agency RMBS), and 2) whether or not the stress tests would have kept corporate credit unions from purchasing securities that performed poorly during the credit crisis. To this end, Kamakura developed six additional portfolios across two of the twelve liability strategies (six- 50% Overnight and 0.50 Y weighted average life; and twelve- 75% Overnight and 1.00Y weighted average life) with gradually expanded stress test limits and compared the annualized returns of the structured products that were included and excluded from each portfolio. Finally,

[49] There are many other restrictions in the proposed rule that further limit a model corporate credit union's ability to purchase and maintain an investment portfolio, though it is Kamakura's view that the stress test limits are by far the most restrictive.

[50] New issuance may be designed specifically to satisfy the stress tests mandated by the rule and corporate credit unions may be all but obligated to purchase tailored issuance due to the severity of these restrictions.

Kamakura inspected the relationship between annualized return and stress tests performance and compared this to a macro-factor and collateral based stress test.

Kamakura has three main conclusions from their additional investigation:

1) The stress test limits have to be greatly expanded in order for the corporate credit union to be able to purchase a diverse, realistic-looking portfolio. The limits that allow our model corporate credit union to purchase a portfolio of 20% RMBS are ten times larger than the ordinary limits under the rule, and six to eight times larger than even the limits under the expanded base-plus authority. The revised limits that are necessary for the desired portfolio allocation would have to allow a corporate credit union with 96% liability funding to eliminate their Net Economic Value 1.5 times over when yields or spreads increase by 300 bp, and 1.8 times over when spreads widen by 300 bp and prepayment speeds simultaneously decline by 50%.
2) The performance of a given CUSIP on a given stress test seems to be unrelated to how that CUSIP performed during the credit crisis. If the stress tests allowed corporate credit unions to purchase securities that performed well, and rejected securities that performed poorly, there would be a positive relationship between stress test outcome and annualized returns during the crisis. The largest of the correlations between the three stress tests and annualized returns was 0.15, and that was driven almost entirely by 14 observations with very low annualized returns. In short, the stress tests in the proposed regulations do not appear to inform the corporate credit union's ability to mitigate credit losses.
3) The performance of certain real-estate backed securities during the credit crisis does appear to be related to their performance on stress tests with respect to residential real estate prices. The correlation ranges from 0.27 to 0.30 and is more stable. While the outcomes of these stress tests have a non-trivial confidence interval and may be unattractive for that reason, macro factor based stress tests do appear to be related to the performance of CUSIPs during the credit crisis.
4) If the corporate credit union had selected structured products from the a universe similar to Kamakura's construction (based on the weighted average life, ratings, and other restrictions in the proposed rule), and if the corporate credit union followed a maximum diversification approach[51] the corporate credit union would have purchased structured product securities that led to annualized rates of return between 50bp and 500bp with 95% probability (even at greatly expanded stress test limits). This seems to be largely due to initial requirements on ratings, subordination, and average life used in construction of the initial asset universe, as the NEV stress tests do not appear to identify assets that perform poorly relative to assets that perform well. That said, the losses on Treasury and Corporate securities due to extreme rate changes appear to be of roughly the same magnitude as the historical credit losses experienced by corporate credit unions through the crisis.

[51] Diversification in this way would preclude excessively high concentrations in particular sectors or securities types, such as private label residential mortgage backed securities.

Points (1) and (2) above suggest that some alternative or additional monitoring may be desired to limit the systemic risks of the portfolio. In addition, the stress test output is required at the portfolio level, and as such is very computationally intensive for a corporate credit union to calculate this information in order to evaluate every potential security purchase. The costs of these tests seem to far outweigh their benefits. While Kamakura believes that explicit macro factor based stress testing similar to what is mandated by the Supervisory Capital Assessment Program (though incorporating even more macroeconomic factors) is best practice, the sector and subordination limits serve to somewhat mimic macroeconomic factor based testing. The NCUA may also want to consider aggregated limits on particular asset classes based on common shocks as well, such as auto loans and credit cards (vulnerable to unemployment rates), or RMBS and CMBS (vulnerable to real estate prices), and so on.

Given the amount that the stress tests in the proposed rule would have to be relaxed to accommodate non-trivial structured products purchases (150% change in NEV increased from 15% under the normal regulations, and 20% under the base-plus regulations), the complexity of implementing these tests at very high frequency at the portfolio level, and the limited relationship between the stress test performance and the historical performance during the credit crisis, Kamakura recommends that the NCUA pursue alternative testing regimes to determine if assets are fit for purchase. These should include tests for changes in the slope of yield and spread curves, changes in the value of particular macroeconomic factors, such as home prices, equities, commodities, unemployment rates, etc. Such tests are not uncommon: we devote the next several pages to third-party documentation and sources, including alternative regulatory bodies, that recommend or require macro-economic stress tests.

Kamakura Corporation summarized the findings of the Society of Actuaries in an October 9, 2009 blog entry entitled "An Appreciation and Some Suggestions: 'The Financial Crisis and Lessons for Insurers' from the Society of Actuaries." We quote from that survey of the Society of Actuaries findings extensively below:

> In September 2009, the Society of Actuaries released a fine paper entitled "The Financial Crisis and Lessons for Insurers" by a talented team of authors (Robert W. Klein, Gang Ma, Eric R. Ulm, Shaun Wang, Xiangjing Wei, George Zanjani).The full text of this paper is available via this link to the Society of Actuaries website:
>
> http://soa.org/files/pdf/research-2009-fin-crisis.pdf
>
> The paper gets off to a very good start in Kamakura's view by laying out "home prices" as the number one cause of what's been called by various names that the authors list: "subprime crisis, credit crisis, financial crisis." This isn't a credit crisis—the credit problems are "derivatives" from another fundamental cause. It's a "home price crisis" as the authors note on page 4:

Roots and causes of the subprime mortgage crisis:

We argue that the *primary cause* of the crisis lay in the widely held belief that housing prices could not decline significantly on a national basis. This optimistic belief was shared by policymakers, economists, and market participants in general, permeated the models used by rating agencies to assign inflated ratings to securities built from subprime mortgages, and was reinforced, for a time, in market prices through a self-fulfilling prophecy. Additionally, we document five *secondary causes*: 1) a complex and ultimately ineffective regulatory regime in the U.S.; 2) various incentive problems embedded in the originate-to-distribute model for securitization; 3) an over-reliance on credit ratings by market participants and regulators; 4) excessive faith in the Federal Reserve System; and 5) the subsidization of risk-taking in home ownership embedded in various government policies. The catalyst of over-optimism in the housing market combined with these secondary ingredients to produce catastrophic results.

Another important perspective on the credit crisis comes from chief executive officers and board members of the institutions who were most affected. We summarize three key quotations here:

Ann Reese, chairwoman of Merrill's audit committee, said the board had had "numerous discussions'' with management about its investments in the months before the credit crisis. The board initially didn't realize that prices of CDOs were linked to the U.S. housing market, she said.

``The CDO position did not come to the board's attention until late in the process,'' said Reese, a former chief financial officer of ITT Corp. who now is co-executive director of the non-profit Center for Adoption Policy. ``For reasons that we have subsequently explored, there was not a sense that these triple-A securities should be included in the overall exposure to residential real estate.'' [52]

From **"Shareholder's Report on UBS's Write-downs," UBS AG**, April 18, 2008, page 19: "Whilst there were a number of credit spread RFL [risk factor limits] limits in place, there was no RFL [risk factor limit] that specifically addressed certain factors relevant to Subprime exposure, such as delinquency rates or residential real estate price developments."

The next quotation is from Vikram Pandit, CEO of **Citigroup**: "What went wrong is we had tremendous concentration in the sense we put a lot of our money to work against U.S. real estate," Pandit said in an interview on PBS' Charlie Rose show. "We got here by lending money, and putting

[52] Bloomberg.com, April 24, 2008, reporting on the Merrill Lynch shareholders meeting

money to work in the U.S. real estate market, in a size that was probably larger than what we ought to have done on a diversification basis."[53]

The need to address home prices as a risk factor from a regulatory point of view has been addressed by a series of regulators in the United States. We reproduce below an edited version of a November 24, 2009 press release from the National Association of Insurance Commissioners:

Summary Statement of the National Association of Insurance Commissioners
November 24, 2009 Press Release of National Association of Insurance Commissioners (Summary edited by Kamakura Corporation)

NAIC ADVANCES RMBS MODELING PROCESS
Release of Assumptions Draft an Important Step Toward
New Designations for Mortgage Backed Securities

WASHINGTON, D.C. (Nov. 24, 2009) - The National Association of Insurance Commissioners (NAIC) will expose a discussion draft Wednesday, Nov. 25, outlining the economic assumptions regulators will use to evaluate residential mortgage backed securities (RMBS). The document will be made available on the Valuation of Securities Task Force page of the NAIC Web site.

"This is a critical step in developing the new designation methodology," said Roger Sevigny, NAIC President and New Hampshire Insurance Commissioner. "We are acting carefully to make sure insurers hold adequate capital to meet their obligations to consumers, while moving quickly and openly to address an issue at the core of the financial meltdown."

Specifically, it will discuss the use of home price appreciation (HPA) and projected interest rates as key variables. The NAIC will evaluate each security using a set of HPA projections representing moderate (or base), aggressive and conservative expectations.

The task force will discuss the draft during a conference call (open to the public) on November 30, at 11:00 a.m. EST. In addition, an overview of the proposal and process is scheduled for December 7, during the NAIC Winter National Meeting in San Francisco (see NAIC Meetings Web page for details).

The new model will calculate expected carrying value for each RMBS security held by insurers. Insurers will be able to map these values to the appropriate NAIC designation and accompanying RBC requirements.

Regulators plan to finalize designations and RBC price ranges by year-end. Companies will be able to report their 2009 annual statement results due March 1, 2010, using the appropriate, new designations.

[53] Quote from Citigroup Inc. Chief Executive Vikram Pandit, November 25, 2008, Reuters.com

In the United States regulatory environment, home prices were first addressed as a driver of correlated default among U.S. financial institutions in the Federal Deposit Insurance Corporation Loss Distribution Model published by Jarrow et al on December 10, 2003. Table 2 in that report explicitly shows home prices as one of three key drivers of correlated default among U.S. banks:

Table 2
Descriptive Statistics
Correlation Matrix of Data Used in Projection

	Statistics	House Price Indices	Bank Stock Price Indices
Interest Rate Factors	Mean	0.025	-0.063
	Median	0.036	-0.061
	Std. Dev.	0.106	0.101
House Price Indices	Mean	0.281	0.051
	Median	0.330	0.027
	Std. Dev.	0.294	0.133
Bank Stock Price Indices	Mean		0.667
	Median		0.678
	Std Dev.		0.100

For a copy of the full text of the FDIC Loss Distribution Model, please contact Kamakura Corporation or use this link to request a copy directly from the Federal Deposit Insurance Corporation:

http://www.fdic.gov/bank/analytical/fyi/2003/121003fyi.html

Similar macro-factor risk management problems resulted from the crash of the bubble economy in Japan (1989) or the "Tequila Crisis" in Mexico in 1994-1995. In the case of Japan, stock indices dropped more than 80%, residential real estate prices in the major cities dropped by more than 60%, and commercial real estate prices dropped by a similar amount. In Mexico in the Tequila crisis, more than 50% of the mortgage loans defaulted when borrowers could not pay floating rate mortgage payments when interest rates approached 100%. The need to use a comprehensive array of macro-economic factors to measure risk in an integrated way is described in *Advanced Financial Risk Management*[54] (2004, John Wiley & Sons), which is incorporated in this report by reference.

With the home price collapse driving a fall in mortgage back securities and collateralized debt obligations prices, U.S. bank regulators collaborated on a formal stress testing program with respect to three key macro factors: home prices, the percentage growth in real gross domestic product, and the civilian unemployment rate.

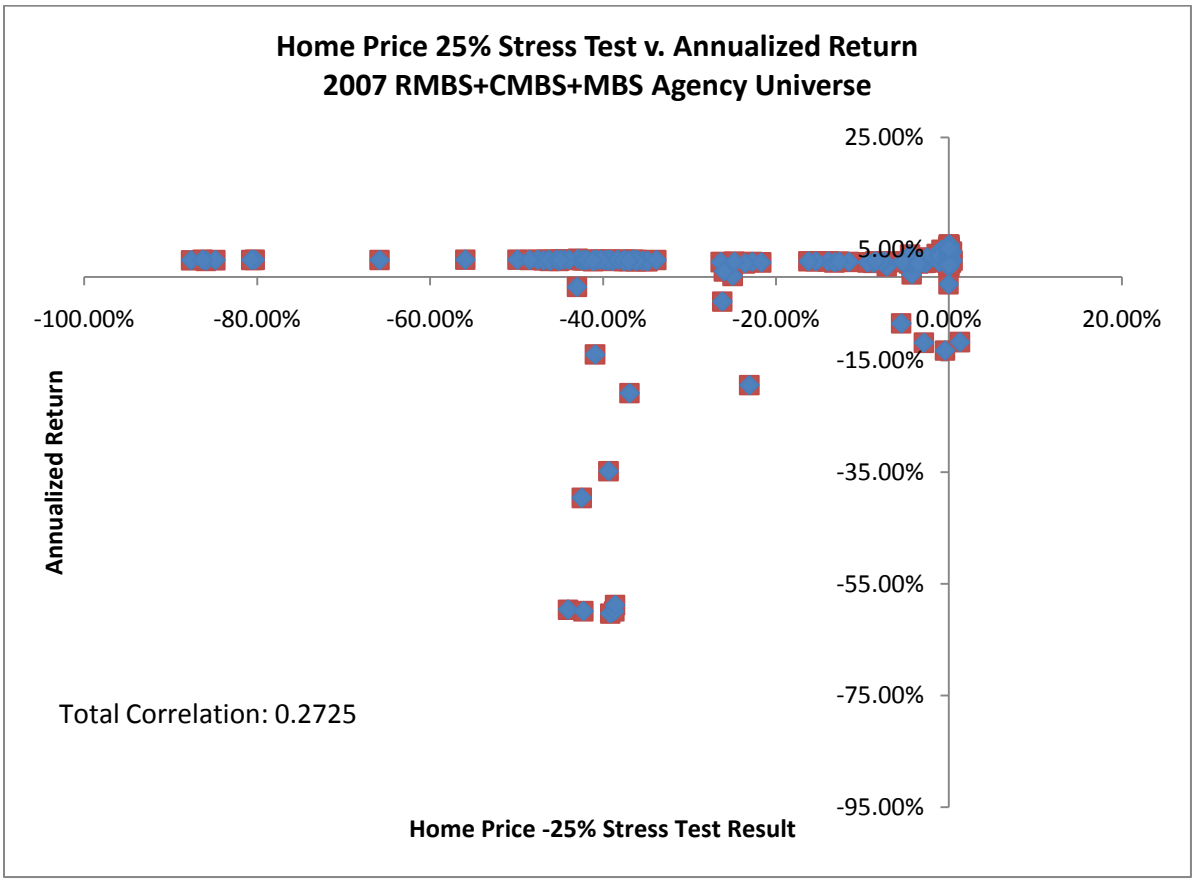
Correlation Between Sample Home Price Stress Tests and Annualized Return on RMBS

[54] Donald R. van Deventer, a co-author of this report, is an author of *Advanced Financial Risk Management* along with co-authors Kenji Imai and Mark Mesler of Kamakura Corporation.

Kamakura recognizes that macro-factor based stress tests are not ideal for regulatory agencies as they are not externally verifiable (as say a yield stress test is verified by a modified duration calculation), and instead depend on default, recovery and prepayment models relating to the underlying macro economic factors. However, such tests based on the value of the underlying collateral have several nice properties in terms of identifying securities that are at risk.

For this exercise, the structured product securities used Kamakura's own KRIS suite of structured product default probability models. For real estate backed securities, decreases in real estate prices (home prices or commercial real estate prices) cause the default rates on those asset classes to rise, which will (in general) decrease the cash flows to the CUSIPs in this asset class. It is also quite likely that decreases in real estate prices will be associated with decreases in recovery rates, further compounding the decrease in cash flows to the related CUSIP. In short, while the outcome of macro factor based stress tests has some margin for error, they are more clearly related to the performance of and the risks faced by the underlying securities.

