

Synthetic ABS 101: PAUG and ABX.HE

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I. Introduction

The application of credit derivatives technology to structured finance products has been attracting much attention in recent months. Since the introduction of the first version of the standardized contract for CDS of structured finance products ("ABS CDS") in June 2005, the market for synthetic ABS has grown at an incredible rate. In this paper, we illustrate the mechanism of an ABS CDS contract for home equity ABS and provide an overview of the recently launched synthetic indices for home equity ABS, the ABX.HE.

II. What is Synthetic ABS?

Synthetic ABS refers to a replication of an ABS tranche using a credit default swap (CDS). A CDS is a derivative contract that works like an insurance policy against the credit risk of a company ("reference entity") or an asset ("reference obligation").¹ The seller of protection assumes the credit risk of the reference entity or the reference obligation from the buyer of protection in exchange for periodic payments of a protection premium. The term "ABS CDS" is often used for CDS referencing structured finance products, including residential mortgage backed securities (RMBS) and commercial mortgage backed securities (CMBS).

Selling protection on a CDS differs from actually owning a bond in several ways. First, the issuer (or the borrower) is not involved in a CDS contract. Instead, the issuer is merely "referenced" in a private

¹ For the basics of CDS, please see: *CDS Primer*, Nomura Fixed Income Research (May 2004).

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contract between the buyer and the seller of protection. A CDS can be created even if a certain reference obligation is not available in the cash bond market. Also, one can "short" credit risk by buying protection. Furthermore, as a derivative contract, a CDS does not require an initial investment. Hence, the synthetic form of credit risk offers greater flexibility for hedging or expressing a view.

ABS CDS first appeared around 2003, but trading in single-name ABS CDS grew significantly in 2005. According to S&P, the volume of synthetic CDOs that reference structured finance (SF) securities surpassed \$12 billion in 2005 in the U.S., compared with about \$2 billion in 2004 and less than \$100 million in 2003.² For single-name ABS CDS, the total notional amount outstanding reached \$100 billion by the end of 2005. About 60% of the trading volume in ABS CDS referenced sub-prime ABS, while CMBS and other types of ABS accounted for 30% and 10% of the market, respectively.

A. Corporate CDS vs. ABS CDS

Unlike a corporate CDS that often covers multiple bonds of a reference entity, an ABS CDS usually references a specific tranche of a securitization. Initially, ABS CDS took a form similar to corporate CDS, where a certain "credit event" triggers a one-off payment from the protection seller to the protection buyer. After this contingent payment, the CDS contract terminates. This type of contract uses the "Cash/Physical Settlement" template, which is similar to the one used for corporate CDS.³

An ABS CDS with cash/physical settlement is simple but does not closely reflect the risk of the reference ABS. The cash flow of an asset-backed security is often very different from that of a corporate bond. For example, failure to pay interest generally does not trigger default in ABS and other structured finance securities. Also, they rarely "default" before their legal maturities. However, even in the absence of default, an investor in ABS may suffer a interest shortfall or a writedown. Moreover, the ABS investor is exposed to uncertainty of cash flow because of a wide payment window. In addition, a tranche that has been written down may be subsequently written back up.

In order to closely mirror the cash flow of the reference ABS, the so-called "pay-as-you-go (PAUG)" template was introduced. The PAUG format involves two-way payments between the seller and the buyer of protection *throughout the life of a CDS contract*, instead of one contingent payment triggered by a single credit event. For example, if the reference ABS suffers an interest shortfall, the protection seller will compensate the protection buyer for the amount of shortfall. If the shortfall is reversed in a subsequent period, the protection buyer will repay the amount received from the protection seller for the shortfall.

After ISDA released the templates for ABS CDS in June 2005, the PAUG quickly became the dominant format for ABS CDS, particularly in the U.S. There are currently two forms of PAUG templates, the Dealer Form (Form I) and the End-User Form (Form II), with some differences in the definition of credit events and settlement options. At the time of this writing, there are some efforts to reconcile the differences between the two, in order to create a more standardized format.

² Teshler, D. et al., *U.S. CDO Sector Reviews and Outlooks for 2005*, S&P teleconference (17 February 2005).

³ Cash settlement refers to an arrangement where the protection seller makes a cash payment to the protection buyer after a credit event is triggered. The amount of the cash payment is calculated as the actual amount of loss (par minus recovery) and determined via an auction.

In a physical settlement, in contrast, the protection buyer delivers a cash bond to the protection seller and receives par. Physical settlement is more common in single-name CDS, while cash settlement is more prevalent among portfolio-based CDS, but some contracts allow both. Either way, a single credit event triggers settlement, after which the contract is terminated.

