

Jump and Cojump Risk in Subprime Home Equity Derivatives

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Inquire Europe: Liquidity, Credit and Risk
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Markets and
Instruments

Jump
Processes

Daily Jump
Risk Estimates

Does News
Explain Jump
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Cojumps and
A Predictive
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The Financial
Crisis: Prices
and Quantities

- 1 The subprime mortgage market has been a source of systemic risk to the global economy.
- 2 Jump processes are important to risk analysis.
- 3 Can we measure them accurately with daily data?
- 4 What causes jumps in the housing derivatives market?
- 5 Can we predict them and perhaps avoid future crises?

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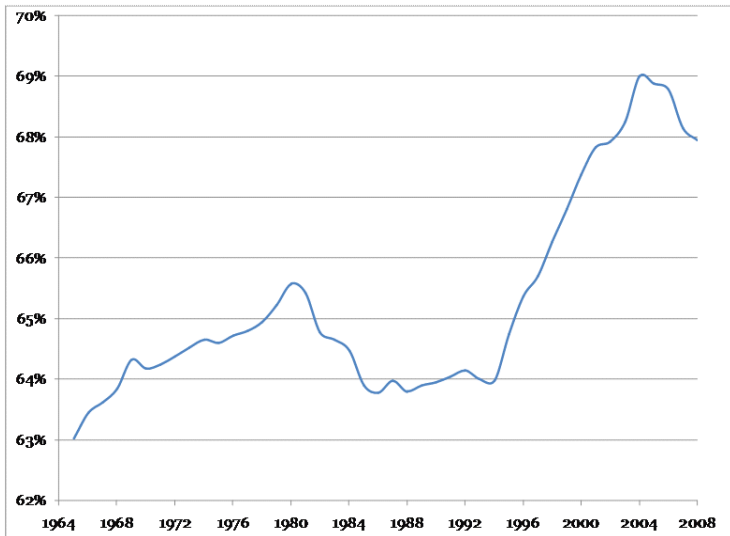
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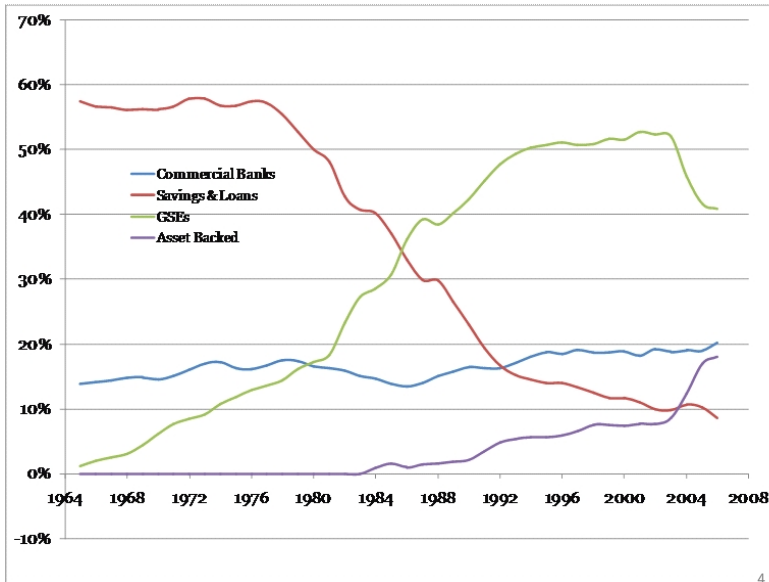
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Subprime borrowers who have Fair Isaac & Co. (FICO) credit scores in the low 600s, high loan to value (LTV) ratios, and they may lack documentation of their income or assets. Schloemer, Li, Ernst, and Keist (2006) estimate that the subprime share of mortgage originations reached 23% in 2006, up from only 10% in 1998

Alt A mortgages are loans where the borrower possesses a strong credit history, but is in need of non-traditional underwriting and processing guidelines. Examples of such non-traditional guidelines are the [Trustcorp Mortgage](#): NINA – No Income No Assets.

A *jumbo loan* exceeds the borrowing limits of Federal Housing Administration (FHA) conforming mortgages. Until recently, the limit was \$417,000, but it [was raised in March 2008](#) to \$729,750.

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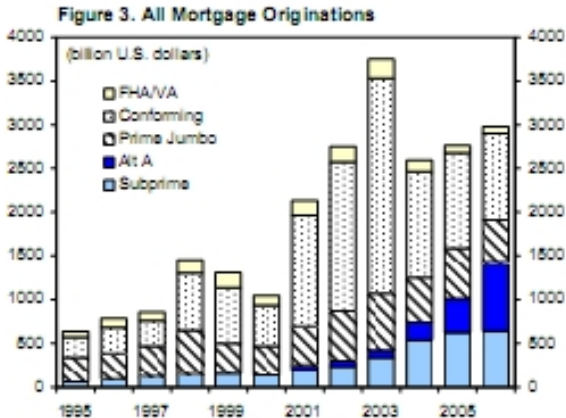
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Source: Inside Mortgage Finance.

Source: [Kiff and Mills \(2007\)](#).

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The Case-Shiller indices (CSI) use a repeat sale methodology. The index computes a three-month moving average of the repeat sales of single family houses in 20 metropolitan areas. The use of repeat sales is preferable to using a hedonic index to compensate for changes in quality, but obviously does not avoid it due to home improvements (or lack thereof). The method produces a cap-weighted index for residential real estate in a particular region. A national composite is then produced from the regional indices using census weights.

In May 2006, the Chicago Mercantile exchange began trading futures on the CSI indices for 10 metropolitan areas: Boston; Chicago; Denver; Las Vegas; Los Angeles; Miami; New York; San Diego; San Francisco; and Washington, D.C. There are also options on the futures.

