

An Analysis of the Limitations of Utilizing the Development Method for Projecting Mortgage Credit Losses and Recommended Enhancements

2010 CAS Annual Meeting

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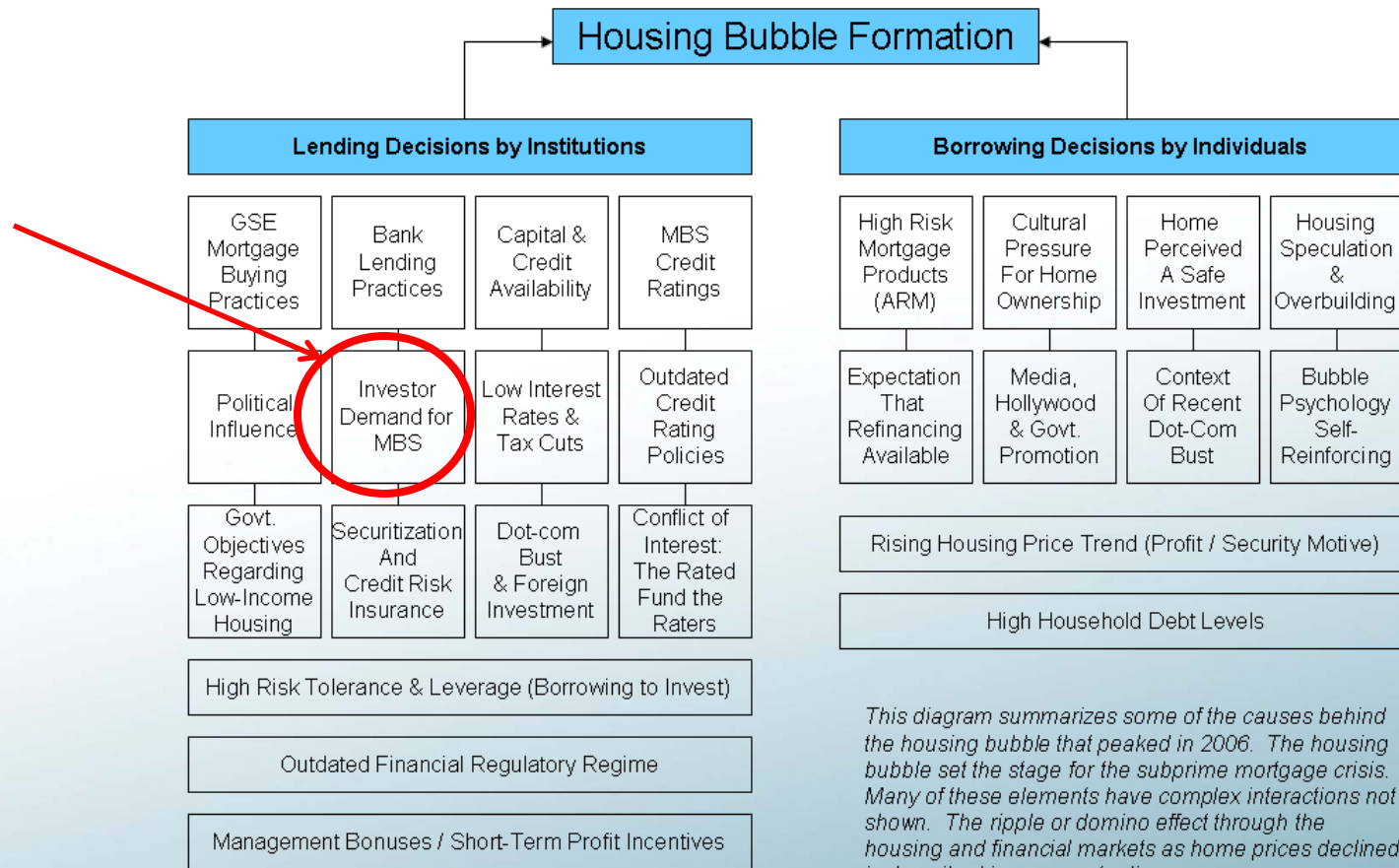
Agenda

- Background
- LDF Limitations
- Recommended General Enhancements
- Closing
- References

Background

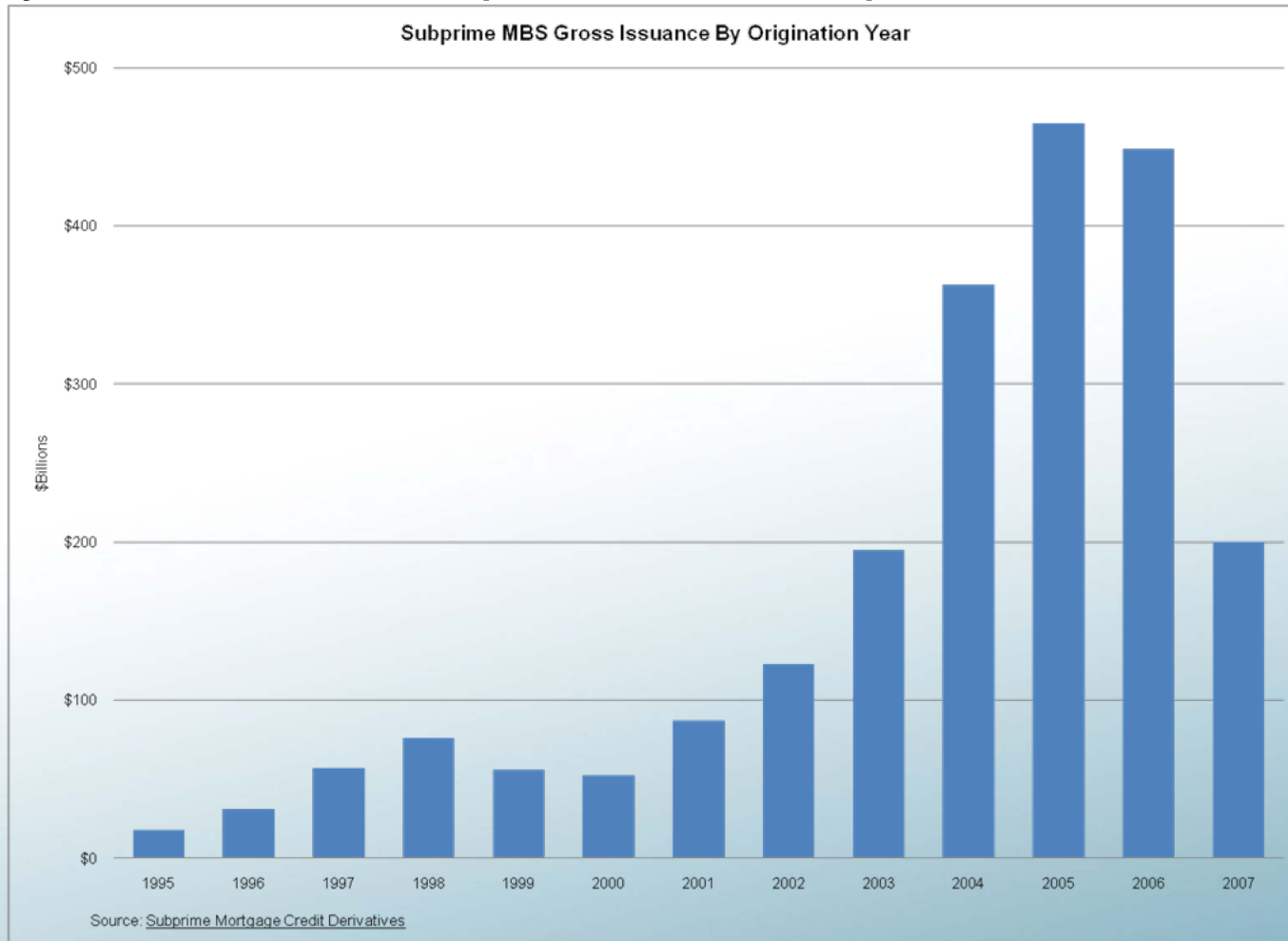
■ MBS investor demand fuels housing bubble