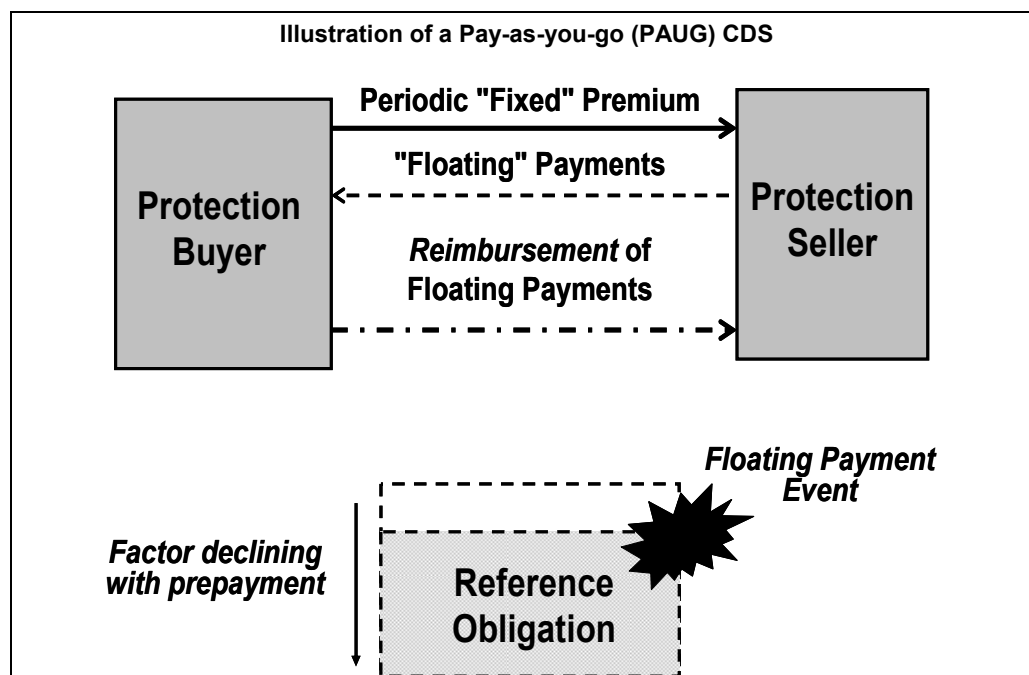
A Brief History of PAUG Templates

The ISDA initially published two templates for ABS CDS in June 2005. The first template was designed for transactions with cash and physical settlement (called the "Cash/Physical Settlement format"), which was very similar to the template for corporate CDS. The second template, intended for pay-as-you-go (PAUG) settlements to closely mirror the cash flow of the referenced ABS, received great attention in the market. Given the complex and diverse nature of structured finance securities, the initial version of the PAUG template required some fine-tuning. Monoline insurers, who are sellers of protection in so-called "negative basis" trades, complained that the initial version of the PAUG template favored protection buyers (*i.e.*, dealers). The initial PAUG template had a wide scope of credit events and gave the protection buyer an option to terminate the contract by delivering the reference obligation. In December 2005, Monolines published a revised template, which is now called the End-user form (Form II). In contrast, the original PAUG template is called the Dealer form (Form I), and the latest version of the Dealer form was released in January 2006. The main differences between the two are that the End-User form excludes Implied Writedown and Rating Downgrade from credit events and eliminates the physical settlement option. All versions are available on ISDA's web site at: www.isda.org.

B. Pay-As-You-Go (PAUG) for Home Equity (HEL) ABS

At present, CDS of home equity loan ABS represents the largest segment of the ABS CDS market. A home equity (HEL) ABS is a security backed by a pool of home equity loans (HELs). HELs include sub-prime residential mortgage loans, second-lien mortgage loans, home equity line of credit (HELOCs), and high-LTV loans.⁴ HEL ABS have unique risk characteristics as they contain both credit and prepayment risks.

A HEL ABS typically has a long maturity, so the maturity of the CDS contract tends to match that of the reference bond. A PAUG CDS referencing HEL ABS does not terminate even after multiple trigger events (called "floating amount events"). As mentioned before, a floating amount event may be reversed in a subsequent period. The notional amount of an index is adjusted as any of the reference ABS (1) amortizes, (2) prepays, (3) is written down, (4) defaults, or as previous floating amount events are "reversed." The exhibit below illustrates the mechanism of a PAUG contract.



Source: Nomura

⁴ For more on HEL ABS, see; *Home Equity ABS Basics*, Nomura Fixed Income Research (1 November 2004).

Furthermore, a PAUG contract may include a physical settlement option, allowing the protection buyer to terminate the contract before maturity by delivering the reference obligation.