Case-Shiller house price indices (2000=100)

Subprime
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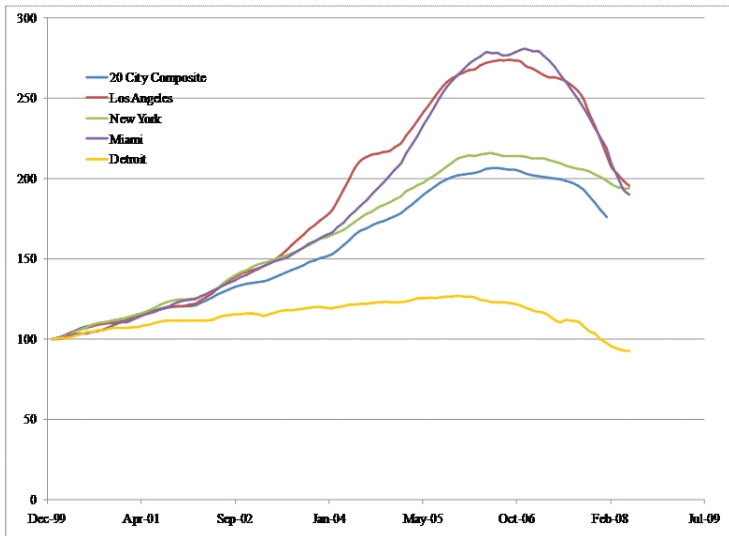
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National Delinquency Survey 2007Q3:

	% of	
	Loans	Foreclosures
Prime Fixed	65%	18%
Prime ARM	15%	20%
Subprime Fixed	6%	12%
Subprime ARM	7%	42%
FHA	7%	8%

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This paper does not study the residential mortgage backed securities market (RMBS), but rather a set of home equity loans (HEL) which the market considers to be *asset backed securities* (ABS).

Ashcraft and Schuermann (2008): “First-lien subprime mortgage loans as well as second-lien home equity loans and home equity lines of credit (HELCOs) are all part of the HEL ABS sector.”

Other non-conventional mortgages, including Alt-A and Jumbo loans, are classified as RMBS.

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For more than a decade, HEL have been made available to subprime borrowers.

According to [Fitch](#), the subprime market originated as much as USD1.4 trillion of loans in 2005-2007.

As the credit crunch unfolded in 2007, HEL securities faced growing credit spreads, deteriorating collateral, and the inevitable ratings downgrades from the credit rating agencies. According to SIFMA, “in excess of 95 percent of ABS downgrades in the 2005-2007 vintages sector were HEL.”

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Credit default swaps are derivative securities that pay security holders contingent upon a credit event. Typically, these are triggered by some failure to deliver the underlying cash flows promised to the security pool. There are now very liquid markets in credit default swaps on corporate and sovereign bonds.

Credit default swaps on ABS reference individual tranches from a *special purpose vehicle* (SPV) because they are likely to have a wide range of default probabilities. Other unique features of asset backed securities are: (1) the amortization of principal; (2) adjustment of security values in light of partial interest shortfalls or principal writedown.

Protection sellers will compensate for losses in principal *and* any interest shortfall. These differ from corporate credit default swaps which usually involve a single payment after a credit event. ABS credit default swaps can have long maturities.

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The ABX indices are aggregators of the performance of a variety of credit default swaps on asset backed securities.

MarkIt Ltd., a London based source of credit derivatives information, collects information on individual credit default swaps and produces a series of indices that have become benchmarks for the industry.

This paper studies the ABX.HE indices which track home equity loans.

54 securities met the MarkIt criteria.

20 distinct securities were chosen to form the ABX HE-061 index which was constituted on January 11, 2006. The index began trading on January 19, 2006.

There have been subsequent indices formed every 6 months, with HE-062 pricing beginning on July 19, 2006, HE-071 on January 19, 2007, and HE-072 on July 19, 2007.

There are 5 credit tranches to each of the underlying exposures, AAA, AA, A, BBB and BBB-. Ratings are determined by the lower of the Moody's or Standard & Poor's grades.

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	ABX	60+	FICO	LTV	ARM	IO	Full Doc
2006-01	11.94	634	80.36	81.75	32.13	58.71	
2006-02	11.94	627	77.76	80.78	22.52	56.90	
2007-01	5.48	626	79.21	76.84	15.64	57.57	

Source: Nomura Fixed Income Research (April 2007)

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Nearly every major (former!) investment bank is represented including Barclays, Goldman Sachs, JP Morgan, Merrill Lynch, Morgan Stanley and UBS.

Non-bank financial intermediaries include GMAC.

There are also mortgage originators like Ameriquest, Countrywide, First Franklin, and New Century.

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Index	AAA	AA	A	BBB	BBB-
ABX.HE-061	18	32	54	154	267
ABX.HE-062	11	17	44	133	242
ABX.HE-071	9	15	64	224	389

To protect \$1 million in the AAA tranche of the 06-1 index, you will pay \$1,800 per year and \$26,700 for the BBB-. Note that for the high credit quality tranches, AAA and AA, coupon rates have actually fallen in the first half of 2007. The coupon rates have risen to up to 389 basis points for BBB and BBB- tranches.

When ABX prices fall, buyers make payments up front based on the distance from par. With the AAA index at 92.00, a protection buyer would pay

$$\$1mn \times (100 - 92.00)\% + \$1,800 = \$81,800.$$

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While liquidity has certainly fallen off recently, the ABX indices constitute the best available aggregate indicator of subprime borrowing and are now widely used to mark to market institutional portfolios. Motivated by the new accounting rule FASB 157, banks are being prompted to mark their securities to market prices rather than models. The ABX, according to Reuters, is being used to price up to \$1 trillion dollars in subprime mortgage securities.

