### **Shorting Home Equity Mezzanine Tranches**

A strategy to cash in on a slowing housing market

February 2007



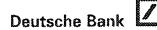
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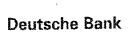


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### **Summary**

- Investor expresses a bearish view on the subprime US RMBS market (or the US Consumer or US Home Prices) by shorting (or buying protection on) selected Home Equity ABS credits
- We believe this product is the most efficient way to express these views; more efficient than shorting stocks of homebuilders, REITs, the S&P 500, etc. We are interested in hearing of other ideas
- Since 2003, spreads for Baa3 and Baa2 have compressed. But if anything, risk of a housing bubble / defaults has only increased with the continued proliferation of alternative mortgage products such as IOs, silent seconds, stated-income loans and option ARMs. These products have become quite popular as home price increases until very recently outstripped wage growth. The percentage of subprime mortgages originated that were IO mortgages grew from virtually zero in 2002 to around 30% in 2005 and 2006. The percentage of subprime mortgages originated that were stated-income mortgages grew from around 25% in 2000 and 2001 to over 40% in 2005 and 2006. Mortgages with 40 or even 50-year terms were recently introduced, and have quickly become popular in subprime lending.
- After a brief widening near the end of 2005, spreads for Baa2 and Baa3 home equity bonds tightened for most of the first half of 2006, reflecting strong demand from CDOs. Demand from CDOs is a result of worldwide excess capital chasing yieldy products. Such demand, may prove elusive in an adverse market environment. Spread tightening lost its momentum in April, as the CDO's arbitrage has been squeezed. In fact, spreads gradually widened out from May to August. As the housing data has become increasingly bearish, this widening trend accelerated in September with Baa3 spreads nearly 100 bp wider than the April tights. After a brief rebound in October, spreads resumed widening again in November and December.



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### Summary (continued)

- It is increasingly evident that the housing boom in the past 10 years has come to its end. The Market Index from the National Association of Home Builders showed a steep decline in recent months to a level that hasn't been seen since 1991, when the nation was experiencing a housing recession. Other indicators such as housing starts and building permits have also seen steep declines in recent months. New and existing home sales indices from the National Association of Realtors, which had experienced virtually incessant rises in recent years, also have lost their momentum and have even dropped in recent months.
- Though each deal has certain idiosyncrasies that on the margin make one deal better or worse, from a default perspective, the risk in the asset class remains a macroeconomic risk - e.g. all pools have thousands of loans and are geographically dispersed with similar credit scoring models and underwriting procedures across issuers with defaults ultimately driven by 3 things: home prices, interest rates (payment shocks and ability to refinance/move) and unemployment
- Historical data show that losses in subprime mortgage collateral are strongly negatively correlated with home price appreciation, both in default frequency and severity. In a scenario where home prices grow significantly slower than what has been seen in the past few years. especially in high growth states such as California and Florida, one may expect losses to be substantially higher than what has been experienced in the recent past. The result could be more dramatic should prices actually decline
- Rating agencies' rating models for subprime mortgage lending criteria and bond subordination levels are based largely on performance experience that has mostly accumulated since the mid-1990s, when the nation's housing market has been booming
- In a flat housing market, most subprime RMBS rated BBB- or BBB may come under severe stress. Dramatic spread widening, downgrades or even loss of principal and interest could result. Already there have been a few 2005 and 2006 deals either downgraded or placed on downgrade watch. Previously, rating actions on structured products within two years of their issuance were virtually unheard of.

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### The downside and upside of shorting subprime mortgage mezzanine bonds

- In a scenario where subprime mortgages perform well
  - Prepayments are likely to be fast.
  - Very little extension risk
  - If the underlying Baa3 bonds has an weighted average life of 2 to 4 years and the premium is 250 bp, the protection buyer may lose 5 to 10% (2.5% x 2 to 4) of initial notional amount.
- A reasonable worst case scenario would be somewhat slow prepayments, but no defaults in the underlying bond. In that case the protection buyer may lose 15% of the notional balance or 6 years of protection payments.

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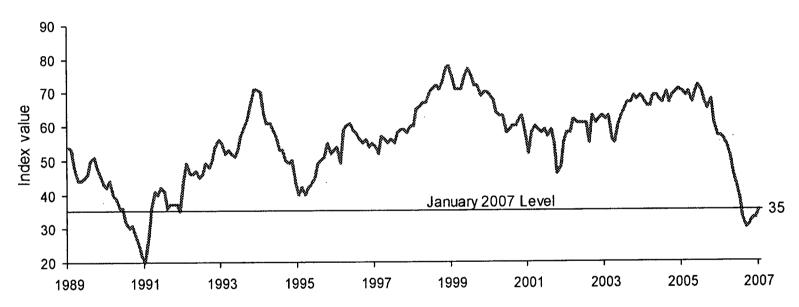
- In a scenario where losses for subprime mortgages rise to above 9%
  - Protection buyers are expected to have a profit of 50% to 100% of the initial notional balance, less the protection premium paid. Higher losses are needed for Baa2 shorts to reach these profits.
- In the meantime, if the spreads for mezzanine bonds widen
  - Protection buyers may choose to unwind the position with a profit
  - The price sensitivity against spread change for a typical at-the-money CDS is about \$40,000 per basis points spread widening per \$100 million dollar notional.
- The long-run payoff is arguably somewhere between 6 and 10 to 1. The odds against a default may be much less.



### The National Association of Home Builders Market Index has dropped to a level unseen since early 1991

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### National Association of Home Builders Market Index

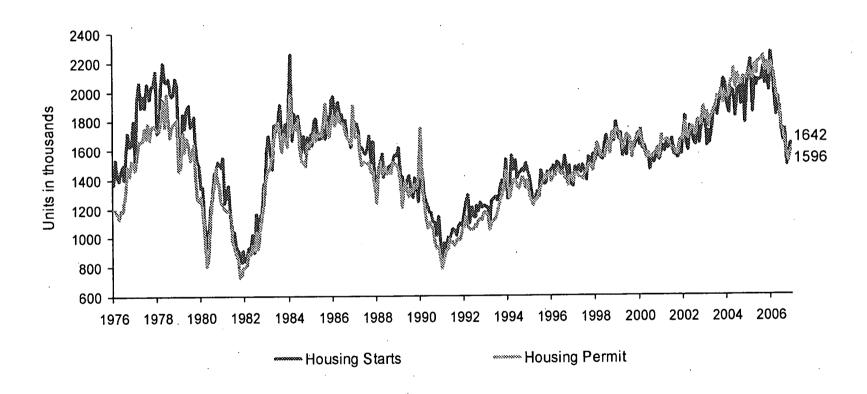


Source: National Association of Home Builders

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### Both housing starts and building permits indexes have seen declines in recent months not experienced since 1990

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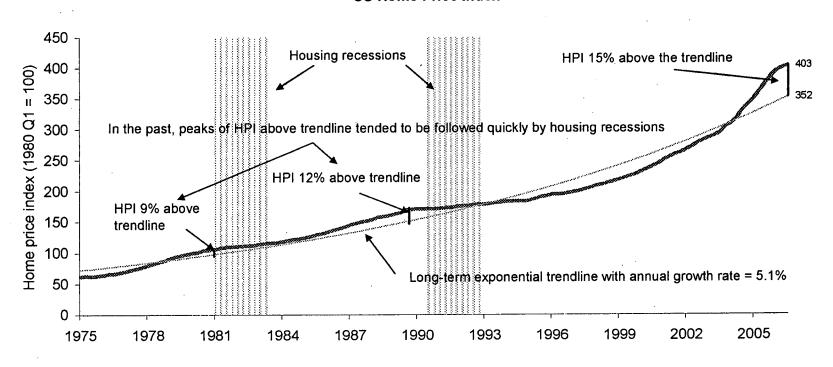
Source: US Department of Commerce Data as of end of December 2006

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### US Home price index in recent years has been above the long-term trend line

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### **US Home Price Index**

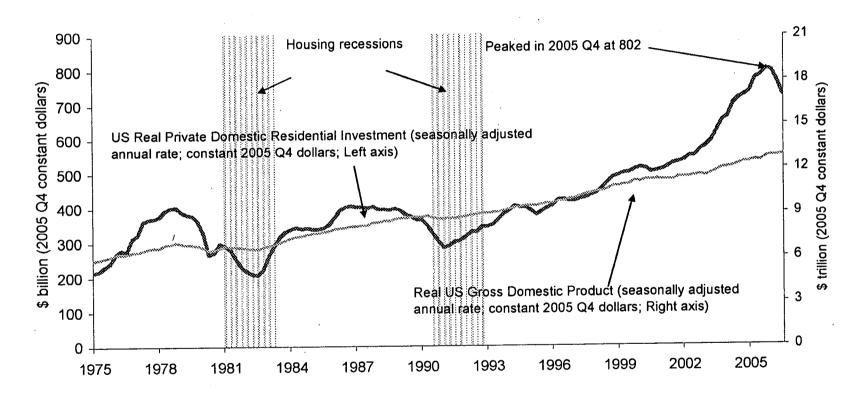


Source: Office of Federal Housing Enterprise Oversight, Deutsche Bank Data as of end of Third Quarter 2006

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### Investment poured into the residential market has dramatically increased during the last decade

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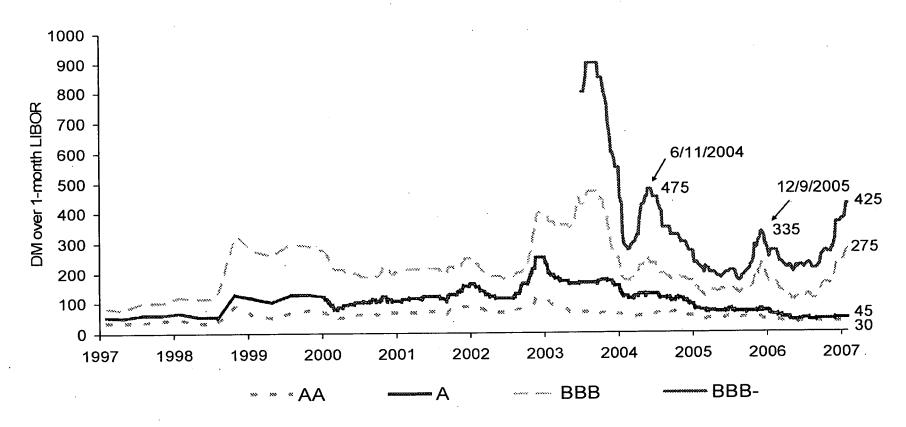