1. The Floating Amount Events

Trigger events under the PAUG are quite different from those in a corporate CDS.⁵ While credit events for a corporate CDS are intended to capture an event of default, the PAUG aims to capture non-default events that affect the cash flow of the reference obligation. Under the PAUG, a reduction in interest ("Interest Shortfall") also triggers a payment from the protection seller to the protection buyer. These trigger events are called Floating Amount Events and generally include;

Writedown: This refers to a reduction in principal. A writedown may be reversed in a subsequent period. If the reference ABS does not allow for writedown, an **Implied Writedown** may apply as a credit event. The amount of Implied Writedown is calculated based on the under-collateralization of the reference security, or any shortfall between the reference obligation's pool balance and the aggregate balance of all *pari passu* obligations and senior securities backed by the same pool.

Principal Shortfall: This event occurs if the reference ABS fails to pay off principal by its legal final maturity, or when the collateral pool supporting the reference obligation is liquidated. This event, sometimes referred to as a "failure-to-pay principal" event, is the equivalent to the default of a cash structured finance bond.

Interest Shortfall: An interest shortfall may occur when the interest passed through from the underlying mortgage loans is less than the interest to be paid on the security. This may happen when: (i) the reference ABS is distressed, or (ii) the reference ABS is subject to an "available funds cap (AFC)" mechanism. The amount of interest shortfall is calculated as the difference between the expected interest payment and the actual interest payment paid on the reference obligation.

2. Three Options for Interest Shortfall: Fixed Cap, Variable Cap, and No Cap

The Interest Shortfall event described in the previous section comes in three variations; fixed cap, variable cap, and no cap. Each of the three options is detailed below;

1. The "**Fixed Cap Applicable**" option refers to an arrangement where an interest shortfall is covered up to the Fixed Rate amount. The protection buyer simply offsets the interest shortfall amount with the periodic CDS premium, so the amount the protection seller receives is reduced by the shortfall amount. If the shortfall amount exceeds the Fixed Rate amount, the protection buyer is partially exposed to the risk of interest shortfall.
2. The "**Variable Cap Applicable**" option protects the buyer from an interest shortfall up to Libor plus the Fixed Rate amount. That means the protection seller may need to pay out of pocket. From the standpoint of a protection buyer, the variable cap offers better protection against AFC risk than the fixed cap.
3. If no cap is selected ("**Cap Not Applicable**"), the protection seller must cover the entire amount of interest shortfall.

Clearly, a variable cap provides stronger protection to the buyer than a fixed cap, but protection is the strongest when no cap is applied. Depending on the price of reference ABS, significant basis can exist among the three options. The variable cap and the no cap are equivalent *if the reference*

⁵ Corporate CDS generally use (1) bankruptcy, (2) failure-to-pay (principal and interest), and (3) restructuring as the credit events.

obligation is trading at par, but the degree of protection will diverge if the reference ABS is trading at a premium.

To see this point, assume that the CDS spread is currently 200 bps and the reference ABS tranche is paying Libor plus some spread. If the reference ABS is trading at par, a fixed cap would protect the buyer of CDS up to 200 bps of interest shortfall, while a variable cap and "no cap" would both provide protection up to Libor plus 200 bps. The below table illustrates this situation;

Comparison of Fixed, Variable, and No Cap (Assuming CDS spread of 200 bps)			
Price of Reference ABS	Max protection		
	Fixed	Variable	No Cap
Discount (ABS paying L+150 bps)	200 bps	Libor+200 bps	Libor+150 bps
Par (ABS paying L+200 bps)			Libor+200 bps
Premium (ABS paying L+250 bps)			Libor+250 bps

Source: Nomura

If the reference ABS is priced at a discount (e.g., ABS paying L+150), the fixed cap would cover up to 200 bps of interest shortfall. The variable cap, on the other hand, would provide protection up to Libor plus 200 bps, while "no cap" would cover up to Libor plus 150 bps. So, the variable cap provides more than adequate protection against interest shortfalls on the reference ABS.

In contrast, if the ABS bond is trading at a premium (e.g., ABS paying L+250), the fixed cap would not cover the entire spread portion of the reference ABS. In such a case, the variable cap would cover only up to Libor plus 200 bps, leaving the protection buyer partially exposed to the risk of interest shortfall. "No cap" always covers the entire coupon of the reference ABS.

3. The Protection Buyer Must Pay, Too! – Reimbursement of Floating Rate Payments

Interest shortfalls and principal writedowns in most home equity ABS may be reversed in a subsequent period. When an interest shortfall is recovered or a principal writedown is reversed in the reference ABS, the protection buyer must repay the amount previously received from the protection seller. This amount is called an "Additional Fixed Payment." For this reason, the PAUG format involves two-way payments between the protection seller and the protection buyer, and the counterparty risk of the *protection buyer* also needs to be evaluated.