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Basel II (2006, p.163) requires that VaR capture “specific risk [which] includes the risk that an individual debt or equity security moves by more or less than the general market in day-to-day trading (including periods when the whole market is volatile) and *event* risk (where the price of an individual debt or equity security moves precipitously relative to the general market, e.g. on a takeover bid or some other shock event; such events would also include the risk of “default”).

Gibson (2001): “ incorporating event risk has a large effect on VaR for the long-short [equity] portfolio. The mean [99% 1-day] Jump-VaR is as much as 12 percent higher than the mean no-jump VaR.”

Bhar and Wang (2008): iTraxx jump risk is non-diversifiable.

Consider a stochastic volatility model with jumps,

$$dp_t = \mu_t dt + \sigma_t dw_{1,t} + J_t dq_t,$$

$$d\sigma_t^2 = \beta(\theta - \sigma_t^2)dt + \gamma\sqrt{\sigma_t^2}dw_{2,t},$$

where p_t is the log price of the underlying asset, μ_t is its drift, σ_t is the local volatility, $w_{1,t}$ and $w_{2,t}$ are standard Brownian motions with correlation ρ , q_t is a Poisson process with intensity λ_t , and J_t is a normally distributed jump process with mean μ_J and standard deviation σ_J .

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The *quadratic variation* for the return process is then

$$[r, r]_t = \int_{t-1}^t \sigma^2(s) ds + \sum_{t-1 < s \leq t} J^2(s).$$

Estimation of the quadratic variation proceeds with discrete sampling from the log price process.

By comparing realized volatility

$$RV_t = \sum_{j=1}^M r_{t,j}^2.$$

and bipower variation

$$BV_t = \mu_1^{-2} \sum_{j=1}^M |r_{t,j}| |r_{t,j-1}|$$

where $\mu_1 = \sqrt{2/\pi}$, we have the estimate of just the jump portion of the process,

$$\lim_{M \rightarrow \infty} (RV_t - BV_t) = \sum_{t-1 < s \leq t} J^2(s).$$

For many time series, even financial data, we don't have reliable intra-daily data for extracting the jump component. I explore whether daily data can still be useful.

I set the sampling interval to be daily changes, $M = 1$, and compute n -day rolling sample estimates of realized volatility,

$$RV_t = \sum_{k=0}^{n-1} r_{t-k}^2$$

and bipower variation,

$$BV_t = (\pi/2) \sum_{k=0}^{n-1} |r_{t-k}| |r_{t-k-1}|.$$

I follow Huang and Tauchen (2005) and construct the relative jump measure,

$$RJ_t = \frac{RV_t - BV_t}{RV_t}.$$

They show that the statistic

$$z_t = \frac{RJ_t}{\left[((\pi/2)^2 + \pi - 5) \frac{1}{n} \max(1, \frac{TP_t}{BV_t^2}) \right]},$$

where

$$TP_t = \left[2^{2/3} \frac{\Gamma(7/6)}{\Gamma(1/2)} \right]^{-3} \frac{n}{n-2} \sum_{k=0}^{n-1} |r_{t-k}|^{4/3} |r_{t-k-1}|^{4/3} |r_{t-k-2}|^{4/3}$$

has the standard normal distribution. Monte Carlo evidence in Huang and Tauchen shows that this statistic has good size and power properties in high frequency data.

I constrain the jump risk to be positive,

$$J_t^2 = (\max[RV_t - BV_t, 0])/n,$$

and then compute what Andersen, Bollerslev and Diebold (2006) call the *significant jumps* using an $\alpha\%$ confidence level,

$$J_{z,t}^2 = J_t^2 I(z_t > \Phi_\alpha^{-1}),$$

where Φ is the cumulative normal distribution.

Empiricists typically find “too many” jumps in intradaily data which they compensate for by adjusting α .

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- Drift: $\mu(t) = 0$
- Volatility mean reversion: $\beta = 0.10$
- Volatility of volatility $\gamma = 0.05$.
- Jump frequency $\lambda dt = 0.05dt$.
- Average jump size $\mu_J = 0.20$ with a standard deviation of $\sigma_J = 1.40$.
- The return and volatility shocks have a correlation of $\rho = -0.5$.

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Tauchen and Zhou (2007) note that as you raise the long run mean of volatility θ , you lower the jump contribution to the total variance. At $\theta = 0.9$, the jump contributes only 10%, but at $\theta = 0.025$, the jump contribution rises to 76%. I also consider an intermediate case with $\theta = 0.2$ where the jump contributes 33%.

I use 400 days of simulated 1-minute data which are sampled at 5-minute and daily intervals. For the daily estimator, I set the moving average to $n = 50$. The tick frequency and sample length approximate those of the ABX sample.

