Credit Suisse Non-Agency RMBS Models

Executive Summary

Credit Suisse non-agency RMBS collateral models cover Subprime (including Subprime Second Liens), ALT-A, Prime Jumbo, Option ARM and Prime Second Lien products. These models project prepayment, default, and loss severity. Models are run at the loan level, and the results are aggregated at a security level.

Under each product type, our model consists of sub-models:

- Sub-models based on loan rate and term types: Fixed Rate, 2/28 ARM, 3/27 ARM, 5/25 ARM
- Sub-models based on loan delinquency statuses: Current, 30-day Delinquency, 60-day Delinquency, 90+ days delinquency, Foreclosure, REO
- Default models for current loans consist of two stages: current to 90 days delinquency, and 90 days delinquency to default

The loan rate/term types and loan delinquency statuses are key differentiation factors for loan performance going forward. Furthermore, they exhibit a distinctive set of risk factors and sensitivity to these risk factors. These sub-models help to make model estimation robust and efficient.

Each sub-model (for example, Alt-A Fixed rate default model for current loans) utilizes a host of variables:

- Macro Economic variables: mortgage rates, house price indices, unemployment rate and their histories
  - Case-Shiller House price indices (HPI) are utilized at the zip code level, where possible; Unemployment rates are utilized at the MSA level
- Loan status: current delinquency status and recent 12-month performance history
- Loan variables: terms, amount, age, rates, reset, IO term, prepayment penalty term, loan purpose, loan-to-value ratio
- Property variables: property type, location
- Borrower variables: user's original FICO, Debt-to-income ratio, availability of documentation of income and assets
- Our model also incorporates the effects of changing credit underwriting standards, as well as recent extension of foreclosure and liquidation timelines.

Model projections are based on future home price appreciation (HPA) and unemployment rate change assumptions. Currently for the Non-Agency bond Analyzer, we use 4 HPA scenarios (base, stress, optimistic, and Economy.com forecast scenarios) and one unemployment rate scenario.
## Exhibit 1: HPA and Unemployment Rate scenarios

<table>
<thead>
<tr>
<th>HPA Scenario</th>
<th>Base</th>
<th>Stress</th>
<th>Optimistic</th>
<th>Economy.com *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Home Price Change (%)</td>
<td>-5</td>
<td>-10</td>
<td>0</td>
<td>-3.1</td>
</tr>
<tr>
<td>Year 1</td>
<td>0</td>
<td>-5</td>
<td>3</td>
<td>2.7</td>
</tr>
<tr>
<td>Year 2</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>7.0</td>
</tr>
<tr>
<td>Year 3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>6.6</td>
</tr>
<tr>
<td>Year 4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4.4</td>
</tr>
<tr>
<td>Year 5</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>18.3%</td>
</tr>
<tr>
<td>Cumulative 5 year</td>
<td>3.8%</td>
<td>-9.3%</td>
<td>12.6%</td>
<td></td>
</tr>
</tbody>
</table>

*updated on monthly basis

### Cumulative Unemployment Rate Change(%)

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
<th>Year 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>-0.7</td>
<td>-1.4</td>
<td>-2.4</td>
<td>-3.4</td>
<td>-4.4</td>
<td>-4.4</td>
</tr>
</tbody>
</table>

Source: Credit Suisse

Our model defines default as a transition from delinquency to REO or as a short sale with a loss. The main drivers for default are:

- Original combined LTV and cumulative HPA
- Payment history
- HPA momentum
- Cumulative unemployment rate change
- Original FICO scores
- Documentation and Occupancy status
- ARM terms, IO term and payment shocks
- Loan modifications

A prepayment occurs when a loan pays off (other than from the REO status) with no loss. Borrowers prepay mortgage loans for home sales, rate related refinancing, and cashout refinancing. The main prepayment drivers are:

- Credit underwriting standards
- Loan age, ARM terms, IO terms, prepayment penalty terms
- Original combine LTV and cumulative HPA
- Seasonality

Loss severity or loss given default is measured by net loss divided by the outstanding balance of a loan at liquidation. The magnitude of loss severity depends on how a loan is liquidated. The loss severity model has three components: property value at liquidation, interest carry and disposition expenses. The main drivers for loss severity are:

- Current LTV
- Servicer Advances and Liquidation timeline
- Current Balance
- Property Type and Occupancy status
- Mortgage Insurance

These model drivers and model performances are discussed in detail in the model documentation.
# Credit Suisse Non-Agency Default, Prepayment and Severity Models

## Introduction

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model Framework</td>
<td>5</td>
</tr>
<tr>
<td>Model Overview</td>
<td>5</td>
</tr>
<tr>
<td>Analysis of Default Drivers</td>
<td>9</td>
</tr>
<tr>
<td>Original Combined LTV and Cumulative HPA</td>
<td>9</td>
</tr>
<tr>
<td>Payment history</td>
<td>10</td>
</tr>
<tr>
<td>HPA Momentum</td>
<td>11</td>
</tr>
<tr>
<td>Cumulative Unemployment Rate Change</td>
<td>12</td>
</tr>
<tr>
<td>Original FICO score</td>
<td>12</td>
</tr>
<tr>
<td>Documentation and Occupancy</td>
<td>13</td>
</tr>
<tr>
<td>Hybrid ARM, IO products</td>
<td>13</td>
</tr>
<tr>
<td>Seasoning</td>
<td>14</td>
</tr>
<tr>
<td>Loan Modification</td>
<td>14</td>
</tr>
<tr>
<td>Default model performance</td>
<td>14</td>
</tr>
</tbody>
</table>

## Analysis of Prepayment Drivers

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline prepayment curves and Prepayment Penalties</td>
<td>16</td>
</tr>
<tr>
<td>Cumulative Home Price Appreciation</td>
<td>17</td>
</tr>
<tr>
<td>Original Combined LTV</td>
<td>18</td>
</tr>
<tr>
<td>Seasonal Variation</td>
<td>18</td>
</tr>
<tr>
<td>Prepayment model performance</td>
<td>18</td>
</tr>
</tbody>
</table>

## Loss Severity Model

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current LTV</td>
<td>19</td>
</tr>
<tr>
<td>Servicer Advances and Liquidation Timeline</td>
<td>20</td>
</tr>
<tr>
<td>Current Balance</td>
<td>21</td>
</tr>
<tr>
<td>Property Type, Occupancy</td>
<td>21</td>
</tr>
<tr>
<td>Loan age at default</td>
<td>21</td>
</tr>
<tr>
<td>Mortgage Insurance</td>
<td>21</td>
</tr>
<tr>
<td>Loss Severity model performance</td>
<td>21</td>
</tr>
</tbody>
</table>
Introduction

Credit Suisse non-agency RMBS collateral models cover Subprime (including Subprime Second Liens), ALT-A, Prime Jumbo, Option ARM and Prime Second Lien products. These models project prepayment, default rates and loss severity.