4. Physical Settlement Option⁶

The PAUG includes a provision for giving an option to the protection buyer to terminate the contract by delivering the reference obligation. This, called the "Physical Settlement Option," is triggered by a credit event, *just like the physical settlement under the corporate CDS*. In other words, if a certain "Credit Event" happens, the protection buyer can deliver the reference obligation, either for the full notional amount or a portion of the notional amount of the CDS contract. If the protection buyer delivers the reference bond for a portion of the CDS notional, the PAUG contract remains in force for the remaining portion of the notional amount. On the other hand, if the full notional amount is physically settled, the contract terminates at that point.

The Physical Settlement Option can be triggered by: (1) Writedown, (2) Failure to Pay Principal, or (3) Distressed Ratings Downgrade.⁷ The third item is an optional credit event and is triggered when the reference obligation is downgraded to 'Caa2/CCC' or below, or the rating is withdrawn by one or more

⁶ A previously included event called "maturity extension" has been removed from the latest ISDA template, released in January 2006, as a optional credit event.

⁷ Another credit event called "Maturity Extension" used to be an optional credit event but has been removed from the revised PAUG template released in January 2006.

of the three rating agencies.⁸ Note that these events are called "Credit Events," as opposed to the "Floating Amount Events" that trigger two-way payments.

5. Coupon Step-up

A home equity ABS often comes with a provision called "clean-up call." A clean-up call refers to a situation where the deal is called when the loan balance of a deal falls below a certain level (e.g., 10%) of the original balance. When this call is not exercised, the interest on the ABS may be raised, a situation called "coupon step-up."

If the Step-up provisions in a PAUG CDS are elected, the protection buyer is given an option to terminate the contract if the coupon step-up occurs on the reference ABS. If the option is not exercised, the CDS contract will continue and the premium will be raised by the same basis points as the coupon step-up in the reference bond.⁹

In contrast, if the Step-up provisions are not applicable, the CDS premium will NOT step up even if the clean-up call is not exercised and the coupon on the reference ABS is raised. This in fact is the case with the ABX.HE indices. Obviously, a PAUG CDS without the Step-up provisions is less favorable to the protection seller, because the CDS premium he receives remains unchanged when the coupon on the reference ABS increases.

C. PAUG for Other Structured Finance Products

The current PAUG template ("Form I") is mostly intended for residential ABS and CMBS. However, some revisions are in the works for expanding the asset classes to CDOs and non-residential ABS.¹⁰ For example, physical settlement may be difficult for a synthetic CDO where the CDO must pay par out of pocket to accept delivery of a cash bond.¹¹

III. The Next Frontier: The ABX.HE Index

On January 19, 2006, the new ABX.HE indices began trading. The first day of trading saw as much as \$5 billion of trading volume. The ABX.HE includes five indices based on rating class: triple-A, double-A, single-A, triple-B, and triple-B minus. Each class of the indices includes 20 recently issued home equity loan (HEL) ABS as reference obligations, which are selected using a dealer poll. The first series of the indices is called ABX.HE.06-01, and a new series will be introduced every six months. Each index portfolio is static, meaning that there will be no substitution of reference obligations. As reference ABS bonds experience amortization, prepayments and defaults, the portfolio notional amount will decline, reflecting the outstanding amount of each reference bond.

The ABX.HE indices are the first group of synthetic ABS indices to be launched. The dealer consortium is planning to introduce additional index groups based on other ABS sectors, such as credit card ABS and auto loan ABS. Obviously, the timing and the depth of additional indices to be launched depend on whether the ABX.HE indices proves to be successful.

⁸ However, an exception is where the reference obligation was rated 'Baa3/BBB-' or higher immediately before the rating is withdrawn and then a rating of 'Caa1/CCC+' or higher is given within three months of the rating withdrawal.

⁹ This could result in a difference in the relative amounts of coupon increase between the CDS and the reference ABS, if the cash bond is trading at a discount or a premium.

¹⁰ *Dealers Ready Cross-Asset Confirm for CDS of ABS*, Creditflux (1 December 2005).

¹¹ Cunningham, T., et al., *Fitch Examines Effects of Pay-As-You-Go (CDO and Single Name)*, Fitch special report (11 November 2005).

A. The Documentation and Credit Events

The ABX.HE indices trade with the standardized template based on the Pay-As-You-Go (PAUG) template by ISDA. The ABX.HE indices use three floating amount events; (1) Writedown (Implied Writedown), (2) Principal Shortfall, and, (3) Interest Shortfall with a Fixed Cap. The Writedown and Principal Shortfall events trigger a payment from the protection seller to the protection buyer. In contrast, Interest Shortfall is covered up to the amount of the fixed premium. In other words, when an interest shortfall occurs, the protection buyer simply skips the fixed rate payment or pays only a portion of it.¹²

Unlike single-name ABS CDS, an ABX.HE index contract does not provide for a physical delivery option to the protection buyer.¹³ Furthermore, the index contract does not include the Step-up provisions, so the fixed rate on the index will not be raised when one or more reference ABS experiences an increase in coupon.