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			5-min		Daily	
	θ	RJ	5%	1%	5%	1%
Does News Explain Jump Risk?	0.9	0.00	0.292 (0.51)	0.058 (0.23)	0.000 (0.00)	0.000 (0.00)
Cojumps and A Predictive Model	0.2	0.00	0.870 (0.97)	0.200 (0.43)	0.000 (0.00)	0.000 (0.00)
The Financial Crisis: Prices and Quantities	0.025	0.00	0.328 (0.57)	0.052 (0.23)	0.000 (0.00)	0.000 (0.00)

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5-min						
θ	$E[J^2]$	$E[RJ]$	J^2	RJ	5%	1%
0.9	0.1	0.10	0.086 (0.03)	0.087 (0.03)	64.311% (13.61)%	53.414% (12.34)%
0.2	0.1	0.33	0.085 (0.04)	0.284 (0.08)	75.814% (11.27)%	69.932% (10.12)%
0.025	0.1	0.76	0.092 (0.04)	0.746 (0.08)	84.427% (9.10)%	82.400% (8.97)%

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					Daily		
	θ	$E[J^2]$	$E[RJ]$	J^2	RJ	5%	1%
Does News Explain Jump Risk?	0.9	0.1	0.10	0.054 (0.03)	0.053 (0.03)	7.285% (10.13)%	2.726% (6.13)%
Cojumps and A Predictive Model	0.2	0.1	0.33	0.053 (0.03)	0.169 (0.08)	36.817% (19.47)%	25.420% (18.21)%
The Financial Crisis: Prices and Quantities	0.025	0.1	0.76	0.078 (0.04)	0.598 (0.10)	84.662% (12.16)%	79.917% (14.37)%

When the jump contributes only 10%, the power is quite weak.

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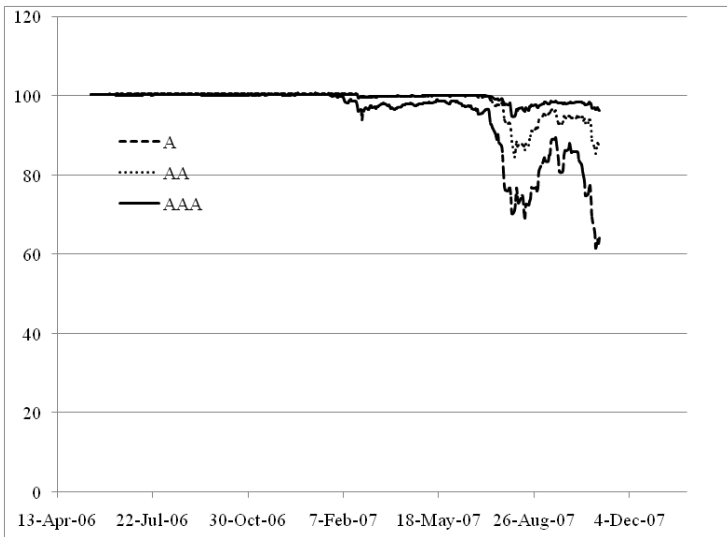
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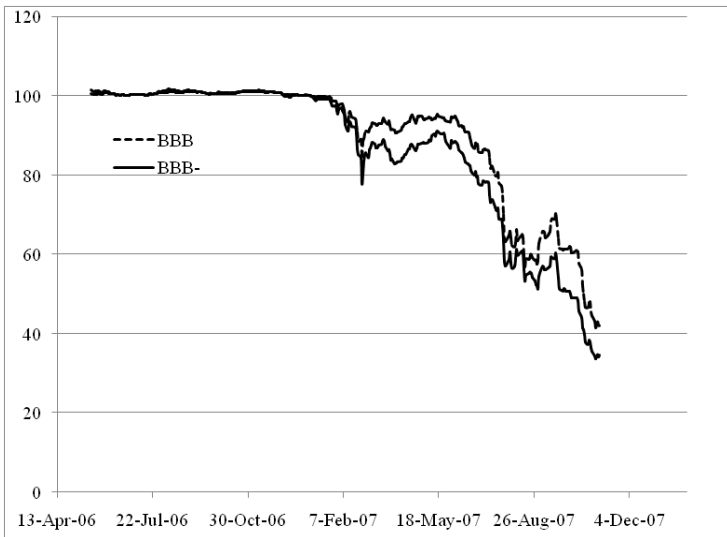
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ABX-061	<i>RJ</i>		μ_J^*	N^*	λ^*
	Avg.	Max			
AAA	0.2381	0.8117	-0.0000	91	0.2880
AA	0.0991	0.5561	-0.0018	38	0.1203
A	0.0910	0.6725	-0.0001	59	0.1867
BBB	0.0487	0.3823	-0.0001	11	0.0348
BBB-	0.0852	0.4303	-0.0012	26	0.0823

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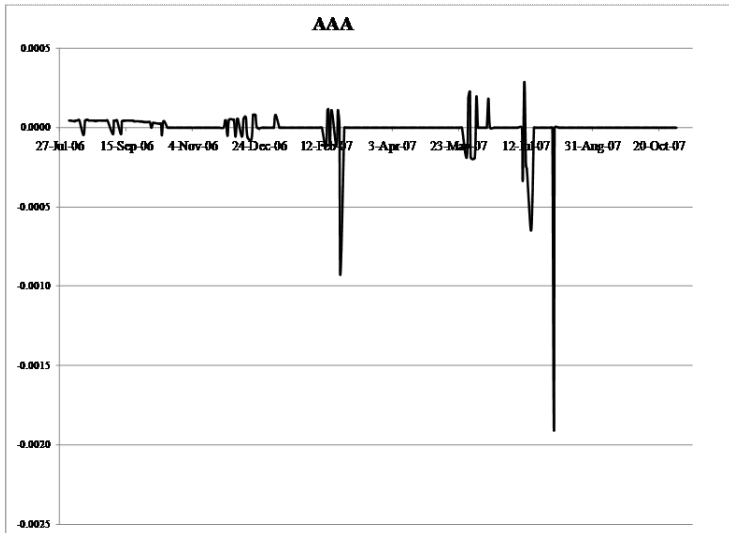
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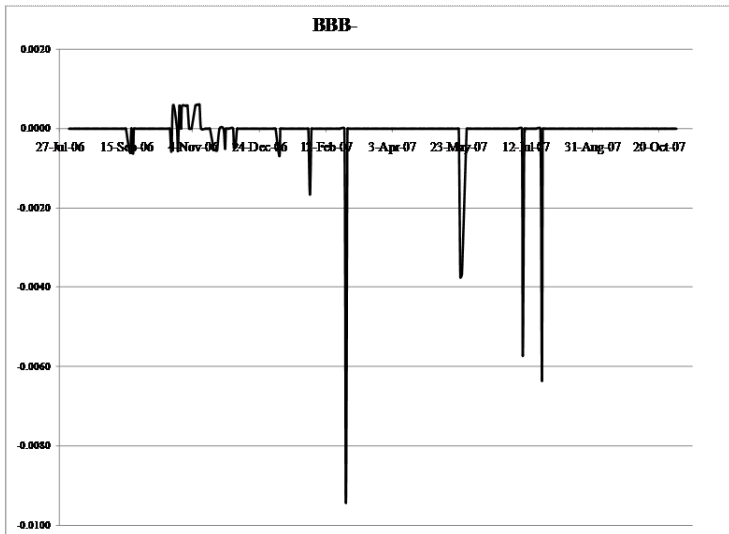
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Daily jump risk estimates for housing futures