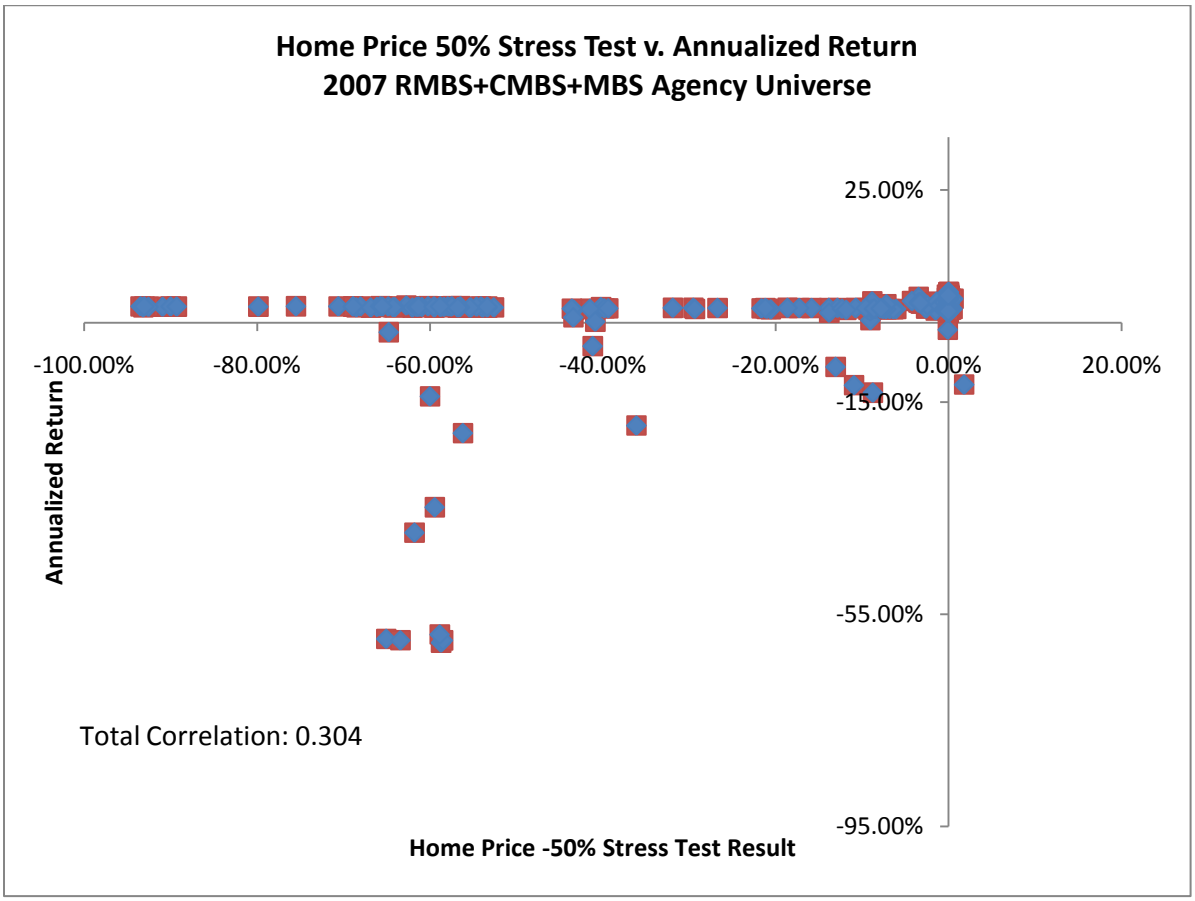
Below, we depict the relationship between the annualized return for real estate based CUSIPs (RMBS, CMBS, and Agency MBS) against annualized returns through the credit crisis.



While not perfect (recall many of these CUSIPs are very senior tranches that are unlikely to be affected by default rates), there is a large, positive correlation between the performance on this stress test and the performance of the securities through the crisis. Moreover, this correlation appears to be

systematic: excluding the same low-return securities as before, the correlation remains positive at 0.134. A stress test with respect to a 25% decline in home prices appears to have some ability to differentiate between securities that performed better or worse during the credit crisis. Amongst securities with negative returns during the crisis, the correlation rises to 0.624.

This relationship is strengthened further when the magnitude of the stress is increased. Below, we depict the outcome of 50% decline in home prices.



The relationship begins to be quite visible with the naked eye at this point, and remains positive as before: excluding the CUSIPs with annual returns less than -15% yields a correlation of 0.1705. These macro-economic factor tests would have had a greater chance to eliminate securities that performed poorly during the crisis, and could have been set at a flexible enough level to allow many more securities within each asset class to be purchased. Amongst securities with negative returns over the crisis, the correlation rises to 0.625.

Kamakura Impact Analysis- Part IV: 2009 Simulations

2009 Portfolios

The following section describes the portfolio of securities purchased in 2009. Recall that more securities are eligible for inclusion in 2009 due to the relative lack of issuance of new structured products in 2007-2009. This decreases the weighted average life of the securities available for purchase, which in turn increases the performance of an individual security on a given stress test.

Please note that with the asset class disclosure of the balance sheet and income statement detail, it is possible to calculate the performance of alternative portfolios constructed by:

1) Calculating the implied average return for a given asset class based on the income statement forecast and balance sheet forecast

2) Generating the desired asset class balances in a balance sheet

3) Applying the percentage returns in (1) to the balances in (2).

For concreteness, consider the following sheet:

Balance Sheet

Asset Class	1/31/2010
Non-agency RMBS	2,500,000,000
CMBS	2,500,000,000
US Treasuries	5,000,000,000
Total	10,000,000,000

Desired Balance Sheet

Asset Class	1/31/2010
Non-agency RMBS	7,500,000,000.00
CMBS	1,000,000,000.00
US Treasuries	1,500,000,000.00
Total	10,000,000,000

Income Statement

Asset Class	1/31/2010
Non-agency RMBS	10,416,666.67
CMBS	12,500,000.00
US Treasuries	6,250,000.00

Implied Income Statement

Asset Class	1/31/2010	Formula
Non-agency RMBS	31,250,000.00	=7.5 B * 0.4167%
CMBS	5,000,000.00	=1 B * 0.500%
US Treasuries	1,875,000.00	=1.5 B * 0.125%

Implied Returns from Income Statement

Asset Class	1/31/2010	Formula
Non-agency RMBS	0.4167%	=10.416/2500
CMBS	0.5000%	=12.500/2500
US Treasuries	0.1250%	=6.250/5000

Liability Strategy 1

Sector	Port Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	20.22%	0.0000	0.5348	18
RMBS	3.37%	0.0337	0.4529	3
MBS Agency	4.49%	0.0000	0.4040	4
CMBS	1.12%	0.0000	0.9351	1
Credit Card	10.11%	0.0112	0.5769	9
Student Loan Private	5.62%	0.0000	0.3895	5
Student Loan FFELP	5.62%	0.0000	0.6416	5
Treasury Security	40.45%	0.0000	0.4558	36
Corporate	3.37%	0.0000	0.9397	3
ABS Other	5.62%	0.0000	0.5884	5

1	Stress Test Outcomes		
Test	YC300	SPR300	SPR300+
Change NEV	-8.23%	-19.06%	-22.27%
NEV Constraint	20.00%	20.00%	30.00%

		Count	89
		Structured	50
Max Stress Loss	-0.033	WAL	0.517

The first portfolio contains 40% Treasury securities, roughly 33 percentage points fewer than liability scenario 1 in 2007. Note that the stress loss threshold remains essentially identical at 3.3%. Again, we see that the spread test appears to be the most binding. Note that we also see a handful of subordinated securities in the portfolio, even at this stage.

Liability Strategy 2

Sector	Port Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	15.57%	0.0000	0.5429	19
RMBS	8.20%	0.0328	1.3745	10
MBS Agency	5.74%	0.0000	0.7312	7
CMBS	1.64%	0.0000	1.1159	2
Credit Card	9.84%	0.0082	0.7758	12
Student Loan Private	5.74%	0.0000	0.6409	7
Student Loan FFELP	5.74%	0.0000	0.8647	7
Treasury Security	38.52%	0.0000	0.7244	47
Corporate	2.46%	0.0000	0.9397	3
ABS Other	6.56%	0.0000	0.7903	8

2	Stress Test Outcomes		
Test	YC300	SPR300	SPR300+
Change NEV	2.01%	-18.34%	-23.16%
NEV Constraint	20.00%	20.00%	30.00%

		Count	122
		Structured	72
Max Stress Loss	-0.054	WAL	0.774

The weighted average life increases by roughly three months, and the number of structured products increases by almost 50%. Treasury holdings continue to decline, and subordinated RMBS holdings are at the limit in the proposed regulations (they remain so essentially throughout the liability strategies).

Liability Strategy 3

Sector	Port Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	12.18%	0.0000	0.5429	19
RMBS	10.90%	0.0321	1.6775	17
MBS Agency	12.18%	0.0000	1.2818	19
CMBS	1.28%	0.0000	1.1159	2
Credit Card	8.33%	0.0064	0.8857	13
Student Loan Private	4.49%	0.0000	0.6409	7
Student Loan FFELP	5.13%	0.0000	1.0029	8
Treasury Security	37.82%	0.0000	1.0372	59
Corporate	1.92%	0.0000	0.9397	3
ABS Other	5.77%	0.0000	0.9447	9

3	Stress Test Outcomes		
Test	YC300	SPR300	SPR300+
Change NEV	6.05%	-19.93%	-29.36%
NEV Constraint	20.00%	20.00%	30.00%

		Count	156
		Structured	94
Max Stress Loss	-0.074	WAL	1.038

Both the spread and spread + prepayment tests bind with liability strategy 3, and the structured products holdings represent two-thirds of the total portfolio.

Liability Strategy 4

Sector	Port Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	10.61%	0.0000	0.5429	19
RMBS	11.17%	0.0391	1.8530	20
MBS Agency	12.85%	0.0000	1.4824	23
CMBS	1.12%	0.0000	1.1159	2
Credit Card	8.38%	0.0056	1.1863	15
Student Loan Private	3.91%	0.0000	0.6409	7
Student Loan FFELP	4.47%	0.0000	1.0029	8
Treasury Security	38.55%	0.0000	1.3089	69
Corporate	3.35%	0.0000	1.9457	6
ABS Other	5.59%	0.0000	1.0265	10

4		Stress Test Outcomes	
Test	YC300	SPR300	SPR300+
Change NEV	13.84%	-19.82%	-29.12%
NEV Constraint	20.00%	20.00%	30.00%
		Count	179
		Structured	104
Max Stress Loss	-0.087	WAL	1.264

Here the prepayment and spread test is the binding constraint, the weighted average life of the assets has increased to well over one year, the Treasury holdings are under 40%, and the portfolio contains almost one hundred different structured products (36% of the structured products available for purchase out of the 2009 universe).

Liability Strategy 5

Sector	Port Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	20.22%	0.0000	0.5348	18
RMBS	3.37%	0.0337	0.4529	3
MBS Agency	4.49%	0.0000	0.4040	4
CMBS	1.12%	0.0000	0.9351	1
Credit Card	10.11%	0.0112	0.5769	9
Student Loan Private	5.62%	0.0000	0.3895	5
Student Loan FFELP	5.62%	0.0000	0.6416	5
Treasury Security	40.45%	0.0000	0.4558	36
Corporate	3.37%	0.0000	0.9397	3
ABS Other	5.62%	0.0000	0.5884	5

5	Stress Test Outcomes		
Test	YC300	SPR300	SPR300+
Change NEV	-8.36%	-19.20%	-22.40%
NEV Constraint	20.00%	20.00%	30.00%

		Count	89
		Structured	50
Max Stress Loss	-0.033	WAL	0.517

Once again, strategy five looks similar to strategy one as they share the same weighted average lives.

Liability Strategy 6

Sector	Port Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	15.57%	0.0000	0.5429	19
RMBS	8.20%	0.0328	1.4178	10
MBS Agency	5.74%	0.0000	0.7312	7
CMBS	1.64%	0.0000	1.1159	2
Credit Card	9.84%	0.0082	0.7758	12
Student Loan Private	5.74%	0.0000	0.6409	7
Student Loan FFELP	5.74%	0.0000	0.8647	7
Treasury Security	38.52%	0.0000	0.7244	47
Corporate	2.46%	0.0000	0.9397	3
ABS Other	6.56%	0.0000	0.7903	8

6		Stress Test Outcomes	
Test	YC300	SPR300	SPR300+
Change NEV	0.81%	-19.62%	-24.45%
NEV Constraint	20.00%	20.00%	30.00%
		Count	122
		Structured	72
Max Stress Loss	-0.054	WAL	0.778

Again, both the spread and spread and prepayment stress tests seem to be binding for liability strategy six. The portfolio remains at roughly 40% US Treasuries. Somewhat surprisingly, Auto Loans represent a large portion of the structured products contained in the portfolio, while they represent a relatively small portion of the 2009 universe (certainly much smaller than RMBS).

Liability Strategy 7

Sector	Port Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	12.93%	0.0000	0.5429	19
RMBS	10.88%	0.0340	1.6438	16
MBS Agency	8.84%	0.0000	1.0802	13
CMBS	1.36%	0.0000	1.1159	2
Credit Card	8.84%	0.0068	0.8857	13
Student Loan Private	4.76%	0.0000	0.6409	7
Student Loan FFELP	5.44%	0.0000	1.0029	8
Treasury Security	38.78%	0.0000	0.9823	57
Corporate	2.04%	0.0000	0.9397	3
ABS Other	6.12%	0.0000	0.9447	9

7	Stress Test Outcomes		
Test	YC300	SPR300	SPR300+
Change NEV	7.55%	-18.36%	-25.38%
NEV Constraint	20.00%	20.00%	30.00%

		Count	147
		Structured	87
Max Stress Loss	-0.070	WAL	0.981

Liability Strategy 8

Sector	Port Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	10.92%	0.0000	0.5429	19
RMBS	10.34%	0.0345	1.7679	18
MBS Agency	13.22%	0.0000	1.4824	23
CMBS	1.15%	0.0000	1.1159	2
Credit Card	7.47%	0.0057	0.8857	13
Student Loan Private	4.02%	0.0000	0.6409	7
Student Loan FFELP	4.60%	0.0000	1.0029	8
Treasury Security	39.08%	0.0000	1.2816	68
Corporate	3.45%	0.0000	1.9457	6
ABS Other	5.75%	0.0000	1.0265	10

8		Stress Test Outcomes		
Test		YC300	SPR300	SPR300+
Change NEV		10.70%	-18.96%	-28.75%
NEV Constraint		20.00%	20.00%	30.00%
			Count	174
			Structured	100
Max Stress Loss	-0.085		WAL	1.216

Liability Strategy 9

Sector	Port Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	18.82%	0.0000	0.4940	16
RMBS	2.35%	0.0235	0.3132	2
MBS Agency	4.71%	0.0000	0.4040	4
CMBS	1.18%	0.0000	0.9351	1
Credit Card	10.59%	0.0118	0.5769	9
Student Loan Private	5.88%	0.0000	0.3895	5
Student Loan FFELP	5.88%	0.0000	0.6416	5
Treasury Security	41.18%	0.0000	0.4378	35
Corporate	3.53%	0.0000	0.9397	3
ABS Other	5.88%	0.0000	0.5884	5

9	Stress Test Outcomes		
Test	YC300	SPR300	SPR300+
Change NEV	-7.75%	-18.87%	-21.78%
NEV Constraint	20.00%	20.00%	30.00%

		Count	85
		Structured	47
Max Stress Loss	-0.031	WAL	0.500

Liability Strategy 10

Sector	Port Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	16.38%	0.0000	0.5429	19
RMBS	7.76%	0.0345	1.2356	9
MBS Agency	5.17%	0.0000	0.6209	6
CMBS	1.72%	0.0000	1.1159	2
Credit Card	10.34%	0.0086	0.7758	12
Student Loan Private	6.03%	0.0000	0.6409	7
Student Loan FFELP	5.17%	0.0000	0.6995	6
Treasury Security	37.93%	0.0000	0.6479	44
Corporate	2.59%	0.0000	0.9397	3
ABS Other	6.90%	0.0000	0.7903	8

10		Stress Test Outcomes	
Test	YC300	SPR300	SPR300+
Change NEV	1.51%	-18.33%	-23.62%
NEV Constraint	20.00%	20.00%	30.00%
		Count	116
		Structured	69
Max Stress Loss	-0.052	WAL	0.716

Liability Strategy 11

Sector	Port Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	13.38%	0.0000	0.5429	19
RMBS	10.56%	0.0352	1.5886	15
MBS Agency	8.45%	0.0000	0.9989	12
CMBS	1.41%	0.0000	1.1159	2
Credit Card	9.15%	0.0070	0.8857	13
Student Loan Private	4.93%	0.0000	0.6409	7
Student Loan FFELP	5.63%	0.0000	1.0029	8
Treasury Security	38.03%	0.0000	0.9012	54
Corporate	2.11%	0.0000	0.9397	3
ABS Other	6.34%	0.0000	0.9447	9