These loan-level models were developed using First American CoreLogic loan level performance data. Case-Shiller home price indices at a zip code level, where possible, are used to estimate home price appreciation, local housing market momentum, and current loan-to-value ratio for loans. Given the significance of unemployment on credit performance, we incorporate granular MSA level unemployment data as another important macro economic driver to forecast performance. In addition, we model the general credit and underwriting standards changes and recent extension of foreclosure and liquidation timelines. Models are run at the loan level, and the results are aggregated at a security level.

Key model inputs at the loan level are loan, property and borrower information. Loan and property information includes current delinquency status, 12-month payment history, loan terms, loan amount, age, rates, prepayment penalties, loan-to-value ratio, property location, property type, and loan purpose. Borrower information includes FICO score, Debt to Income ratio.

In this paper, we will use the ALT-A model to illustrate our methodology, what the major default, prepayment, and severity drivers are, as well as other model assumptions and performance. The models for other products share a similar modeling framework and risk drivers. Our model is essentially a hybrid model, which utilizes a hazard regression model and roll rate techniques to achieve both model accuracy and speed.
Model Framework

Model Overview

Exhibit 2 shows the model structure. The key inputs to the models are loan delinquency status as well as loan rate and term types (i.e., fixed rates types, and various ARM types), in essence, we have sub-models for current and various delinquency statuses, as well as fixed rate loans and various ARM loans. The models then utilize other loan and borrower attributes (for example, FICO, LTV, loan delinquency history, etc.) and macro economic variables (for example, house price indices, and unemployment rates) to produce monthly prepayment, default, and loss forecasts. The reasons for constructing sub-models based on loan delinquency status, loan rate, and term types are two-fold:

1. These variables of borrower status and self-selection are key differentiation factors for loan performance going forward

2. They also exhibit a distinctive set of risk factors and sensitivity to these risk factors

As shown in Exhibit 2, default models for current loans are modeled in two stages: current to 90 days delinquent and 90 days delinquent to default. We take this approach because of the distinctive set of risk factors associated with each stage.

A default event is defined, when a delinquent loan goes into the real estate owned (REO) status (except for the Subprime model, where a default event is defined by liquidation). In addition, when a loan pays off (other than from REO) with a loss, it is treated as a default. In other words, short sales with a loss are treated as defaults.

After a loan defaults, it takes some time for a loan servicer to liquidate the property. This time span from default to liquidation varies greatly across different states. Other macroeconomic factors, such as REO properties backlog and home price changes, affect the liquidation timeline. These issues are modeled in a liquidation timeline sub-model.

Exhibit 3 lists loan performance drivers for each sub-model. They include static borrower and loan attributes, dynamic loan attributes as well as macroeconomic variables. They will be discussed in detail later in this document.
Exhibit 2: ALT-A Loan Level Model Structure

Note:
P: Prepayment Model;
D0: Current to 90 days delinquent model;
D1: Delinquent to Default Model;
L: Liquidation and Loss Severity model
Source: Credit Suisse
Future home price appreciation (HPA) and unemployment rate change are key drivers for our model projections. Currently for the Non-Agency bond Analyzer, we use four HPA scenarios (base, stress, optimistic, and Economy.com forecast scenarios) and one unemployment rate scenario. These assumptions are listed in Exhibit 4. The Economy.com scenario is updated on a monthly basis.
Exhibit 4: HPA and Unemployment Rate scenarios

<table>
<thead>
<tr>
<th>HPA Scenario</th>
<th>Annual Home Price Change (%)</th>
<th>Cumulative 5 year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Year 1</td>
<td>Year 2</td>
</tr>
<tr>
<td>Base</td>
<td>-5</td>
<td>0</td>
</tr>
<tr>
<td>Stress</td>
<td>-10</td>
<td>-5</td>
</tr>
<tr>
<td>Optimistic</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Economy.com *</td>
<td>-3.1</td>
<td>2.7</td>
</tr>
</tbody>
</table>

*updated on monthly basis

Cumulative Unemployment Rate Change(%)

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
<th>Year 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>-0.7</td>
<td>-1.4</td>
<td>-2.4</td>
<td>-3.4</td>
<td>-4.4</td>
<td>-4.4</td>
</tr>
</tbody>
</table>

Source: Credit Suisse

Liquidation timelines have extended significantly, especially in the subprime space, due primarily to procedural problems with processing foreclosures. Exhibit 5 shows the increasing number of months between a borrower’s last interest payment date and the liquidation date. The foreclosure moratorium, declining home prices and generally weak economic conditions have resulted in liquidation timelines going up from around 14 months to roughly 20 months over the past two years. Additionally, short-sales as a percentage of liquidations are rising. We have incorporated these effects by extending our base default timeline.

Exhibit 5: Recent default timeline

Source: Credit Suisse, CoreLogic
Analysis of Default Drivers

A default is defined as a transition from delinquency to REO or as a short sale with a loss. Borrowers default when:

- They are not able or not willing to make the scheduled payments due to a life event such as job loss, serious illness, divorce etc., and
- They cannot sell their homes without loss due to negative equity.

We use a set of static and dynamic attributes as well as macroeconomic factors to evaluate the ability and willingness of borrowers to make payments. On the home equity side, we use Case-Shiller home price indices at the Zip, CBSA, and state level to estimate mark-to-market house prices.

Home price changes and a borrower’s payment history are the key drivers of defaults. Other drivers include a borrower’s original FICO score, level of documentation at origination, unemployment rate change, and debt-to-income ratio.

Original Combined LTV and Cumulative HPA

The empirical studies show that the default propensity of mortgage borrowers has the strongest dependence on the original combined LTV (CLTV) and cumulative HPA. These findings are consistent with economic intuition. The original CLTV reflects how leveraged a borrower is, and cumulative HPA determines a borrower’s equity position. The amount of home equity measures the ability of the borrower to sell a home without a loss if unable or unwilling to make payments. Those two variables together with the amortization adjustment can be used to obtain the current CLTV, which is the single most important determination of default.

Exhibit 6 shows the effect of cumulative HPA and current CLTV on cumulative liquidation rate. Lower cumulative HPA or higher current CLTV results in higher defaults.