Source: Bureau of Economic Analysis, Bureau of Labor Statistics, Deutsche Bank Data as of end of Third Quarter 2006

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### Generic new issue spreads for BBB & BBB- home equity tranches have tightened since summer 2003, but have widened somewhat in 4th quarter 2006

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Note: Issuance of BBB- bonds was not common before 2003

Data as of February 2, 2007

Source: Deutsche Bank

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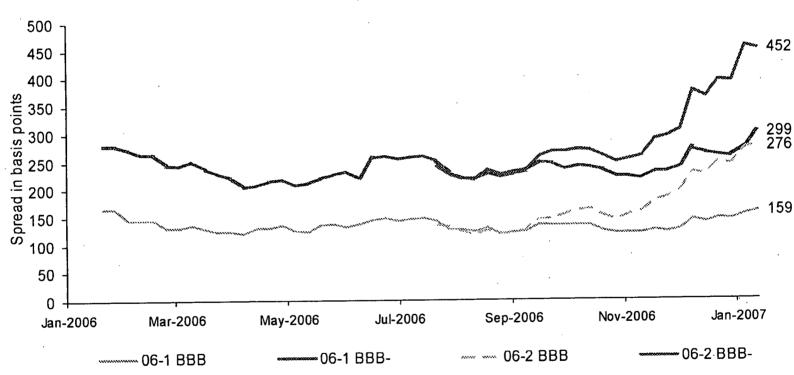


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### ABX.HE BBB and BBB- indexes have widened in the face of deteriorating fundamentals, more than generic spreads

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### ABX HE (BBB/BBB-) Spreads



Note: Issuance of BBB- bonds was not common before 2003

Data as of January 12, 2007

Source: Deutsche Bank

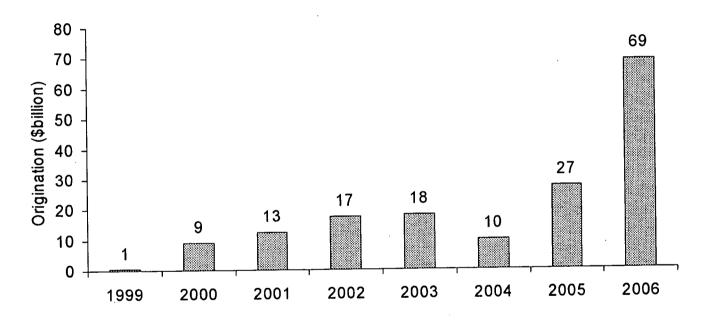
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## Hyperactivity in mezz CDO issuance kept mezzanine subprime mortgage spreads tight in most part of 2006

### Annual Issuance Volume for Mezzanine RMBS CDO

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Source: MCM structured Finance Watch, Deutsche Bank Data as of the end of 2006.

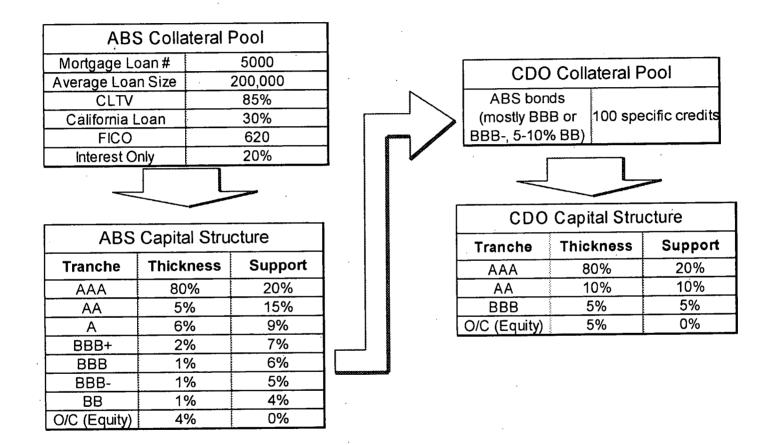
Issuance volume includes cash, hybrid and synthetic mezzanine RMBS CDO.

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### Typical ABS and CDO deal structures

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## Historically, lifetime losses in subprime mortgages reached over 6%, even with the strong housing market

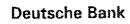
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			Historical C	umulative N	et Loss Rate				Initial % of	
as of December 2006									Pool	
Vintage	Dec-04	Mar-05	Jun-05	Sep-05	Dec-05	Mar-06	Jun-06	Sep-06	l	
ARM									ARM	
2006							0.00%	0.02%	76.1%	
2005			0.00%	0.01%	0.02%	0.04%	0.10%	0.18%	79.7%	
2004	0.01%	0.02%	0.05%	0.10%	0.17%	0.27%	0.39%	0.53%	72.7%	
2003	0.24%	0.34%	0.45%	0.56%	0.68%	0.81%	0.90%	0.98%	62.2%	
2002	0.89%	1.05%	1.21%	1.39%	1.50%	1.67%	1.79%	1.82%	63.9%	
2001	2.36%	2.55%	2.73%	3.14%	3.17%	3.34%	3.50%	3.63%	58.9%	
2000	3.99%	4.35%	4.78%	5.17%	5.59%	5.77%	5.96%	6.13%	63.1%	
1999	5.26%	5.45%	5.59%	5.74%	6.11%	6.41%	6.55%	6.59%	50.9%	
1998	5.72%	6.27%	6.51%	6.63%	6.72%	6.78%	6.88%*	6.88%*	51.9%	
Fixed Rate									Fixed	
2006		:					0.00%	0.00%	23.9%	
2005			0.00%	0.00%	0.01%	0.02%	0.06%	0.10%	20.3%	
2004	0.02%	0.04%	0.07%	0.10%	0.14%	0.24%	0.39%	0.56%	27.3%	
2003	0.25%	0.34%	0.44%	0.55%	0.65%	0.75%	0.87%	0.97%	37.8%	
2002	1.11%	1.28%	1.46%	1.71%	1.86%	2.06%	2.22%	2.34%	36.1%	
2001	2.89%	3.18%	3.42%	3.68%	3.87%	3.92%	4.11%	4.15%*	41.1%	
2000	4.77%	4.89%	5.22%	5.43%	5.78%	5.91%	6.19%	6.52%	36.9%	
1999	5.05%	5.35%	5.56%	5.64%	6.03%	6.09%	6.25%*	6.27%	49.1%	
1998	5.56%	5.59%	5.68%	6.13%	6.33%*	6.48%*	6.58%*	6.63*%	48.1%	

<sup>\*</sup> Re-estimated by Deutsche Bank to adjust for the effect due to optional calls on certain deals

Source Moody's, LoanPerformance, Deutsche Bank

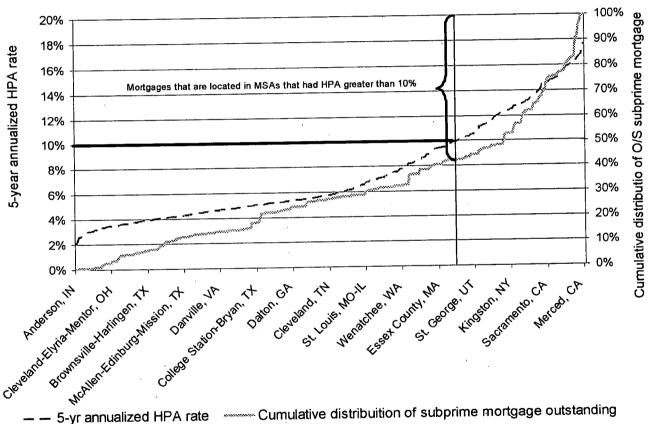
Cumulative loss data published by Moody's in December 2006





### Nearly 60% of outstanding subprime mortgages are located in the MSAs with double digit 6-year average of annual home price growth rates

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Source: LoanPerformance, OFHEO, Deutsche Bank

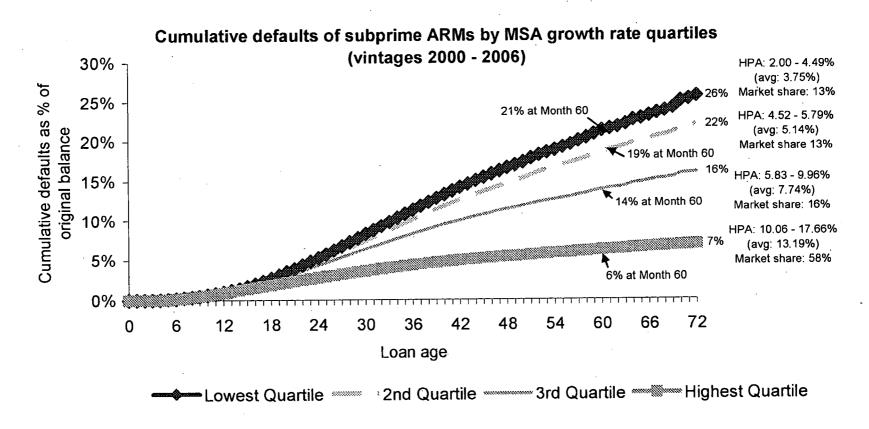
HPA data as of the end of Third Quarter 2006, mortgage data as of December 2006



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### Defaults of subprime mortgages are also strongly negatively correlated with home price growth rates

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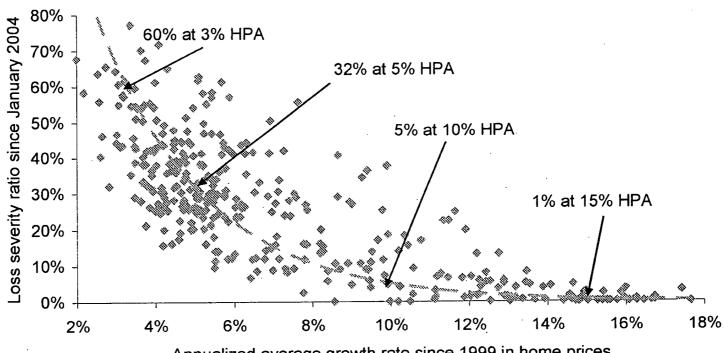
Source: LoanPerformance, OFHEO, Deutsche Bank