11	Stress Test Outcomes		
Test	YC300	SPR300	SPR300+
Change NEV	5.14%	-18.63%	-25.51%
NEV Constraint	20.00%	20.00%	30.00%

		Count	142
		Structured	85
Max Stress Loss	-0.067	WAL	0.932

Liability Strategy 12

Sector	Port Concentration	Subordinated Concentration within Sector	Sector Weighted Average Life	Security Count
Auto Loan	11.38%	0.0000	0.5429	19
RMBS	10.78%	0.0359	1.6782	18
MBS Agency	12.57%	0.0000	1.3565	21
CMBS	1.20%	0.0000	1.1159	2
Credit Card	7.78%	0.0060	0.8857	13
Student Loan Private	4.19%	0.0000	0.6409	7
Student Loan FFELP	4.79%	0.0000	1.0029	8
Treasury Security	39.52%	0.0000	1.2264	66
Corporate	1.80%	0.0000	0.9397	3
ABS Other	5.99%	0.0000	1.0265	10

12	Stress Test Outcomes		
Test	YC300	SPR300	SPR300+
Change NEV	7.98%	-18.28%	-27.99%
NEV Constraint	20.00%	20.00%	30.00%

		Count	167
		Structured	98
Max Stress Loss	-0.082	WAL	1.133

Sample Reports: Liability Strategy 12

Financial Ratio Report

Kamakura RiskPortal - Convert Report Table to Excel

Report Name: Financial Ratio Summary(FRA001)
Table Name: FinancialRatioAnalysisTable

Report Environment Properties

Property	Value
Report Name	Financial Ratio Summary(FRA001)
Excel Spreadsheet Generated Date:	6/17/2010
Table Name	FinancialRatioAnalysisTable
View Name	SummaryView
User Name	Sean Klein
Shock	Base
Database	MCCU
KRM Run Date:	12/31/2009
Scenario	[C712] 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L12

Objective	1/31/2010 31 Days	2/28/2010 28 Days	3/31/2010 30 Days	4/30/2010 30 Days
FINANCIAL ACCOUNTING BASIS				
Total Period End Assets (Financial Accounting Basis)	10,003,328,719.50	10,018,930,527.04	10,034,057,452.27	10,051,160,466.38
Average Assets (Financial Accounting Basis)	6,947,610,906.11	7,013,696,323.55	6,921,757,974.30	7,110,905,845.24
Total Period End Liabilities (Financial Accounting Basis)	(9,592,320,257.75)	(9,585,480,251.03)	(9,578,186,569.81)	(9,571,415,430.31)
Net Economic Value (Financial Accounting Basis)	411,008,461.75	433,450,276.01	455,870,882.46	479,745,036.07
Basel II Risk-weighted Assets (Financial Accounting Basis)	1,070,971,065.90	999,506,371.82	881,876,671.29	817,557,688.53
INCOME AND EARNINGS				
Cumulative Retained Earnings	2,804,600.01	32,289,912.02	61,821,219.65	91,150,981.39
Interest Income	32,428,583.90	29,468,696.16	32,362,268.26	26,722,698.38
Interest Expense	(4,191,373.94)	(4,159,663.67)	(4,347,863.09)	(4,354,526.63)
Net Interest Income	28,237,209.96	25,309,032.49	28,014,405.16	22,368,171.74
Net Income	2,804,600.01	29,485,312.01	29,531,307.63	29,329,761.75
MARKET VALUE BASIS				
Total Period End Assets (Market Value Basis)	9,996,010,407.87	10,009,443,239.42	10,028,824,765.44	10,050,732,319.36
Total Period End Liabilities (Market Value Basis)	(9,593,603,013.33)	(9,586,548,780.83)	(9,579,331,282.03)	(9,572,319,849.24)
Net Economic Value (Market Value Basis)	402,407,394.54	422,894,458.59	449,493,483.41	478,412,470.12
FINANCIAL RATIOS				
Cumulative Return on Assets (Annualized)	0.00	0.04	0.04	0.04
Return on Average Assets (Annualized)	0.00	0.05	0.05	0.05
Return on Equity (Annualized)	0.08	0.89	0.79	0.74
Leverage Ratio	24.34	23.11	22.01	20.95
Capital Ratio	0.04	0.04	0.05	0.05
Basel II Tier 1 Capital Ratio	0.38	0.43	0.52	0.59
Net Economic Value (MVB) / Assets (FAB)	0.04	0.04	0.04	0.05
Net Economic Value (MVB) / Average Assets (FAB)	0.06	0.06	0.06	0.07
Net Interest Margin (FAB) / Average Assets (FAB)	0.00	0.00	0.00	0.00
Cumulative Retained Earnings (FAB) / Average Assets (FAB)	0.00	0.00	0.01	0.01

Income Statement Forecast

Kamakura RiskPortal - Convert Report Table to Excel

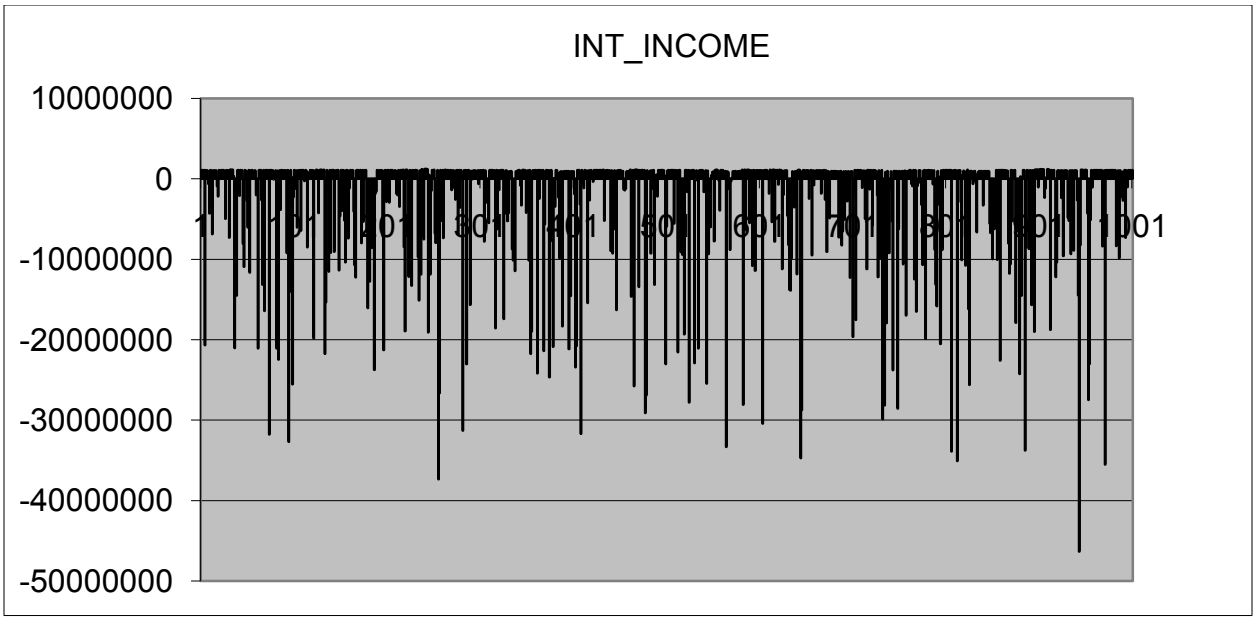
Report Name: Income Statement Forecast(EAR003.NCUA)
Table Name: IncomeStatementTree

Report Environment Properties

Property	Value
Report Name	Income Statement Forecast(EAR003.NCUA)
Excel Spreadsheet Gen	6/17/2010
Table Name	IncomeStatementTree
View Name	defaultView
User Name	Sean Klein
Shock	Base
Database	MCCU
KRM Run Date:	12/31/2009
Scenario	[C712] 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L12
Chart of Accounts	None

	1/31/10	2/28/10	3/31/10	4/30/10
Income	28,237,209.96	25,309,032.49	28,014,405.18	22,368,171.75
Interest Margin	28,237,209.96	25,309,032.49	28,014,405.18	22,368,171.75
Interest Income	32,428,583.90	29,468,696.16	32,362,268.27	26,722,698.38
ABS Other	751,166.67	764,155.18	818,173.77	747,954.77
Auto Loan	1,188,276.71	(2,690,904.79)	(1,632,219.34)	(619,732.05)
CMBS	533,202.42	408,158.07	423,132.80	439,948.78
Credit Card	518,747.17	457,095.40	461,973.34	404,796.36
CVX	227,944.20	200,460.99	209,969.49	189,090.59
DNA	23,047.17	20,816.35	23,047.17	22,303.14
JNJ	27,367.30	24,718.87	27,367.30	26,484.91
MBS Agency	3,085,044.65	2,656,262.26	3,088,213.84	2,577,783.02
RMBS PA	2,792,360.38	2,378,294.64	2,809,523.57	2,367,294.91
RMBS SA	19,236,628.08	22,009,487.04	22,585,636.47	17,543,865.13
Student Loan FFELP	218,300.58	156,722.28	525,799.01	465,195.53
Student Loan Private	1,426,728.76	902,911.28	608,325.59	193,498.96
Treasury Security	2,399,769.81	2,180,518.59	2,413,325.26	2,364,214.33
Interest Expense	(4,191,373.94)	(4,159,663.67)	(4,347,863.09)	(4,354,526.63)
Deposit 10Y	(3,619,079.79)	(3,562,964.23)	(3,725,184.15)	(3,655,120.52)
Deposit 1D	(28,152.00)	(42,120.00)	(46,080.00)	(84,456.00)
Deposit 1M	(8,296.88)	(8,180.72)	(11,055.95)	(17,057.93)
Deposit 1Y	(18,327.28)	(18,360.44)	(22,620.60)	(24,356.72)
Deposit 2M	(8,318.64)	(8,674.32)	(5,813.76)	(20,760.52)
Deposit 2Y	(77,307.12)	(82,261.57)	(81,874.22)	(87,555.46)
Deposit 3M	(9,029.12)	(9,520.16)	(7,829.28)	(13,101.44)
Deposit 3Y	(41,911.69)	(43,444.28)	(46,513.44)	(47,740.91)
Deposit 5Y	(64,565.06)	(64,970.84)	(69,139.45)	(68,601.70)
Deposit 6M	(12,102.55)	(12,914.35)	(12,979.32)	(15,978.75)
Deposit 7Y	(288,842.74)	(290,354.95)	(302,082.63)	(301,051.22)
Deposit 9M	(15,441.07)	(15,897.81)	(16,690.29)	(18,745.46)

Note the negative income in the Auto Loans category in early 2010. Recall that the Net Interest Income calculation involves cash flow from interest and principal, changes in accrued interest, and changes in amortized cost. Large changes in the amortized cost of an asset class can lead to negative net interest income figures. In this simulation, roughly one third of the scenarios in the second accounting period generate sufficiently large changes in amortized cost (due to changes in the default rate) to overwhelm the scheduled interest payments. Below we reproduce the values for interest income for auto loan securities across all 1000 scenarios during accounting period 2 (ending 03/31/2010):



The negative interest income figure is driven by roughly 30-34% of the scenarios with large changes in amortized cost of the security. These scenarios represent the roughly 1/3 chance that the economy failed to recover in early 2010—GDP declines, unemployment rates rise, home prices continue to fall, and auto loan default rates rise.

Balance Sheet Forecast

Kamakura RiskPortal - Convert Report Table to Excel

Report Name: Balance Sheet Forecast(EAR004.NCUA)
Table Name: BalanceSheetTree

Report Environment Properties

Property	Value
Report Name	Balance Sheet Forecast(EAR004.NCUA)
Excel Spreadsheet Gen	6/17/2010
Table Name	BalanceSheetTree
View Name	treeView
User Name	Sean Klein
Shock	Base
Database	MCCU
KRM Run Date:	12/31/2009
Scenario	[C712] 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L12
Chart of Accounts	None

			12/31/09	1/31/10	2/28/10	3/31/10	4/30/10
Assets			10,000,000,000.01	10,003,328,719.51	10,018,930,527.05	10,034,057,452.29	10,051,160,466.40
	ABS Other		566,037,735.85	524,127,295.81	495,239,692.24	464,840,467.86	437,839,831.62
	Auto Loan		1,069,182,389.94	894,761,237.89	746,163,430.14	624,421,352.14	534,929,418.41
	CMBS		125,786,163.52	120,611,330.91	119,713,826.87	118,398,145.99	117,216,634.43
	CVX		62,893,081.76	54,270,805.21	50,821,607.46	48,281,547.93	49,576,378.78
	Credit Card		628,930,817.61	565,920,261.45	565,768,631.97	502,582,082.85	502,407,169.23
	DNA		62,893,081.76	62,894,904.40	62,895,902.94	62,890,876.60	62,885,575.73
	JNJ		62,893,081.76	62,938,843.00	62,943,108.64	62,944,083.16	62,949,218.12
	MBS Agency		1,320,754,716.98	1,251,683,898.97	1,183,947,235.25	1,116,589,347.79	1,050,794,552.11
	RMBS PA		314,465,408.81	299,413,601.51	285,873,811.94	272,745,081.23	259,325,611.65
	RMBS SA		691,823,899.37	648,412,725.90	595,922,596.49	550,464,960.80	501,580,579.20
	Student Loan FFELP		503,144,654.09	471,630,027.77	460,150,640.73	397,125,726.59	326,181,374.59
	Student Loan Private		440,251,572.33	398,320,597.07	369,080,962.08	190,522,034.19	186,140,226.36
	Treasury Security		4,150,943,396.23	4,648,343,189.62	5,020,409,080.30	5,622,251,745.16	5,959,333,896.17
Liability and Equity			9,600,000,096.00	9,592,320,257.75	9,585,480,251.03	9,578,186,569.81	9,571,415,430.31
	Liability		9,600,000,096.00	9,592,320,257.75	9,585,480,251.03	9,578,186,569.81	9,571,415,430.31
		Deposit 10'	1,720,878,720.00	1,714,334,833.30	1,708,475,201.53	1,702,194,313.29	1,696,276,670.87
		Deposit 1D	7,200,000,000.00	7,200,000,504.00	7,200,014,976.00	7,200,032,563.30	7,200,087,658.13
		Deposit 1M	48,000,480.00	48,000,419.04	48,000,586.56	48,003,623.30	48,012,434.82
		Deposit 1Y	48,000,000.00	47,955,876.60	47,920,041.92	47,887,826.95	47,865,850.60
		Deposit 2M	48,000,000.00	47,999,378.40	47,999,370.72	48,000,619.44	48,008,081.26
		Deposit 2Y	126,015,360.00	125,813,826.21	125,640,361.71	125,467,960.20	125,318,164.14
		Deposit 3M	48000000	47997608.8	47996331.52	47997654.88	48001846.38
		Deposit 3Y	48002784	47877536.92	47768090.45	47653734.52	47551275.12
		Deposit 5Y	48000000	47845198.8	47706455.51	47556848.26	47418072.79
		Deposit 6M	48002496	47982430.56	47969292.91	47961461.14	47960820.25
		Deposit 7Y	169100256	168547774.8	168050685.7	167511885.1	167008008
		Deposit 9M	48000000	47964870.3	47938856.54	47918079.47	47906547.99

Sample Distributions

Net Income

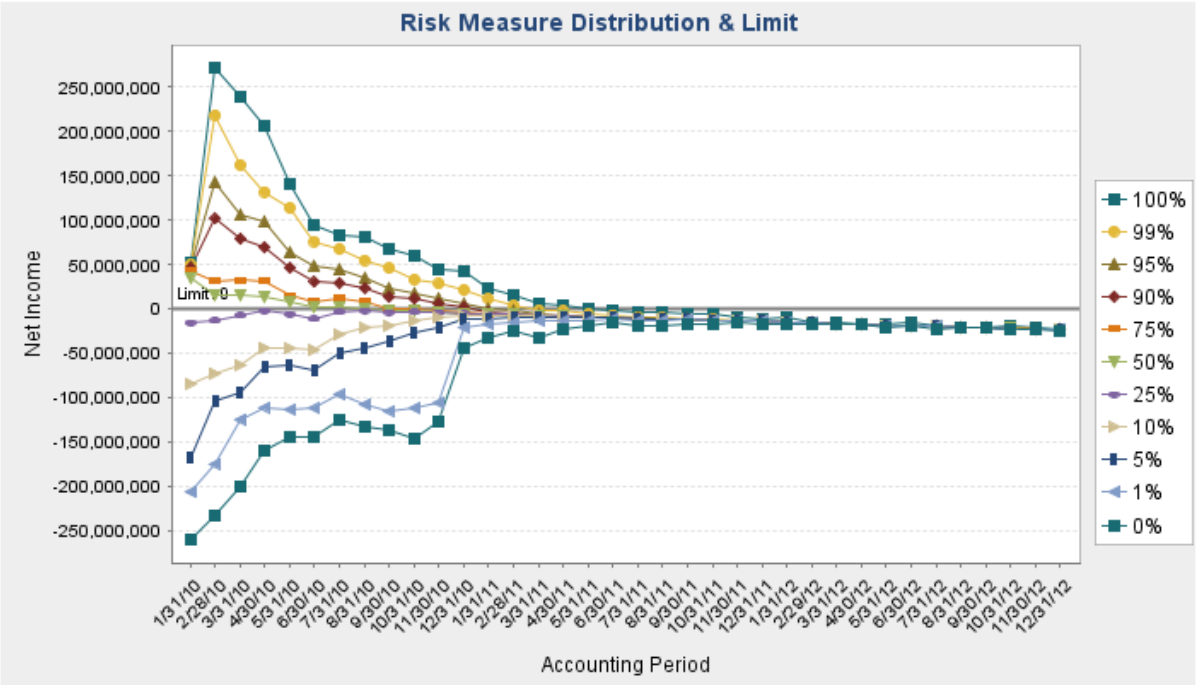
Risk Limit Adherence - Monte Carlo Analysis