Exhibit 6: Effect of Cumulative HPA and Current LTV on liquidation rate, 12/1/2007 model run date

The model uses Moody’s Case-Shiller home price indices to estimate cumulative HPA. They are applied at the most granular level, in the hierarchical order from the zip code level, to CBSA level, to state level, based on availability of loan level data as well as home price indices data.
Payment history

In addition to current delinquency status, the loan’s payment history is an important risk indicator of future performance, for both current and delinquent loans. The model identifies the following variables to capture the effect of the payment history:

- number of missed payments
- number of consecutive missed payments
- number of months since last delinquency (for current loans only)
- current delinquency (for 90+ and Foreclosures only)
- maximum past delinquency

It is important to note the difference in performance, between borrowers who were always current on their payments ("clean current"), and those who are marked as current but have missed payments in the past ("dirty current"), as shown in Exhibit 7. Missed payments on current loans serve as an indicator of a borrower’s financial hardship in the past; although these borrowers have managed to catch up on their payments, their prior delinquency history increases their propensity to become delinquent again in the future. In addition, delinquency history helps in the modeling of modified loans, which generally have missed payments and have high re-default probability after modification.

Exhibit 7: Effect number of missed payments on liquidation rate, 12/1/2007 model run date

For seriously delinquent loans, the number of prior missed payments helps to identify consistently late borrowers. For example, a 60 days delinquent borrower, who only missed two payments is less risky when compared to a 60 days delinquent borrower, who consistently missed more payments. (Exhibit 7).

We combine the number of missed payments with the number of consecutively missed payments to distinguish between borrowers who have became delinquent recently and those who have been delinquent for a while. Number of consecutively missed payments itself helps us to identify whether the delinquency level is growing or shrinking. The higher the delinquency level, the more likely the borrower will default, as can be seen in Exhibit 8.
**Exhibit 8: Effect of payment history on default rate (Delinquent loans), 12/1/2007 model run date**

<table>
<thead>
<tr>
<th>ALT-A, Cum. Liquidation by # of consecutive missed payments</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 3</td>
</tr>
<tr>
<td>Date</td>
</tr>
<tr>
<td>0%</td>
</tr>
</tbody>
</table>

Source: Credit Suisse, CoreLogic

**HPA Momentum**

In addition to cumulative HPA, the HPA trend is also an important driver for default. The model uses the six-month HPA change (HPA momentum) to capture the current speed of home price changes in local markets. Loans with more positive HPA momentum have lower default probabilities. Especially important for delinquent loans, any positive home price movements increase chances that the borrower will be able to short-sell his property without a loss, thus driving default rates and losses down. Positive HPA momentum also increases the chances of curing for those borrowers who decided to default for strategic reasons (Exhibit 9).

For delinquent loans, the positive effect of the HPA momentum is correlated with the relative age. The longer a delinquent borrower stays in the delinquent status, the more likely he will eventually default even if home prices were going up over the past six months. Therefore, we gradually reduce the effect of positive HPA momentum on delinquent loans as they season. For 30 days delinquent loans, we use a 24-month ramp, for 60 days – 18-month and for 90+ delinquent borrowers, we use a 12-month ramp.

**Exhibit 9: Effect of HPA momentum on liquidation rate, 12/1/2007 model run date**

<table>
<thead>
<tr>
<th>ALT-A, Cum. Liquidation by HPA momentum</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;= -15%</td>
</tr>
<tr>
<td>loan age</td>
</tr>
<tr>
<td>0%</td>
</tr>
</tbody>
</table>

Source: Credit Suisse, CoreLogic
Cumulative Unemployment Rate Change

Job loss is another major default driver. Although we cannot forecast when or if a particular borrower loses his/her job, we use the cumulative unemployment rate change at the CBSA level since loan origination to estimate the likelihood of job loss. Because of the correlation between the unemployment rate and HPA, the impact of unemployment on default probability is modeled as a residual effect in addition to HPA risk factors. (Exhibit 10).

Exhibit 10: Effect of Cumulative Unemployment Rate change on liquidation rate, 12/1/2007 model run date

Original FICO score

FICO score, one of the commonly used credit scores, measures a borrower’s probability of becoming 90+ days delinquent on a consumer loan. It is a strong indicator of a borrower’s credit quality. While using updated FICO scores will improve forecasts for individual loans, often only original FICO scores are available for seasoned loans and securities. Because of the high correlation between original credit scores and updated credit scores, our research found that the improvement by using updated credit scores at the security level (where there are many loans) is marginal.

The FICO effect differs for different delinquency statuses. As a loan becomes delinquent, the predictive power of FICO declines as the recent payment history becomes more important. It is interesting to note that delinquent loans with high original FICO scores are more likely to default as shown in Exhibit 11. Data show that borrowers with higher end FICO (higher than 740) are less likely to be delinquent, but once they become delinquent, it is relatively harder for them to recover compared to borrowers with 720–740 FICO scores. Here, “going delinquent” for a borrower with a high FICO score indicates either severe financial hardship or a strategic decision to walk away from the loan.
Documentation and Occupancy

Loans with low documentation or no income verification perform significantly worse than full documentation loans. Low documentation correlates with exaggerated income and asset levels, and potential fraud, thus leading to a high default rate.

Loans backed by the primary residence are less risky than investment property loans. Borrowers are generally more psychologically and emotionally attached to a primary residence than to investment properties. Investors may be more ruthless in exercising their default option when it becomes clear that they have little or no equity.

Hybrid ARM, IO products

Borrowers self-select by the mortgage product they choose. Mortgage products with low initial monthly payments, such as hybrid ARM loans, interest-only (IO) loans or Option ARM loans signal an over-stretched financial condition and borrower’s expectation for future house price growth. These risk factors typically lead to worse credit performance compared to regular level pay loans despite having higher FICO scores and larger balances (Exhibit 12).

Exhibit 12: IO loans characteristics as of March 2011 distribution

<table>
<thead>
<tr>
<th>Sector</th>
<th>IO type</th>
<th>Average Orig. Balance</th>
<th>Average FICO</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALT A</td>
<td>Non-IO</td>
<td>221,657</td>
<td>709</td>
</tr>
<tr>
<td></td>
<td>IO</td>
<td>330,186</td>
<td>713</td>
</tr>
<tr>
<td>Prime</td>
<td>Non-IO</td>
<td>507,753</td>
<td>733</td>
</tr>
<tr>
<td></td>
<td>IO</td>
<td>539,899</td>
<td>736</td>
</tr>
<tr>
<td>Option ARM</td>
<td>Non-IO</td>
<td>385,120</td>
<td>705</td>
</tr>
<tr>
<td></td>
<td>IO</td>
<td>382,219</td>
<td>716</td>
</tr>
<tr>
<td>Subprime</td>
<td>Non-IO</td>
<td>159,463</td>
<td>618</td>
</tr>
<tr>
<td></td>
<td>IO</td>
<td>249,778</td>
<td>657</td>
</tr>
</tbody>
</table>

Source: Credit Suisse, CoreLogic, 1010
Another important risk factor for these loans is “payment shock.” A borrower’s monthly mortgage payment may increase sharply when initial low rates for hybrid ARM and Option ARM loans reset to higher rates, or when loans start to amortize when the initial IO periods end and Option ARMs recast. Exhibit 13 shows the effect of payment shocks on default probability. They sharply increase delinquency and default probabilities immediately after the onset of “payment shocks.” Effects diminish gradually when loans survive these shocks.