Subprime
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Contract	<i>RJ</i>		μ_J^*	N^*	λ^*
	Avg.	Max			
f^1	0.4071	1.0000	0.0013	212	0.6709
f^{12}	0.4617	1.0000	0.0012	221	0.6994

Jumps are, on average small, but they contribute 40.7% of the total return variation in the 1-month futures and 46.2% in the 12-month.

Both series jump over 200 times, with the probability of a jump occurring around 2/3.

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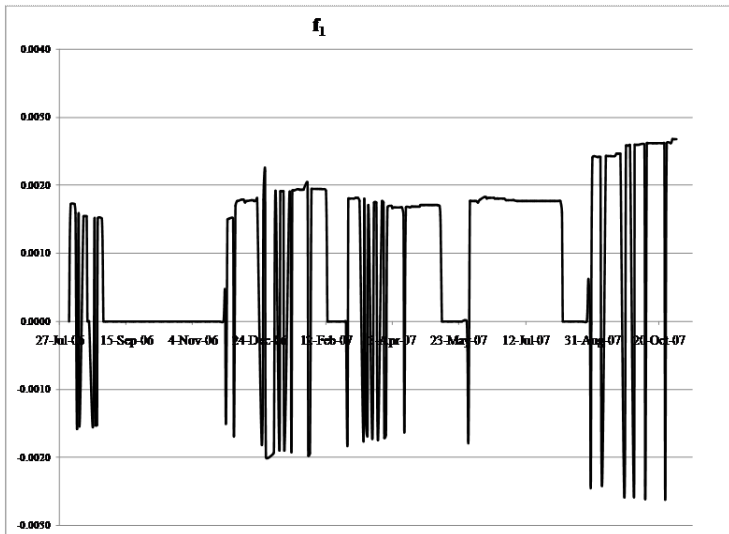
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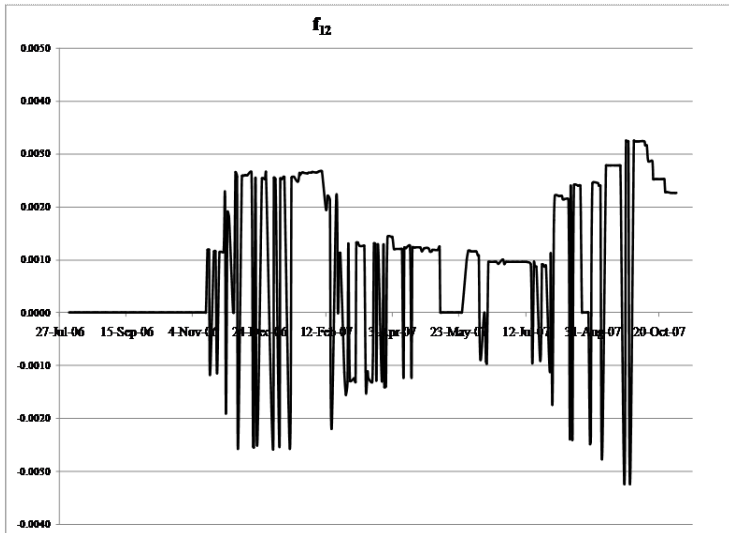
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	ABX.HE 06-1		Housing		S&P 500	
	AAA	ABX-BBB-	f^1	f^{12}	Cash	Futures
RJ	0.2381	0.0852	0.4071	0.4617	0.0733	0.0445

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The Wall Street Journal noted in January 8, 2008, that in the newspaper, there were 75 mentions of the word subprime in the second half of 2006. In the second half of 2007, there were 1,561. The question before us here is whether jump risk did any better anticipating it.

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I utilize three time lines that have been published since the subprime crisis hit. (1) BBC; (2) JEC; (3) PIMCO;

I gathered news stories from the three timelines about (1) Federal Reserve actions; (2) Materials news from subprime lenders like Countrywide and investment banks like Merrill Lynch; (3) I excluded macroeconomic news unless it appeared on at least 2 of 3 timelines. The stories caught by these filters are listed in Table 6.

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$\#M_t$ counts stories that appeared in any of the three timelines on a given event day. For example, on August 9, 2007, there was; (1) a coordinated intervention by ECB, Fed and Bank of Japan; (2) the French bank BNP Paribas suspended redemption in three hedge funds; and (3) AIG warned that defaults were spreading beyond subprime. This would set the count variable to 3.