KRM Run: 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L1 (values in USD)

Risk Limit NetInc

Set Name	NCUA Limits
Name	NetInc
Objective	Net Income
Form	Absolute Level
Driver	All Risks
Formula	>=
Limit	0

Table | Graph



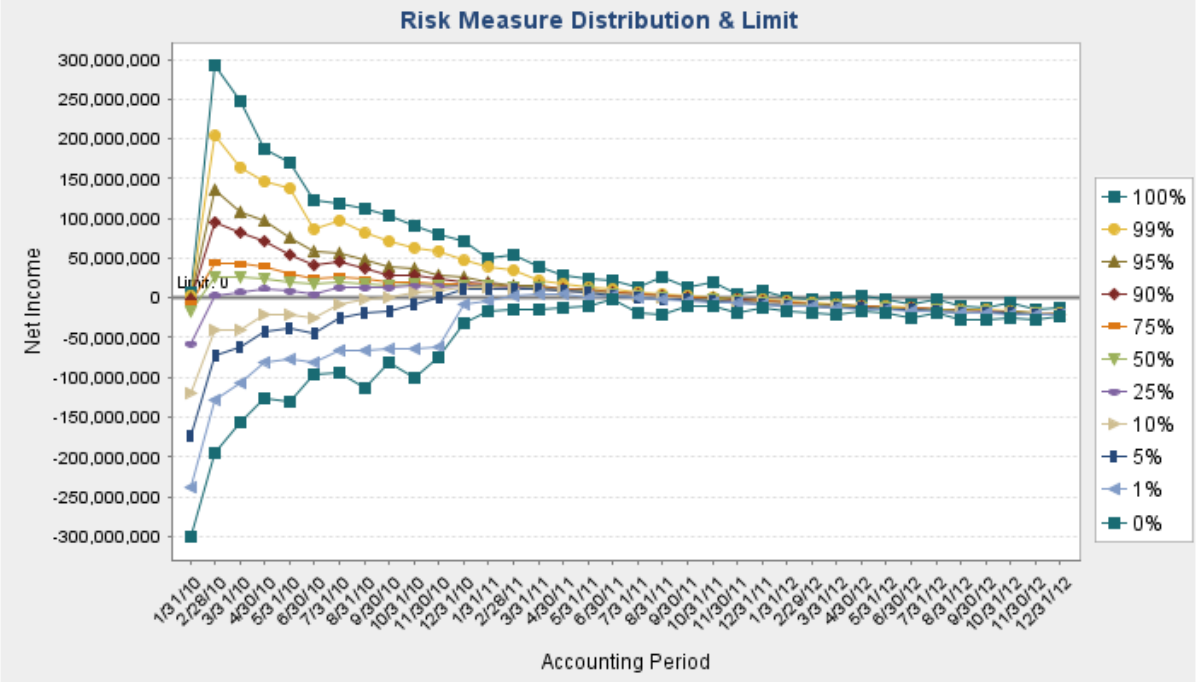
Risk Limit Adherence - Monte Carlo Analysis

KRM Run: 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L2 (values in USD)

Risk Limit NetInc

Set Name	NCUA Limits
Name	NetInc
Objective	Net Income
Form	Absolute Level
Driver	All Risks
Formula	>=
Limit	0

Table | Graph



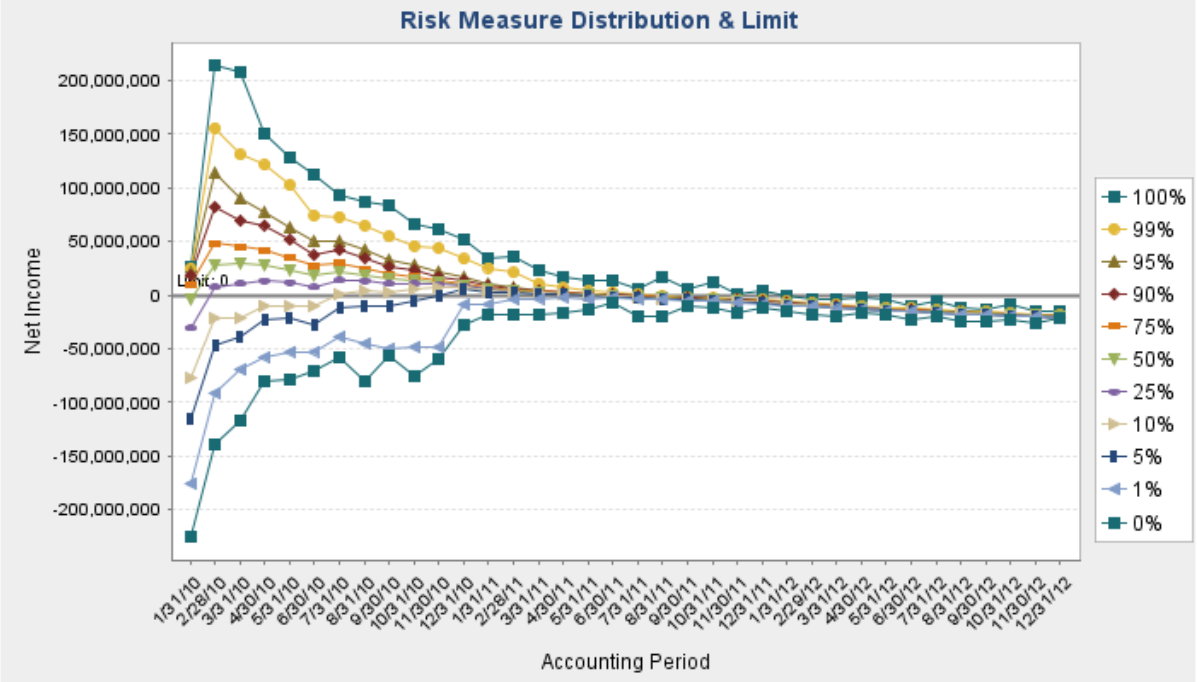
Risk Limit Adherence - Monte Carlo Analysis

KRM Run: 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L3 (values in USD)

Risk Limit NetInc

Set Name	NCUA Limits
Name	NetInc
Objective	Net Income
Form	Absolute Level
Driver	All Risks
Formula	>=
Limit	0

Table | Graph



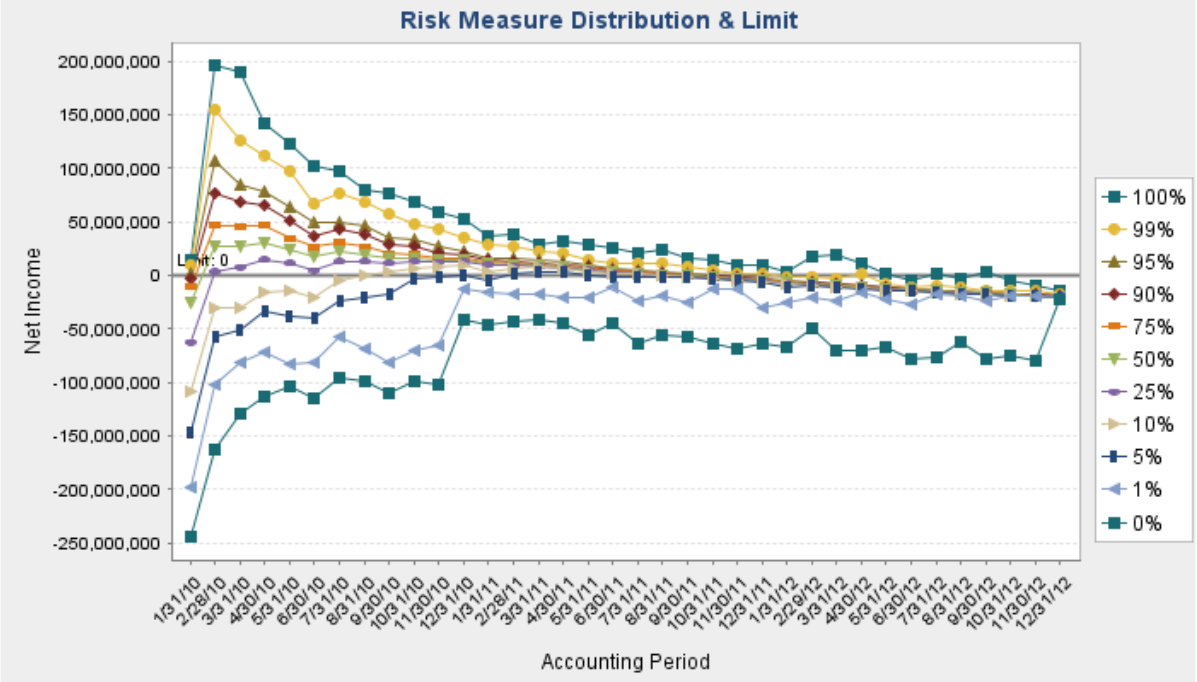
Risk Limit Adherence - Monte Carlo Analysis

KRM Run: 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L4 (values in USD)

Risk Limit NetInc

Set Name	NCUA Limits
Name	NetInc
Objective	Net Income
Form	Absolute Level
Driver	All Risks
Formula	>=
Limit	0

Table | Graph



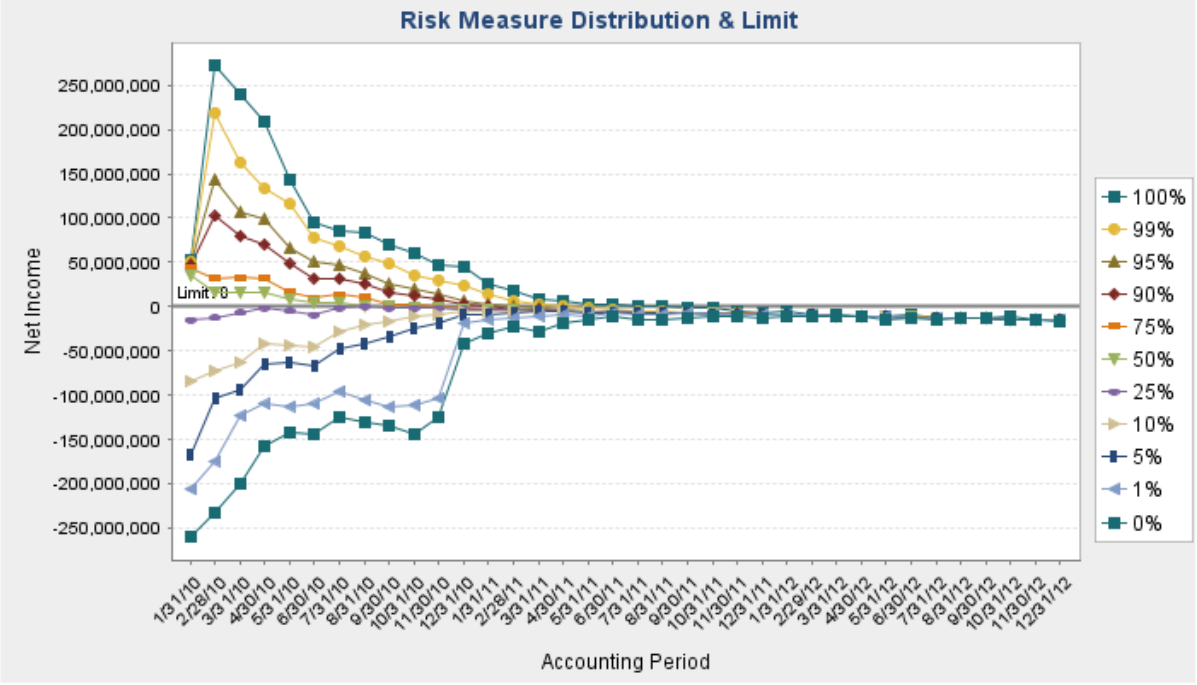
Risk Limit Adherence - Monte Carlo Analysis

KRM Run: 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L5 (values in USD)

Risk Limit NetInc

Set Name	NCUA Limits
Name	NetInc
Objective	Net Income
Form	Absolute Level
Driver	All Risks
Formula	>=
Limit	0

Table | Graph



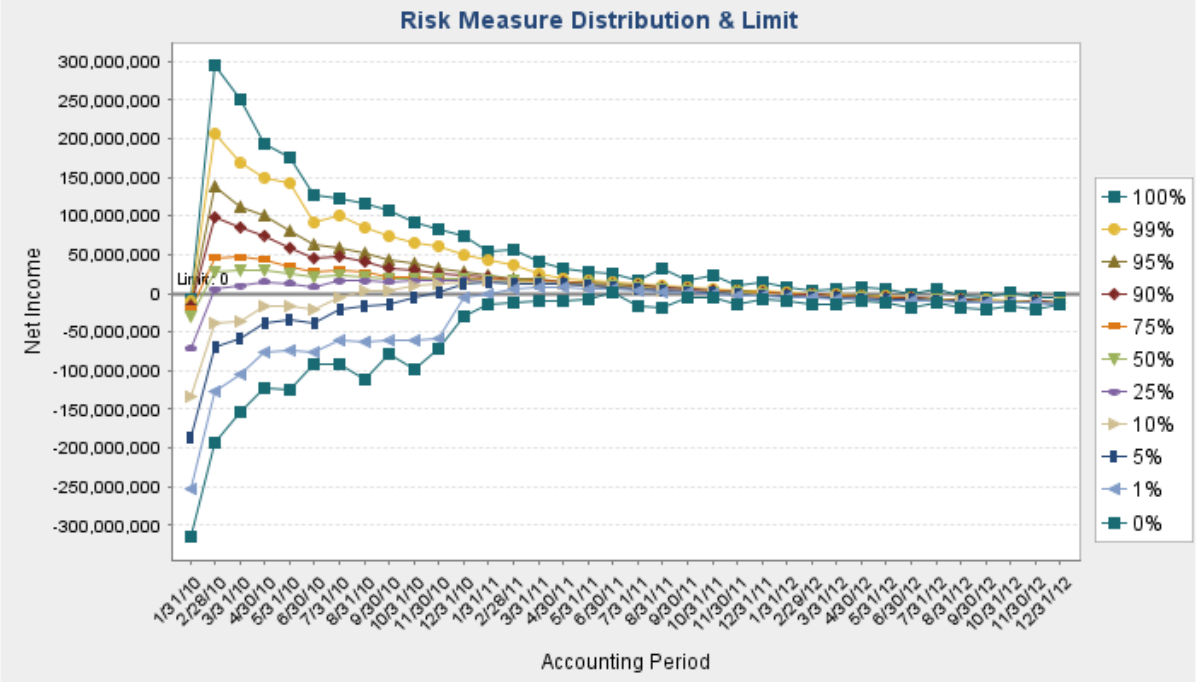
Risk Limit Adherence - Monte Carlo Analysis

KRM Run: 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L6 (values in USD)

Risk Limit NetInc

Set Name	NCUA Limits
Name	NetInc
Objective	Net Income
Form	Absolute Level
Driver	All Risks
Formula	>=
Limit	0

Table | Graph



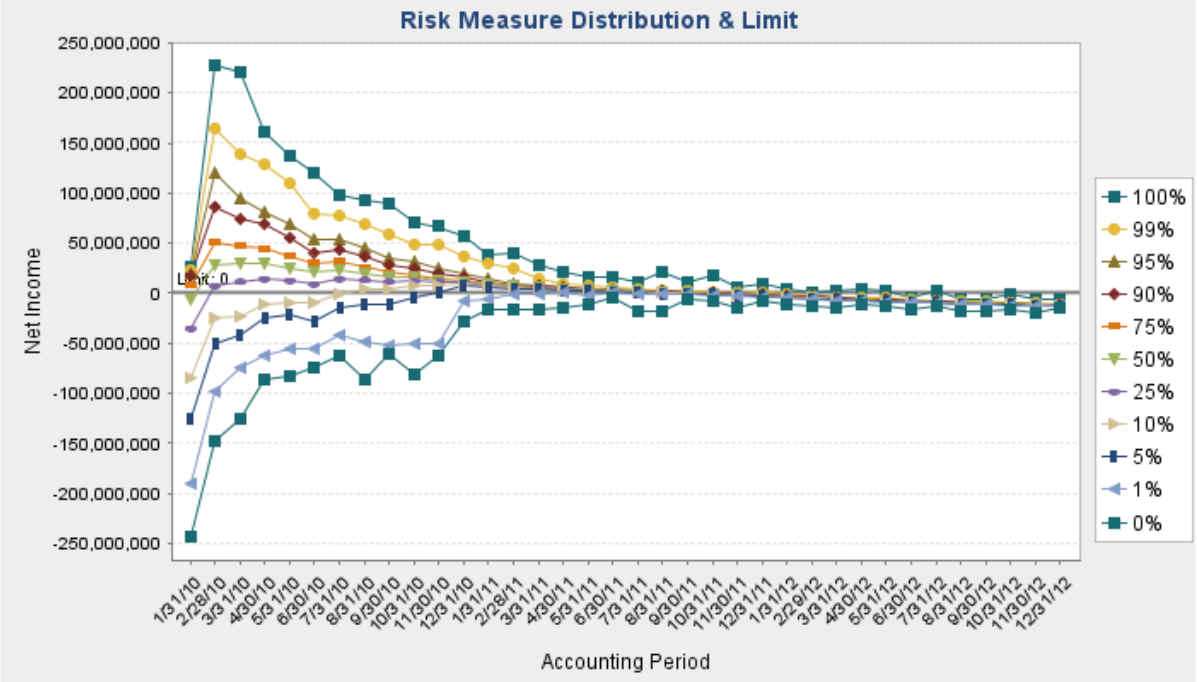
Risk Limit Adherence - Monte Carlo Analysis