*Subprime Mortgage Crisis
Diagram 1 of 2*



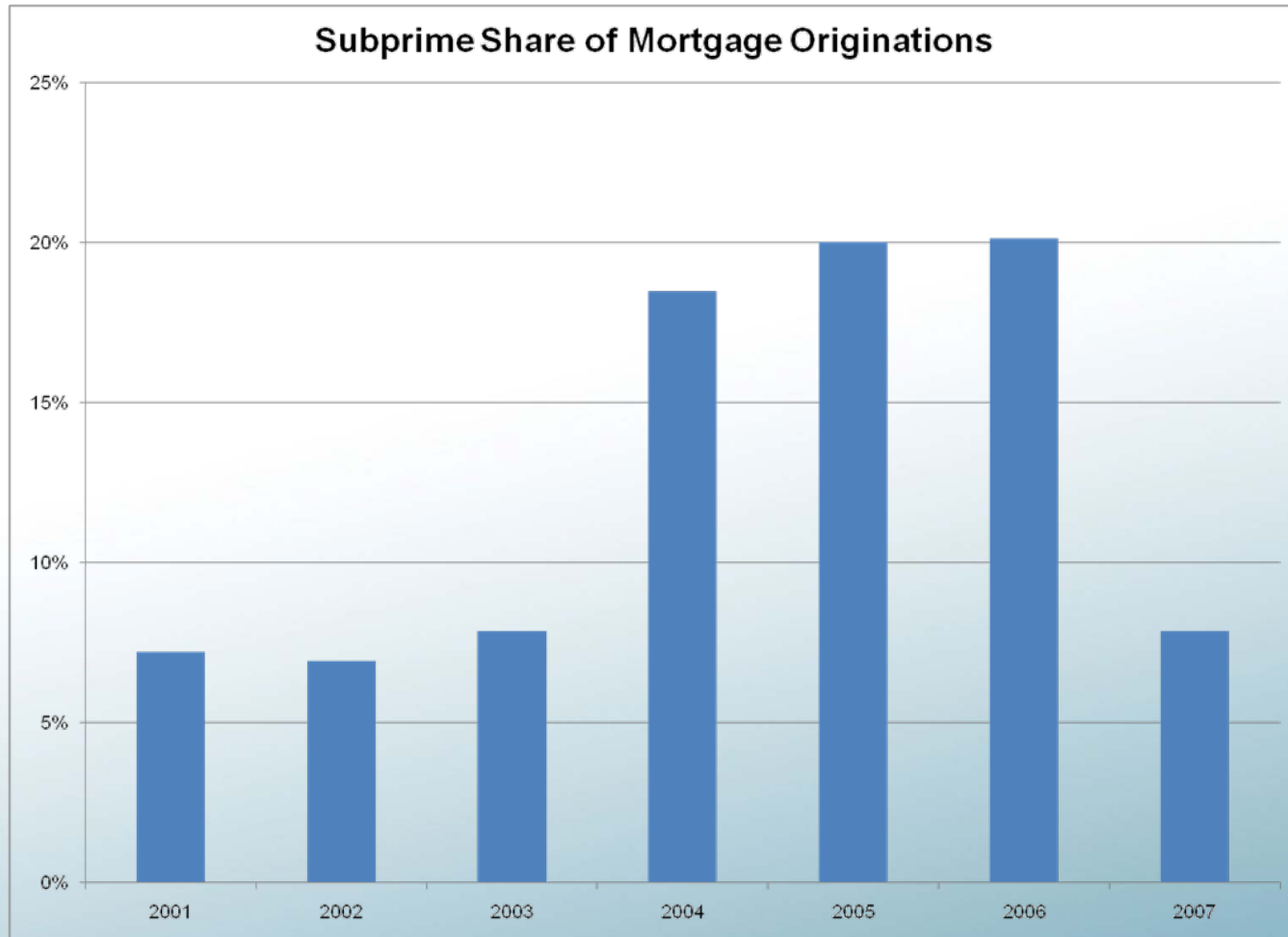
Background

- Early/mid-2000s-Subprime MBS expands



Background

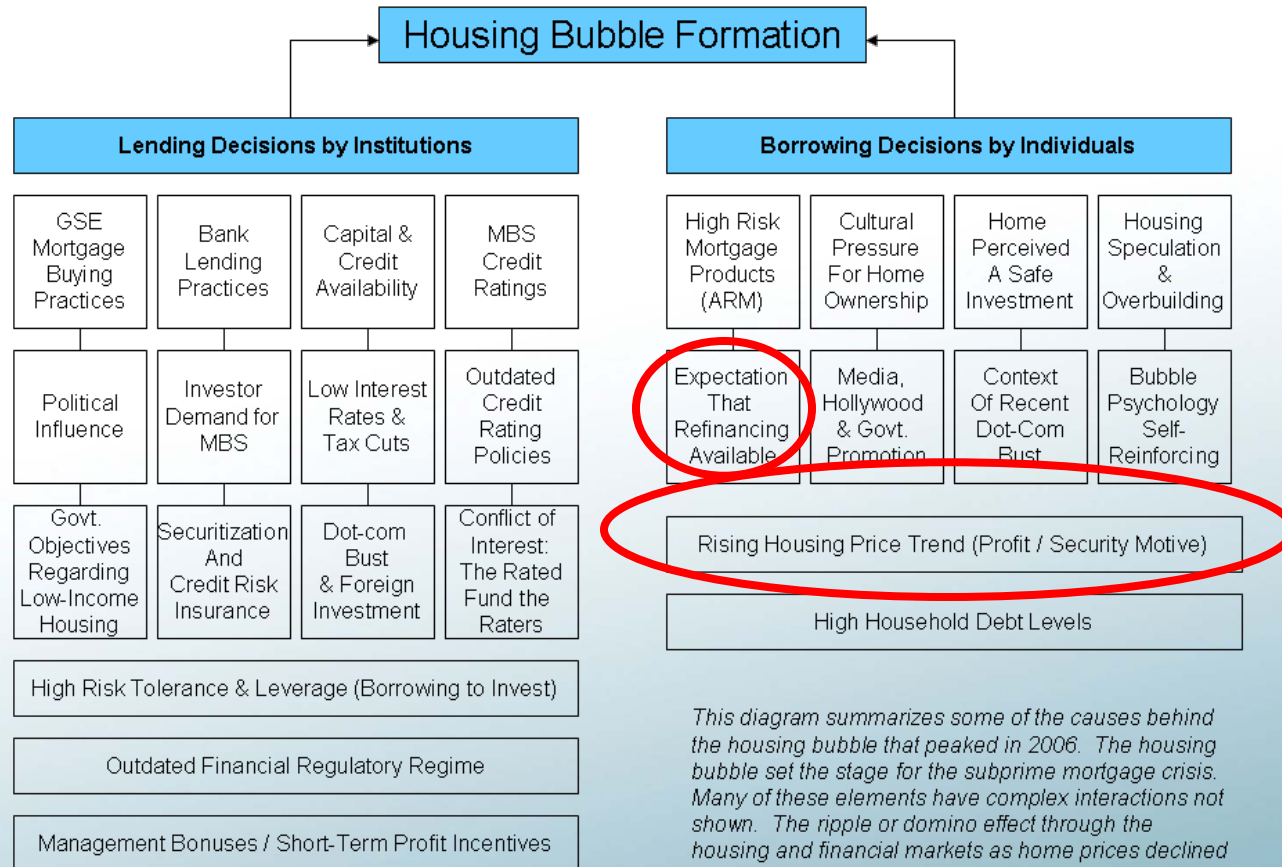
- Early/mid-2000s-Subprime MBS expands



Background

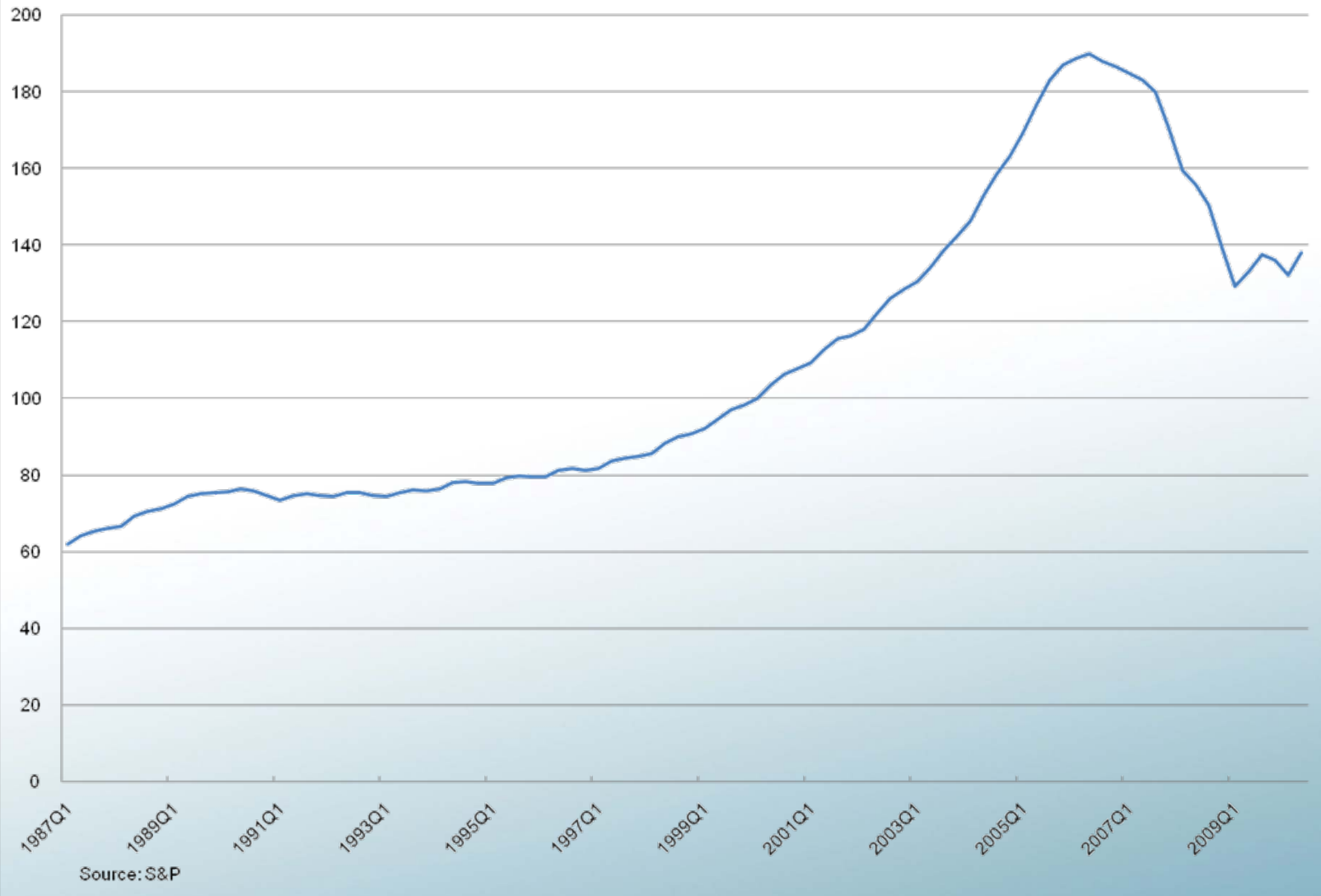
■ Seemingly dependable collateral

*Subprime Mortgage Crisis
Diagram 1 of 2*



This diagram summarizes some of the causes behind the housing bubble that peaked in 2006. The housing bubble set the stage for the subprime mortgage crisis. Many of these elements have complex interactions not shown. The ripple or domino effect through the housing and financial markets as home prices declined is described in a separate diagram.