B. How ABX.HE Works

Unlike the indices of corporate CDS, such as the DJ CDX and the iTraxx, the ABX.HE indices trade based on price rather than spread, with a pre-determined fixed coupon (*i.e.*, Fixed Rate). The fixed coupon is determined before the launch of the new series. If the quoted price of an index is different from par, the seller and the buyer of protection settle the difference when they enter into a transaction. If the quoted price is below par, the protection buyer makes a payment to the protection seller. Over the life of a contract, the protection buyer pays the Fixed Rate Amount¹⁴ to the protection seller, based on the current notional amount of the index. As in the cash bond market, a market price above par means that the market spread is tighter than the fixed rate, and vice versa.

As in a single-name ABS CDS, the notional amount of an index is adjusted as any of the reference ABS (1) amortizes or prepays, (2) is written down, (3) defaults, or as (4) previous floating amount events are "reversed" (*i.e.*, reimbursements occur). Unlike the single-name case, however, the index notional reflects change in the notional amount of all reference ABS in the index portfolio, which are initially equally weighted.¹⁵ The portion of principal currently outstanding is expressed as a Current Factor, which is initially one.

An investor who wishes to take synthetic exposure to the index pays to the protection buyer the difference between the quoted price multiplied by the notional amount and the current factor of the index. For example, the table in the next page shows that the AAA index of the ABX.HE.06-1 was trading at 100.31 on February 24, 2006. That means, he pays $0.31\% \times [\text{notional}] \times [\text{current factor}]$ to the protection buyer. If, on the other hand, the market price is quoted at discount, the initial payment goes from the protection buyer to the protection seller. Over the life of a contract, the protection buyer makes monthly payments to the protection seller of 18 bps (*i.e.*, the Fixed Rate) on the current notional amount of the ABX.HE.06-1 AAA index.

¹² According to Markit, one of the reference ABS deals in the ABX, called GSAMP 2005-HE4, experienced about \$450 of interest shortfall in early March, due to the application of the Servicemembers Civil Relief Act. As a result, each of the ABX.HE 06-1 indices will experience interest shortfall of two cents per \$1 million of notional amount, as calculated by Markit. The protection buyer must deliver a floating payment notice in order to be compensated for the interest shortfall.

¹³ An index contract does not include Rating Downgrade or Maturity Extension as credit events. Hence, an ABX.HE contract will not terminate before the end of the reference ABS bond's life.

¹⁴ The Fixed Rate payments for the ABX.HE indices are paid *monthly*, while premium in a corporate CDS is generally paid quarterly.

¹⁵ That means, the asset weight of an index changes over time, reflecting each asset's principal amount outstanding. This effect is likely to come under the spotlight in the future, as the composition of a seasoned index will reflect the past prepayments and defaults. The potential impact of such seasoning effect remains to be seen.

ABX.HE Index (as of February 24, 2005)			
Index	Price	Weekly change	Coupon (bps)
ABX.HE.AAA.06-1	100.31	+ 0.02	18
ABX.HE.AA.06-1	100.34	+ 0.10	32
ABX.HE.A.06-1	100.32	+ 0.12	54
ABX.HE.BBB.06-1	100.82	+ 0.49	154
ABX.HE.BBB-.06-1	100.84	+ 0.59	267

Source: Markit

More importantly, an ABX.HE index transaction does not include a physical settlement option. Hence, the protection buyer cannot terminate the contract early by delivering a cash bond after a credit event. Also, there is no coupon step-up option in the ABX.HE index template, so the protection seller will continue to receive the same Fixed Rate even after the reference ABS experiences a coupon step-up.

C. Who Are the Participants and What Are They Doing with the ABX.HE?

Several dozens of accounts reportedly traded the ABX.HE during the first week of trading. As in the indices of corporate CDS, the synthetic ABS indices allow an investor to express a macro view of the home equity ABS sector by either taking a long or short position in the form of a CDS. Alternatively, an investor can isolate spread risk from credit risk of the sector by rolling into a new index series every six months.

Moreover, the ABX.HE indices enable various relative value strategies. For example, the indices make it possible to express a rating-specific relative value view within the HEL ABS sector. For example, if an investor feels that the triple-B ABS sector is rich relative to the single-A area, she may buy protection in the triple-B index while selling protection in the single-A index. Another relative value strategy is to isolate the deal-specific risk from the market risk by taking a long-short position in single-name ABS CDS and an ABX.HE index.