KRM Run: 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L7 (values in USD)

Risk Limit NetInc

Set Name	NCUA Limits
Name	NetInc
Objective	Net Income
Form	Absolute Level
Driver	All Risks
Formula	>=
Limit	0

Table | Graph



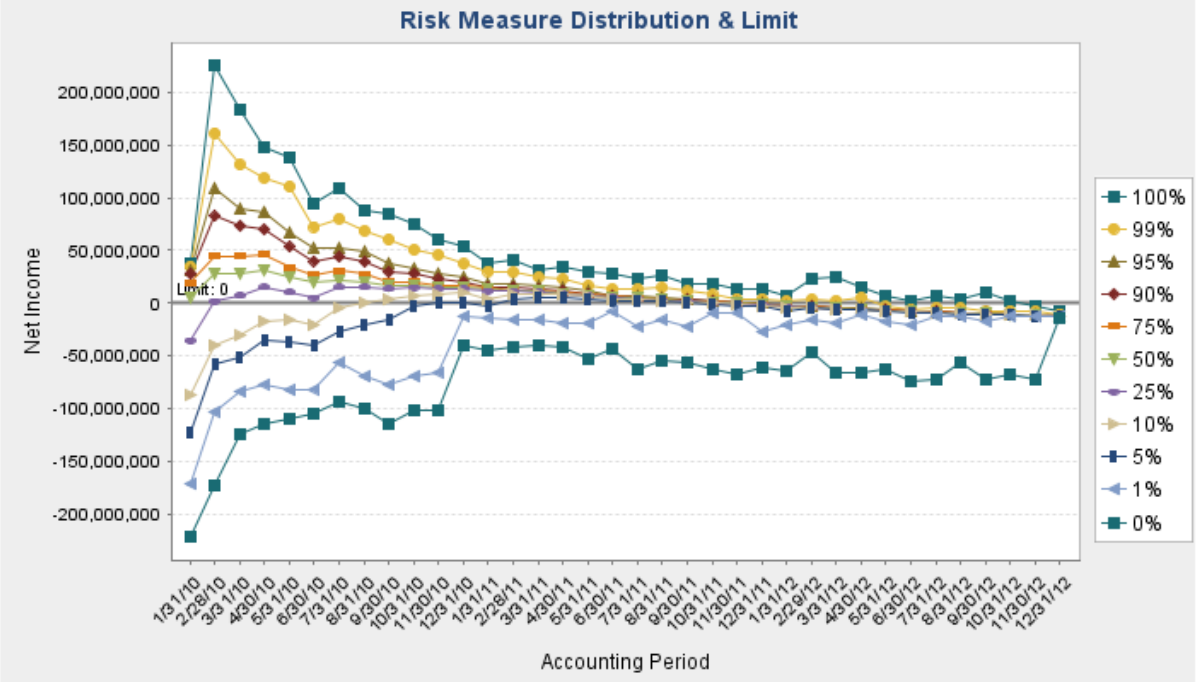
Risk Limit Adherence - Monte Carlo Analysis

KRM Run: 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L8 (values in USD)

Risk Limit NetInc

Set Name	NCUA Limits
Name	NetInc
Objective	Net Income
Form	Absolute Level
Driver	All Risks
Formula	>=
Limit	0

Table | Graph



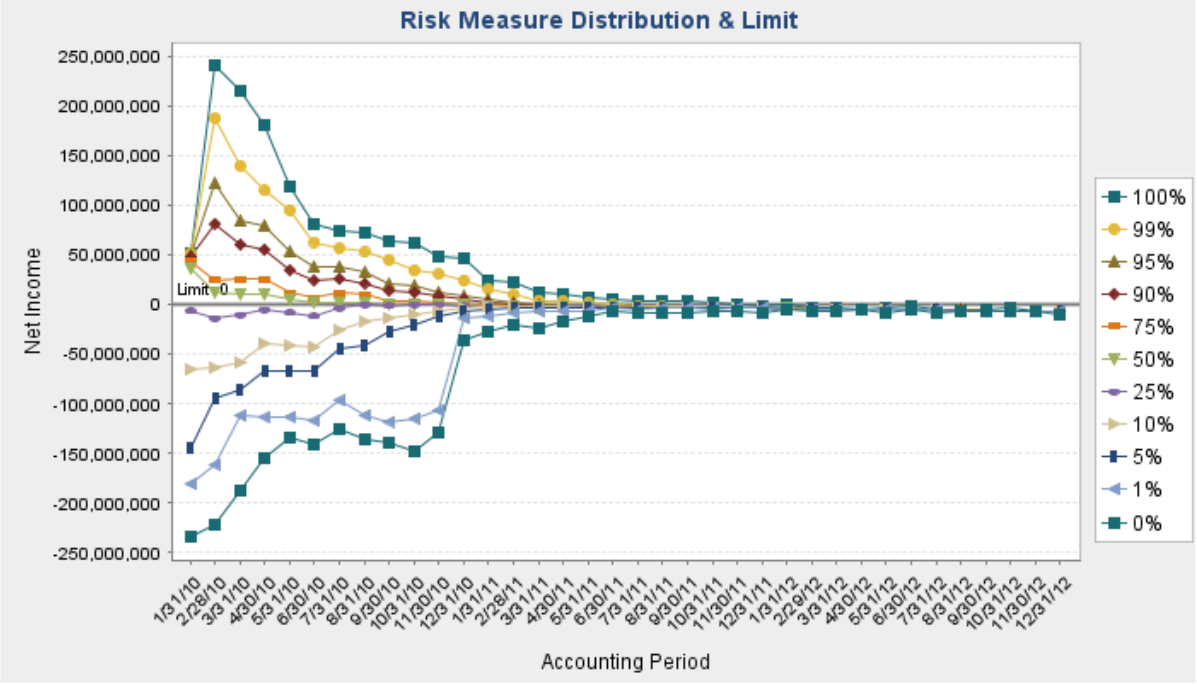
Risk Limit Adherence - Monte Carlo Analysis

KRM Run: 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L9 (values in USD)

Risk Limit NetInc

Set Name	NCUA Limits
Name	NetInc
Objective	Net Income
Form	Absolute Level
Driver	All Risks
Formula	>=
Limit	0

Table | Graph



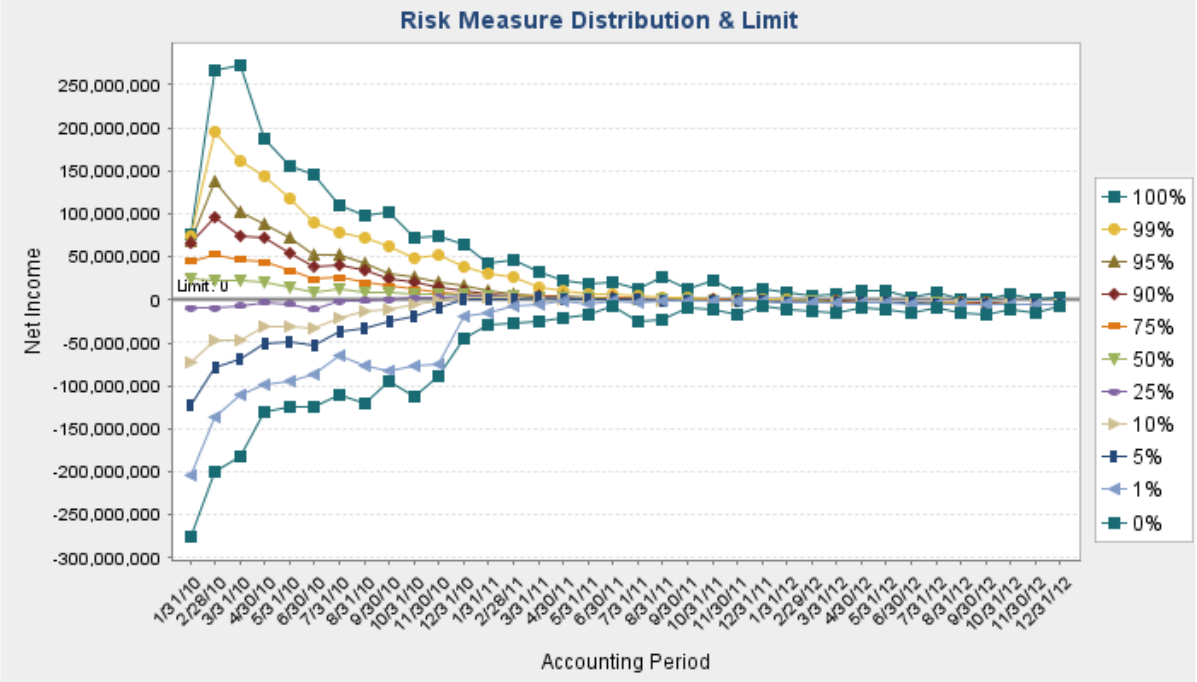
Risk Limit Adherence - Monte Carlo Analysis

KRM Run: 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L10 (values in USD)

Risk Limit NetInc

Set Name	NCUA Limits
Name	NetInc
Objective	Net Income
Form	Absolute Level
Driver	All Risks
Formula	>=
Limit	0

Table | Graph



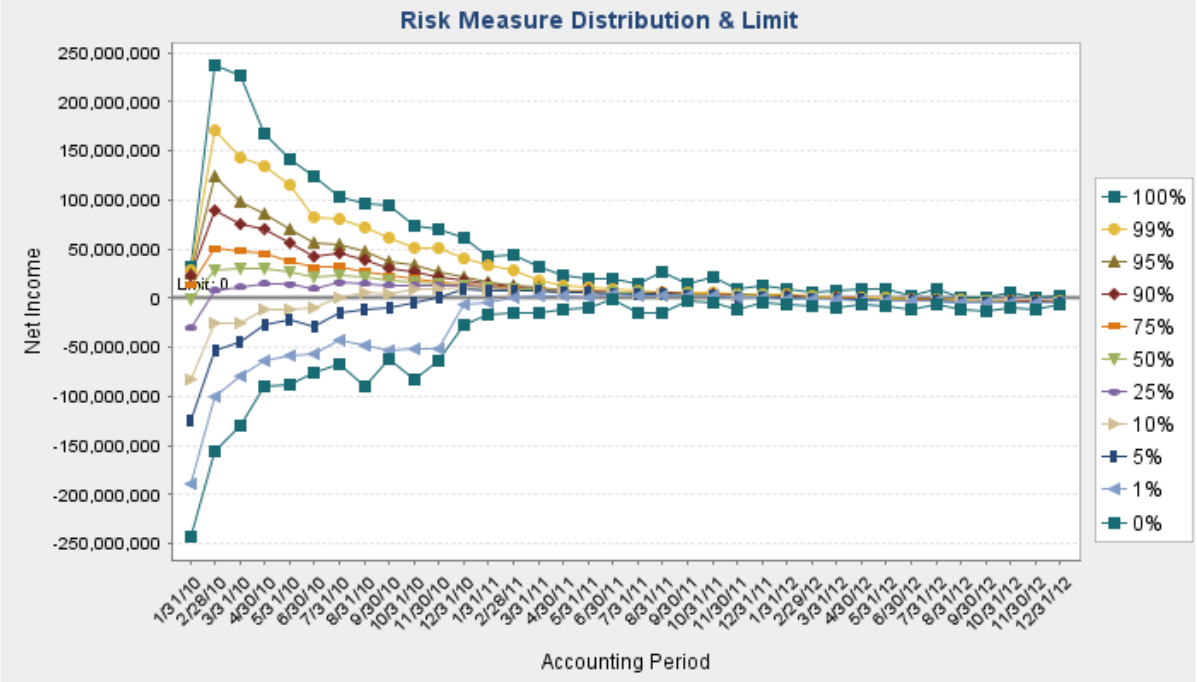
Risk Limit Adherence - Monte Carlo Analysis

KRM Run: 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L11 (values in USD)

Risk Limit NetInc

Set Name	NCUA Limits
Name	NetInc
Objective	Net Income
Form	Absolute Level
Driver	All Risks
Formula	>=
Limit	0

Table | Graph



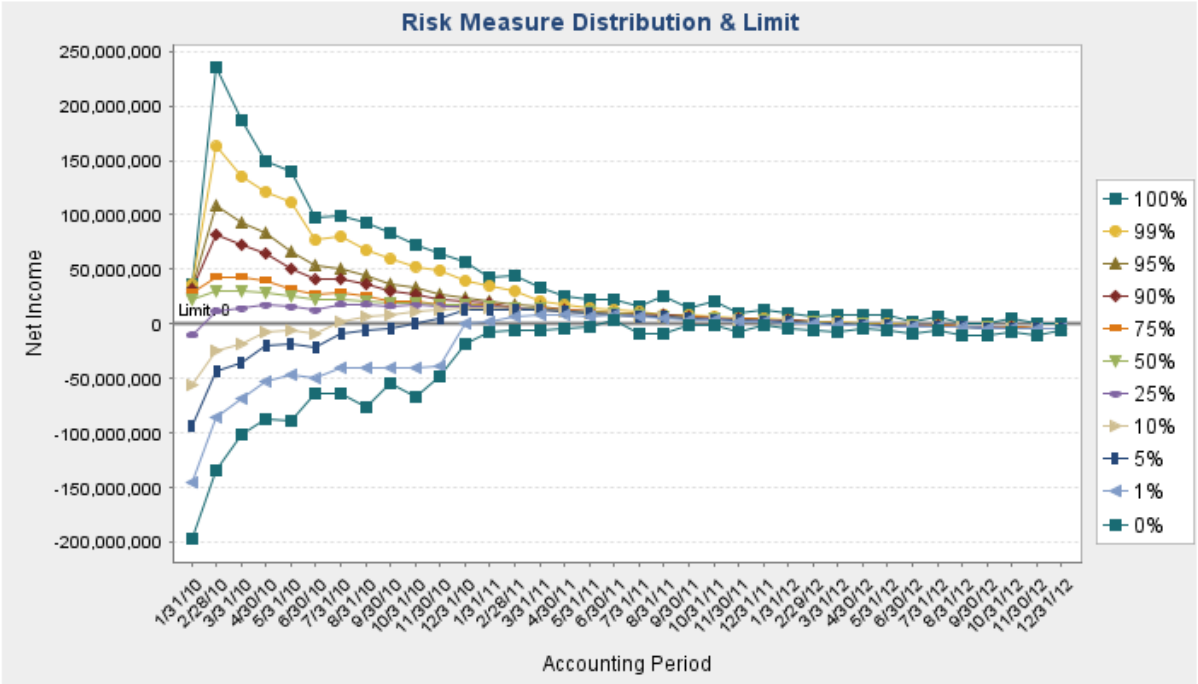
Risk Limit Adherence - Monte Carlo Analysis

KRM Run: 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L12 (values in USD)

Risk Limit NetInc

Set Name	NCUA Limits
Name	NetInc
Objective	Net Income
Form	Absolute Level
Driver	All Risks
Formula	>=
Limit	0

Table | Graph



One can see quite a bit of volatility in the 2009 Net Income simulation, that essentially disappears as the bulk of the structured product securities mature and thus roll over into low risk Treasury bills. Liability scenarios two and six seem to display the most volatility in net income from structured products at the outset. Eighteen months into the simulation, essentially all of the risky holdings have matured, and the simulation shows very little volatility, with either a small profit or a small loss depending on the liability scenario employed in the simulation. Cumulative retained earnings initially increase for each strategy, and then either level off or decline as the structured product securities are rolled off.