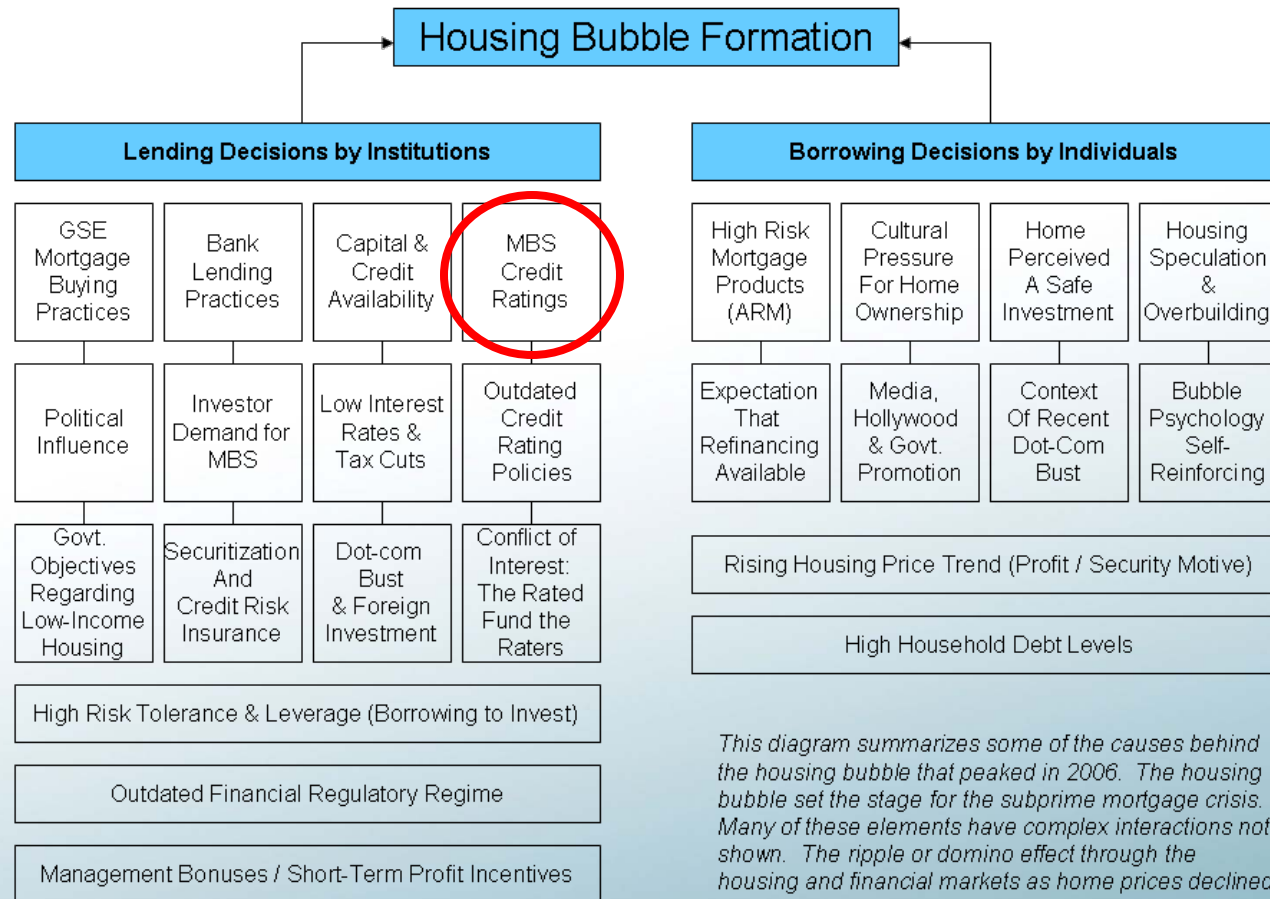
S&P/Case-Shiller U.S. National Home Price Index



Background

- Subprime MBS rated by credit rating agencies

*Subprime Mortgage Crisis
Diagram 1 of 2*

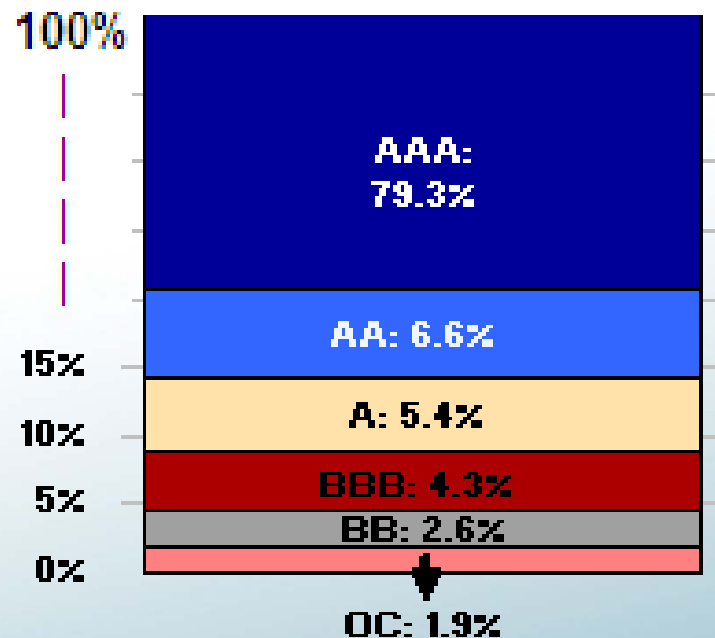


This diagram summarizes some of the causes behind the housing bubble that peaked in 2006. The housing bubble set the stage for the subprime mortgage crisis. Many of these elements have complex interactions not shown. The ripple or domino effect through the housing and financial markets as home prices declined is described in a separate diagram.