$\#nM_t$ counts the number of timelines in which a story appears. I interpret it as a measure of intensity. For example, the Bear Stearns' announcement on August 18, 2007 that it would be returning little or nothing to investors in two of its' mortgage backed hedge funds appears in the BBC, JEC and PIMCO timelines, so $\#nM_t = 3$. If there are multiple stories for a given day, the story that appears the most determines the counter for this variable.

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Date	News	BBC	JEC
20070402	New Century files for bankruptcy	X	X
20070622	Bear Stearns \$3.2bn hedge fund bail out	X	X
20070718	Bear: investors will get little money back	X	X
20070816	CFC draws entire 11.5bn credit line	X	X
20070817	Fed cuts discount rate by 50 basis points	X	X
20071031	Fed delivers second rate cut	X	X

To smooth over possible difficulties in timing with stories being released in Europe and the U.S. and the possibility that action might take effect with some lag, I construct a 5-day sum of both variables,

$$D_{1,t} = \sum_{j=1}^5 \#M_{t+1-j}, \quad D_{2,t} = \sum_{j=1}^5 \#M_{t+1-j}$$

I then regress the statistically significant jumps at time t on the lagged values of the two moving sums,

$$J_{t,z}^* = b_0 + b_1 D_{i,t-1}, \quad i = 1, 2.$$

Regressions results for all 5 credit quality tranches for the 2006-1 roll are in Table 9.

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The Financial
Crisis: Prices
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News explains the jumps best in the AAA and BBB- tranches. The best fit is with the D_2 variable for the AAA, where news explains 56% of the jump risk. For the BBB-, the same variable explains nearly 53%.

In the middle tranches, the fits are respectable to poor. For the A and AA, news explains between 9% and 23% of the jumps. The BBB tranche, which has only 11 jumps, is uncorrelated with the news flow.

News unrelated to housing futures jump risk

Subprime
Jump Risk

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Contract	$D_{1,t-1}$	$D_{2,t-1}$	Stat.
f^1	1.5669 (-2.57)	1.3200 (-2.07)	Coeff (t-stat)
	0.0259	0.0153	\bar{R}^2
f^{12}	0.2271 (-0.36)	-0.1547 (-0.27)	Coeff (t-stat)
	-0.0040	-0.0042	\bar{R}^2

Bollerslev, Law and Tauchen (BLT, 2007) have proposed a measure of the cross correlation of markets to look at jumps occurring simultaneously in more than one market, called *cojumps*. I restrict the analysis here to the contemporaneous daily correlation,

$$cp_t = \sum_{k=0}^{n-1} r_{1,t-k} r_{2,t-k},$$

where $r_{1,t}$ and $r_{2,t}$ are the returns in markets 1 and 2.

There is, as of this writing, no formal asymptotic theory for cojumps, so I follow BLT and use the studentized statistic,

$$z_{cp,t} = \frac{cp_t - \overline{cp}}{s_{cp}},$$

where

$$\overline{cp} = \frac{1}{T} \sum_{t=1}^T cp_t,$$

and

$$s_{cp} = \left[\frac{1}{T-1} \sum_{t=1}^T (cp_t - \overline{cp})^2 \right]^{1/2}.$$

I will designate the significant cojumps as

$$cp_{t,z}^* = \text{sign}(r_{1,t}r_{2,t}) \times cp_t I(|z_t| > \Phi_\alpha^{-1}).$$

I use the absolute value because the cojump test is two-sided. I explore the finite sample performance in the next section.

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ρ_J	$\theta = 0.1$		$\theta = 0.5$	
	5%	1%	5%	1%
0.50	92.532% (19.68)%	90.442% (23.25)%	90.103% (22.73)%	88.502% (25.13)%
0.75	88.810% (17.99)%	87.088% (19.54)%	87.710% (20.15)%	86.118% (21.24)%

At $\rho_J = 0.5$. The test is quite powerful and seems unaffected by the jump contribution to the variance. We reject between 90 and 92.5% at the 5% significance level. As we increase the number of cojumps by setting $\rho_J = 0.75$, the detection rate falls off just a little, to 87.7% at the 5% level for the case $\theta = 0.5$

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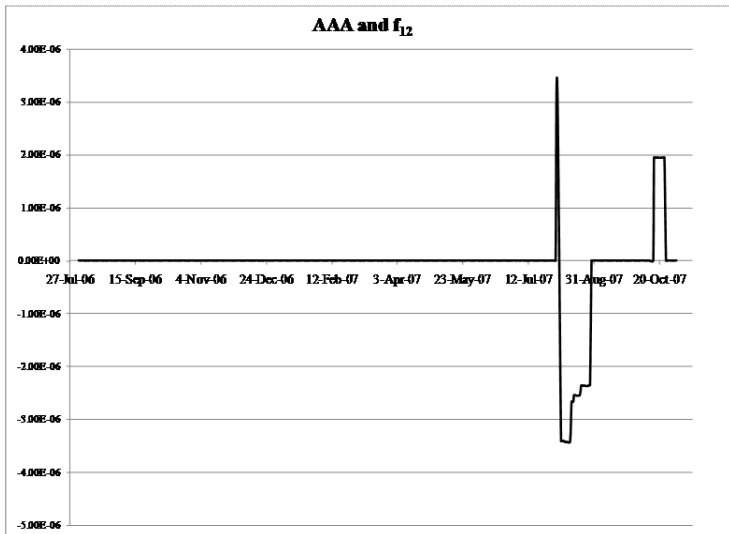
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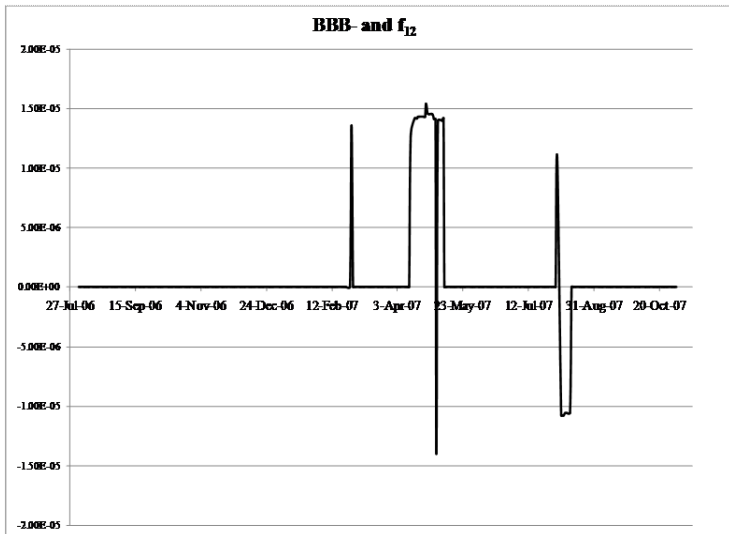
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There are 25 significant cojumps in the AAA tranche/12-month futures pair. All of these episodes occur in the summer of 2007 once the subprime crisis was well under way. There is a significant negative period in August 2007 followed by a shorter positive episode in mid-to-late October.