Exhibit 13: Effect of IO reset on CDR (base case HPI)

![Graph showing effect of payment increase after IO reset and ALTA Fixed rate 5yr IO, age<60 (current only)](image)

Source: Credit Suisse

Seasoning

Assuming a reasonable credit underwriting process, borrowers do not typically default immediately after a loan is originated. Default probability gradually increases as various risk factors influence a borrower’s credit profile. Deterioration of credit takes time as mortgages go from current to delinquent and seriously delinquent. The “default timing curve” measures this gradual increase of default probability for current loans, and is a function of loan age at the time the forecasts are made.

Loan Modification

In the current version of our model, if a loan is modified from a delinquent status to current, it is treated as a dirty current loan. Its re-default probability is estimated by using its payment history and original attributes.

Default model performance

Exhibit 14 shows sample default model performance for 5/25 hybrid ARM and fixed ALT-A loans. The sample data are outstanding loans as of December 2007. With loan level information as of 12/1/2007, including payment history at a loan level, model forecasts are made for forward 40 months with macro economic variable inputs, for example, house prices indices, unemployment rate, etc. The forecasted cumulative default rates are compared with actual performance. Results for sample vintages of 2005, 2006 and 2007 ALT-A loan cohorts are shown and they are generally in-line with actual performance.
Exhibit 14: Predicted Cumulative Liquidation vs. actual, 12/1/2007 model run date

Source: Credit Suisse, CoreLogic
Analysis of Prepayment Drivers

A prepayment occurs when a loan pays off (other than from the REO status) with no loss. Therefore, transitions from 60/90+ days delinquent to pay off with no loss will be treated as prepayments in our model.

Borrowers prepay mortgage loans for several reasons:

- **Rate Refinancing.** Borrowers refinance out of an existing loan into a new one in order to lower their monthly payments. This may take the form of a new loan with a lower coupon when the market rate drops or a borrower’s credit cures. Prior to 2007 affordability products, such as an IO loan or balloon loans with 30-year and 40-year amortization schedules, were popular. However, since the housing crash in 2007, affordable mortgage products have disappeared from the market, and underwriting standards have tightened. This has muted the refinance response even for the best borrowers. For borrowers in the non-agency sector, who usually have some combination of lower credit scores, difficulty in documenting income and assets, higher debt-to-income ratios, and history of missed mortgage payment, there have been few or no funding alternatives.

- **Cash-Out Refinancing.** In a cash-out refinance, borrowers take out a new loan with a higher loan amount, in order to access their equity in the property. The ability to cash-out is a key driver of prepayments among subprime and ALT-A borrowers. However, the sharp decline in home prices, since 2007 has left many non-agency homeowners in a negative equity position. Less equity along with much tighter underwriting standards has resulted in much lower levels of cash or refinancing.

- **Housing Turnover.** Mortgage prepayments also result from home sales. The overall turnover level is calculated as a percentage of sales of existing homes divided by the total housing stock. The housing turnover level is mainly driven by loan seasoning, level of mortgage rates, housing and credit environment. It also has a seasonality component.

The prepayment model captures these components through factors such as delinquency status, cumulative HPA, HPA momentum, interest rate incentives and mortgage product features. The regime change from pre-2007 easy housing credit to the current tight mortgage underwriting environment means that the current prepayment drivers will be those that determine whether existing non-agency borrowers qualify for agency underwriting standards, (e.g., borrower credit quality, delinquency history, and available equity in the property).

Baseline prepayment curves and Prepayment Penalties

A typical baseline prepayment curve reflects prepayment speeds as a function of loan age. New mortgage loans prepay at a slower rate relative to seasoned loans because borrowers who have recently purchased or refinanced are less likely to sell the property in the near future. Therefore, speeds tend to ramp up gradually over time. Prepayment penalties, expiration of IO period and ARM mortgage rate resets also drive prepayment timing. Exhibit 15 shows sample timing curves for ALT-A ARMs and fixed rate mortgages with various prepay penalty terms.
Prepayment penalties are common features in Subprime, ALT-A and Option Arm loans, which greatly reduce prepayment speeds during the penalty period due to the additional costs involved with loan payoff. The majority of securitized non-agency loans with penalties have two or three-year penalty terms, which have already expired as of March 2011 distribution. However, approximately 56,000 of ALT-A loans and around 122,000 of Subprime loans outstanding as of March 2011 have five-year terms. For these upcoming expiration of prepayment penalties, models predict moderate prepayment spikes, except for subprime loans which lack alternative financing options.

Cumulative Home Price Appreciation

Having more equity in a property increases the chances that a borrower will qualify for a new loan when lower mortgage interest rates provide an incentive to refinance. In addition, it enables the borrower to take cash out to repay other debts, such as credit card debt bearing much higher rates compared to mortgages. Correspondingly, negative equity greatly reduces a borrower’s ability to refinance or extract equity (Exhibit 16). Home price depreciation also dampens housing turnover by reducing a borrower’s ability to move.
Original Combined LTV

Similar to the default model, we use cumulative HPA along with the original CLTV to capture the effect of home price changes on the prepayment probabilities. High CLTV is strongly correlated with negative equity in a weak housing market. Even if home prices do not change, high CLTV loans have much less ability to prepay (Exhibit 16), as lenders are not willing to lend money to borrowers with little equity in the property.

Seasonal Variation

Housing turnover has a distinctive seasonal pattern with highs occurring in summer and lows in winter. Housing turnover seasonality factors are shown in Exhibit 17.

Exhibit 17: Seasonal multiplier

ALT-A ARM 5/25 CPR multiplier, January is the base

Source: Credit Suisse, CoreLogic

Prepayment model performance

Exhibit 18 shows sample model performance for the prepayment model. The sample data and methodology are the same as used in the default model section. It compares the actual and projected cumulative prepayment for various vintage ALT-A loan cohorts.

Exhibit 18: Predicted Cumulative Prepayment vs. actual, 12/1/2007 model run date

Source: Credit Suisse, CoreLogic
Loss Severity Model

Loss severity or loss given default is measured by net loss divided by the outstanding balance of a loan at liquidation. The magnitude of loss severity depends on how a loan is liquidated. Typically, when a loan becomes delinquent, the servicer contacts the borrower and tries to find the best course of action that will maximize the net present value of the loan. If the borrower is not able to make payments or is not willing to do so, the borrower may try to sell (short sale) the property to pay off the outstanding balance. This can be done more easily if the borrower has positive equity. If the borrower is under water and is not able to short sell his property, the servicer will initiate a foreclosure process, which is more costly compared to a short sale, thereby increasing loss severity.