HPA data as of end of the third quarter 2006, mortgage data as of December 2006

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## There is a strong negative correlation between home price appreciation and loss severity

Annualized home price appreciation rates since 1999 and loss severity by MSA



Annualized average growth rate since 1999 in home prices

HPA data as of end of third quarter 2006, mortgage data as of October 2006

Note: See the next page for more details

Source: LoanPerformance, OFHEO, Deutsche Bank

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### Loss severity ratios have been strongly negatively correlated with home price appreciation rates

- In the chart on the previous page
  - Defaults are defined as loans exiting pools when being more than 90 days in delinquency, in foreclosure or in REO

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- Only loans belonging to pools where losses are reported by LoanPerformance are included but zero severity liquidations are also included
- For each individual loan, if the loss amount exceeds the outstanding balance, actual loss amount will be used (i.e. loss severity ratios above 100% are allowed.)
- Larger MSAs with high loss severity ratios include Youngstown, OH-PA (70%), Fort Wayne, IN (64%), Pittsburgh (62%), Dayton, OH (61%), Cleveland (59%) and Indianapolis (55%). All had mediocre home price appreciation in the last 5 years.
- Some larger MSAs with high home price appreciation rates had very low loss severity ratios. These include Los Angeles (0%), Riverside-San Bernardino, CA (0%), Sacramento (0%), Fort Lauderdale (0%), Miami (1%), San Francisco (1%), Las Vegas (1%) and Washington, DC (1%)
- The loss severity ratios in the chart were calculated using first-lien subprime mortgages Originated between January 2000 and December 2004, with initial balance not exceeding \$300,000, original LTV between 75 and 85 and defaulted between January 2004 and December 2006. Loss severity ratios for defaults before 2003 were generally higher.



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## High HPA rates played major roles in good performance of subprime mortgages in past few years

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As shown above

- Mortgages located in the quartile of MSAs with lowest home price growth have been three to five times as likely to default as those in the quartile of MSAs with highest home price growth
- experiencing loss severity ratios less than 20%, many such MSAs had loss severity ratios less than 10%. The average loss severity ratio for loans located in areas with growth rate over 12% was 2%. By contrast, the average loss severity ratio for loans located in areas with growth rate between 2 and 6% was 35%, a 17-fold increase in loss severity.
- A majority of mortgages by balance originated in the past few years are in areas with double-digit home price appreciation rates
- If home price appreciation rates slow-down to 4% p.a. for MSAs currently having double-digit rates, losses (both defaults and severity ratios) may increase substantially in these MSAs

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### Average jobless rates by states from 2001 to 2005 varied between 3 to 7%

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	Lowest Quartile Second Quartile							TI	nird Qua	rtile			Hig	hest Qu	ıartile				
State	Jobless rate	5-year HPA (CAGR)	6-year cumul. defaults	2005 Orig %	State	Jobless rate	5-year HPA (CAGR)	6-year cumul. defaults	2005 Orig %	State	Jobles s rate	5-year HPA (CAGR)	6-year cumul. defaults	2005 Orig %	State	Jobless rate	5-year HPA (CAGR)	6-year cumul. defaults	2005 Orlg %
ND	3.37%	6.91%	12.62%	0.1%	ME	4.52%	10.09%	9.28%	0.4%	Ri	5.06%	. 14.17%	5.66%	0.5%	ΚY	5.76%	4.55%	25.42%	0.7%
SD	3.54%	5.58%	18.01%	0.1%	СТ	4.58%	10.26%	9.98%	1.2%	IN	5.07%	3.19%	28.67%	1.6%	TX	5.88%	4.17%	25.99%	5.8%
н	3.64%	16.13%	5.10%	0.5%	ок	4.68%	4.85%	27.24%	0.7%	KS	5.14%	4.41%	19.71%	0.5%	NC	5.89%	5.13%	25.24%	1.8%
NE	3.71%	3.98%	21.18%	0.3%	GA	4.74%	5.06%	25.04%	3.0%	ΑZ	5.23%	14.49%	9.49%	4.0%	LA	6.10%	6.64%	22.43%	0.7%
VA	3.72%	12.89%	8.40%	2.5%	FL	4.79%	16.28%	11.05%	10.3%	AR	5.25%	5.76%	22.92%	0.4%	l L	6.11%	7.38%	15.28%	5.0%
VT	3.78%	10.66%	10.27%	0.1%	ID	4.80%	9.20%	20.21%	0.4%	co	5.26%	4.34%	19.30%	1.9%	CA	6.12%	16.21%	4.56%	18.7%
NH	3.98%	10.00%	6.95%	0.4%	AL	4.95%	5.42%	22.60%	0.8%	MO	5.28%	5.92%	20.66%	1.8%	sc	6.31%	5.63%	28.74%	0.9%
DE	3.98%	11.29%	12.62%	0.3%	MA	4.96%	9.44%	7.46%	2.0%	PA	5.29%	9.24%	19.01%	2.5%	MI	6.46%	3.53%	20.19%	3.5%
WY	3.98%	9.25%	11.70%	0.1%	NV	4.96%	15.41%	7.81%	2.0%	TN	5.34%	5.07%	26.10%	1.7%	WA	6.54%	9.89%	16.39%	2.3%
IA	4.18%	4.33%	21.93%	0.5%	WI	5.01%	6.34%	17.08%	1.4%	NM	5.46%	8.49%	21.18%	0.4%	MS	6.58%	5.00%	29.69%	0.5%
MD	4.29%	15.18%	8.52%	3.3%	UT	5.01%	5.93%	25.20%	0.9%	w	5.47%	6.14%	21.27%	0.1%	DC	6.80%	17.08%	10.07%	0.2%
MT	4.34%	9.28%	16.55%	0.1%	NJ-	5.05%	13.09%	11.64%	2.9%	NY	5.66%	11.55%	12.02%	3.9%	ΑK	7.02%	8.88%	12.30%	0.1%
MN	4.36%	7.95%	12.89%	1.7%						ОН	5.70%	3.44%	27.87%	3.0%	OR	7.12%	10.37%	17.98%	1.2%

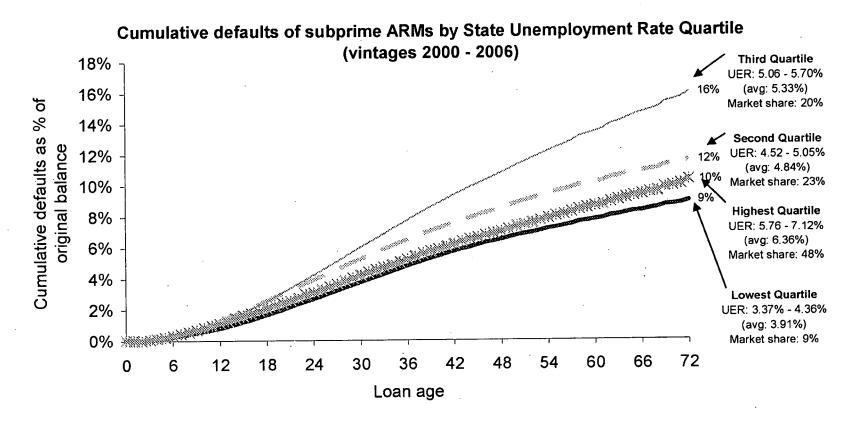
Source: US Department of Labor, Office of Federal Housing Enterprise Oversight, LoanPerformance and Deutsche Bank Job data as of the end of 2005, HPA data as of end of second quarter, Default data as of end of August



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## The quartile of states with highest unemployment rates

## have not been the one with highest default rates



Source: LoanPerformance, OFHEO, Deutsche Bank

Data as of December 2006

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## Though jobless rates had an impact on subprime mortgage defaults, the pattern has not been nearly as clear as that of home price growth rates

Footnote Exhibits - Page 0946

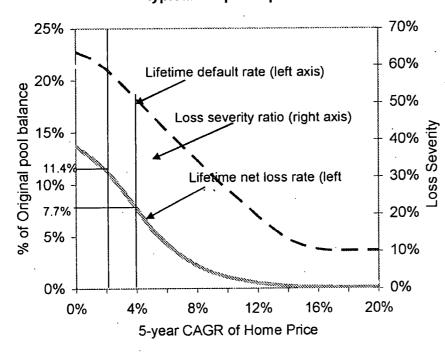
As shown on the last page

- The quartile of the states with highest unemployment rates from 2001 to 2005, which includes California, has had fairly low cumulative default rates, compared with other quartiles
- This shows that, at least in the last six years, the job market has not been the most influential factor of subprime mortgage credit performance, good or bad
- The low defaults in the quartile of states with highest unemployment rates have largely been the result of California's strong housing market, which, despite a below average job market, has produced one of the lowest cumulative default rates

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### Lifetime net losses of subprime mortgage pools can potentially go to high teens if home prices flatten

### Projected defaults, severity & net losses for typical subprime pools



Given the strong historical correlation between home price appreciation and lifetime default rates, as well as that between home price appreciation and loss severity ratios, we can roughly project the relationship between home price appreciation and lifetime net loss rates

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- The lifetime net loss rate is defined as the dollar amount of losses of mortgages in the pool net of recovery divided by the original pool balance. Therefore the lifetime net loss rate equals the lifetime default rate times the loss severity ratio
- As can be seen from the chart on the left, at 4% home price appreciation, we expect the net loss rate to be close to 10%, enough to wipe out most BBBbonds. At 0%, net loss rates is expected to be in high teens, enough to wipe out almost all BBB bonds.
- The basic characteristics assumed in the model shown on the left are
  - FICO: 630
  - **CLTV: 85**
  - Full doc %: 60%
  - Unemployment rate: 5%
  - Balance: \$200,000

Source: Deutsche Bank

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### How high can subprime mortgage losses go? **Experience of Guardian S&L's securitizations**