I identify 27 significant cojumps in the BBB- pairing. There is a strong positive spike on February 27, 2007 which is the day that jump risk spikes in the BBB- ABX tranche. There are some positive moves in the ABX index in late May and early June 2007. Cojump risk is negative again in the first part of August. The BBB- remains insignificant for the rest of the sample after August 13.

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Tranche	$D_{1,t-1}$	$D_{2,t-1}$	Stat.
AAA	-4.0632	-3.1544	Coeff
	-(4.42)	-(3.99)	(t-stat)
	0.4263	0.3736	\bar{R}^2
BBB-	-0.4364	-0.3558	Coeff
	-(1.55)	-(2.33)	(t-stat)
	0.0549	0.1553	\bar{R}^2

News does appear to explain much of the cojumps risk for the AAA tranche. Both news dummies are highly significant and the \bar{R}^2 reaches 0.43. The story is less clear with the BBB- where only the D_2 dummy is significant and news explains, at most, 15% of the risk.

To capture jump risk persistence, I will include lagged jumps $J_{1,t-1,z}^*$ in the empirical model. Extreme events are modeled using lagged squared values of the ABX jumps, $J_{1,t-1,z}^{2*}$.

The cojump risk from the housing market $J_{2,t-1,z}^*$ is in our specification as well.

Finally, there may be risks to the ABX index from changes in home prices in the near future. I include the slope of the housing futures curve ($f_{t-1}^{12} - f_{t-1}^1$) as the final explanatory variable,

$$J_{1,t,z}^* = b_0 + b_1 J_{1,t-1,z}^* + b_2 J_{1,t-1,z}^{2*} + b_3 J_{2,t-1,z}^* + b_4 (f_{t-1}^{12} - f_{t-1}^1).$$

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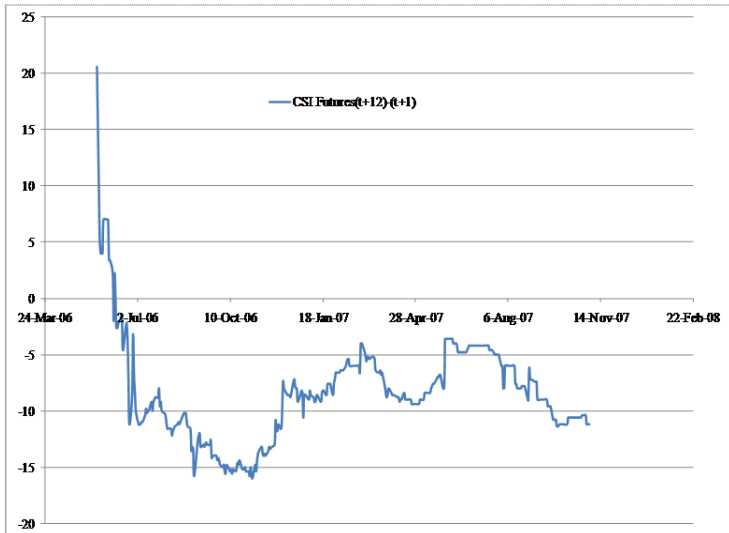
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Tranche	Constant	$J_{1,z,t-1}^*$	$J_{1,z,t-1}^{2*}$	$J_{2,z,t-1}^*$	$(f_{t-1}^{12} - f_{t-1}^1)$
AAA	-0.2446 -(2.41)	0.1112 (0.34)	-441.6708 -(0.54)	0.0508 (2.13)	-0.0199 -(2.29)
AA	-0.2476 -(1.28)	0.6340 (1.52)	-468.7428 -(13.40)	-0.0142 -(0.20)	-0.0214 -(1.27)
A	-0.8450 -(2.99)	-0.2187 -(0.95)	-1,156.9378 -(4.87)	0.0363 (0.61)	-0.0670 -(3.14)
BBB	-1.1830 -(0.94)	-0.0927 -(0.16)	-1,595.0460 -(0.88)	-0.0267 -(0.15)	-0.1030 -(1.20)
BBB-	-9.9029 -(9.91)	-0.1508 -(0.56)	57.5454 (1.21)	1.0907 (4.27)	-0.6873 -(9.42)

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The model fits the data quite well, explaining 31% to 85% of the jumps.

b_1 , the coefficient on lagged jumps, is statistically insignificant in each specification, but the lagged squared jump risk, b_2 , is significant for the AA and A tranches. The extreme jumps appear to be climatic for the market and lower the jump risk the next day, $b_2 < 0$.