Loss severity consists of three components:

- **Property value at liquidation.** The difference between the property value and the unpaid balance is a key determinant of severity.
- **Interest carry.** Typically servicers advance interest and principal to the trust on delinquent loans. When the property gets liquidated, the servicer needs to be reimbursed for these expenses.
- **Disposition expenses.** This can be split into fixed costs (such as appraisal, title search, legal expenses, brokerage costs and taxes) and variable costs, which depend on the length of the liquidation process (insurance, property taxes and maintenance expenses).

Drivers for loss severity are discussed in the following sections.

### Current LTV

The liquidation value of the property at default is estimated using Moody’s house price indices, and combined with loan amortization, estimates the current LTV for the default loan. Higher current LTV leads to a higher loss severity. Exhibit 19 shows the severity levels and model performance for ALT-A loans in various CLTV buckets.

**Exhibit 19: Effect of Current LTV on Severity, 12/1/2007 model run date**

Source: Credit Suisse, CoreLogic
Servicer Advances and Liquidation Timeline

The amount of interest carry owed to the servicer depends on the number of missed payments, and whether the servicer advances interest and principal as well as the coupon rate on the loan. The number of missed payments in turn, depends on the liquidation timeline. States generally have different foreclosure laws and timelines, and therefore liquidation timelines are state specific. Foreclosures in states adhering to strict judicial foreclosure processes take much longer and incur greater expenses, and hence have higher severities. The severity model takes all of these factors into account.

Loan coupon rates and the number of missed payments directly enter our severity model. Higher coupon rates and the greater number of missed payments result in higher severities, conditional on the servicer advancing interest and principal. The future coupon rates for ARM loans are forecasted based on the forward rates, index types, margins and reset schedules. A user is also given an option to enable or disable servicer advancing for a specific servicer.

To forecast the number of missed payments, first we take into account the realized number of missed payments, if any. Second, we use our estimated liquidation timeline to define when the loan will be liquidated, which will drive the future number of missed payments.

We model the total liquidation timeline through two components. The first component is estimated delinquent to default timeline. The second component is estimated default to liquidation timeline (effectively, time in REO). Time in REO not only contributes to interest carry cost but also is a key driver of variable disposition costs, such as insurance and maintenance costs.

The longer liquidation timelines automatically result in higher interest carry costs and higher severities (Exhibit 20). For loans that are already in REO status, the liquidation timeline becomes conditional on the number of months they have been in REO. The longer a loan stays in REO, the more likely it will be liquidated sooner rather than later.

Exhibit 20: Loss Severity drivers, 12/1/2007 model run date

Source: Credit Suisse, CoreLogic
Current Balance

In order to account for the fixed costs in loan disposition, the model uses current loan balance as a driver for loss severities. Controlling for LTV, loans with smaller balances have higher severities (Exhibit 21). This is due to fixed disposition costs such as legal fees, property inspection etc. representing a greater percentage of smaller loan amounts. Servicers may also apply greater loss mitigation efforts for larger loans.

Exhibit 21: Loss Severity drivers (continued), 12/1/2007 model run date

Source: Credit Suisse, CoreLogic

Property Type, Occupancy

Multifamily properties have significantly higher loss severities due to their unique property characteristics (Exhibit 21). Non-owner occupied properties also have higher severities due to the potential lack of maintenance.

Loan age at default

Seasoned loans may have higher severities as the passage of time will make houses more prone to poor maintenance, which is more common among defaulted loans.

Mortgage Insurance

In the past, loans covered by private mortgage insurance (PMI) had lower loss severities and the percentage of PMI coverage was used to reduce the base loss severity projection. However, after the credit crisis, PMI companies’ financial condition and business practices have put in doubt the effectiveness of the mortgage insurance industry. Therefore, our severity model makes the PMI adjustment firm-specific and selectively disables PMI coverage for loans covered by policies from insurers with high rescission rates. An exception is made for Prime Jumbo loans as the rescission rates are low for that sector due to the small amount of fraud and misrepresentations.

Loss Severity model performance

Exhibit 22 shows our severity model performance for sample ALT-A loans liquidated prior to 2011. The sample excludes the loans with PMI coverage. The model is generally in-line with actual severity performance.
Exhibit 22: Predicted Loss Severity vs. actual by loss date and loan vintage

Source: Credit Suisse, CoreLogic
Exhibit 23: Projected Cumulative Loss, March 2011 cut-off date

<table>
<thead>
<tr>
<th>Product</th>
<th>Issue Year</th>
<th>Current Balance</th>
<th>% of 60+ (OTS)</th>
<th>Realized Loss</th>
<th>Cum Loss (base)</th>
<th>Cum Loss (stress)</th>
<th>Cum Loss (Economy.com)</th>
<th>Cum Loss (optimistic)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUBPRIME</td>
<td>1997</td>
<td>$36,154,497</td>
<td>1.55%</td>
<td>17.38%</td>
<td>3.57%</td>
<td>10.39%</td>
<td>14.26%</td>
<td>8.60%</td>
</tr>
<tr>
<td></td>
<td>1998</td>
<td>$140,702,018</td>
<td>1.95%</td>
<td>20.22%</td>
<td>5.39%</td>
<td>12.59%</td>
<td>17.77%</td>
<td>10.08%</td>
</tr>
<tr>
<td></td>
<td>1999</td>
<td>$348,022,311</td>
<td>3.17%</td>
<td>22.76%</td>
<td>5.26%</td>
<td>14.70%</td>
<td>19.86%</td>
<td>12.11%</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>$403,219,517</td>
<td>3.35%</td>
<td>30.99%</td>
<td>7.87%</td>
<td>21.78%</td>
<td>28.82%</td>
<td>17.97%</td>
</tr>
<tr>
<td></td>
<td>2001</td>
<td>$1,590,867,073</td>
<td>3.61%</td>
<td>23.73%</td>
<td>4.69%</td>
<td>24.94%</td>
<td>32.74%</td>
<td>20.65%</td>
</tr>
<tr>
<td></td>
<td>2002</td>
<td>$3,409,421,352</td>
<td>4.18%</td>
<td>23.25%</td>
<td>3.27%</td>
<td>27.65%</td>
<td>35.77%</td>
<td>23.12%</td>
</tr>
<tr>
<td></td>
<td>2003</td>
<td>$11,613,908,575</td>
<td>7.44%</td>
<td>19.09%</td>
<td>2.51%</td>
<td>23.33%</td>
<td>29.80%</td>
<td>20.11%</td>
</tr>
<tr>
<td></td>
<td>2004</td>
<td>$34,251,566,411</td>
<td>10.92%</td>
<td>26.94%</td>
<td>3.42%</td>
<td>32.25%</td>
<td>38.94%</td>
<td>27.92%</td>
</tr>
<tr>
<td></td>
<td>2005</td>
<td>$79,932,364,666</td>
<td>13.82%</td>
<td>30.99%</td>
<td>7.87%</td>
<td>21.78%</td>
<td>28.82%</td>
<td>17.97%</td>
</tr>
<tr>
<td></td>
<td>2006</td>
<td>$143,208,415,161</td>
<td>16.77%</td>
<td>30.99%</td>
<td>7.87%</td>
<td>21.78%</td>
<td>28.82%</td>
<td>17.97%</td>
</tr>
<tr>
<td></td>
<td>2007</td>
<td>$357,107,859</td>
<td>33.66%</td>
<td>30.99%</td>
<td>7.87%</td>
<td>21.78%</td>
<td>28.82%</td>
<td>17.97%</td>
</tr>
<tr>
<td></td>
<td>2008</td>
<td>$1,288,727,839</td>
<td>44.08%</td>
<td>30.99%</td>
<td>7.87%</td>
<td>21.78%</td>
<td>28.82%</td>
<td>17.97%</td>
</tr>
</tbody>
</table>