Some CDO managers may use the indices to quickly ramp up CDO portfolios. It is unlikely that CDO managers will rely on the widely-traded indices to fill up their CDO portfolios, because they add value by picking specific bonds. However, collateral managers may use the index to manage risk and to take advantage of any temporary pricing discrepancies.

In the future, we will likely see relative value strategies between various vintages that compare different series of the ABX.HE index. For instance, an investor may compare the ABX.HE.06-1 index and, say, the ABX.HE.07-1 index, as the general market conditions change over time. Furthermore, the so-called "curve play" will become available once the term structure of ABS indices emerges.

Some market participants anticipate trading in index *tranches* to emerge in the near future.¹⁶ Although the idea of creating a market for synthetic tranches of a portfolio of ABS (which is essentially a synthetic ABS CDO) is interesting, it is unclear if "correlation trading" in synthetic ABS will come of age in the near future.

For one thing, the ABX.HE indices only include 20 deals, while the corporate CDS indices are more diversified containing 125 reference credits. Moreover, the ideas of "correlation trading" and "delta hedging" came under serious skepticism after the corporate CDS indices experienced major turmoil in May 2005.¹⁷ While the credit derivatives market escaped a global meltdown, problems and uncertainty remain in the pricing of synthetic tranches. Correlation of structured finance products is even more ambiguous.

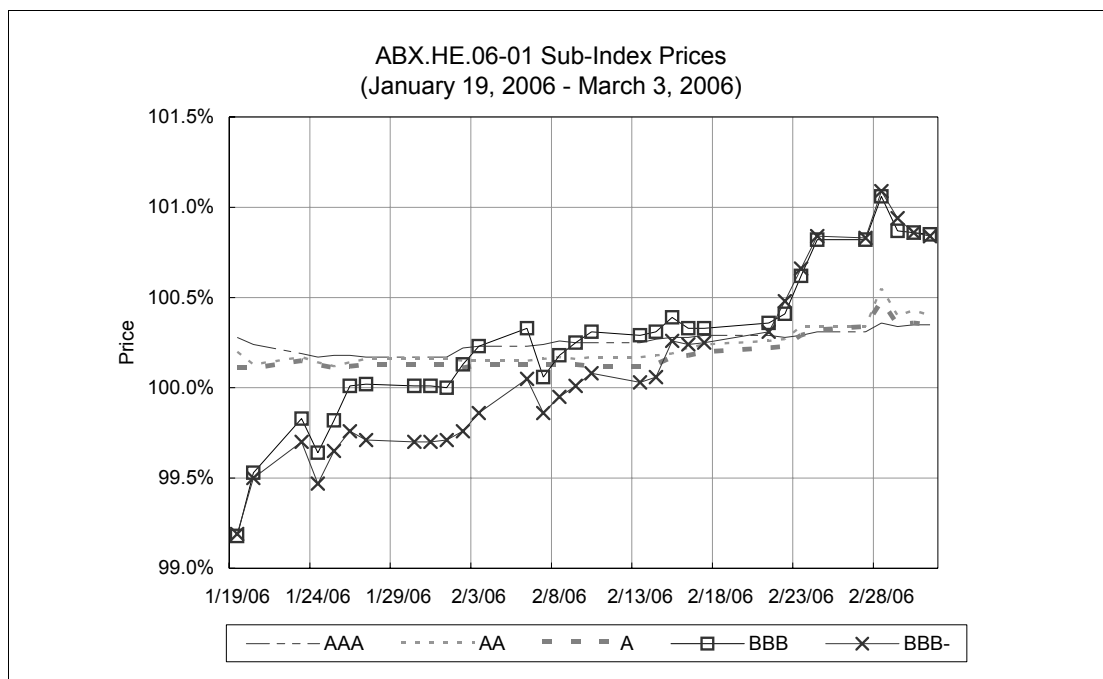
¹⁶ *ABX.HE Index May Hurt CDO Managers*, Asset Securitization Report (13 February 2006).

¹⁷ For the details of the event, see; *Correlation Redux*, Nomura Fixed Income Research (17 October 2005).

For example, the rating agencies use some ad-hoc assumptions for correlation of various structured finance products in modeling ABS CDOs.¹⁸ All the major rating agencies seem to recognize the fact that structured finance securities are created based on a diversified portfolio and thus likely to be highly correlated with each other. However, more research is needed before we can comfortably think of correlation trading in tranches of an ABS portfolio.

D. Observations from Early Trading of the ABX.HE

The trading of the synthetic HEL ABS indices began on January 19, 2006, with much fanfare. Volume on the first trading day was reported to be as much as \$5 billion, although activity declined significantly in the following days. Much of the volume in the first weeks of trading in the synthetic ABS indices was seen in the lower-rated area, and index prices exhibited some volatility in the triple-B and triple-B minus indices (see the graph below).