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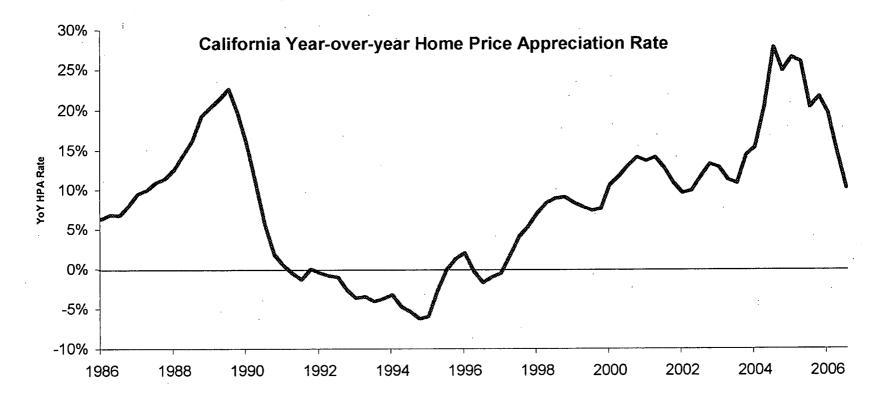
	Deal Name	Issue Date	Original Deal Size	Cumulative
	GSL 1988-01	Jun 88	88,599,160	1.38%
	GSL 1988-02	Aug 88	77,707,894	1.71%
_	GSL 1988-03	Sep 88	70,558,507	3.83%
1988	GSL 1988-04	Oct 88	59,420,630	4.18%
<del>-</del>	GSL 1988-05	Nov 88	62,365,902	4.29%
	GSL 1988-06	Dec 88	54,300,924	4.79%
	Weighted average	je		3.15%
	GSL 1989-01	Jan 89	63,536,170	4.56%
	GSL 1989-02	Feb 89	55,133,511	4.34%
	GSL 1989-03	Apr 89	129,304,085	4.46%
	GSL 1989-04	May 89	73,352,390	7.60%
	GSL 1989-05	Jun 89	66,110,704	6.00%
	GSL 1989-06	Jul 89	64,015,663	7.74%
1989	GSL 1989-07	Jul 89	64,012,175	9.48%
÷	GSL 1989-08	Aug 89	36,764,495	4.62%
	GSL 1989-09	Sep 89	71,197,617	10.14%
	GSL 1989-10	Oct 89	99,948,138	9.29%
	GSL 1989-11	Nov 89	100,031,457	10.78%
	GSL 1989-12	Dec 89	76,193,370	11.40%
	Weighted average	ge		7.70%
· · · · · · · · · · · · · · · · · · ·	GSL 1990-01	Jan 90	106,434,749	13.29%
	GSL 1990-02	Feb 90	70,050,087	14.15%
	GSL 1990-03	Mar 90	85,734,389	15.20% ·
_	GSL 1990-04	Apr 90	135,263,315	17.30%
1990	GSL 1990-05	May 90	113,828,957	16.52%
<del>-</del>	GSL 1990-06	Jul 90	164,111,691	16.36%
	GSL 1990-07	Jul 90	125,697,495	18.88%
•	GSL 1990-08	Sep 90	145,658,584	19.34%
	Weighted avera	ge		16.69%
	GSL 1991-01	Feb 91	184,575,305	18.48%
1991	GSL 1991-02	Mar 91	136,658,468	17.36%
<del>~</del>	Weighted avera	ge		18.01%

Source: Moody's Data as of August 2006



### Is California housing market repeating itself?

Footnote Exhibits - Page 0949



Source: OFHEO, Deutsche Bank

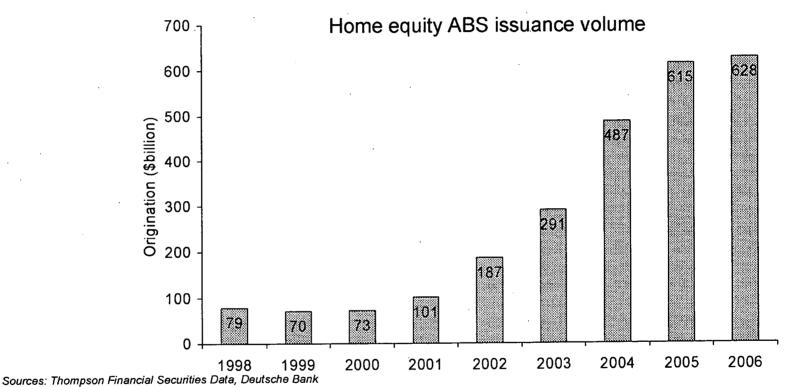
Data as of end of Third Quarter 2006

Deutsche Bank

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### HEL ABS sector has been experiencing fast growth in recent years

Footnote Exhibits - Page 0950



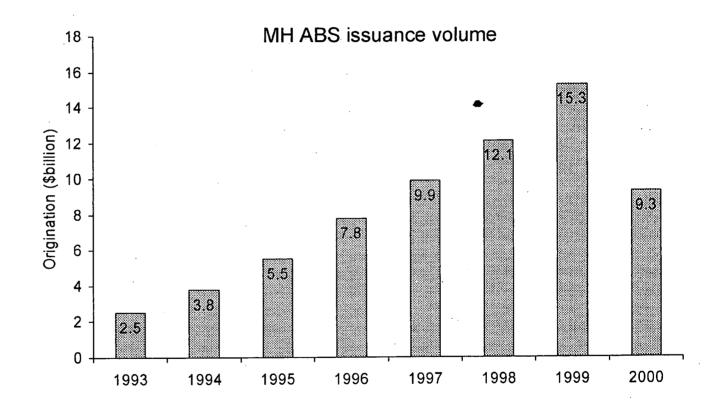
\* Data as of end of December 2006. \*\* Projected by Deutsche Bank

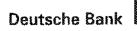
Note: Thompson Financial Securities Data changed its criteria of home equity ABS in January 2006. The new criteria excludes certain deals with relatively high FICO scores. It also no longer include overseas mortgages securitized in the US as home equity ABS, as it used to do. As a result, issuance figures shown here are generally lower than what may have been previously shown.

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### Deja-vu? MH had a similarly rapid (albeit milder) growth pattern

Footnote Exhibits - Page 0951





### What happened to MH bonds issued in 1998 through 2000 originally BBB rated?

Footnote Exhibits - Page 0952

#### As of October 2006

AS OF OCCODE 2006	· · · · · · · · · · · · · · · · · · ·	<del></del>	
	1998-vintage	1999-vintage	2000-vintage
Originally rated Baa2/Baa3 (or BBB+/BBB/BBB-)			
Completely written off (i.e., zero recovery)	40%	88%	100%
Partially written off (more losses to come)	50%	12%	
Not yet hit by writedowns, but downgraded to below Caa or lower	10%		
Total	100%	100%	100%
Originally rated A2 (or A+/A/A-)			
Completely written off (i.e., zero recovery)	0%	50%	85%
Partially written off (more losses to come)	78%	38%	15%
Not yet hit by writedowns, but downgraded to below Caa or lower	22%	13%	
Total	100%	100%	100%

- (1) Data reflect all deals from major issuers such as Bank of America, Bombardier, DFCS, GreenPoint, Green Tree (Conseco). IndyMac, Merit and Oakwood. Vanderbilt deals are excluded because the company has been buying out defaulted loans.
- (2) We use Moody's rating when available, when Moody's ratings are not available, we use S&P's

Source: Moody's, S&P, Deutsche Bank

Deutsche Bank

### Most top issuers are not regulated banks

Footnote Exhibits - Page 0953

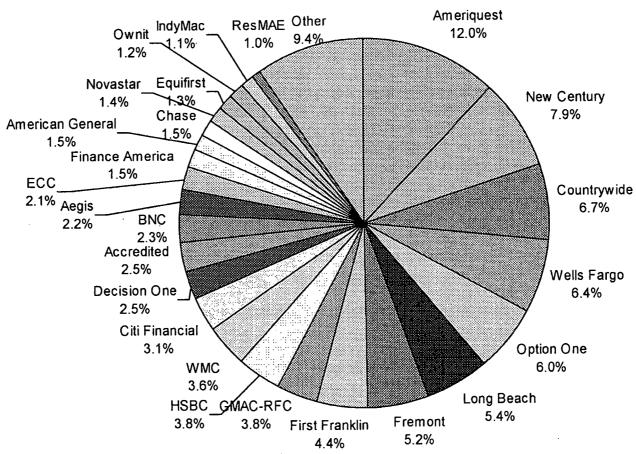
Top 10 originator-issuer in 2005								
Rank	Name	2005 Volume (\$ million)	Market share					
1	Countrywide (CWL / CWHEL / CPT)	63,142	10.3%					
2	Ameriquest (AMSI / ARSI / PPSI)	52,098	8.5%					
3	Lehman Brothers (SAIL / LMT / LXS SASC)	43,871	7.1%					
4	GMAC-RFC (RASC / RAMP / RAAC / RFMS2)	31,823	5.2%					
5	New Century (NCHET)	31,208	5.1%					
6	Option One (OOMLT)	24,730	4.0%					
7	CSFB (HEAT / ABSHE / HEMT)	24,322	4.0%					
8	WMC (GEWMC)	19,225	3.1%					
9	Fremont (FHLT)	18,792	3.1%					
10	Bear Stearns (BSABS)	17,161	2.8%					

Companies in boldface fonts are regulated banks or affiliated with regulated banks.

Sources: Thomson Financial Data Servoce. Deutsche Bank

### Top subprime mortgage lenders in 2005

Footnote Exhibits - Page 0954



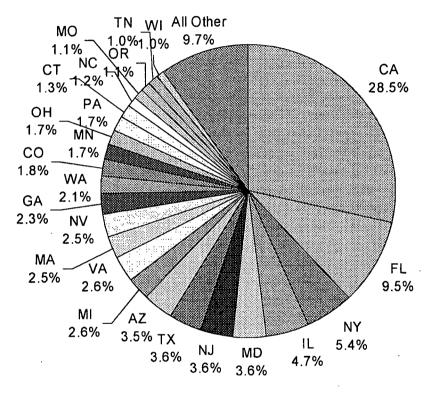
Source: Inside Mortgage Finance Publications, Deutsche Bank

Deutsche Bank

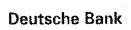
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### Subprime mortgages originated in 2005 by state

Footnote Exhibits - Page 0955



Source: Loan Performance

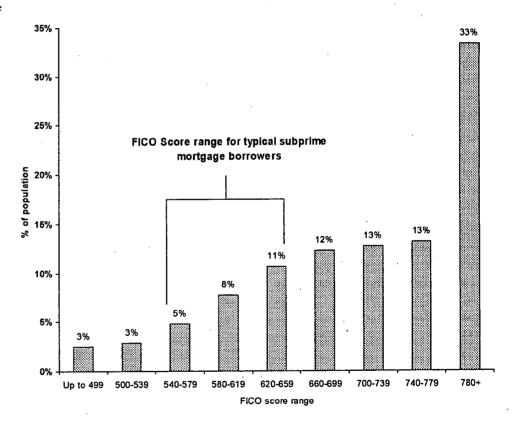


## Subprime mortgage borrower base relative to general US population

- Subprime mortgage sector typically lends to borrowers better than the bottom 5% of US consumers but worse than the top 71%.
- Said another way the subprime mortgage universe 'attaches' at about 5% of US consumers and 'detaches' at roughly 29%. 5% and Below are not deemed suitable for traditional home equity ABS deals.
- About 71% of US consumers have better credit and are eligible for better financing terms from either Fannie Mae or Freddie Mac, or prime mortgage lenders.
- Although subprime mortgage borrowers are not exactly consumers with the worst credit, they form the top 81% of the bottom 29% of US consumers.
- FICO scores of the majority of subprime mortgage borrowers are below 650.