| ALT-A   | 2001       | $118,770,744  | 1.48%          | 19.84%       | 0.53%          | 7.23%            | 9.28%                  | 7.03%                 |
|         | 2002       | $1,417,460,738| 4.59%          | 11.54%       | 0.60%          | 8.06%            | 10.23%                 | 7.64%                 |
|         | 2003       | $12,849,105,007| 17.22%         | 7.19%        | 0.43%          | 5.56%            | 7.15%                  | 5.55%                 |
|         | 2004       | $35,293,984,787| 21.25%         | 12.69%       | 1.32%          | 13.68%           | 16.46%                 | 13.73%                |
|         | 2005       | $109,772,876,507| 37.06%         | 19.07%       | 4.62%          | 37.11%           | 40.92%                 | 34.29%                |
|         | 2006       | $124,855,915,178| 42.87%         | 30.99%       | 7.87%          | 21.78%           | 28.82%                 | 17.97%                |
|         | 2007       | $390,838,310,577| 37.89%         | 30.99%       | 7.87%          | 21.78%           | 28.82%                 | 17.97%                |

| PRIME    | 2001       | $237,865,277  | 5.39%          | 3.03%        | 0.06%          | 1.17%            | 1.48%                  | 1.15%                 |
|          | 2002       | $2,243,349,161| 3.43%          | 5.03%        | 0.05%          | 1.63%            | 2.14%                  | 1.60%                 |
|          | 2003       | $30,006,972,610| 14.11%         | 3.60%        | 0.07%          | 1.17%            | 1.53%                  | 1.27%                 |
|          | 2004       | $38,280,657,337| 22.03%         | 6.29%        | 0.30%          | 3.57%            | 4.48%                  | 3.90%                 |
|          | 2005       | $70,336,739,570| 39.96%         | 8.93%        | 0.98%          | 6.93%            | 8.34%                  | 7.53%                 |
|          | 2006       | $6,111,545,872 | 26.17%         | 6.29%        | 0.30%          | 3.57%            | 4.48%                  | 3.90%                 |
|          | 2007       | $606,330,701   | 63.11%         | 22.23%       | 6.62%          | 25.37%           | 28.89%                 | 22.83%                |
|          | 2008       | $97,305,402    | 93.67%         | 0.33%        | 0.00%          | 16.01%           | 20.39%                 | 14.25%                |

| OPTION-ARM | 2001 | $36,626,254 | 1.65% | 13.82% | 0.00% | 3.28% | 4.25% | 4.04% |
|            | 2002 | $198,158,446 | 4.23% | 6.73%  | 0.03% | 1.63% | 2.10% | 1.84% |
|            | 2003 | $49,627,122 | 7.73% | 18.20% | 0.35% | 13.68% | 16.46% | 13.73% |
|            | 2004 | $38,280,657,337 | 22.03% | 6.29% | 0.30% | 3.57% | 4.48% | 3.90% |
|            | 2005 | $70,336,739,570 | 39.96% | 8.93% | 0.98% | 6.93% | 8.34% | 7.53% |
|            | 2006 | $6,111,545,872 | 26.17% | 6.29% | 0.30% | 3.57% | 4.48% | 3.90% |
|            | 2007 | $606,330,701 | 63.11% | 22.23% | 6.62% | 25.37% | 28.89% | 22.83% |
|            | 2008 | $97,305,402 | 93.67% | 0.33% | 0.00% | 16.01% | 20.39% | 14.25% |

| HPA scenarios: | (1) Base: HPA -5 0 3 3 3 3; (2) Stress: HPA -10 -5 0 3 3 3; (3) Economy.com HPA forecast; (4) Optimistic: HPA 0 3 3 3 3 |

Source: Credit Suisse
GLOBAL SECURITIZED PRODUCTS RESEARCH

Dale Westhoff, Managing Director
Global Head of Securitized Products Research
+1 212 325 4203
dale.westhoff@credit-suisse.com

Eric Miller, Managing Director
Global Head of Fixed Income and Economic Research
+1 212 538 6480
eric.miller.3@credit-suisse.com

NORTH AMERICA

ABS / RMBS
Chandrajit Bhattacharya, Director
Senior Strategist, Group Head
+1 212 325 1546
chandrajit.bhattacharya@credit-suisse.com

Aashish Marfatia, Vice President
+1 212 325 4142
aashish.marfatia@credit-suisse.com

Thomas Suehr, Vice President
+1 212 325 3683
thomas.suehr@credit-suisse.com

CMBS
Serif Ustun, Vice President
+1 212 538 4582
serif.ustun@credit-suisse.com

Sylvain Jousseaume, Vice President
+1 212 325 1356
sylvain.jousseaume@credit-suisse.com

Tee Chew, Associate
+1 212 325 8703
tee.chew@credit-suisse.com

CDO / CLO
David Yan, Director
+1 212 325 5792
david.yan@credit-suisse.com

MODELLING AND ANALYTICS

David Zhang, Managing Director
Group Head
+1 212 325 2783
david.zhang@credit-suisse.com

Yihai Yu, Vice President
+1 212 325 1143
yihai.yu@credit-suisse.com

Locating and Analyzing

Taek Choi, Vice President
+1 212 538 0525
taek.choi@credit-suisse.com

Joy Zhang, Vice President
+1 212 325 5702
joy.zhang@credit-suisse.com

Oleg Koriachkin, Vice President
+1 212 325 0578
oleg.koriachkin@credit-suisse.com

Tony Tang, Vice President
+1 212 325 2804
tony.tang@credit-suisse.com

LOCUS MARKETING

Brian Bailey, Vice President
+1 212 325 0182
brian.bailey@credit-suisse.com

Shana Bornstein, Associate

LONDON

Carlos Diaz, Associate
+44 20 7888 2414
carlos.diaz@credit-suisse.com

JAPAN

Tomohiro Miyasaka, Director
Japan Head
+81 3 4550 7171
tomohiro.miyasaka@credit-suisse.com
Disclosure Appendix

Analyst Certification
The analysts identified in this report each certify, with respect to the companies or securities that the individual analyzes, that (1) the views expressed in this report accurately reflect his or her personal views about all of the subject companies and securities and (2) no part of his or her compensation was, is or will be directly or indirectly related to the specific recommendations or views expressed in this report.