Background

- Subprime MBS capital structure~80% AAA

Average Subprime MBS Capital Structure*



Background

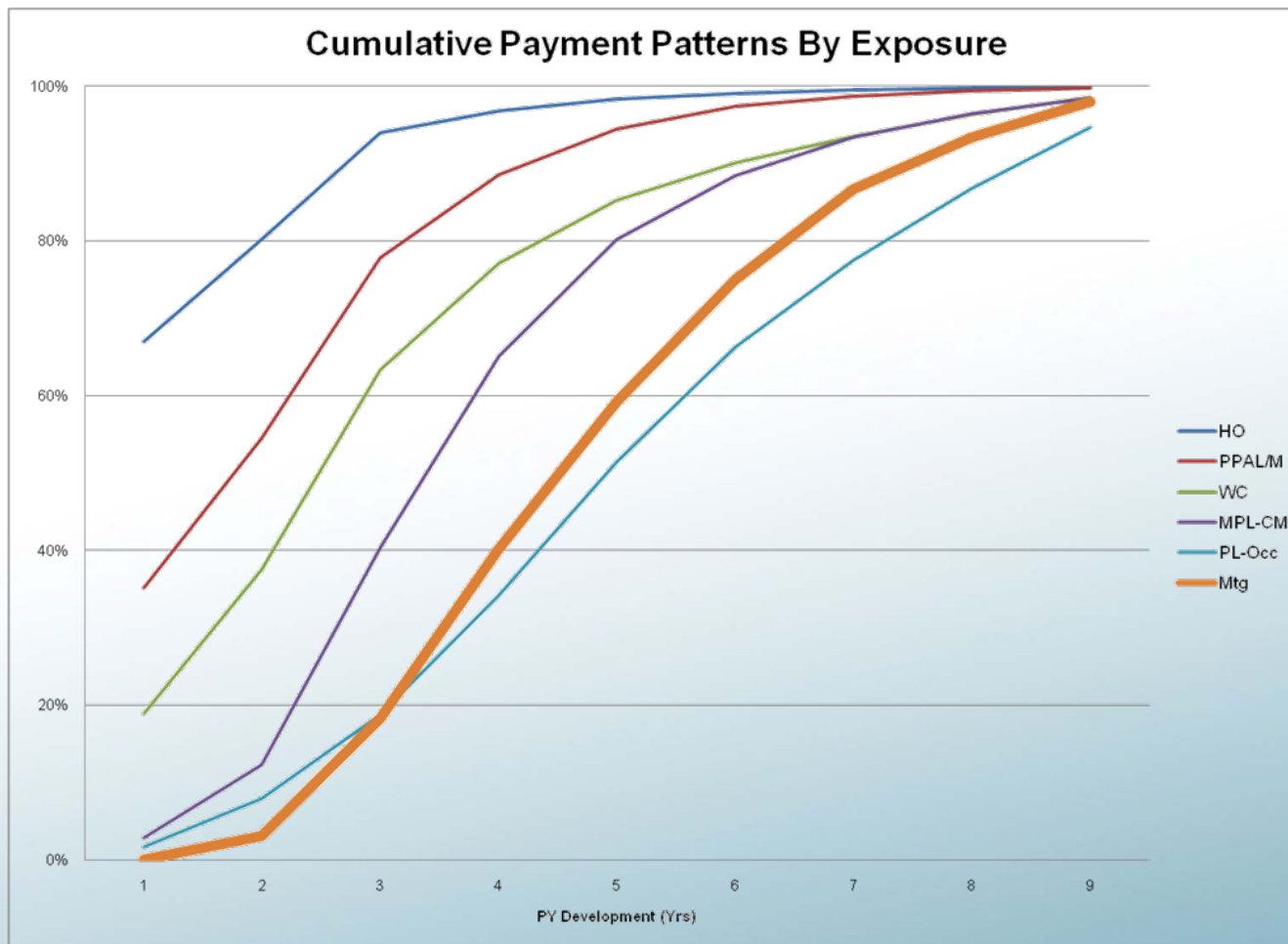
- Investor reliance on credit rating agencies
 - Not intention of rating agencies
 - Rather, they provide opinions on “the risk to the debtholder of not receiving timely payment of principal and interest” on specific debt securities
- NAIC uses credit opinions for policy formulation
 - “Insurers need not file any NRSRO rated securities with the SVO and instead self assign an NAIC designation to the security in accordance with a prescribed equivalency formula”
 - Life/Health insurers owned \$145B non-agency MBS at year-end 2008

Background

- Independent analysis of MBS valuable (though scarce)
 - Broker-dealer quotes
 - Trading partner or third-party evaluator
 - Market value vs. intrinsic value
 - “Bond Powerhouse Has Many Hats”
 - PIMCO Advisory hired by NAIC to value insurers’ RMBS for year-end 2009 statutory reporting and RBC requirements
 - Unit of PIMCO, managing MBS bond fund PTRIX
 - Unit of Allianz, insurance conglomerate ~\$10B R/CMBS

LDF Limitations

- Mortgage credit losses are relatively long-tail



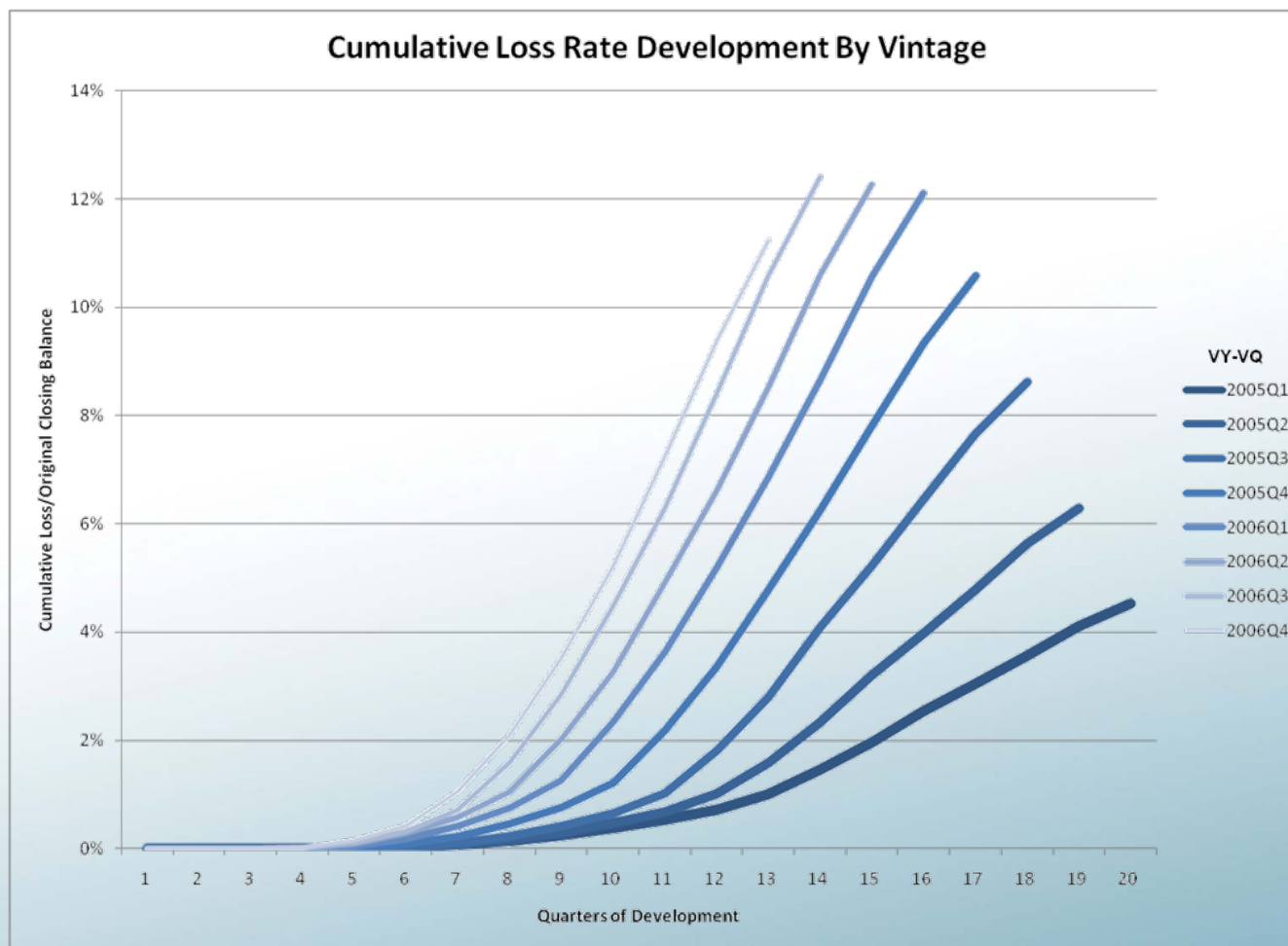
LDF Limitations

- Mortgage credit losses are relatively long-tail

<u>Exposure</u>	<u>Years</u>	
	<u>Mean</u>	<u>Median</u>
HO	1	<1
PPAL/M	2	1-2
WC	3	2-3
MPL-CM	4	3-4
PL-Occ	5	4-5
Mtg	5	4-5

LDF Limitations

- Mortgage credit losses susceptible to CY effects



LDF Limitations

- Mortgage credit losses susceptible to CY effects
 - Economic conditions
 - Government intervention
 - Making Home Affordable
 - HAMP
 - HARP
 - Second Lien Modification Program
 - Foreclosure moratorium
 - First-Time Homebuyer Credit
 - Long-Time Resident Credit
 - Principal Forgiveness
 - Foreclosure crisis