Cumulative Retained Earnings

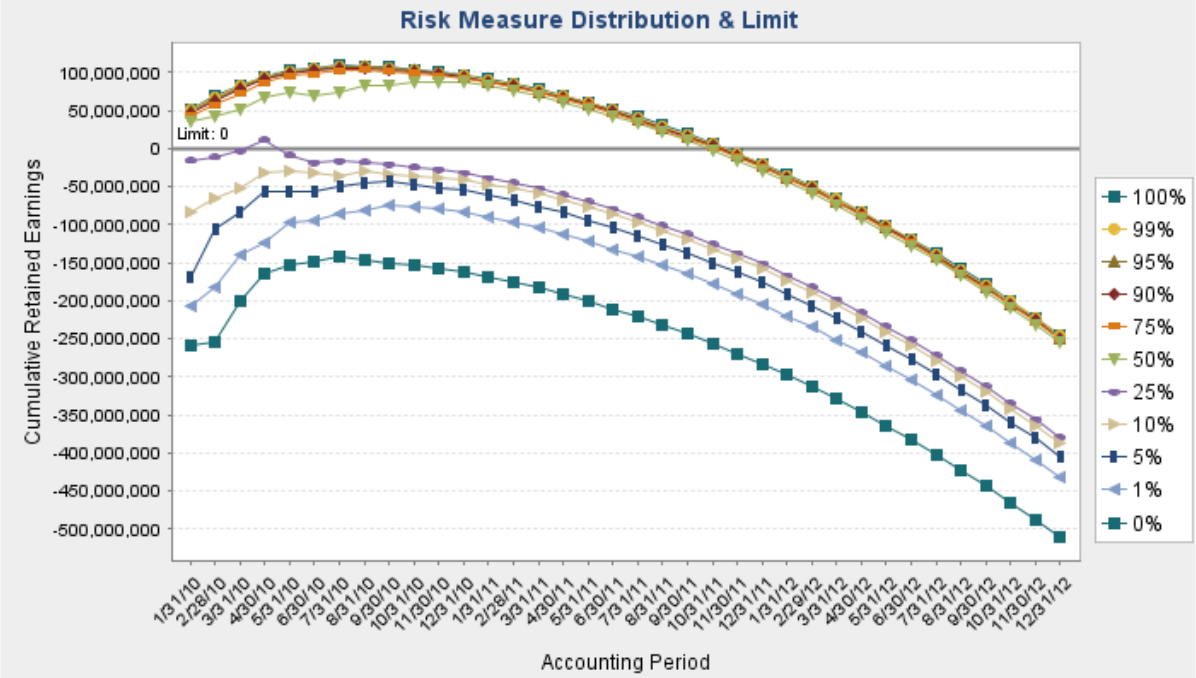
Risk Limit Adherence - Monte Carlo Analysis

KRM Run: 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L1 (values in USD)

Risk Limit CumuRE

Set Name	NCUA Limits
Name	CumuRE
Objective	Cumulative Retained Earnings
Form	Absolute Level
Driver	All Risks
Formula	>=
Limit	0

Table | Graph



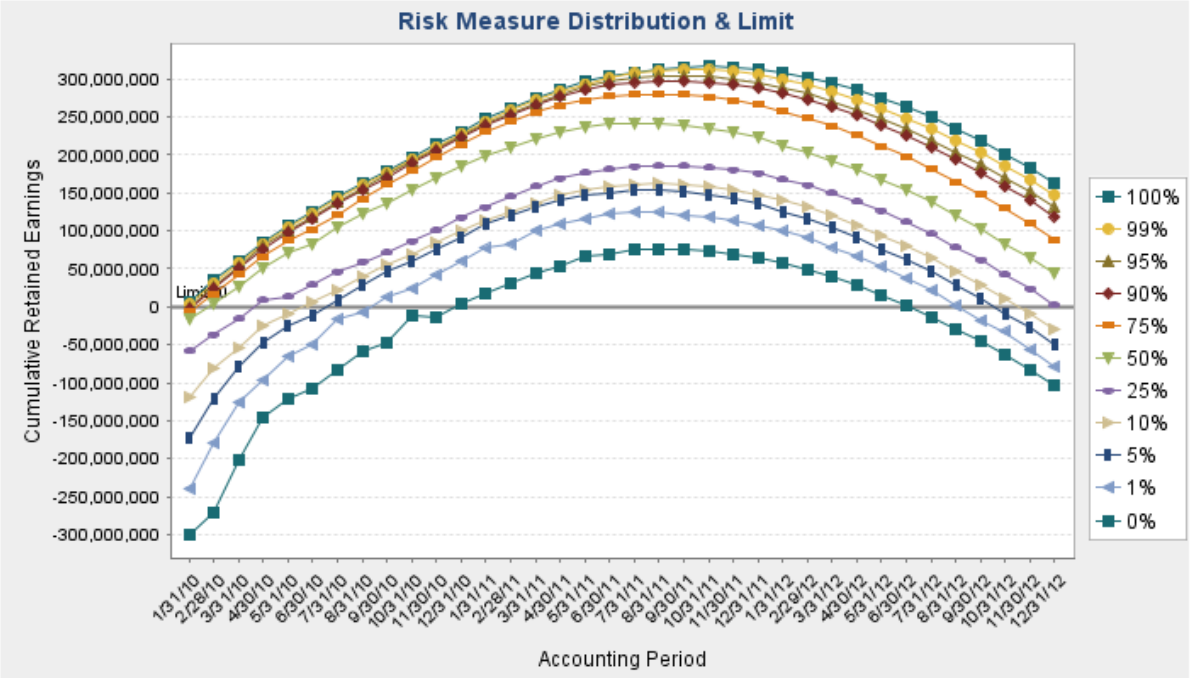
Risk Limit Adherence - Monte Carlo Analysis

KRM Run: 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L2 (values in USD)

Risk Limit CumuRE

Set Name	NCUA Limits
Name	CumuRE
Objective	Cumulative Retained Earnings
Form	Absolute Level
Driver	All Risks
Formula	>=
Limit	0

Table | Graph



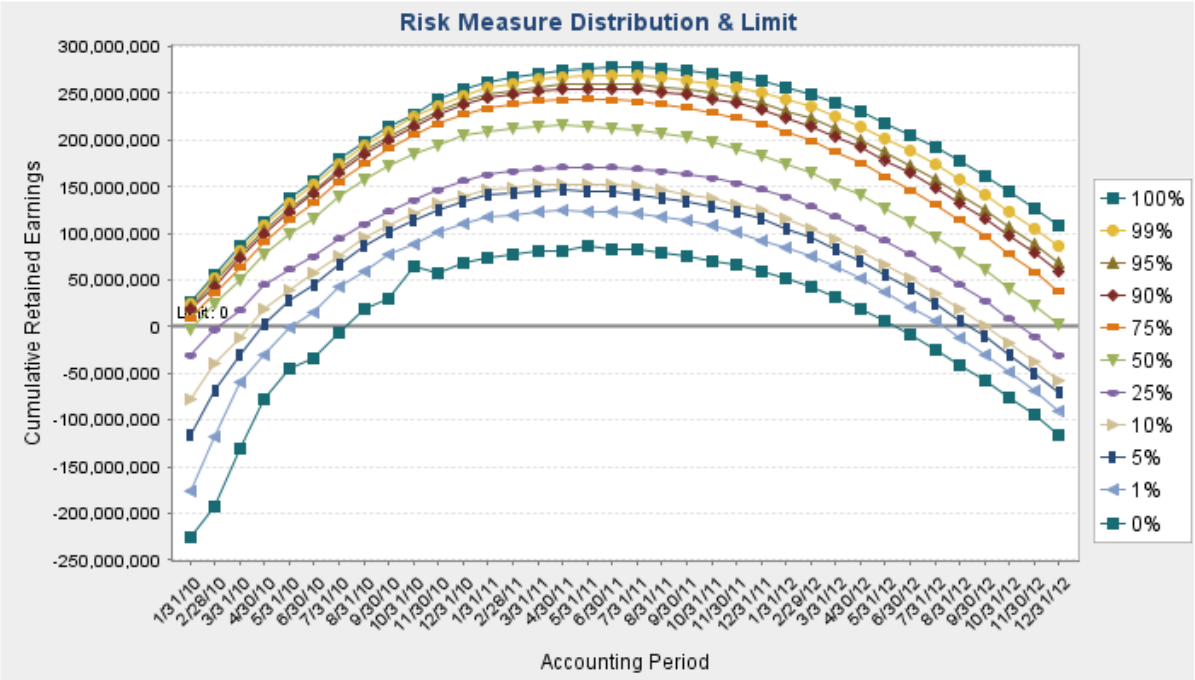
Risk Limit Adherence - Monte Carlo Analysis

KRM Run: 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L3 (values in USD)

Risk Limit CumuRE

Set Name	NCUA Limits
Name	CumuRE
Objective	Cumulative Retained Earnings
Form	Absolute Level
Driver	All Risks
Formula	>=
Limit	0

Table | Graph



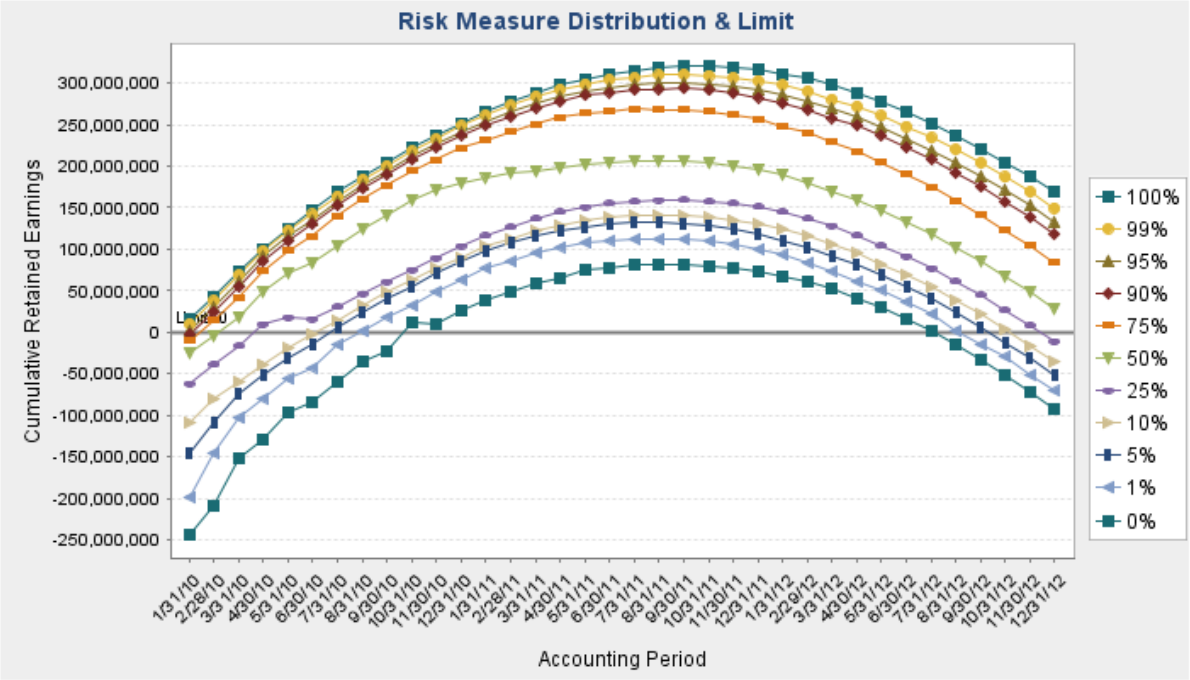
Risk Limit Adherence - Monte Carlo Analysis

KRM Run: 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L4 (values in USD)

Risk Limit CumuRE

Set Name	NCUA Limits
Name	CumuRE
Objective	Cumulative Retained Earnings
Form	Absolute Level
Driver	All Risks
Formula	>=
Limit	0

Table | Graph



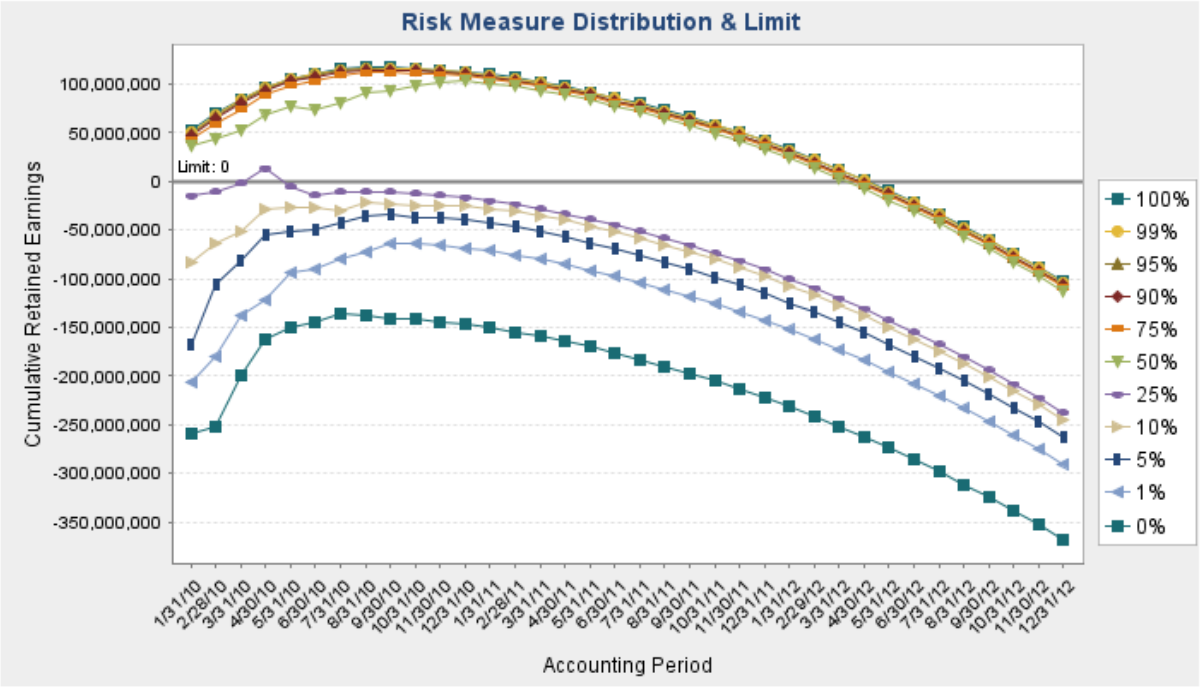
Risk Limit Adherence - Monte Carlo Analysis

KRM Run: 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L5 (values in USD)

Risk Limit CumuRE

Set Name	NCUA Limits
Name	CumuRE
Objective	Cumulative Retained Earnings
Form	Absolute Level
Driver	All Risks
Formula	>=
Limit	0

Table | Graph



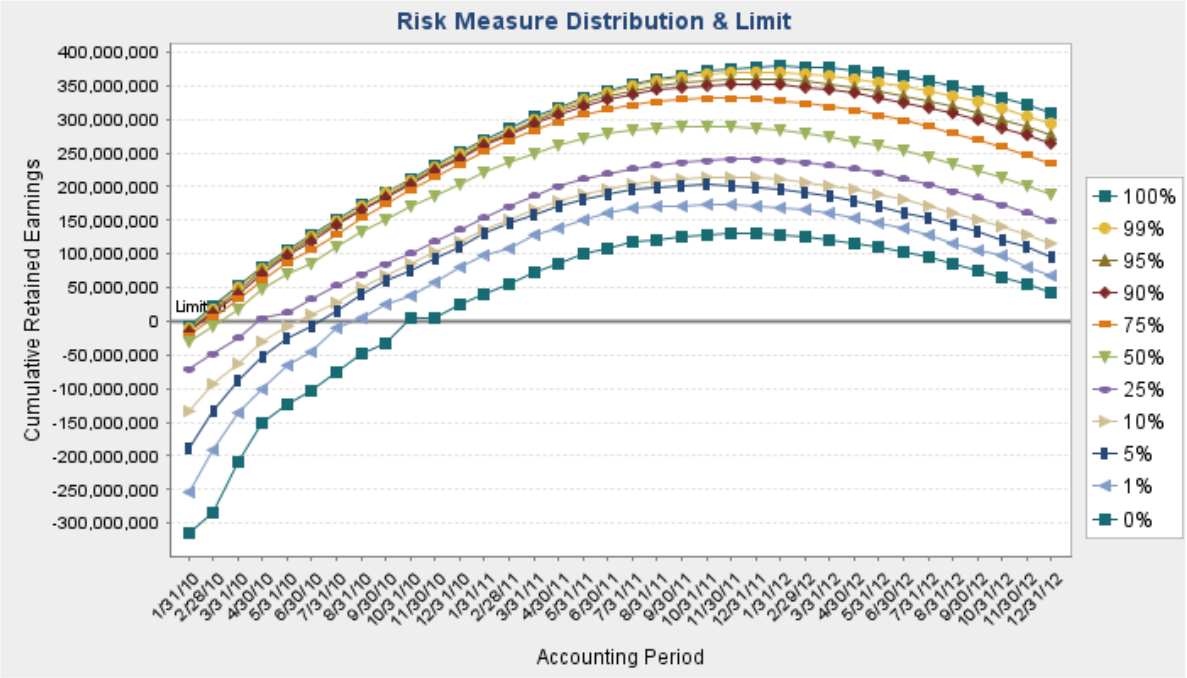
Risk Limit Adherence - Monte Carlo Analysis