Important Disclosures
Credit Suisse's policy is only to publish investment research that is impartial, independent, clear, fair and not misleading. For more detail, please refer to Credit Suisse's Policies for Managing Conflicts of Interest in connection with Investment Research: http://www.csfb.com/research-and-analytics/disclaimer/managing_conflicts_disclaimer.html

Credit Suisse's policy is to publish research reports as it deems appropriate, based on developments with the subject issuer, the sector or the market that may have a material impact on the research views or opinions stated herein.

The analyst(s) involved in the preparation of this research report received compensation that is based upon various factors, including Credit Suisse's total revenues, a portion of which are generated by Credit Suisse's Investment Banking and Fixed Income Divisions.

Credit Suisse may trade as principal in the securities or derivatives of the issuers that are the subject of this report.

At any point in time, Credit Suisse is likely to have significant holdings in the securities mentioned in this report.

As at the date of this report, Credit Suisse acts as a market maker or liquidity provider in the debt securities of the subject issuer(s) mentioned in this report. For important disclosure information on securities recommended in this report, please visit the website at https://iresearchdisclosure.credit-suisse.com or call +1-212-538-7625.

For the history of any relative value trade ideas suggested by the Fixed Income research department as well as fundamental recommendations provided by the Emerging Markets Sovereign Strategy Group over the previous 12 months, please view the document at http://research-and-analytics.csfb.com/docpopup.asp?ctbdocid=330703_1_en. Credit Suisse clients with access to the Locus website may refer to http://www.credit-suisse.com/locus.

For the history of recommendations provided by Technical Analysis, please visit the website at http://www.credit-suisse.com/techanalysis.

Credit Suisse does not provide any tax advice. Any statement herein regarding any US federal tax is not intended or written to be used, and cannot be used, by any taxpayer for the purposes of avoiding any penalties.

Emerging Markets Bond Recommendation Definitions
Buy: Indicates a recommended buy on our expectation that the issue will deliver a return higher than the risk-free rate.
Sell: Indicates a recommended sell on our expectation that the issue will deliver a return lower than the risk-free rate.

Corporate Bond Fundamental Recommendation Definitions
Buy: Indicates a recommended buy on our expectation that the issue will be a top performer in its sector.
Outperform: Indicates an above-average total return performer within its sector. Bonds in this category have stable or improving credit profiles and are undervalued, or they may be weaker credits that, we believe, are cheap relative to the sector and are expected to outperform on a total-return basis. These bonds may possess price risk in a volatile environment.
Market Perform: Indicates a bond that is expected to return average performance in its sector.
Underperform: Indicates a below-average total-return performer within its sector. Bonds in this category have weak or worsening credit trends, or they may be stable credits that, we believe, are overvalued or rich relative to the sector.
Sell: Indicates a recommended sell on the expectation that the issue will be among the poor performers in its sector.
Restricted: In certain circumstances, Credit Suisse policy and/or applicable law and regulations preclude certain types of communications, including an investment recommendation, during the course of Credit Suisse's engagement in an investment banking transaction and in certain other circumstances.
Not Rated: Credit Suisse Global Credit Research or Global Leveraged Finance Research covers the issuer but currently does not offer an investment view on the subject issue.
Not Covered: Neither Credit Suisse Global Credit Research nor Global Leveraged Finance Research covers the issuer or offers an investment view on the issue or any securities related to it. Any communication from Research on securities or companies that Credit Suisse does not cover is factual or a reasonable, non-material deduction based on an analysis of publicly available information.

Corporate Bond Risk Category Definitions
In addition to the recommendation, each issue may have a risk category indicating that it is an appropriate holding for an "average" high yield investor, designated as Market, or that it has a higher or lower risk profile, designated as Speculative and Conservative, respectively.

Credit Suisse Credit Rating Definitions
Credit Suisse may assign rating opinions to investment-grade and crossover issuers. Ratings are based on our assessment of a company's creditworthiness and are not recommendations to buy or sell a security. The ratings scale (AAA, AA, A, BBB, BB, B) is dependent on our assessment of an issuer's ability to meet its financial commitments in a timely manner. Within each category, creditworthiness is further detailed with a scale of High, Mid, or Low – with High being the strongest sub-category rating: High AAA, Mid AAA, Low AAA – obligor's capacity to meet its financial commitments is extremely strong; High AA, Mid AA, Low AA – obligor's capacity to meet its financial commitments is very strong; High A, Mid A, Low A – obligor's capacity to meet its financial commitments is strong; High BB, Mid BB, Low BB – obligor's capacity to meet its financial commitments is adequate, but adverse economic/operating/financial circumstances are more likely to lead to a weakened capacity to meet its obligations; High BB, Mid BB, Low BB – obligor's capacity to meet its financial commitments is very weak and highly vulnerable to adverse economic, operating, and financial circumstances; High CCC, Mid CCC, Low CCC – obligor's capacity to meet its financial commitments is extremely weak and is dependent on favorable economic, operating, and financial circumstances. Credit Suisse's rating opinions do not necessarily correlate with those of the rating agencies.
Structured Securities, Derivatives, and Options Disclaimer

Structured securities, derivatives, and options (including OTC derivatives and options) are complex instruments that are not suitable for every investor, may involve a high degree of risk, and may be appropriate investments only for sophisticated investors who are capable of understanding and assuming the risks involved. Supporting documentation for any claims, comparisons, recommendations, statistics or other technical data will be supplied upon request. Any trade information is preliminary and not intended as an official transaction confirmation.

OTC derivative transactions are not highly liquid investments; before entering into any such transaction you should ensure that you fully understand its potential risks and rewards and independently determine that it is appropriate for you given your objectives, experience, financial and operational resources, and other relevant circumstances. You should consult with such tax, accounting, legal or other advisors as you deem necessary to assist you in making these determinations. In discussions of OTC options and other strategies, the results and risks are based solely on the hypothetical examples cited; actual results and risks will vary depending on specific circumstances. Investors are urged to consider carefully whether OTC options or option-related products, as well as the products or strategies discussed herein, are suitable to their needs.