How do people score in the US?

Footnote Exhibits - Page 0956



Source: Fair Isaac Corporation

Deutsche Bank

Footnote Exhibits - Page 0957

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### How Fair Isaac views the risk of borrowers with various **FICO scores**

FICO Bucket	Share in 2005 subprime deals *	Fair Isaac risk rate **
Up to 499	0.12%	83%
500 - 549	11.67%	70%
550 - 599	22.89%	51%
600 - 649	33.69%	31%
650 - 699	22.44%	14%
700 - 749	7.61%	5%
750 - 799	2.44%	2%
800 and higher	0.13%	1%

- Based on LoanPerformance database. Alt-B deals are excluded.
- \*\* As defined by Fair Isaac, the percentage of borrowers in the cohort that will either default, file for bankruptcy, or become 90 days delinquent on at least one credit account in the next two years in a normal economic environment



### Loans in recent vintage home equity deals are more risky with higher silent seconds, CLTV and IO, lower full doc and bigger payment shocks

Footnote Exhibits - Page 0958

Loan characteristics for subprime ARMs issued in 2004 through 2006

	2004					20	05	2006			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
WA FICO	611	617	618	616	618	· 622	623	625	627	624	620
WA LTV	82	82	82	81	81	79	81	81	81	81	84
WA CLTV	84	85	86	86	86	86	88	86	86	86	89
Silent seconds	12%	15%	24%	25%	27%	30%	34%	32%	24%	27%	27%
Interest-only	8%.	11%	17%	19%	24%	29%	30%	30%	25%	16%	8%
40-year mortgage	0%	0%	0%	0%	0%	0%	4%	7%	17%	29%	36%
Full Doc	60%	61%	61%	58%	57%	57%	57%	55%	53%	55%	53%
Average loan size	172,791	178,595	182,621	188,126	193,661	194,398	203,971	209,096	212,335	214,478	217,741
CA %	33.4%	34.4%	34.5%	34.6%	34.3%	31.9%	32.1%	30.6%	31.4%	27.7%	26.6%
Initial WAC	7.31%	7.00%	7.11%	7.23%	7.12%	7.16%	7.14%	7.25%	7.69%	8.13%	8.34%
WA Margin	6.08%	5.82%	5.87%	5.90%	6.01%	5.88%	5.82%	5.84%	5.83%	6.04%	5.87%
6-Month LIBOR at	1.18%	1.54%	1.97%	2.48%	2.45%	3.05%	3.50%	3.97%	4.39%	4.91%	5.40%
issuance Fully indexed rate at	7.26%	7.36%	7.84%	8.38%	8.46%	8.93%	9.32%	9.81%	10.21%	10.93%	11.26%
issuance Difference between start rate and fully indexed	-0.05%	0.36%	0.73%	1.15%	1.34%	1.77%	2.18%	2.56%	2.52%	2.80%	2.92%
rate at issuance					ì				1		

Source: Moody's, LoanPerformance, Deutsche Bank



### Example: Borrower's debt-to-income ratio may grow dramatically after resets in a typical subprime loan

Footnote Exhibits - Page 0959

Mortgage maturity	360	months
Loan size	\$200,000	
Teaser rate	7.50%	
Teaser period	24	months
IO period	60	months
Reset frequency	6	months
Initial DTI	40%	
Mortgage DTI	35%	
Current LIBOR	5.59%	
Initial periodic cap	3%	
Subsequent periodic cap	1.5%	
Margin	6%	
Assumed annual income growth	4%	
Growth rate of other debts	20%	

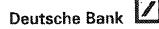
At origination After first reset After the second reset	Mortgage coupon 7.50% 10.50% 11.59%	Monthly Payment \$1,250.00 \$1,750.00 \$1,932.33	Payment shock N/A \$500.00 \$182.33	Mortgage DTI 35.0% 45.3% 49.1%	Total DTI 40.0% 52.0% 56.2%	Annual Income \$42,857.14 \$46,354.29 \$47,272.28	Monthly payment for non-mortgage debts \$178.57 \$257.14 \$281.69
After expiration of IO	11.59%	\$2,046.70	\$114.37	47.1%	57.3%	\$52,142.27	\$444.34



### What does the payment shock mean to the borrower in the example?

Footnote Exhibits - Page 0960

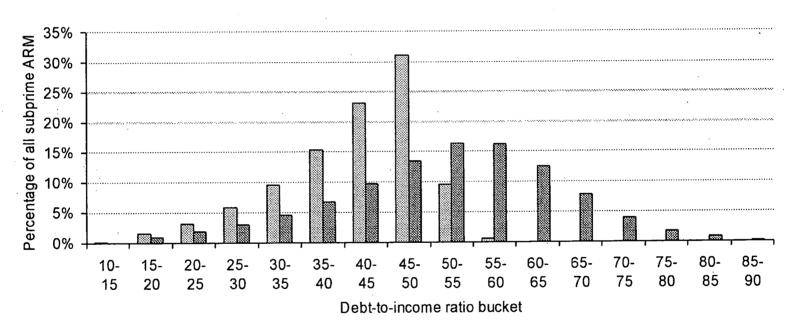
- Borrower's mortgage debt-to-income ratio alone, which is assumed at 35% at the loan origination, will grow more than 10 points to 46% after the initial reset and to nearly 50% at the second reset.
- With a moderate growth assumption for the borrower's other debts, the borrower's total debt-to-income ratio can grow to nearly 60% at the expiration of the IO term.
- In order for the borrower to have the same (mortgage) debt-toincome ratio at the second reset (when the rate becomes fully indexed), the income needs to grow more than 19% annually.
- If home prices stop appreciating, the borrower, with LTV virtually unchanged in the existing loan and likely larger credit card and other debts incurred in the meantime, may find it difficult to refinance into another affordable loan.
- According to a subprime mortgage servicer who has the top servicer rating from all rating agencies, in the past, about 50% of the borrowers who did not refi at the payment reset would default eventually.



## Debt-to-income ratios for subprime mortgage borrower would become dramatically higher if calculated using payments with fully-indexed coupons

Footnote Exhibits - Page 0961

#### Distribution of subprime ARM originated in 2005 and 2006 by DTI



■ DTI reported ■ DTI calculated pro forma using fully-indexed coupon with LIBOR at origination

## Loan characteristics from major issuers' recent deals<sup>a</sup>

Footnote Exhibits - Page 0962

Issuer	ARM %	Type	Loan	WA	FICO	WA	CLTV	10	40-	Piggy-	Super	Low/No Doc	Invest
		- 71-	Size (\$)	FICO	<560	CLTV	>80		Year	back	States		
Ameriquest	84.5%	ARM	209,680	652	2.3	91.6	75.2	51.3	15.4	43.6	58.0	42.2	3.4
		Fixed	144,031	646	. 5.7	83.5	52.7	13.2	9.6	13.6		27.8	3.3
Argent	87.7%	ARM	175,276	599	28.1	80.4	52.0	13.6	8.2	11.2	59.8	34.7	3.5
		Fixed	130,561	648	7.7	81.4	58.0	16.1	3.4	4.9		27.9	5.3
Countrywide	85.0%	ARM	224,679	617	19.7	88.0	72.4	21.5	11.4	33.0	69.6	47.8	9.6
•		Fixed	149,125	624	15.9	81.0	53.5	5.8	7.7	8.5	58.3	23.7	5.9
First Franklin	66.9%	ARM	196,964	614	17.0	86.7	66.6	35.4	9.6	34.9	64.1	43.4	4.4
		Fixed	179,582	613	16.8	78.1	44.3	12.8	9.4	9.0	65.0	26.6	2.5
Fremont	89.0%	ARM	256,136	621	16.7	86.2	54.1	16.0	24.7	32.8	76.2	45.4	
		Fixed	92,852	643	5.3	90.8	74.3	0.0	5.2	14.5	77.2	36.5	4.7
Long Beach	86.5%	ARM	233,398	634	10.2	91.5	77.7	8.9	50.4	56.2		56.5	
- 0		Fixed	106,838	643	5.4	87.0	62.7	0.0	15.4	18.2	62.5	37.9	6.5
New Century	80.3%	ARM	223,667	622	15.7	84.5	57.1	29.3	28.5	18.8	72.4	50.1	9.7
,		Fixed	135,655	634	10.0	81.8	52.0	2.0	9.8	6.4	65.0	31.6	
Option One	81.3%	ARM	224,695	613	17.5	86.4	62.8	20.4	22.5	31.6	64.9	45.3	
		Fixed	126,584	634	7.8	83.2	54.8	4.2	12.4	15.4	65.8	35.7	
RASC	79.7%		171,893	617	10.8	87.5	70.5	17.1	9.8	29.6	46.1	37.0	4.7
		Fixed	99,759	626	8.5	82.7	58.4	2.5	6.6	10.5	41.6	27.1	4.6
WMC	82.7%		265,670	639	9.3	82.9	34.8	18.7	53.4	11.8	80.2	60.1	4.2
		Fixed	91,806	649	2.9	90.2	70.7	0.0	. 14.0	1.3	76.1	55.4	3.3