LDF Limitations

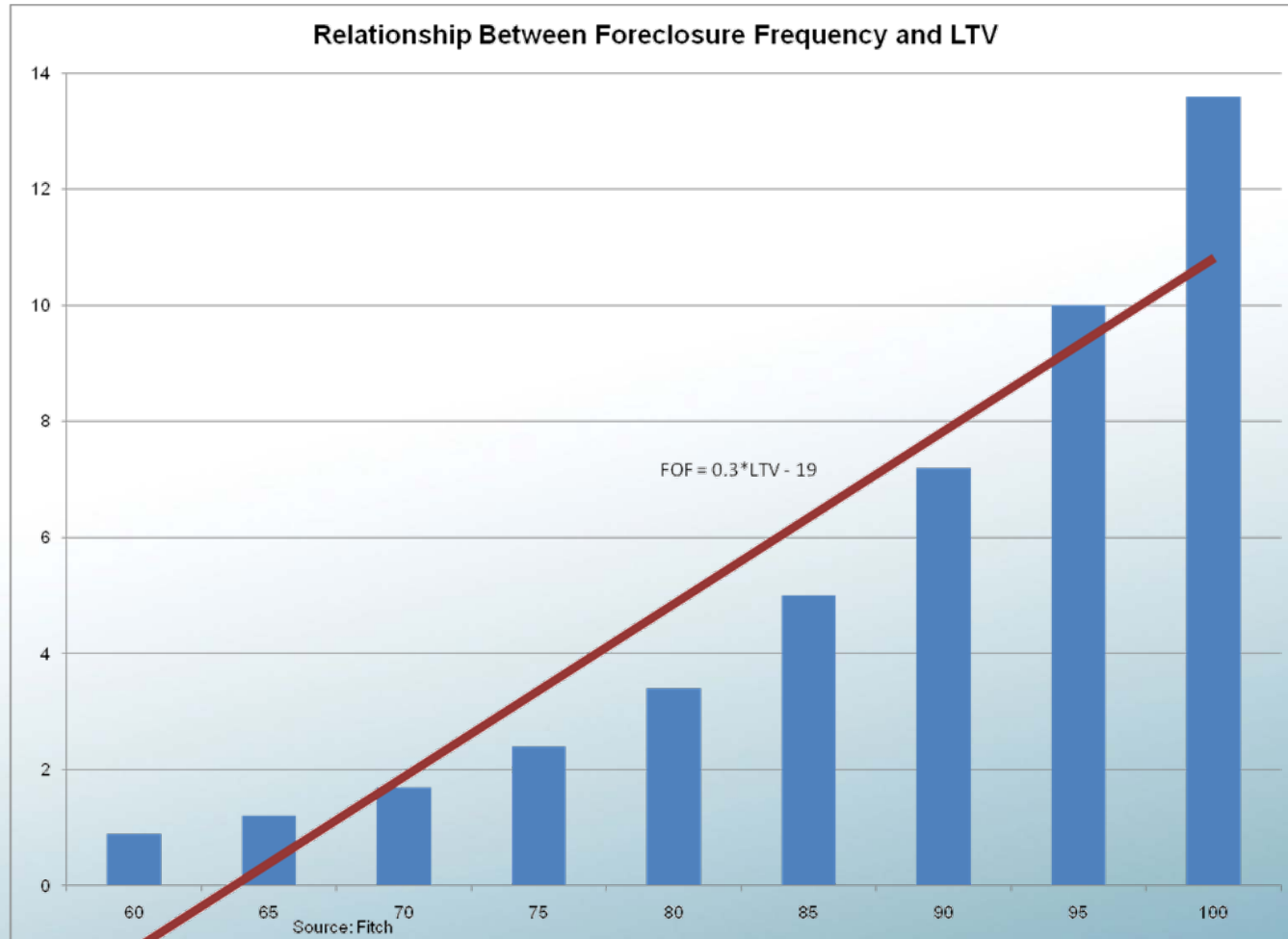
- Heterogeneous risk profiles

Collateral Characteristics Of Subprime ARMs							
<u>OY</u>	<u>CLTV</u>	<u>% IO</u>	<u>% 40 Yr</u>	<u>% Piggyback</u>	<u>% CLTV > 80%</u>	<u>% CLTV > 90%</u>	<u>% Full Doc</u>
2001	81	0	0	4	45	25	71
2002	81	1	0	4	47	27	66
2003	84	6	0	11	56	38	63
2004	85	21	0	20	61	45	59
2005	87	33	8	29	64	51	55
2006	88	20	31	34	69	56	53
2007	85	19	28	20	64	49	57

Source: Subprime Mortgage Credit Derivatives

LDF Limitations

- Foreclosure and borrower equity non-linear relationship



Recommended General Enhancements

- Key considerations
 - Underwriting characteristics
 - Economic conditions
- Other actuarial approaches to consider
 - Berquist-Sherman/Barnett-Zehnworth
 - Bornhuetter-Ferguson
 - More appropriate where development is volatile and/or immature
 - Critical considerations for a priori
 - Underwriting characteristics (FICO, LTV, documentation, I/O, etc.)
 - Economic factors
 - Both paid and “incurred”
 - Persistency
 - Review data at granular level

Recommended General Enhancements

- Sample A Priori Loan-Level Data

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Stratify By None Export CWALT 2005-55CB Loan Details

Group: ALTA/G2 All Loans As of: 01/09

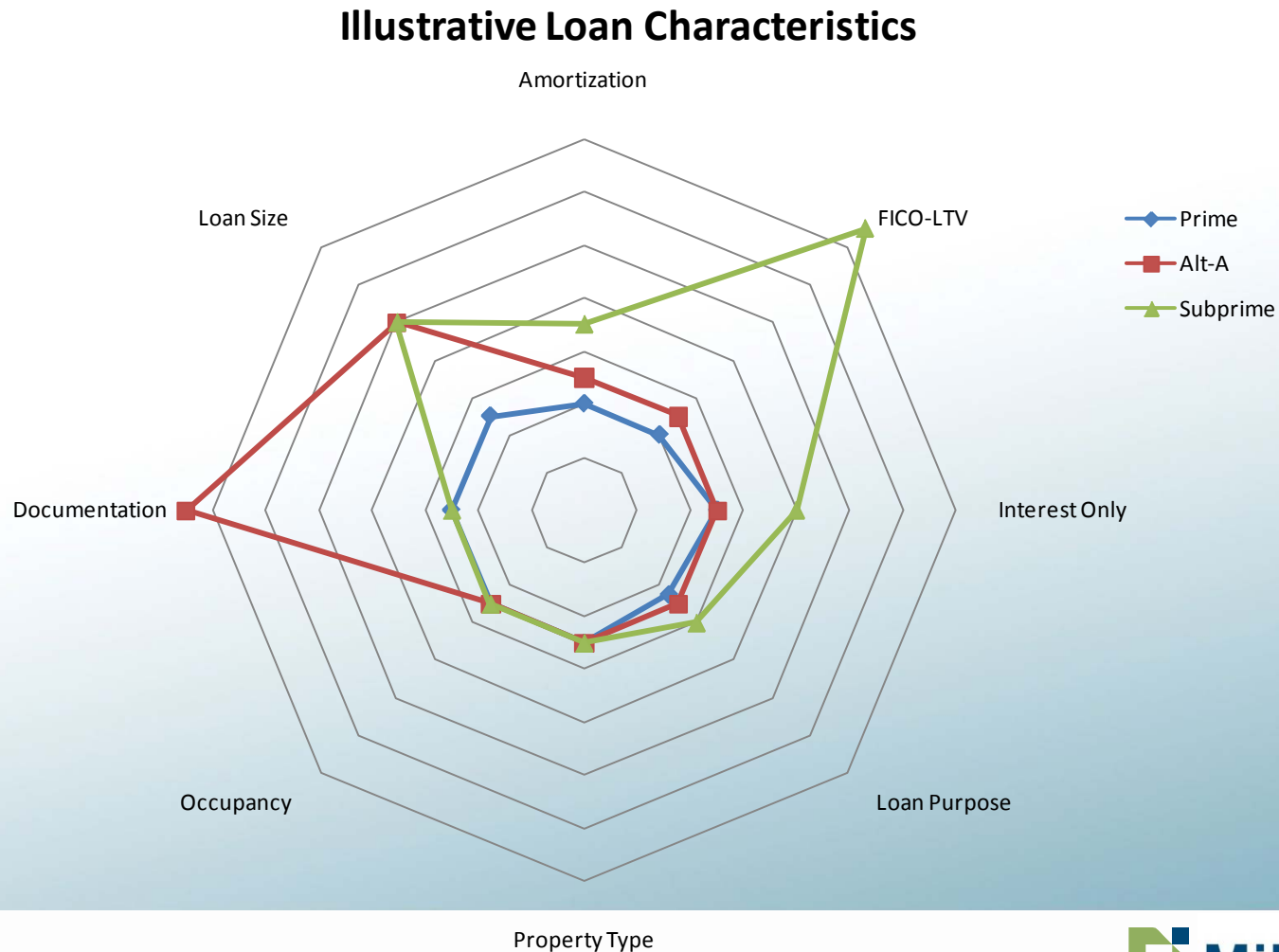
	Count	Curr. Amt (USD)	%	WALTV	Score	Orig. Amt	WAC	WAM	WALA
All Loans	735	150,439,202	100.0	72.9	724	152,782,299	5.92	319	41