At the industry conferences held in February 2006, some market participants expressed their concerns about increased spread volatility with the advent of the synthetic indices.¹⁹ Others complained that the index trading "sucked out" liquidity from the single-name ABS CDS market. Market participants also noticed some tiering is beginning to appear among certain issuers and vintages, as the synthetic indices allow separation of the market-wide risk and the deal-specific risk. Some investors also think that spread volatility reflects more transparency and offers great trading opportunities.

As the synthetic trading in ABS risk gained traction, the market started to observe some spread differential between the cash bond market and the CDS market. The so-called "default swap basis"

¹⁸ For example, S&P assumes a 30% correlation for ABS in the same sector and 10% for assets in different sectors. On the other hand, Moody's uses rating co-movements of structured finance securities to arrive at their asset correlations for CDO rating. See; Toutain, O., et al., *Moody's Revisits Its Assumptions Regarding Structured Finance Default (and Asset) Correlations for CDOs*, Moody's special report (27 June 2005) and, Xie, M., and G. Witt, *Moody's Modeling Approach to Rating Structured Finance Cash Flow CDO Transactions*, Moody's rating methodology (26 September 2005).

¹⁹ See for example; *Industry Speaks Out on ABS CDS Market at ASF Conference*, Asset Securitization Report (6 February 2006) and *Report from Las Vegas – Coverage of Selected Sessions of ASF 2006*, Nomura Fixed Income Research (3 February 2006)

came under the spotlight last fall, as a handful of leveraged players expressed their negative views on the U.S. housing market. Initially, these investors bought outright protection in mezzanine HEL ABS, pushing CDS spreads much wider than cash bond spreads.²⁰ The phenomenon reversed in the subsequent weeks, after synthetic CDOs jumped in the market and sold protection *en masse*. Over the first few months of 2006, the ABS CDS market has so far seen mostly a negative basis.

IV. Pulling All Together – Sources of Potential Basis Risk

The PAUG CDS aims at replicating the risk profile of the reference ABS bond by using the arrangement that closely mimics the cash flow of the reference bond. As we have illustrated above, however, some features in the current ISDA template leave room for potential basis risk between the cash bond and its synthetic version. The main sources of divergence between cash vs. synthetic risk are: (1) transfer of AFC risk, (2) the physical settlement option, and (3) applicability of coupon step-up.

As for the AFC risk, as we mentioned already, the use of a fixed cap favors the protection seller, while using no cap would result in the cash flow that is the most similar to the one on the reference ABS. On the other hand, use of a physical settlement option slightly benefits the protection buyer, especially if an additional credit event, Distressed Rating Downgrade, is included in the contract. Finally, the coupon Step-up provisions in the PAUG CDS also favor the protection buyer, as he is either protected from paying a higher CDS premium (if the provisions are not applicable) or given an option to terminate the contract (if the provisions are applicable) if he does not wish to pay a higher premium.

There is a trade-off between the close replication of the reference bond's risk and the market standardization and liquidity. The ABX.HE indices trade with (1) a fixed cap, (2) no physical settlement option, and (3) no coupon step-up. The fixed cap favors the protection seller, while the lack of coupon step-up favors the protection buyer, although the net effect is difficult to calculate.

V. Conclusion

In this paper, we outlined the basic structure of ABS CDS and the synthetic ABS index, ABX.HE. Synthetic ABS is a crossover product between credit derivatives and securitization, which lends itself to a wide range of potential applications. Synthetic ABS allows replication of ABS bonds where cash securities are not available or where one would like to take a "short" position. Trading in a standardized format helps pricing information become more available and opens the door for new types of products and participants.

However, ABS CDS is much more complicated than corporate CDS, requiring greater understanding of contractual details. In particular, the pay-as-you-go (PAUG) template still remains under review, and developments in coming weeks will provide some indications on the market's growth path. Trading activities so far seem to suggest that most market participants are comfortable with synthetic ABS, while many others are keeping a close eye, trying to determine the right time to enter the new frontier.

²⁰ The triple-B rated spreads of HEL ABS widened to 225-250 bps in October 2005, pushing the positive basis to 40-60 bps. See; *Home Equity ABS CDS Boom, Spreads Widen*, Asset Securitization Report (31 October 2005), and; *CDS Leads to the Return of Volatility in Home-equity ABS*, Asset Securitization Report (21 November 2005).

Appendix I: Glossary of Basic Terms

Available Funds Cap (AFC) is a mechanism in ABS that limits the amount of interest paid on the securities. In a floating-rate HEL ABS deal where underlying collateral consists of fixed-rate or hybrid ARM loans, the AFC prevents the situation where Libor rises so dramatically that interest payments from fixed-rate loans in the underlying pool are not sufficient to support coupon payments on the securities.