CS does not offer tax or accounting advice or act as a financial advisor or fiduciary (unless it has agreed specifically in writing to do so). Because of the importance of tax considerations to many option transactions, the investor considering options should consult with his/her tax advisor as to how taxes affect the outcome of contemplated options transactions.

Use the following link to read the Options Clearing Corporation’s disclosure document: http://www.theocc.com/publications/risks/riskstoc.pdf

Transaction costs may be significant in option strategies calling for multiple purchases and sales of options, such as spreads and straddles. Commissions and transaction costs may be a factor in actual returns realized by the investor and should be taken into consideration.

Backtested, Hypothetical or Simulated Performance Results

Backtested, hypothetical or simulated performance results have inherent limitations. Unlike an actual performance record based on trading actual client portfolios, simulated results are achieved by means of the retroactive application of a backtested model itself designed with the benefit of hindsight. Backtested performance does not reflect the impact that material economic or market factors might have on an adviser’s decision-making process if the adviser were actually managing a client's portfolio. The backtesting of performance differs from actual account performance because the investment strategy may be adjusted at any time, for any reason, and can continue to be changed until desired or better performance results are achieved. The backtested performance includes hypothetical results that do not reflect the reinvestment of dividends and other earnings or the deduction of advisory fees, brokerage or other commissions, and any other expenses that a client would have paid or actually paid. No representation is made that any account will or is likely to achieve profits or losses similar to those shown. Alternative modeling techniques or assumptions might produce significantly different results and prove to be more appropriate. Past hypothetical backtest results are neither an indicator nor guarantee of future returns. Actual results will vary, perhaps materially, from the analysis. As a sophisticated investor, you accept and agree to use such information only for the purpose of discussing with Credit Suisse your preliminary interest in investing in the strategy described herein.
Some investments discussed in this report may have a high level of volatility. High volatility investments may experience sudden and large falls in their value causing losses when that structured product should conduct their own investigation and analysis of the product and consult with their own professional advisers as to the risks involved in making such a purchase. Assuming the risks involved. The market value of any structured security may be affected by changes in economic, financial and political factors (including, but not limited to, spot and effectively assume this risk. Have a positive or adverse effect on the price or income of such securities or financial instruments. Investors in securities such as ADR’s, the values of which are influenced by currency volatility, difficulty for you to obtain reliable information about the value, or risks, to which such an investment is exposed. This report may provide the addresses of, or contain hyperlinks to, websites. Except to the extent the report refers to website material of CS, CS has not reviewed any such site and takes no responsibility for the content contained therein. Such address or hyperlink (including addresses or hyperlinks to CS’s own website material) is provided solely for your convenience and information and the content of any such website does not in any way form part of this document. Accessing such website or following such link through this report or CS’s website shall be at your own risk. This report is issued and distributed in Europe (except Switzerland) by Credit Suisse Securities (Europe) Limited, One Cabot Square, London E14 4QJ, England, which is regulated in the United Kingdom by The Financial Services Authority (‘FSA’). This report is distributed in Germany by Credit Suisse Securities (Europe) Limited Niederlassung Frankfurt am Main regulated by the Bundesanstalt fuer Finanzdienstleistungsaufsicht (‘BaFin’). This report is being distributed in the United States and Canada by Credit Suisse Securities (USA) LLC; in Switzerland by Credit Suisse AG; in Brazil by Banco De Investimentos Credit Suisse (Brazil) S.A.; in Mexico by Banco Credit Suisse (Mexico). S.A. (transactions related to the securities mentioned in this report can only be effected in compliance with applicable regulation); in Japan by Credit Suisse Securities (Japan) Limited, Financial Instruments Firm, Director-General of Kanto Local Finance Bureau (‘KoFi’). No. 66, a member of Japan Securities Dealers Association, The Financial Futures Association of Japan, Japan Securities Investment Advisers Association, Type II Financial Instruments Firms Association; elsewhere in Asia/ Pacific by whichever of the following is the appropriately authorised entity in the relevant jurisdiction: Credit Suisse (Hong Kong) Limited, Credit Suisse Equities (Australia) Limited, Credit Suisse Securities (Thailand) Limited, Credit Suisse Securities (Malaysia) Sdn Bhd, Credit Suisse AG, Singapore Branch, and elsewhere in the world by the relevant authorised affiliate of the above. Research on Taiwanese securities produced by Credit Suisse AG, Taipei Branch has been prepared by a registered Senior Business Person. Research provided to residents of Malaysia is authorised by the Head of Research for Credit Suisse Securities (Malaysia) Sdn Bhd, to whom they should direct any queries on +603 2723 2020. This research may not conform to Canadian disclosure requirements. In jurisdictions where CS is not already registered or licensed to trade in securities, transactions will only be effected in accordance with applicable securities legislation, which will vary from jurisdiction to jurisdiction and may require that the trade be made in accordance with applicable exemptions from registration or licensing requirements. Non-U.S. customers wishing to effect a transaction should contact a CS entity in their local jurisdiction unless governing law permits otherwise. U.S. customers wishing to effect a transaction should do so only by contacting a representative at Credit Suisse Securities (USA) LLC in the U.S. This material is not for distribution to retail clients and is directed exclusively at Credit Suisse's market professional and institutional clients. Recipients who are not market professional or institutional investor clients of CS should seek the advice of their independent financial advisor prior to taking any investment decision based on this report or for any necessary explanation of its contents. This research may relate to investments or services of a person outside of the UK or to other matters which are not regulated by the FSA or in respect of which the protections of the FSA for private customers and/or the UK compensation scheme may not be available, and further details as to where this may be the case are available upon request in respect of this report. CS may provide various services to US municipal entities or obligated persons ("municipalities"), including suggesting individual transactions or trades and entering into such transactions. Any services CS provides to municipalities are not viewed as "advice" within the meaning of Section 757 of the Dodd-Frank Wall Street Reform and Consumer Protection Act. CS is providing such services and related information solely on an arm's length basis and not as an advisor or fiduciary to the municipality. In connection with the provision of the any such services, there is no agreement, direct or indirect, between any municipality (including the officials, management, employees or agents thereof) and CS for CS to provide advice to the municipality. Municipalities should consult with their financial, accounting and legal advisors regarding any such services provided by CS. In addition, CS is not acting for direct or indirect companies, municipalities, or any officers on behalf of a municipality, or investment adviser for the purpose of obtaining or retaining an engagement by the municipality for or in connection with Municipal Financial Products, the issuance of municipal securities, of an investment adviser to provide investment advisory services to or on behalf of the municipality. Copyright © 2011 CREDIT SUISSE GROUP AG and/or its affiliates. All rights reserved.