Loan No.	Curr. Amt ↑	Orig. Amt	Rate	LTV	Score	Age	MTM	Type	Index
112433167	672,937	672,937	6.25	75.0	789	40	320	FIXED	N
104392510	505,000	505,000	5.50	73.2	743	40	320	FIXED	N
104194625	428,000	428,000	6.50	80.0	667	40	320	FIXED	N
111604698	407,368	408,000	5.38	80.0	775	40	320	FIXED	N
103964586	360,000	360,000	6.63	80.0	635	40	320	FIXED	N
60605445	359,650	359,650	5.75	76.7	693	41	319	FIXED	N
104575973	359,650	359,650	6.13	79.9	693	40	320	FIXED	N
104222813	359,650	359,650	5.88	48.0	648	41	319	FIXED	N
104040612	359,650	359,650	5.88	67.9	774	40	320	FIXED	N
104291885	359,649	359,650	5.88	48.5	772	40	320	FIXED	N
104355866	359,640	359,650	5.88	55.3	601	40	320	FIXED	N
104402448	359,638	359,650	6.25	72.7	776	40	320	FIXED	N
60609838	359,600	359,600	5.88	63.7	631	40	320	FIXED	N
44054021	359,575	359,650	6.00	77.0	734	41	319	FIXED	N
103671790	359,573	359,650	5.50	48.0	779	41	319	FIXED	N
103992502	359,522	359,650	5.63	67.2	718	41	319	FIXED	N
103797397	359,378	359,600	5.88	75.8	710	41	319	FIXED	N

Australia 61 2 9777 8600 Brazil 5511 3048 4500 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000
 Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2009 Bloomberg Finance L.P.
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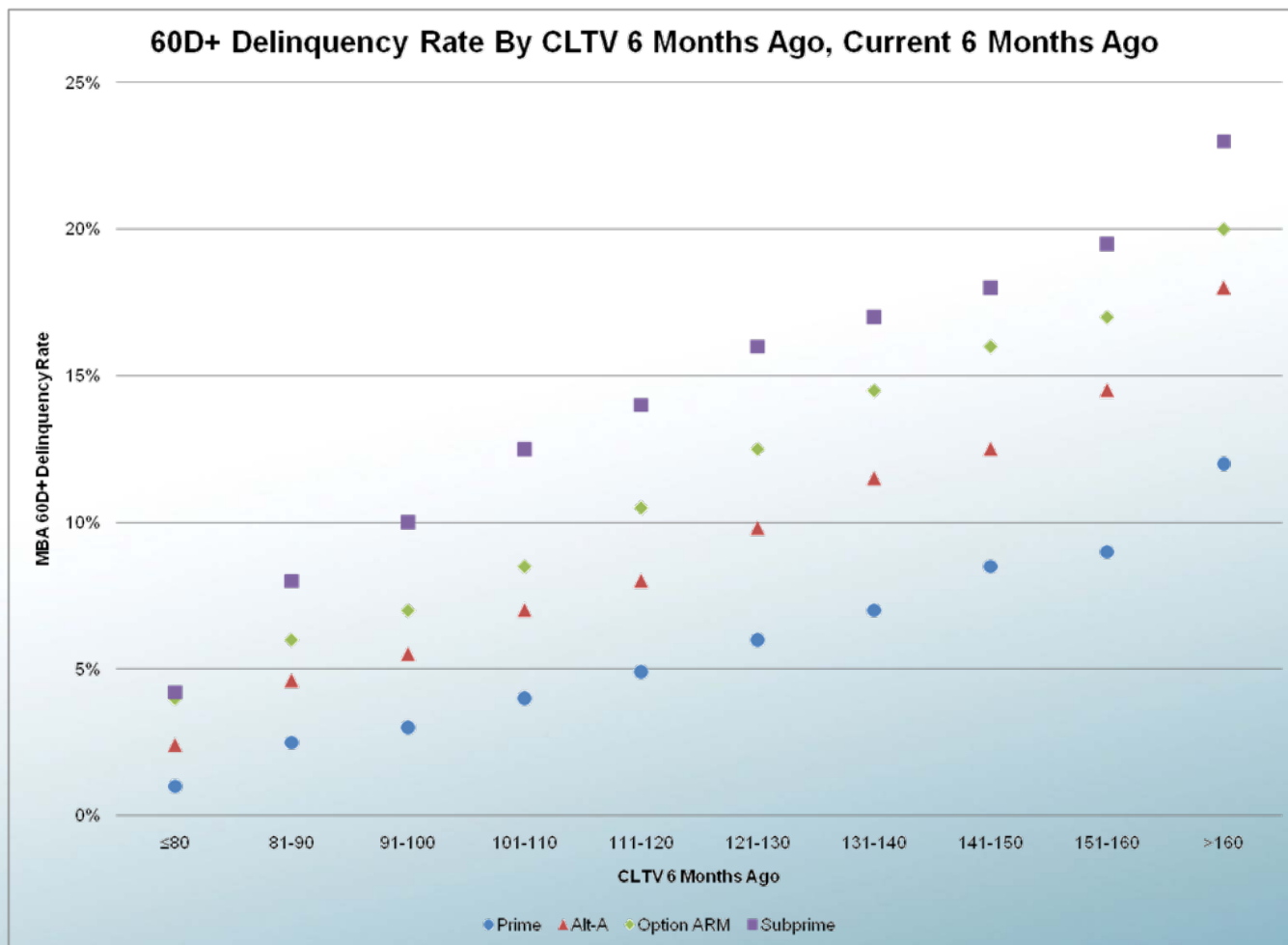
Recommended General Enhancements