KRM Run: 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L6 (values in USD)

Risk Limit CumuRE

Set Name	NCUA Limits
Name	CumuRE
Objective	Cumulative Retained Earnings
Form	Absolute Level
Driver	All Risks
Formula	>=
Limit	0

Table | Graph



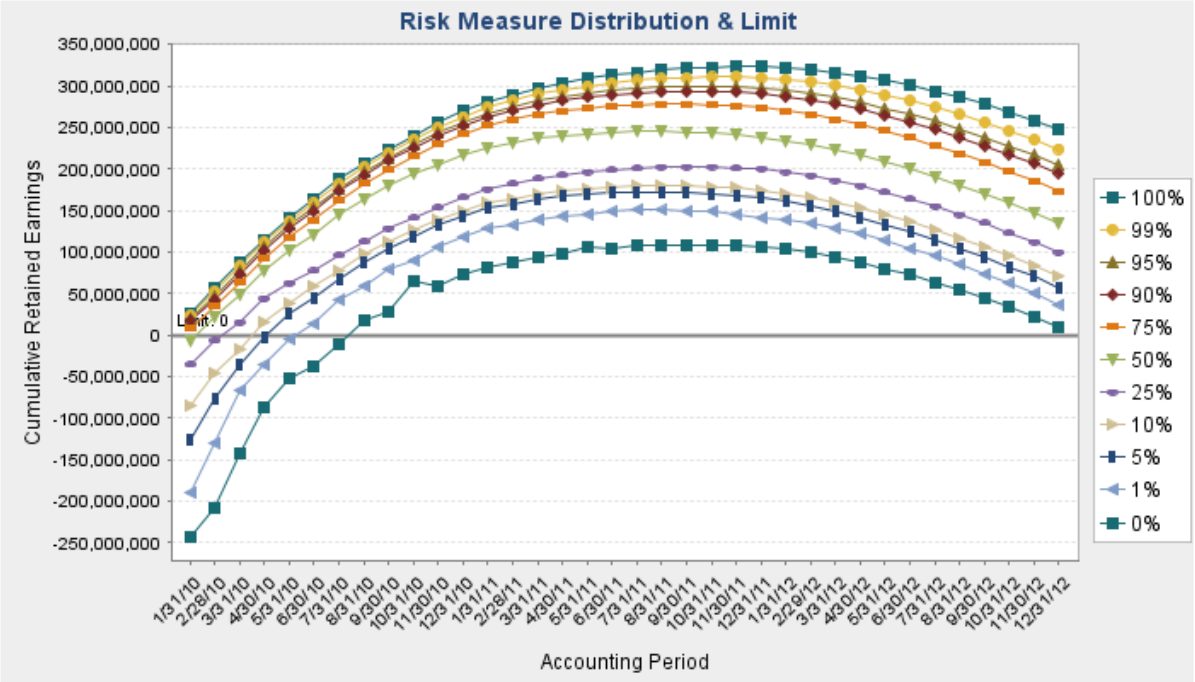
Risk Limit Adherence - Monte Carlo Analysis

KRM Run: 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L7 (values in USD)

Risk Limit CumuRE

Set Name	NCUA Limits
Name	CumuRE
Objective	Cumulative Retained Earnings
Form	Absolute Level
Driver	All Risks
Formula	>=
Limit	0

Table | Graph



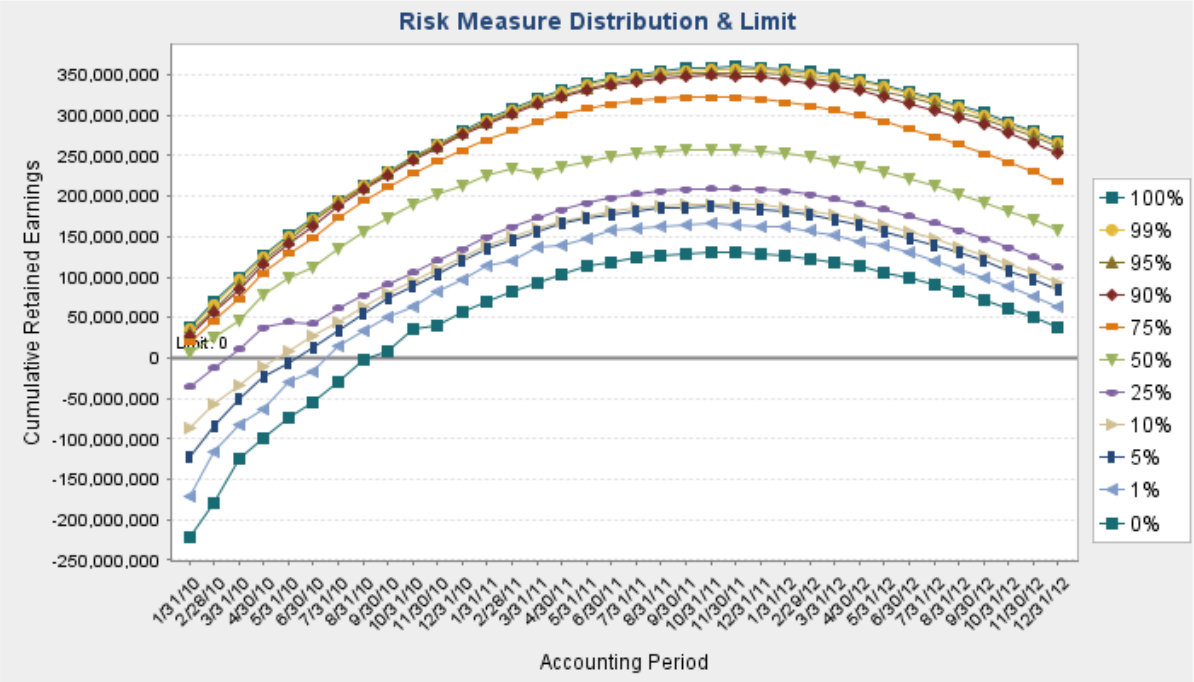
Risk Limit Adherence - Monte Carlo Analysis

KRM Run: 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L8 (values in USD)

Risk Limit CumuRE

Set Name	NCUA Limits
Name	CumuRE
Objective	Cumulative Retained Earnings
Form	Absolute Level
Driver	All Risks
Formula	>=
Limit	0

Table | Graph



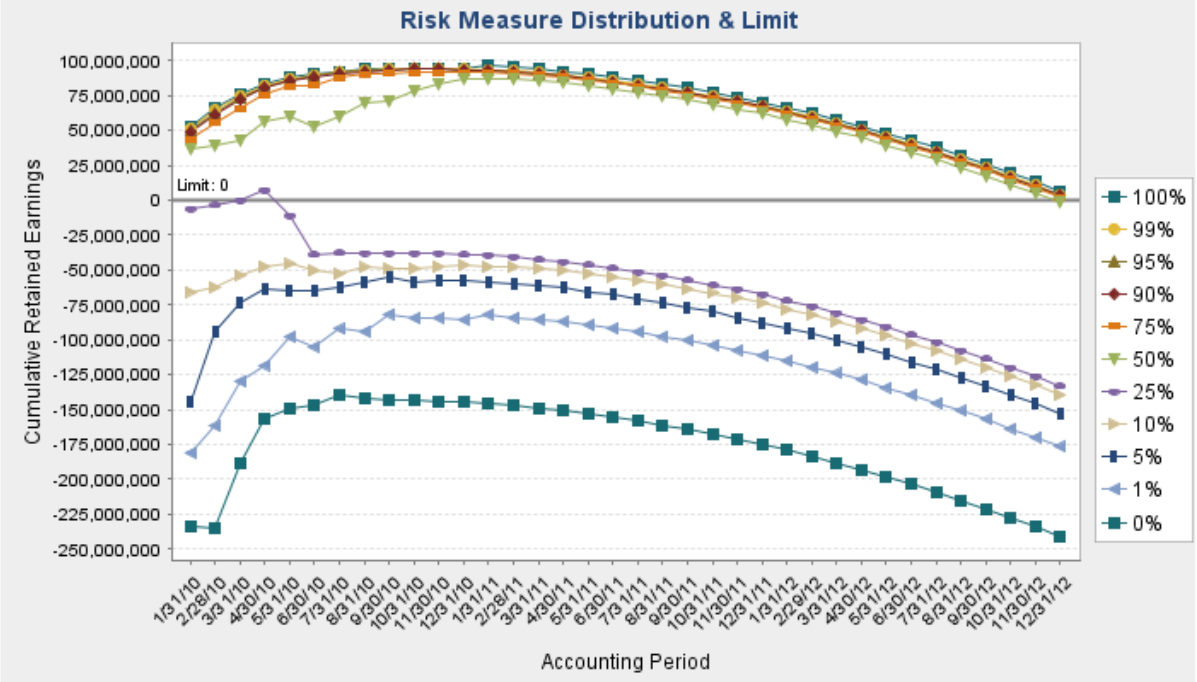
Risk Limit Adherence - Monte Carlo Analysis

KRM Run: 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L9 (values in USD)

Risk Limit CumuRE

Set Name	NCUA Limits
Name	CumuRE
Objective	Cumulative Retained Earnings
Form	Absolute Level
Driver	All Risks
Formula	>=
Limit	0

Table | Graph



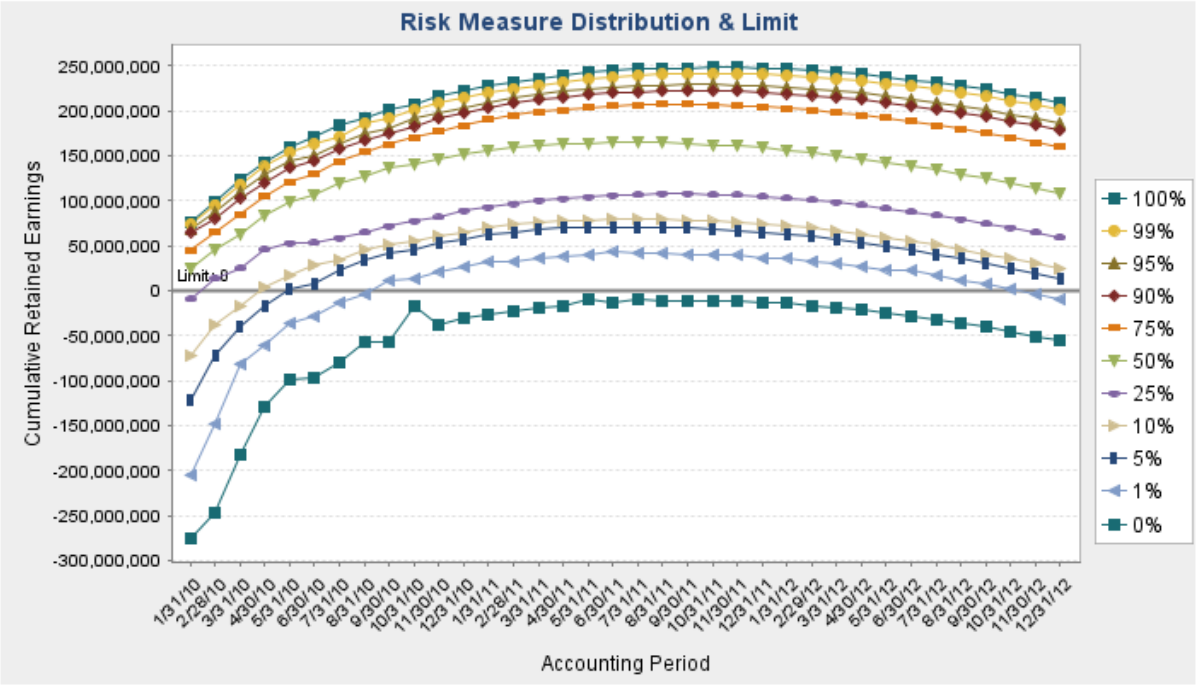
Risk Limit Adherence - Monte Carlo Analysis

KRM Run: 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L10 (values in USD)

Risk Limit CumuRE

Set Name	NCUA Limits
Name	CumuRE
Objective	Cumulative Retained Earnings
Form	Absolute Level
Driver	All Risks
Formula	>=
Limit	0

Table | Graph



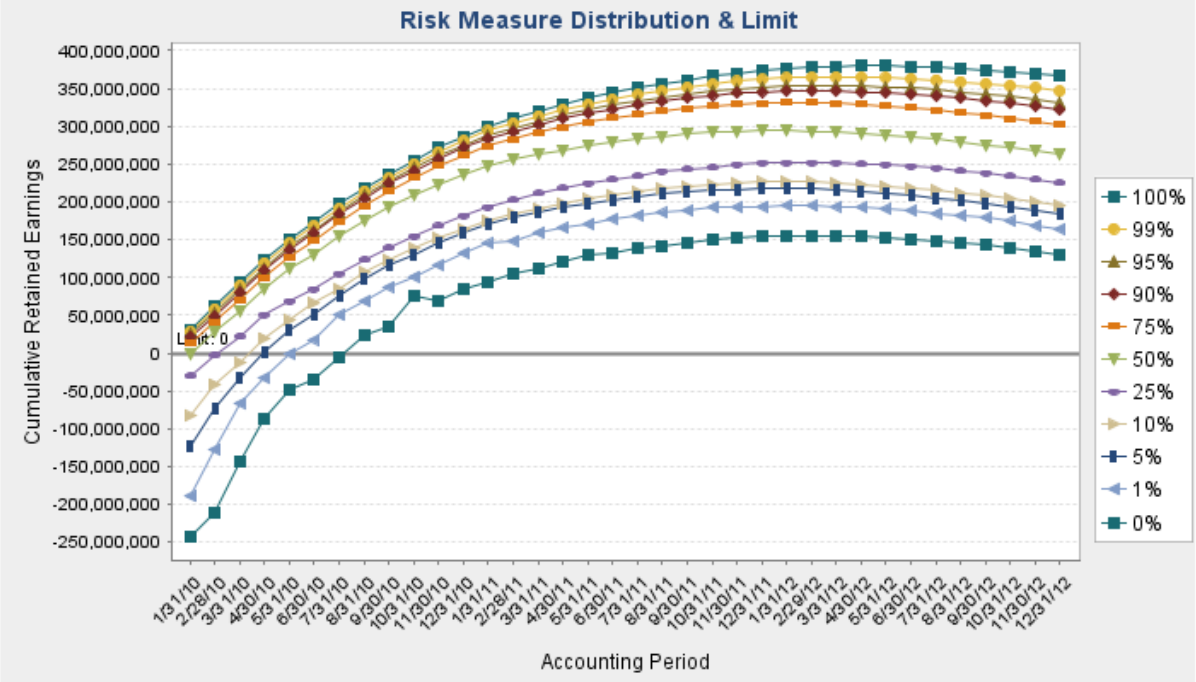
Risk Limit Adherence - Monte Carlo Analysis

KRM Run: 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L11 (values in USD)

Risk Limit CumuRE

Set Name	NCUA Limits
Name	CumuRE
Objective	Cumulative Retained Earnings
Form	Absolute Level
Driver	All Risks
Formula	>=
Limit	0

Table | Graph



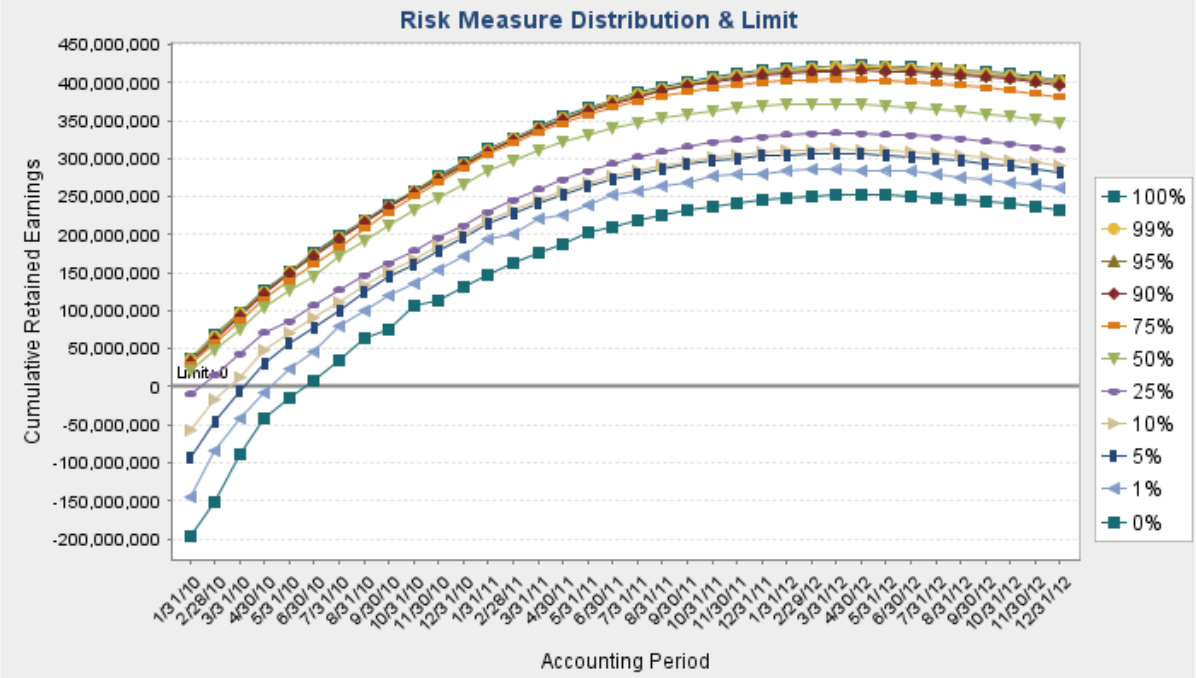
Risk Limit Adherence - Monte Carlo Analysis

KRM Run: 2009 All Stochastic NI with Rollover mc 1000x1000 A7/L12 (values in USD)

Risk Limit CumuRE

Set Name	NCUA Limits
Name	CumuRE
Objective	Cumulative Retained Earnings
Form	Absolute Level
Driver	All Risks
Formula	>=
Limit	0

Table Graph



The outcome of the 2009 simulations seems to be quite dependent on the liability strategy employed by the corporate credit union. This is in part due to the spread on assets that the corporate credit union is simulated to receive one the rollover of the structured products, though these differences persist in the initial accounting periods as well. Still, much of the losses seem to be concentrated in a long tail of losses from the initial accounting period onwards (note that the median result is quite near the 75th and higher percentiles for many of the liability scenarios). However, even the losses seem to level off fairly early in the simulation, as the structured products default and are replaced.