Source: LoanPerformance, Deutsche Bank

b. Super states are states whose home price index increased more than 10% YoY since the second quarter of 2001. These include AZ, CA, CT, DC, DE, FL, HI, MD, ME, NJ, NV, NY,OR, RI, VA and VT





a. Deals issued in 2006

## Typical 2005-vintage home equity deals from major issuers

Footnote Exhibits - Page 0963

			Beach 05-2		ranklin 5-FF6		Century 05-4		SC -KS11
	ARM %	94.0%		89.8%		42.5%		62.7%	
	Average Balance	<b>!</b>		\$223,787		\$205,009		\$151,066	
	WAC		1%	6.6	9%	7.21%		7.51%	
	WA CLTV	90	)%	90%		87%			5%
<del> </del>	WA 1st Lien LTV	. 83	3%	83	3%		1%		1%
Collateral	Piggyback	39	.6%		.9%	29.0%			.9%
at	% CLTV >80		.2%	78.0%		69.0%		63.5%	
	WA DTI	NA		44.50%		41.00%		NA	
၂ ႘၂	% DTI >40		۱A	70.80%		62.60%		NA SS SS	
_	Owner Occ.	81.8%		97.2%		89.7%		93.6% 9.1%	
	% CA	33.9%		41.6%		39.4%			
	Avg. FICO		36	647		626 39.3%			14
	10%		.6%		.2%				.9%
	Aaa	26.35%	(73.65%)		(79.80%)		(77.10%)	20.60%	(79.40%)
o _	Aa2	14.10%	(12.25%)	i	(7.40%)	15.80%	(7.10%)	13.75%	(6.85%)
ati %)	A2	9.70%	(4.40%)	7.85%	(4.95%)	10.20%	(5.60%)	8.30%	(5.45%)
din	A3	8.50%	(1.20%)	6.45%	(1.40%)	8.65%	(1.55%)	6.80%	(1.50%)
ord las	Baa1	6.80%	(1.70%)	5.30%	(1.15%)	7.05%	(1.60%)	5.25% 4.05%	(1.55%) (1.20%)
<u>ရ</u> ၁	Baa2	5.70%	(1.10%)	4.20%	(1.10%)	5.95%	(1.10%)	4.05% 2.95%	(1.20%)
Subordination (Class %)	Baa3 Ba1	4.50% 3.20%	(1.20%) (1.30%)	3.40% 2.40%	(0.80%) (1.00%)	4.85%	(1.10%)	2.33 //	(1.1070)

## Typical 2006-vintage home equity deals from major issuers

Footnote Exhibits - Page 0964

	and the second	Long			dview		Stanley		SC	
		2006-WL1		2006-OPT3		2006-NC1		2006-KS4		
}	ARM %	90.0%		84.9%		77.7%		86.5%		
	Average Balance	\$207	,619	\$192,957		\$202,198		\$145,305		
	WAC	7.4	5%	8.5	88%	7.3	3%	8.4	3%	
	WA CLTV	92	%	10	0%	8	۱%	87	7%	
=	WA 1st Lien LTV	80	%	80	0%	80	)%	82	2%	
%	Piggyback	57.	5%	94	.3%	١	1A	25	.2%	
#	% CLTV > 80	80.0	0%	99.3%		45.1%		69.2%		
=	WA DTI	NA		42.23%		40.69%		NA		
Collatera	% DTI >40	N	NA		64.84%		60.75%		NA	
	Owner Occ.	91.6%		94	.1%	91	.7%	94	.1%	
	% CA	45.0%		22.1%		38.7%		10.9%		
	Avg. FICO		Α	602		620		6	23	
	10%	7.2%		9.5%		26.2%		15.7%		
	Aaa	23.35%	(76.65%)	23.70%	(76.30%)	21.10%	(78.90%)	22.00%	(78.00%)	
5	Aa2	16.40%	(6.95%)	15.45%	(8.25%)	14.55%	(6.55%)	14.65%	(7.35%)	
ation %)	A2	10.90%	(5.50%)	9.95%	(5.50%)	9.50%	(5.05%)	9.05%	(5.60%)	
ina s %	A3	9.40%	(1.50%)	8.30%	(1.65%)	8.05%	(1.45%)	7.40%	(1.65%)	
rdin	Baa1	8.00%	(1.40%)	6.70%	(1.60%)	6.65%	(1.40%)	5.90%	(1.50%)	
		6.75%	(1.25%)	5.35%	(1.35%)	5.40%	(1.25%)	4.50%	(1.40%)	
5	Baa3	5.75%	(1.00%)	4.25%	(1.10%)	4.35%	(1.05%)	3.50%	(1.00%)	
ဟ	Ba1	4.70%	(1.05%)	3.45%	(0.80%)			2.80%	(0.70%)	

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### How do Baa2 and Baa3 tranches in a typical 2005vintage subprime mortgage deal fare?

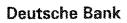
Footnote Exhibits - Page 0965

Lifetime net cumulative losses when the tranche will be hit by principal writedown		Lifetime net cumulative losses when the tranche will be wiped out		
For Baa2				
70%	12.11%	13.66%		
80%	10.81%	12.36%		
90%	9.82%	11.34%		
100%	9.06%	10.55%		
110%	8.46%	9.91%		
120%	7.97%	9.39%		
130%	7.57%	8.96%		
For Baa3				
70%	10.06%	12.11%		
80%	8.84%	10.72%		
90%	7.93%	9.82%		
100%	7.22%	9.06%		
110%	6.66%	8.46%		
120%	6.22%	7.97%		
130%	5.86%	7.57%		

Note: We used multiples of the prepayment and losses assumptions outlined in the prior pages and the forward LIBOR curves as of November 16, 2006. We chose Option One 2005-4 as our model transaction which has somewhat typical initial credit enhancement levels for Baa3 (3.85%), Baa2 (5.35%) and Baa1 (6.55%). All step-down or step-up triggers in the deal structure are assumed activated for conservatism. If the triggers are not activated, the break points may be substantially lower.

As shown, faster prepayments usually cause bonds to "break" at lower loss levels, since there is less excess spread.

Conversely, bonds "break" at higher loss levels under slow prepayments. However, under such a scenario, more borrowers will pay fully indexed rates longer (usually this is a sign that fewer borrowers are able to refinance). Therefore, the cumulative losses out of a pool could be higher.





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## How do Baa2 and Baa3 tranches in a typical 2005vintage subprime mortgage deal fare (continued)?

Footnote Exhibits - Page 0966

% for base case prepayment	Lifetime net cumulative losses when the tranche will be hit by principal writedown	Lifetime net cumulative losses when the tranche will have 30% principal writedown	Lifetime net cumulative losses when the tranche will be wiped ou
For Baa2			
70%	12.11%	12.58%	13.66%
80%	10.81%	11.28%	12.36%
90%	9.82%	10.28%	11.34%
100%	9.06%	9.51%	10.55%
110%	8.46%	6.17%	9.91%
120%	4.24%	5.17%	9.39%
130%	3.13%	5.19%	9.39%
For Baa3			
70%	10.06%	10.67%	12.11%
80%	8.84%	9.42%	10.81%
90%	7.07%	7.56%	9.82%
100%	5.70%	6.42%	9.06%
110%	4.52%	5.27%	8.46%
120%	3.39%	4.50%	8.98%
130%	2.54%	4.43%	9.64%

Note: We used multiples of the prepayment and losses assumptions outlined in the prior pages and the forward LIBOR curves as of November 16, 2006. We chose Option One 2005-4 as our model transaction which has somewhat typical initial credit enhancement levels for Baa3 (3.85%), Baa2 (5.35%) and Baa1 (6.55%). In this scenario, all step-down or step-up triggers in the deal structure are allowed to pass or fail based on the prepayment and default assumptions (and a 0% delinquency rate). This results in lower breakpoints than the initial enhancements under rapid prepayment scenarios because the subordination begins to pay down or be released before losses have hit the deal at the three year stepdown date.

As shown, faster prepayments usually cause bonds to "break" at lower loss levels, since there is less excess spread.

Conversely, bonds "break" at higher loss levels under slow prepayments. However, under such a scenario, more borrowers will pay fully indexed rates longer (usually this is a sign that fewer borrowers are able to refinance). Therefore, the cumulative losses out of a pool could be higher.

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## How do Baa2 and Baa3 tranches in a typical 2006vintage subprime mortgage deal fare?

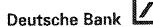
Footnote Exhibits - Page 0967

6 for base case prepayment Lifetime net cumulative losses when the tranche will be hit by principal writedown		Lifetime net cumulative losses when the tranche will be wiped ou		
For Baa2				
70%	14.57%	15.37%		
80%	12.05%	12.89%		
90%	10.38%	11.23%		
100%	9.16%	10.01%		
110%	8.19%	9.04%		
120%	7.42%	8.27%		
130%	6.80%	7.64%		
For Baa3				
70%	13.28%	14.57%		
80%	10.49%	12.05%		
90%	8.92%	10.38%		
100%	7.73%	9.16%		
110%	6.80%	. 8.19%		
120%	6.06%	7.42%		
130%	5.47%	6.80%		

Note: We used multiples of the prepayment and losses assumptions outlined in the prior pages and the forward LIBOR curves as of November 16, 2006. We chose Citigroup Mortgage Loan Trust 2006-NC1 as our model transaction which has somewhat typical initial credit enhancement levels for Baa3 (3.70%), Baa2 (4.80%) and Baa1 (5.50%). All step-down or step-up triggers in the deal structure are assumed activated for conservatism. If the triggers are not activated, the break points may be substantially lower.

As shown, faster prepayments usually cause bonds to "break" at lower loss levels, since there is less excess spread.

Conversely, bonds "break" at higher loss levels under slow prepayments. However, under such a scenario, more borrowers will pay fully indexed rates longer (usually this is a sign that fewer borrowers are able to refinance). Therefore, the cumulative losses out of a pool could be higher.