Jump risk from the housing futures appears to matter only for the highest and lowest rated tranches, and it tends to increase the jump size, $b_3 > 0$.

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The slope of the housing futures yield curve matters for jumps in 3 of the 5 tranches. A steeply sloping yield curve like we had in the housing bubble contributes to negative jumps, $b_4 < 0$.

Consider May 19, 2006, the 1-month composite futures price was at 235.20 and the 12-month ahead price was 255.80. This spread of 20.60 leads to an expected jump of -1.42% in the BBB- tranche.

A possibly hopeful sign is that the inversion of the futures curve since June 19, 2006 makes jumps *up* more likely.

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Mortgage originators: New Century (Apr. 2, 2007) and Countrywide (Jan. 11, 2008); RMBS guarantors: Fannie and Freddie (Sept. 7, 2008).

IndyMac (July 12, 2008) and Washington Mutual (Sep. 26, 2008), the nation's largest thrift, seized by the FDIC. There have been [12 failures](#) as of September 2008.

The investment banking landscape has been permanently transformed: Bear (Mar 16, 2008), Lehman (Sep 15, 2008), Merrill (Sep. 15, 2008).

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The *Wall Street Journal* reported in December 14, 2007 that Goldman Sachs' structured products trading group earned more than \$4bn in profits in 2007 from shorting subprime securities using the ABX.

John Paulson's Credit Opportunities hedge fund returned 589.9% in 2007 betting on a decline in subprime mortgages, generating Paulson \$3.7bn.

The ABX rallies on bailout news - AAA tranches

Subprime
Jump Risk

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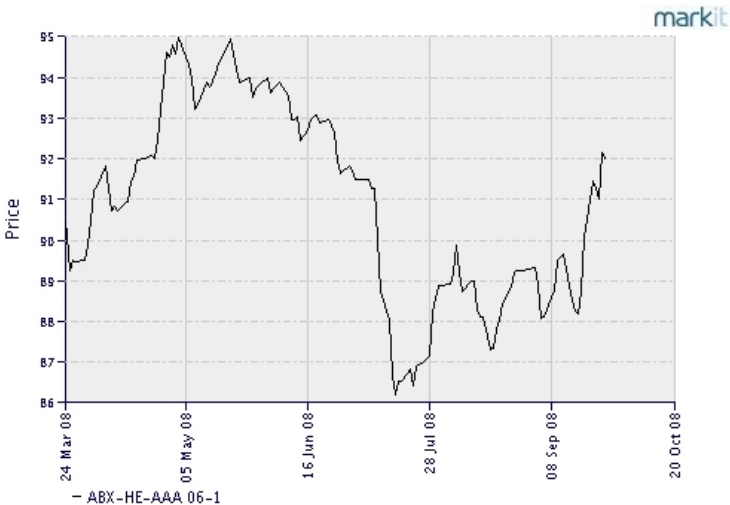
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Mortgage Bankers Association Report 2008Q2: “Subprime ARM loans accounted for 36 percent of all foreclosures started and prime ARMs, which include option ARMs, represented 23 percent. However, the increase in prime ARMs foreclosure starts was greater than the combined increase in fixed-rate and ARM subprime loans. Thus the foreclosure start numbers will likely be increasingly dominated increasingly by *prime ARM loans*.”

Conclusion: If residential real estate prices continue to fall, losses on prime loans will exceed losses on subprime.

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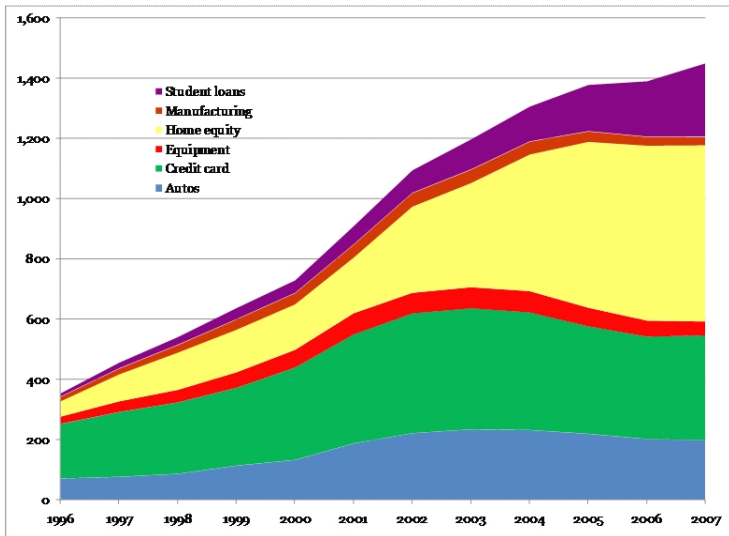
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Source: SIFMA

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With the recent turmoil in the credit markets, particularly in home equity, MarkIt was unable to constitute an index for 2008. On December 19, 2007, they released a statement that they would postpone the launch of HE 08-1: “Under current index rules, only five deals qualified for inclusion in the MarkIt ABX.HE 08-1. MarkIt and the dealer community considered amending the index rules to include deals which failed to qualify initially but decided against this approach at this time.”

According to [Inside Mortgage Finance](#), only \$10 billion of subprime loans were issued in the 2008Q1.

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	2007	2008	%ch
Autos	202.1	197.8	-2.10%
Credit Cards	336.6	357.3	6.13%
Equipment	50.5	44.0	-12.97%
Home Equity	588.0	586.7	-0.23%
Student Loans	207.2	252.6	21.94%

Source: [SIFMA](#).

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