Discussion of 2009 Stochastic Results

In the 2009 simulations, the model corporate credit union still faces many of the problems present in the 2007 deterministic scenario, along with several new ones:

- Interest rates start at very low levels which, given any asset spread, makes it harder to meet a given ROA target than the higher rates of the March 31, 2007 starting point.
- Yield curves are flatter, so there is much less chance for a positive spread from mismatching.
- Mortgages and other securities assets often default with a lag after home prices have fallen, and those defaults have yet to be fully worked out by December 31, 2009.

The result is substantial variation in income within a liability strategy due to credit losses within the first year of the simulation, and ultimate portfolios either able or unable to meet funding costs dependent largely on the level and slope of the yield curve when the securities are rolled over. Cumulative retained earnings 36 months into the simulation ranges from -$314 million in liability strategy one to $343 million in liability strategy twelve. When turned into monthly return on asset figures, these range from an average loss of 4.2% per month to a gain of 1.7% per month. When restricted to the first year (before the majority of structured products have rolled over), liability strategy one fails to meet the return on asset targets on average and in the median, though scenario twelve meets the targets in essentially all of the scenarios.

In general, whether or not the corporate credit union is profitable in the simulation seems to be dictated by the liability profile (which determines how many securities the model corporate credit union can purchase, and what degree of mismatching is permissible). This suggests that the stress tests did not limit securities prone to further credit losses, and that stress testing yield and spread slopes could provide useful information on the success or failure of the model corporate credit union.

Conclusions and Recommendations

Kamakura believes that the preceding analysis highlights many issues with the proposed regulations, as well as areas where they perform well or could be specifically improved. In this section, we will summarize the analysis in the preceding pages with special emphasis on the conclusions of Kamakura's analysis of the raw data.

The most striking conclusions concern the stress tests mandated in the proposed rule. The analysis clearly shows that the NEV stress tests in part 704(d), 704(e), and 704(f) result in a wide swath of the fixed income securities market being inaccessible to corporate credit unions, regardless of the credit risk of the underlying securities. In many of the portfolios constructed in the 2007 simulations, structured product purchases are essentially non-existent. Additional analysis shows that these limits would have to be expanded between 5 and 10 times even their base plus levels to allow for the purchase of historically realistic levels of structured products. This is the case in spite of the portfolio construction algorithm employed by Kamakura that endeavors to purchase as many securities as possible under the proposed regulations. In addition, the NEV stress tests in part 704(d), 704(e), and 704(f) take a significant amount of time and resources to calculate as the proposed regulations require calculations to be done at the portfolio level. This is particularly relevant as the regulations also explicitly encourage or require short-lived portfolios, which directly leads to more rollover and reinvestment (and more frequent portfolio level stress test calculations). While portfolio level calculation does impart more accuracy than any single-asset calculation, it is much more complicated to calculate. The benefits to the additional accuracy can be assessed by an inspection of the stress test's abilities to identify and exclude assets that perform relatively poorly. With that in mind, Kamakura analyzed the relationship between asset stress test performance on March 31, 2007 and subsequent historical performance throughout the credit crisis. The NEV stress tests in part 704(d), 704(e), and 704(f) seem to eliminate securities in a way that is unrelated to the performance of the security through the credit crisis: correlations between performance on the three stress tests and annualized returns through the credit crisis are essentially zero. This lack of correlation leads Kamakura to believe that with virtually any level of stress test limits, it is likely that credit losses for structured products that a corporate credit union purchased under the proposed regulations would not have performed materially better than securities that they were unable to purchase due to the NEV stress tests in the proposed regulations. Using the best available historical data, the total return (including coupon payments, price changes, and all other forms of risk compensation and loss) for securities that had high stress test performance was essentially unrelated to the stress test performance of that particular asset. This is in contrast to sample macro-factor based stress tests that Kamakura has calculated and presented on the asset universe. In total, the NEV stress tests in the proposed regulations are quite restrictive, relatively difficult to calculate, and do not seem to be able to identify and exclude securities that were the most likely cause of the current issues faced by the corporate credit unions.

In addition to the stress tests, there are several other aspects of the proposed rule that, while well intentioned, may not be ideal once put into practice. The actual weighted average life statistic used in the

proposed regulations itself is unknowable, and as such the proposed regulations use calculations based on the simple expected life. This is especially relevant in periods with large changes in prepayment rates (large changes in rates for example), or large changes in default rates (large changes in unemployment and home prices). Kamakura recognizes that this simplification removes many opportunities for the corporate credit union to obfuscate the nature of their balance sheet through erratic simulated option exercise, though this benefit comes at great cost to relevance and realism when it would otherwise be applied. In addition, the reliance on legacy ratings as a credit risk hurdle may not be effective. While Kamakura understands and applauds the NCUA's effort to reduce the credit risk in the portfolios of the corporate credit unions, we believe that agency ratings are an ineffective tool for this purpose. Many securities faced significant downgrades during the crisis, suggesting that the ratings may not be a sufficient statistic for the credit quality of a given security. Regulatory minimums on ratings also may force the sale of securities immediately upon downgrades, precisely when market conditions are at their worst. This is particularly relevant given the ratings experiences through 2008 and 2009.

The simulations performed in Kamakura Risk Manager yielded mixed results. Both the 2007 deterministic scenario and 2009 Monte Carlo simulation show that a low rate environment and flat yield curves can over-burden corporate credit unions with long-dated liabilities and high funding costs. This is a very dangerous scenario that is not directly addressed by the stress tests mandated by the proposed rule as the stress tests evaluate parallel shifts in the yield curve rather than flattening or steepening of the curve. To the extent that corporate credit unions employ mismatching strategies in the maturity of their assets and liabilities, such tests would be particularly relevant. In contrast, the 2007 monte carlo simulation, which was calibrated to market conditions before the crisis, contains scenarios of moderately high interest rates and steep yield curves that allow short term profits from funding mismatches.[55] In terms of credit losses, there are two substantive conclusions regarding the 2007 and 2009 portfolios respectively. In 2007, the simulated portfolios contain very few structured products and as such have minimal credit losses throughout the crisis. However, the expanded portfolios constructed by relaxing the NEV stress test constraints in the proposed rule show that there was no significant relationship between the return on structured products during the crisis and the performance on the stress tests in the proposed rule (and hence whether or not they were included in the expanded portfolios). That is, Kamakura would not expect the performance of the model corporate credit union to be improved or weakened by any level of stress tests in the proposed regulations. That said, the 2007 structured product universe, on average, has small but positive returns. Recall that this universe was constructed with the weighted average life limits, sector, seniority, and subordination limits of the proposed rule in mind: those limits seemed to generate a subset of structured products with above average, or at least slightly positive, returns during the credit crisis. In 2009, the credit losses appear to be mitigated. After some moderate initial credit losses at the outset of the simulation, the portfolios have fairly limited adjustments to net interest income ($1-$4 million per month in

[55] Kamakura notes that such mismatch profits do not represent economic value to the institution, simply compensation for risk. Indeed, even the small interest rate mismatching allowed under the regulations leads to fairly large and fairly stable losses for the 2007 deterministic and 2009 stochastic simulations.

absolute value, roughly 20-50% of net interest income) for the first twelve months.[56] There is quite a bit of heterogeneity in earnings of the model corporate credit union across the twelve liability strategies. There are two reasons for this: certain scenarios admit many more structured products than others, and certain scenarios are more exposed to changes in the slope of the yield curve. The effects of the former can be best seen in the first 6 months to 12 months of the simulation.

Kamakura has several recommendations for the National Credit Union Administration: we organize this section into sections of the regulations that we find particularly appropriate and effective, recommendations for adjustments to other sections that would introduce best practice risk management into the proposed rule, and recommendations that, while less effective, may be easier to implement given the structure and content of the proposed regulations.

Best Components of the Proposed Regulations and Requested Analysis

- At the heart, the regulations attempt to reduce the ability of corporate credit unions to purchase highly concentrated amounts of risky securities through ratings and sector limits. While Kamakura believes that there may be more effective methods to accomplish this goal, the NCUA should be applauded for their efforts in this regard.

- The proposed regulations recognize the difficulties that corporate credit unions have in raising capital and as such try to ensure that the corporate credit unions are managed to attain certain returns and retained earnings targets. These targets can be improved, but Kamakura agrees with the appeal of these limits given the difficulty the corporate credit union faces when raising additional capital.

- The sector, subordination, and issuer limits in the proposed regulations implicitly limit the macroeconomic factor risks faced by the corporate credit union. Based on the performance of the asset universe constructed with these limits in mind, Kamakura believes that these limits would have mitigated the losses faced by the corporate credit unions.

- The NCUA requested the analysis to be conducted on a variety of liability strategies and with a variety of portfolio targets. In practice, it turned out that many of these portfolio targets were unattainable given the limits in the proposed rule, but the thoroughness of the approach is appealing, particularly when the liability structures have such an impact on the simulations.

- The proposed regulations reward portfolio monitoring and management behavior with more relaxed stress test limits and ratings requirements. While Kamakura has reservations about the effectiveness of ratings requirements and the stress tests in the proposed rule, the linkage between risk management efforts and rewards is very appealing, and all too absent in the marketplace.

[56] Whether these adjustments are on average gains or losses depends on the liability strategy: it appears that the liability strategies that admit more securities perform better on average than the more restrictive set.

- While beyond the scope of the analysis, the prompt corrective action powers granted to the NCUA may be helpful in preventing and controlling risky behavior.

However, Kamakura believes that there are several alterations that can be made to the proposed regulations to greatly increase their effectiveness. This section details changes that can be made that would more accurately reflect what Kamakura calls "best practice" risk management.

Best Practice Recommendations

- Eliminate the calculation of the NEV Stress tests in sections 704 (d), 704 (e) and 704 (f). These tests pose a substantial burden on the corporate credit unions, greatly reduce the number of securities available for investment, and do not appear to identify securities with differences in credit performance meaningfully related to the performance of securities throughout the credit crisis.
- Require use of an internal models approach based on correlated macroeconomic factors. While the precise effects of these factors are subjective, macroeconomic factors are clearly related to the overall performance of securities.
- Require stress testing of economic value of equity with respect to macroeconomic risk factors (such as home prices, real GDP growth, commodities, equities, interest rates, and unemployment rate) and specify limits.
- Require all stress tests of every asset in the portfolio, even derivative securities. Stress tests should assume rational option exercise, with the models underlying option exercise decisions available for view and audit on demand.
- Eliminate the legacy ratings minimum and replace it, if necessary, with a maximum default probability of a given percentage over a specific time horizon using best available techniques.
- Modify the target profitability test, stated as the target for cumulative retained earnings as a percent of assets after three years. The level of interest rates largely determines the degree to which these targets can be met, even without earning a positive spread over funding costs. For example, at the current levels in the proposed regulations, if rates are 4% or above, the 15 basis point ROA target can be met even with zero funding spread. These tests should instead require a minimum spread over funding costs, rather than a simple ROA target.
- Encourage the movement of fund management "off balance sheet" from the corporate credit unions by allowing them to establish investment management affiliates in which they act as agent, not principal, in managing money for natural person credit unions. This would allow corporate credit unions to offer a wider array of investment alternatives at considerably lower operating costs. It would also considerably reduce the capital requirements of corporate credit unions, thereby boosting risk-adjusted profitability.
- Require that structured product investments only be in securities where the underlying collateral is fully disclosed on a transaction by transaction basis on demand, by the investor, in electronic form
- Require limits based on market based assessments of performance, such as a maximum allowable credit swap for the corporate credit union

If these recommendations are difficult to implement for political, legal, or other reasons, Kamakura lists below alternative recommendations that will not change the underlying rule as dramatically.

Alternative Approaches

- Remove the portfolio level stress test requirements to ease calculation burdens of corporate credit unions. Instead, specify for a set of target liability maturity schedules, the maximum allowable change in value of an individual asset with respect to particular stress tests. Such a calculation is substantively similar to what is in the proposed regulations, but dramatically lightens the computation required whenever a corporate credit union purchases and sells securities.
- Greatly relax or remove the stress test requirements in sections 704 (d), 704 (e), and 704 (f), even at the single asset level. The spread and prepayment stress test appears somewhat effective, and highlights the joint nature of stress tests. Kamakura also believes that an additional stress test involving the slope of the yield curve should be applied. These stress tests should be conducted on every security in the portfolio, and should accommodate rational option exercise.
- Enhance the sector and issuer concentration limits in the proposed rule with further tightening, and joint sector limits based on common macroeconomic factors: for example, non-agency RMBS is limited to 15% of the portfolio, CMBS is limited to 15% of the portfolio, and non-agency RMBS + CMBS is limited to 25% of the portfolio.
- Relax the reliance on agency ratings, possibly replacing them with additional limits on shared characteristics, such as collateral level FICO scores, information requirements, tranching structure and so on. Such approaches target needlessly complex and difficult to assess securities without a heavy reliance on ratings. The regulations should also explicitly prohibit the use of ratings from firms that are engaged by the issuer of the structured security.
- Greatly relax the agency ratings requirements on corporate firms. If ratings must be used as an investment criterion, the proposed regulations as they are currently written prevent corporate credit unions from investing in the vast majority of corporate issuers. Kamakura believes that alternate ratings thresholds for corporate debt and structured products can achieve these ends, while still recognizing the vast and systematic underestimation of risk by rating agencies on structured products through the credit crisis.
- Require that structured product investments only be in securities where the underlying collateral is fully disclosed on a transaction by transaction basis on demand, by the investor, in electronic form. This sort of information requirement will help prevent investment in needlessly complex securities, or in securities that the corporate credit union cannot easily assess.
- Restrict investment in structured products where the security is tranched by any criteria other than the maturity of interest and principal. Specifically, collateralized debt obligations or any security by any other name where tranches are created by the percentile rank of credit losses should be prohibited or greatly reduced. Subordinated securities of this type faced the largest credit losses through the crisis, and the senior tranches had risks that were systematically under-estimated.
- Prohibit investment in securities of any kind if the corporate credit union's risk management department and investment department, or either department individually, are unable to

perform an independent assessment of the valuation and risk sensitivity of the instrument. The models and assumptions used in this assessment must be available on demand and must be re-assessed at least every two years.

Kamakura believes that the proposed regulations can be greatly improved by the above changes.

Contact information:
Comments and questions concerning this Impact Analysis are welcome.

Please direct them to David Boldon, dboldon@kamakuraco.com, at 1-808-791-9888.

Dr. Sean Patrick Klein
Mr. David Boldon
Dr. Robert Jarrow
Dr. Donald R. van Deventer

Kamakura Corporation
2222 Kalakaua Avenue, Suite 1400
Honolulu, Hawaii 96815