## How do Baa2 and Baa3 tranches in a typical 2006vintage subprime mortgage deal fare (continued)?

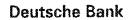
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% for base case prepayment	Lifetime net cumulative losses when the tranche will be hit by principal writedown	Lifetime net cumulative losses when the tranche will have 30% principal writedown	Lifetime net cumulative losses when the tranche will be wiped out
For Baa2			
70%	14.57%	14.81%	15.37%
80%	12.05%	12.30%	12.89%
90%	10.38%	10.64%	11.23%
100%	9.16%	9.42%	10.01%
110%	5.70%	6.11%	9.04%
120%	4.23%	4.59%	7.70%
130%	3.14%	4.67%	7.43%
For Baa3			
70%	13.28%	13.68%	14.57%
80%	10.49%	10.94%	12.05%
90%	8.92%	9.35%	10.38%
100%	6.31%	6.89%	9.16%
110%	4.87%	5.49%	7.58%
120%	3.64%	4.20%	7.25%
130%	2.67%	4.51%	7.74%

Note: We used multiples of the prepayment and losses assumptions outlined in the prior pages and the forward LIBOR curves as of November 16, 2006. We chose Citigroup Mortgage Loan Trust 2006-NC1 as our model transaction which has somewhat typical initial credit enhancement levels for Baa3 (3.70%), Baa2 (4.80%) and Baa1 (5.50%). In this scenario, all step-down or step-up triggers in the deal structure are allowed to pass or fail based on the prepayment and default assumptions, (and a 0% delinquency rate). This results in lower breakpoints than the initial enhancements under rapid prepayment scenarios because the subordination begins to pay down or be released before losses have hit the deal at the three year stepdown date...

As shown, faster prepayments usually cause bonds to "break" at lower loss levels, since there is less excess spread.

Conversely, bonds "break" at higher loss levels under slow prepayments. However, under such a scenario, more borrowers will pay fully indexed rates longer (usually this is a sign that fewer borrowers are able to refinance). Therefore, the cumulative losses out of a pool could be higher.



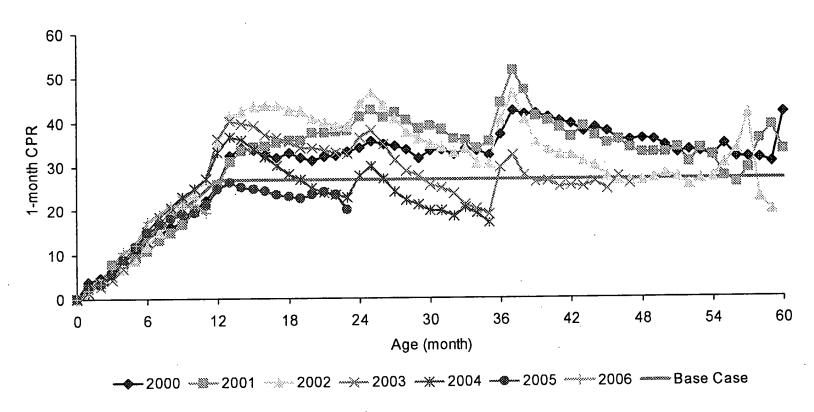


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## We assume base case prepayment assumption using historical prepayment data – fixed rate mortgages

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### Fixed rate historical prepayments and base case assumption



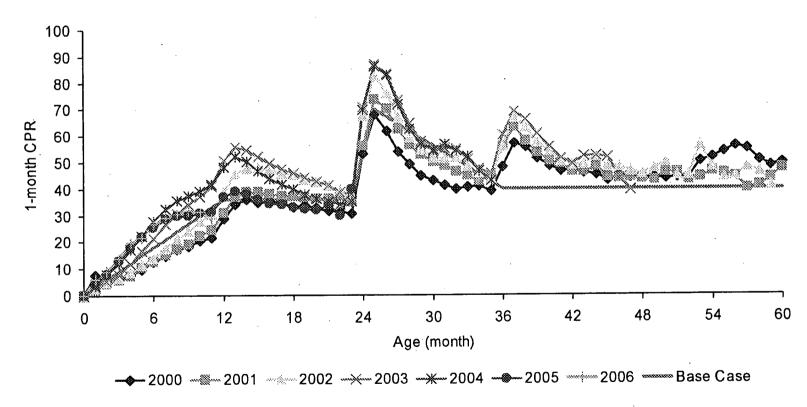
Source: Loan Performance, Deutsche Bank

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## We assume base case prepayment assumption using historical prepayment data - ARMs

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#### ARM historical prepayments and base case assumption

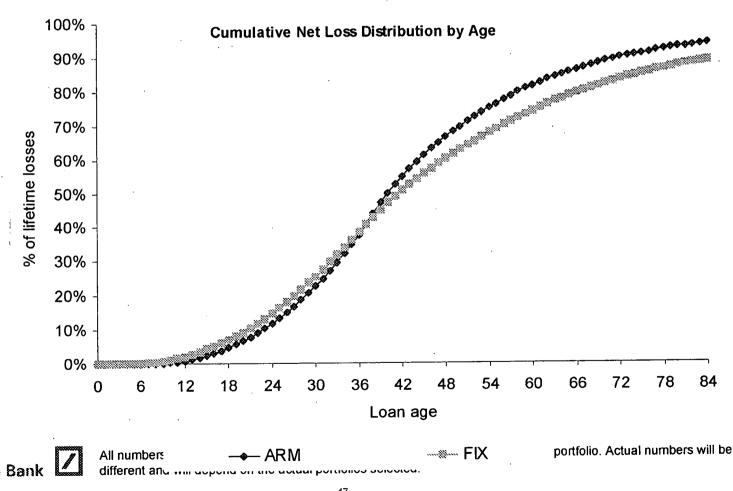


Source: Loan Performance, Deutsche Bank

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## Most of losses in collateral happen between year 2 and year 4, especially after rate-adjustment induced payment shocks

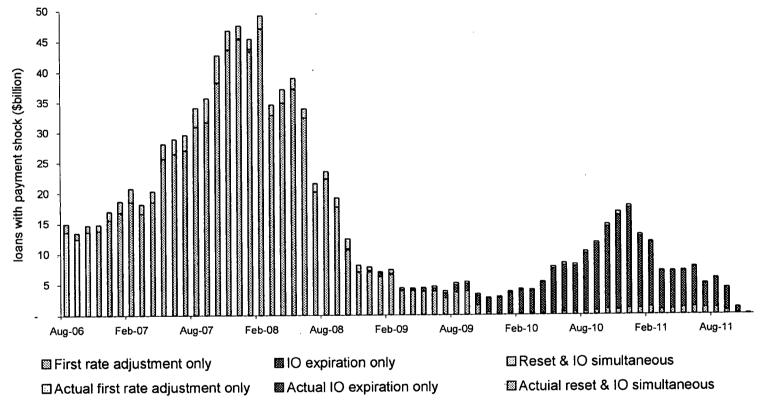
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## Nearly \$783 billion subprime mortgages will experience payment shocks in the next 3 years

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Estimated amount of current outstanding subprime mortgages with future payment shocks



Note: Securitized subprime mortgages only

Data as of October 2006

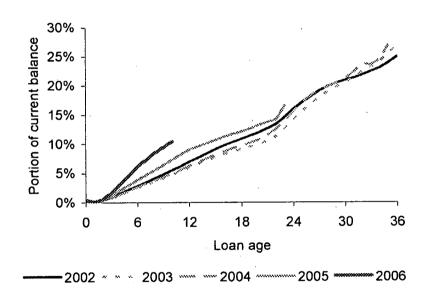
Sources: LoanPerformance, Deutsche Bank

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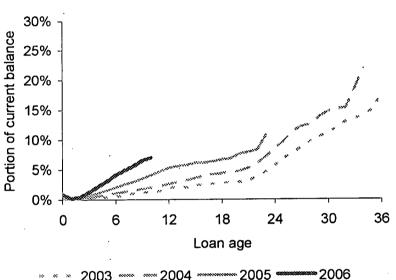
### The 2005 and 2006-vintages have underperformed their predecessors





Serious Delinquency Rate for IO ARM

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Note: There was virtually no subprime IO lending before 2003.

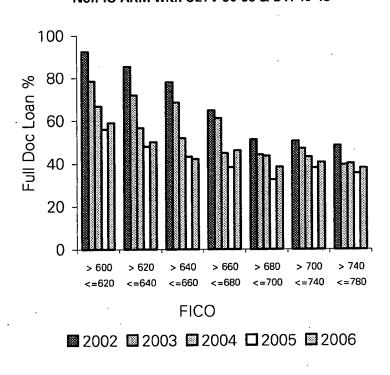
Data as of October 2006

Source: Loan Performance, Deutsche Bank



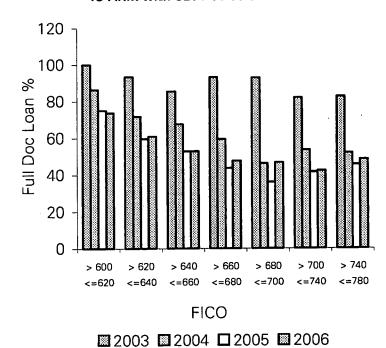
## The 2005-vintage was most risk-layered

#### Non-IO ARM with CLTV 90-95 & DTI 40-45



#### IO ARM with CLTV 90-95 & DTI 40-45

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Sources: LoanPerformance, Deutsche Bank

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## Pay-as-you-go (PAUG) structure: the market's answer to challenges posed to ABS CDS

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- The physical delivery and credit event-settlement are not required
  - Unlike corporate CDS, ABS CDS does not require physical delivery of the underlying bond from the protection buyer (who has effectively sold the underlying bond short). This helps to greatly neutralize the risk of a short squeeze.
  - Nor is cash settlement at the credit event mandatory. This would avoid either party from been trapped with artificially high or low quotes.
- The cashflow of the PAUG ABS CDS is dictated by the underlying bonds distribution cashflow, outstanding balance, and interest shortfalls or principal writedown, if any.
  - The underlying bond's balance, interest shortfall and principal writedown are calculated using rules set at the issuance. (See Appendix for typical bond payment structure.)
  - If the underlying bond is paid down, the notional amount for the CDS will decline accordingly.
  - If there is an interest shortfall in the underlying bond resulted from the available funds cap, premium payment for CDS will be reduced accordingly, subject to the ceiling of the premium size.
  - If there is an interest shortfall due to credit loss or there is a principal writedown, the protection seller will pay the protection buyer accordingly



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# Deutsche Bank's counterparty will have stable counterparty risk while enjoy flexibility of assigning the contract to another broker-dealer

- A protection buyer will always have DB as the counterparty if the contract is initially made with DB
  - DB may hedge its position, but will never assign the contract to any third party
  - If the CDO is DB's counterparty, it is required to be fully funded in a separate offshore SPV
- However, the protection buyer can offload the position by
  - Unwind the contract with DB
  - Physically deliver the bond
  - Assign the contract to another broker dealer (effectively covering the short)

Appendix:

The underlying securities: subprime RMBS

## **U.S. Residential Mortgage**

#### Single family mortgages

- mortgages on single family (detached) houses
- not included: condos, town houses, co-ops, buildings with more than 1 units, commercial properties, etc.