Credit derivative is a type of derivative that transfers credit risk. The most widely used type of credit derivative is the credit default swap (CDS). Other types of products include Nth-to-default baskets, CDS indices and index tranches, which are based on a portfolio of CDS. If a certain pre-specified trigger event (called a "credit event") occurs, the protection seller compensates the protection buyer for the credit loss suffered. According to ISDA, the total notional amount in the global credit derivatives market reached \$12.43 trillion in 2005.

Credit default swap (CDS) works like an insurance contract that provides protection against credit risk of a borrower or assets. The buyer of protection pays a periodic premium (fee) to the seller of protection over the life of a contract. If a certain pre-determined event ("credit event") occurs, the protection seller compensates the protection buyer for the credit loss suffered. The company or the assets on which a CDS contract is written is called a "reference entity" or "reference obligations."

Credit event is an event that triggers settlement in a CDS. CDS for corporations' credit risk generally include (1) bankruptcy, (2) failure to pay, and (3) restructuring as credit events. However, CDS of structured finance securities (such as ABS, RMBS, and CMBS) tend to require more detailed definitions of credit events, because defaults of these securities do not accompany the events specified in the documentation for corporate CDS.

Default swap basis is the difference between the CDS spread and the spread of the reference obligation. In a corporate CDS, default swap basis should be positive in theory, because the CDS generally riskier with (1) a wider coverage of credit events and (2) multiple deliverable obligations. However, negative basis is often observed in the market. In a structured finance security, the sign and magnitude of default swap basis is less clear. Factors that may affect CDS-cash basis for a HEL ABS includes; (1) transfer of AFC risk, (2) additional credit events, and (3) treatment of coupon step-up.

Floating Rate Payer refers to the seller of protection in a CDS. Floating Rate is the contingent payment made to the protection buyer upon a certain credit/floating event.

Fixed Rate Payer refers to the buyer of protection in a CDS. Fixed Rate is the periodic premium (fee) for the protection provided via a CDS.

Home equity loan (HEL) ABS refers to an ABS backed by home equity loans and is one of the major ABS sub-sectors. In the past, HELs originally referred to second-lien mortgages, but the term is often used in a broader sense for sub-prime residential real estate loans. HEL ABS issuance for 2005 was about \$430 billion.

Negative basis trade refers to a strategy that combines a long position in a cash bond and a short position (*i.e.*, buying protection) via a CDS. Such a strategy makes sense, as default swap basis is often negative, meaning that the cost of credit protection is less than the spread received on a cash bond. One popular strategy has been a negative basis trade in a triple-A CDO tranche, where a bank holds a cash bond and pays premium to a monoline insurer for protection.

Appendix II: Summary of ABX.HE Index Rules

Index Administration:

The ABX.HE indices are part of the DJ CDX index family owned and managed by CDS IndexCo. Markit serves as the Administration and Calculation Agent for the indices.

Trading Terms:

Use the pay-as-you-go CDS template from ISDA, with (1) Writedown, (2) Principal Shortfall, and (3) Interest Shortfall, as Floating Payment Events. The Fixed Cap applies to Interest Shortfall. The three floating payment events may be reversed (*i.e.*, reimbursement). The physical settlement option and the Step-up provisions are not applicable. Each index is a static portfolio of 20 HEL ABS deals, where the notional amount mirrors amortization of the reference bonds. Market quotes are based on price, not on spread. Protection buyers pay monthly premium based on a predetermined Fixed Rate.

Index Roll:

Each series of the ABX.HE indices will be rolled every six months. Before the roll date, Markit will send to dealers a list of deals from the largest 25 issuers. Dealers will then submit rankings of preferred deals, from which Markit determines the composition of a new index. Once created, the index composition remains static. The new index composition will be announced at least four days before the roll date. Also, new fixed rates will be determined from the average of spreads submitted by each market maker one day before the roll date.

Index Construction:

Each of the ABX.HE index classes will be created from the 20 largest sub-prime home equity ABS deals issued within the past six months. Reference obligations must satisfy:

- Minimum deal size of \$500 million; minimum \$15 million for triple-A tranche
- At least 90% of the deal's assets must be first-lien mortgages
- Weighted average FICO scores is less than 660
- No more than 4 deals from the same originator
- No more than 6 deals with the same master servicer
- Weighted average life of greater than 4 years at the issuance date, except for triple-A tranches which must have WAL of greater than 5 years
- Pay floating-rate coupon on the 25th of the month
- Rated by both Moody's and S&P; classified by the lower of the two in case of a split rating

Data & Marketing info:

The standardized CDS confirmation for the ABX.HE indices and other information is available on Markit's web site; www.markit.com/abx.jsp.

— E N D —

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