- Underwriting characteristics spider chart



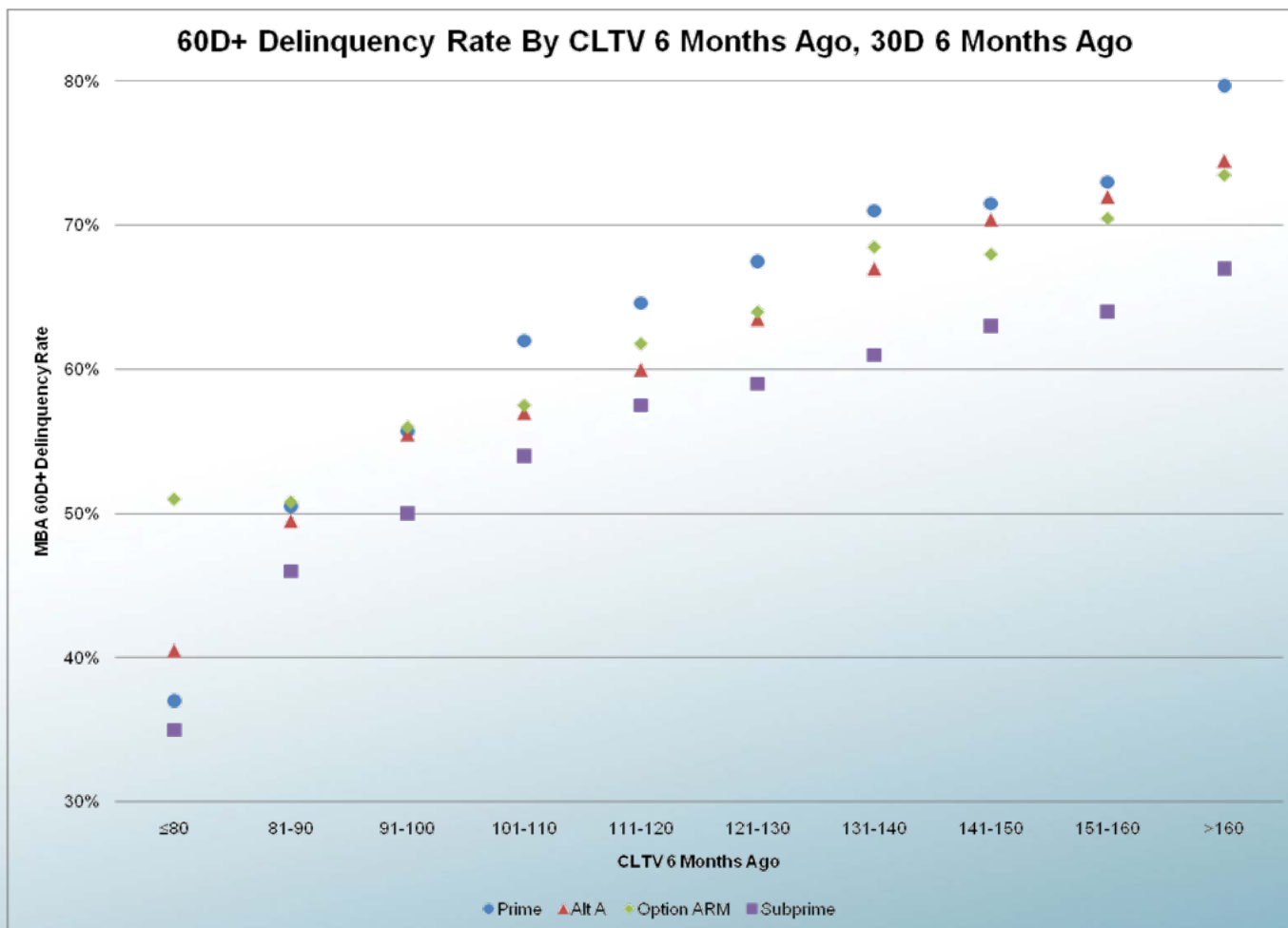
Recommended General Enhancements

- Econometric models



Recommended General Enhancements

- Econometric models

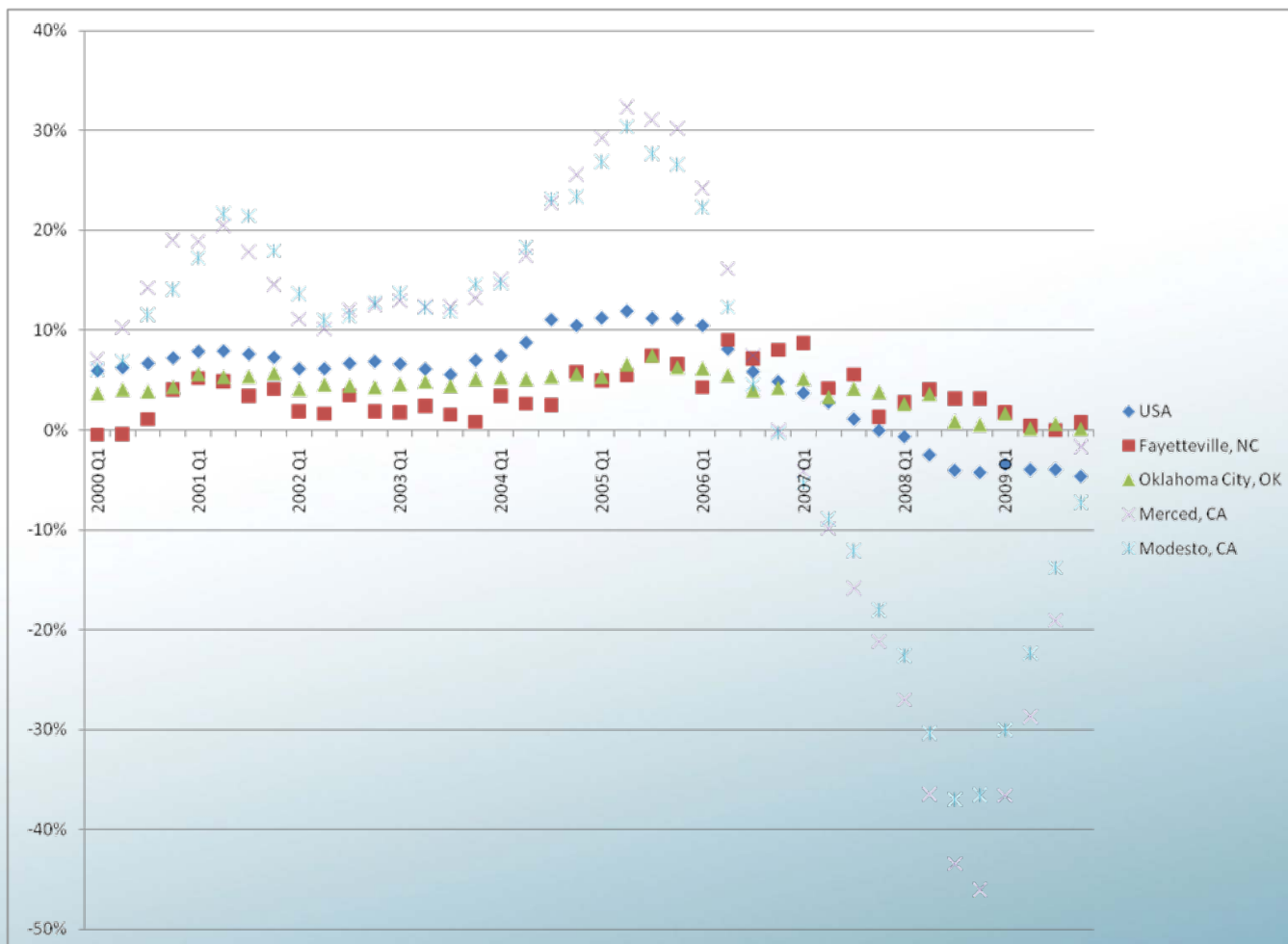


Recommended General Enhancements

- A priori persistency adjustment
 - Actual persistency
 - A priori persistency
 - Adjustment needed to allow for more/less defaults based on actual vs. anticipated exposure duration
 - Adjust a priori ultimate by persistency factor

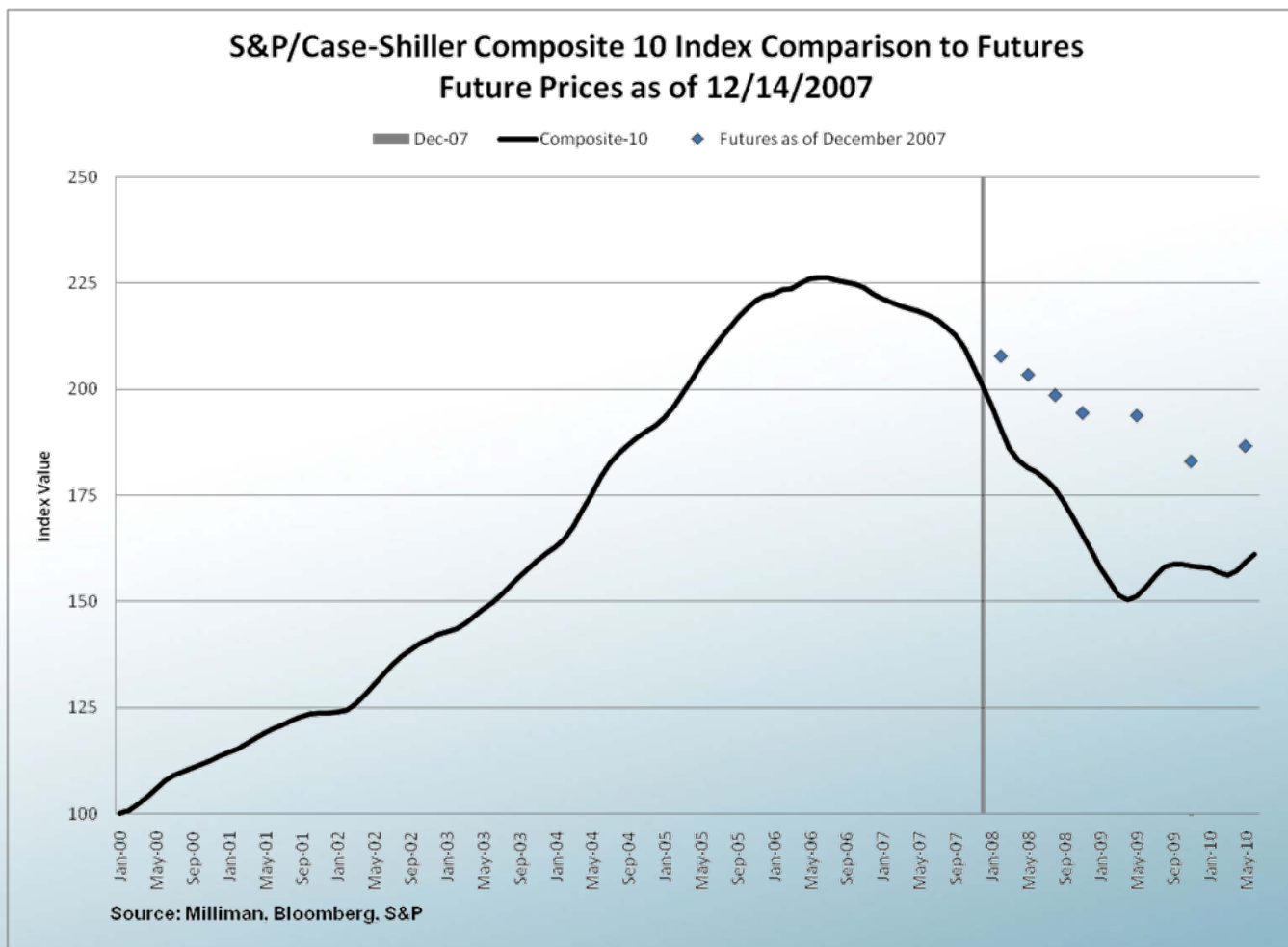
Recommended General Enhancements

- Be granular (know your basis: FHFA vs Case-Shiller)