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#### 2-4 family mortgages

mortgages on residential buildings with 2 to 4 family units

#### Multi-family mortgages

usually considered as commercial mortgages

#### Other residential mortgages

condos, town houses, co-ops, etc.



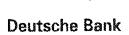
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### The US Residential MBS Market

Agency mortgages are mortgages that are in Ginnie Mae, Fannie Mae and Freddie Mac programs.

Typical Fannie Mae / Freddie Mac requirements

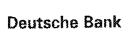
- balance limit: \$359,650 for 2005 (single family house)
- loan priority: must be first-lien
- debt-to-income ratio limit:
  - 28% for mortgage debt
  - 33% for total debt
- cash-out not above 75% LTV (if refinance)
- loan-to-value ratio limit: 95%
- credit history: FICO score at least 720



## Residential Mortgages (continued)

- Conventional loans: fixed rate loans in Fannie Mae and Freddie Mac programs
- GNMA loans are not available to the general public
- Jumbo mortgage: a prime loan with a balance higher than the agency limit.
- Prime mortgages: mortgages that are either agency mortgages or jumbo mortgages.

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## Profile of traditional home equity product

- Low balance
- Second or third lien
- Credit score above 680
- Usually a refinancing to take out cash
- 15-year maturity (or shorter)
- Combined loan-to-value (CLTV) ratio less than 100
- Include home equity lines of credit (securitized separately)

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## Subprime (a.k.a. B&C) mortgages

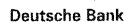
- Often a first lien mortgage
- May be purchase, cash out, etc.
- May be used for cash-out purposes or debt consolidation
- Typical LTV around 80, may reach 100
- Often have piggy-back second lien loans
- Includes FHA Title 1 loans and other home improvement loan products

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## Products that may be riskier than traditional home equity/subprime mortgages have become popular

Because of the continued faster pace in home price appreciation compared with wage growth, lenders have developed a number of products to enable borrowers to qualify for mortgage payments and/or to pay minimal downpayment

- IO mortgages
  - Loan only pays interest in the IO period (usually 2 to 5 years)
  - At the expiration of the IO period, loan converts to fully amortizing loans
  - Payment shock at the expiration of the IO period may cause defaults to surge
- Silent second mortgages
  - A simultaneous pair of first and second lien loans are made at the origination (usually 80% LTV for the first lien and 10 to 20% LTV for the second lien)
  - Borrower pays little or no down-payment
  - Only the first lien mortgage shows up in a securitization and LTV appear to only be 80%. But the borrower's tendency to default is much high than a true 80% first lien mortgage.
- Option ARMs
  - Allow borrower to pay exceedingly low initial minimum payments
  - Indexed on moving Treasury average (MTA), LIBOR or COFI-11
  - Likely to have negative amortization
  - Recast of schedule at 5<sup>th</sup> anniversary may potentially cause significant payment shocks
- Stated-income mortgage loans
  - Income of the borrowers is not substantiated by the documentation, nor is it verified
  - Borrowers may inflate income to get loan approved
- 40-year mortgages
  - Lengthened amortization schedule to make monthly payment smaller
- High debt-to-income ratio loans
  - DTI for these loans may reach beyond 50%, leaving little for the borrower to pay other expenses



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## **Subprime mortgagors**

- Demographically, this borrower is "middle America"
- Financially, this borrower
  - Has mismanaged his finances (past delinquencies, foreclosures or bankruptcies, low credit score)
  - Used excessive leverage (high DTI and/or LTV)
  - Is cash-strapped (large amount of cash-out refi.)
- While "riskier" than prime and jumbo borrowers, subprime borrowers
  - Are not directly impacted by stock market gyrations
  - Live in homes that are more liquid, less volatile

## The channel of mortgage lending

- There are three major channels of lending mortgages
  - Retail Loans are originated in branches of the lender. The lender controls most aspects of underwriting, including credit checking, income verification, appraiser selection, appraisal quality control, etc. The originator is more likely to have local market knowledge

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- Whole-sale Loans are originated by brokers who have regular business relationships with the lender. The lender may have an approval process in accepting a broker to its network and may monitor the performance of a broker's origination. The lender controls some aspects of the underwriting process but relies on the broker to do others.
- Correspondence Loans are originated by non-affiliated brokers according to the lenders underwriting matrix. The lender is likely to re-underwrite the loan in most aspects.





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## Income documentation and verification

- Full documentation, full verification
  - Last 2 years' W2s
  - Last 2 months' pay stubs
  - Letter from employer (verified by call)
  - Last 2 years' income tax returns (self-employed only)
  - Last 2 months' bank statements (verified by call)
- Partially (limited, light) documentation
  - Some of the documentations are deficient but usually one of income or employment proofs is available
- No income (stated income), no verification
  - Nothing is available



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## Appraisal process: the V in LTV

- Most used form of appraisals
  - Full appraisal (1004 appraisal)
  - Drive-by appraisal (2055 appraisal)
  - Broker price opinion (BPO)
  - Automated valuation model (AVM)
- Appraisers are paid on the case load, not value of the property
- Most of appraisers' business come from lenders
- Many lenders also employ in-house appraisers to control the quality of appraisals
- Even for purchase loans, an appraisal is needed to mitigate the risk of fraud

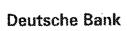


## **Business models of subprime lenders**

- Balance sheet lending
  - Pure lending on the company's own book is very rare for major lenders
- Whole-loan sales
  - Newer lenders mostly rely on whole-loan sales to dispose loans
  - Established lenders often engage in whole-loan sales when they see opportunities

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- Whole-loans sold will most likely be securitized by the buyer
- Securitization
  - Securitization are used for many purposes, the most common among them
    - Lower cost of funding
    - Raise leverage
    - Release regulatory capital
    - Managing risk



## What do credit ratings really mean?

- Most common approach by rating agencies
  - Establish a set of base case assumptions
    - Default (foreclosure) frequency
    - Loss severity ratio
    - Prepayments
    - Interest rate scenario
  - Establish AAA class stress assumptions
    - Default frequency for AAA, depend on the type of loans, may be 4 to 10 times of the base case

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- Moody's uses simulations to decide AAA credit enhancement (bonds should have no losses in 99.5% or more of the simulated cases)
- Committee decisions are mostly involved in deciding the C/E

## What factors are used in deciding assumptions?

- Factors used in determining the base case assumptions include:
  - Borrower characteristics (income, credit history, etc)
  - Loan characteristics (LTV ratio, term, property type, purpose, occupancy, MI, etc)

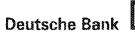
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- Pool characteristics (concentration, etc)
- Originator and servicer practices and loan programs
- Macro and local economic consideration (employment, real estate market, etc.)

## Moody's typical loss severity assumption on the underlying loans

Rating Level	Loss severity percent		
Aaa	60.0%		
Аа	55.0%		
Ą	50.0%		
Ваа	45.0%		
Ba	42.5%		
. В	40.0%		

Source: Moody's Investor Service



## Other issues rating agencies consider

- Mortgage insurance
  - The presence of MI will reduce loss severity
  - Rating agencies generally assume that the servicer won't be able to collect 100% of claims. A "haircut" is made to the mortgage insurance
  - Haircut is made according to the rating

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## Over-collateralization: the most basic credit enhancement

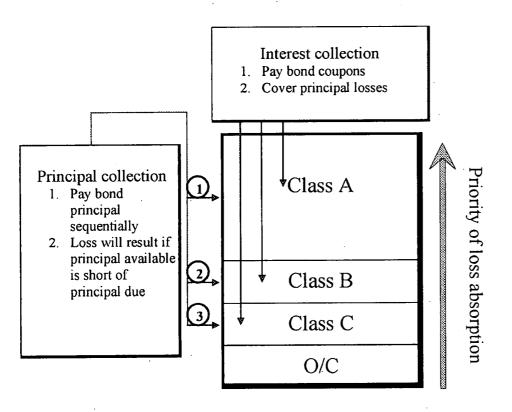
- A deal is over-collateralized when
  - The balance of the pool is larger than the aggregate balance of the bonds
  - Collection proceeds are first used to pay bonds' interest and principal
- Most mortgage ABS deals use some form of over-collateralization to enhance the credit for
  - Bondholder
  - Insurer
- The exceptions are
  - Whole-loan deals issued by GSEs
  - Some deals with issuer-guaranteed classes
- OC can be viewed as a special tranche that is the first loss piece for the deal

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## Subordinate bonds act as cushion against losses

- In a senior-sub structure, in each period, senior bonds have the priority in
  - Interest payments
  - Principal payments
- Sub bonds' interest payment may or may not have priority versus senior bonds' principal payments

## Typical home equity ABS structure: sequential with cross-over, OC turbo and step-down



In the first few years, principal are paid sequentially among senior, mezzanine and subordinate tranches

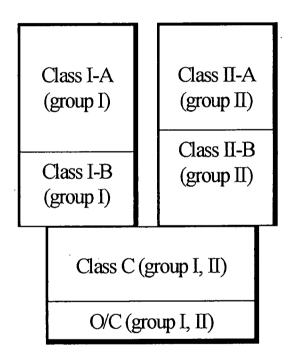
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- OC can be built up from the initial level by using excess spreads to pay down principal of bonds
- After the cross-over date, mezzanine and subordinate bonds start to receive principal simultaneously with senior bonds (provide no trigger event occurs)
- After the step-down date, part of OC is released (provided no trigger event occurs)
- An optional redemption (clean-up) call allows the servicer to call the deal when the collateral pool is below 10% of the original size.

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### Deals with multiple collateral groups: Y-structure

- A deal may have more than one group of collateral, each supporting its own sets of bonds
- Lower classes (or O/C) may receive cash from entire pool
- This structure enables the better performing group to aid the worse performing one
- Triggers are more complicated



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## Available funds cap: definition

- Maximum net WAC caps the coupon paid to bondholders
- Net WAC is gross WAC minus
  - Servicing fee
  - Trustee fee
  - Insurance premium (if any)
  - IO payment (if any)
- Designed to prevent bonds from defaulting because interest mismatch (as opposed to collateral performance)
- Capped-out amount is carried forward and may be recouped in the next month