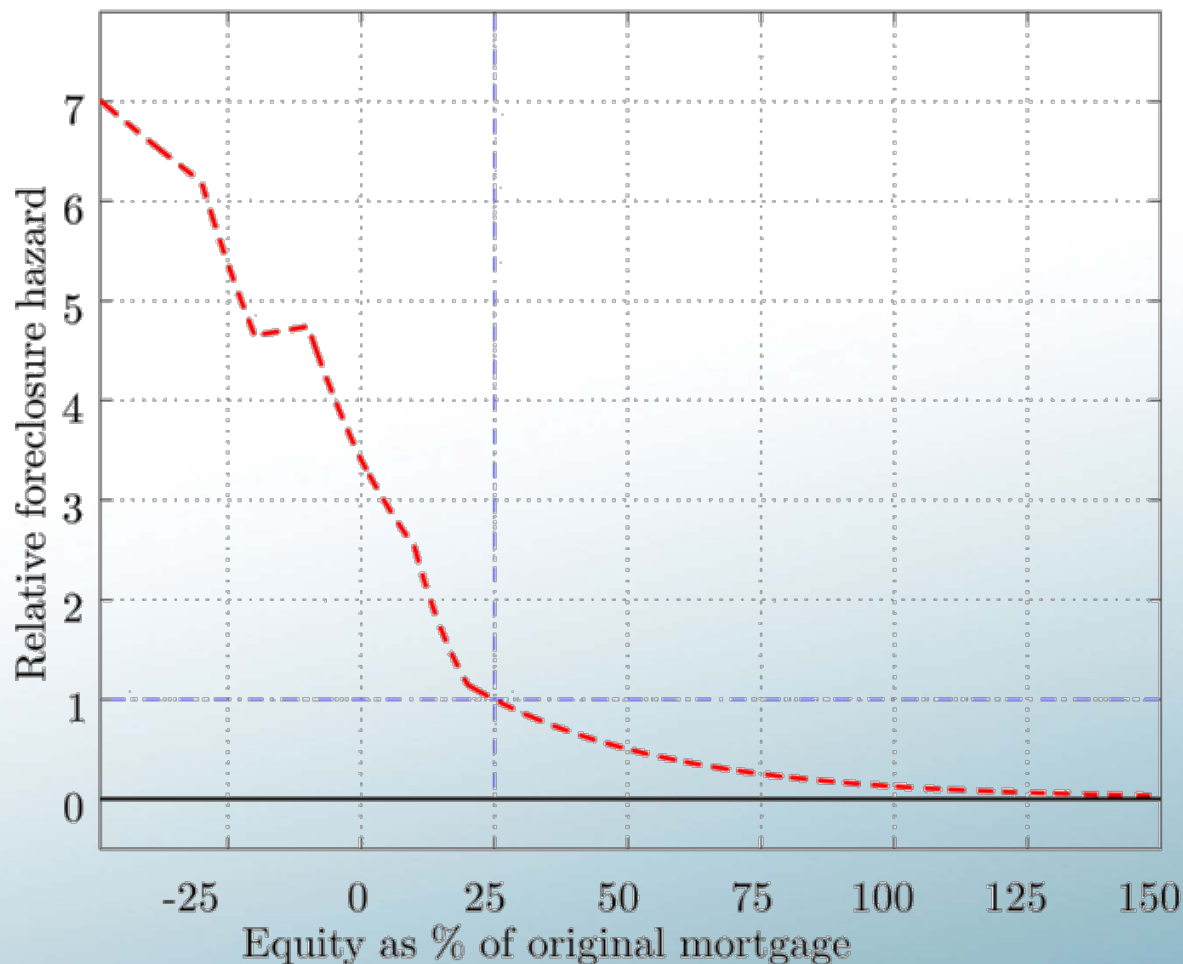
Recommended General Enhancements

- S&P/Case Shiller: Actual and Futures Implied

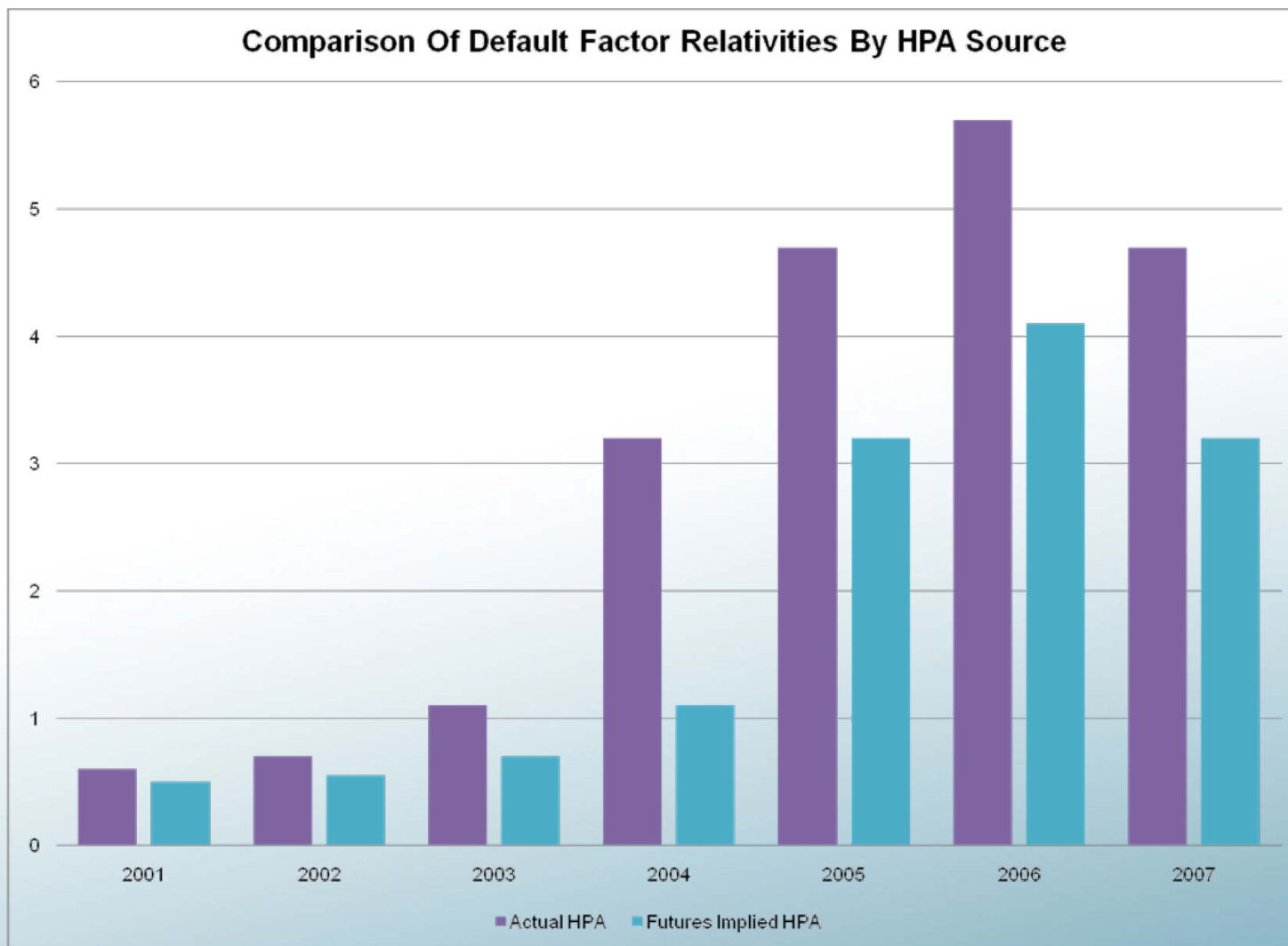


Recommended General Enhancements

Estimated Effect of Equity on Default



Recommended General Enhancements



Closing

- Actuarial talent is valuable in mortgage analysis
- Value independence and transparency
- Consider enhancements beyond LDF
- Critical considerations: underwriting attributes and economics
- Develop assumptions at granular level
- Don't overlook tail risk

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