

MANAGING EXTREMES

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CANE 2015 SPRING MEETING

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Rest Assured, Surety Is An
Interesting Line Of Business

March 23, 2015

Presenters:

Charles Costantini, Vice President, Munich Re America

Cynthia Cheng, Vice President, Willis Re

Agenda

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- Section 1 What is Surety?
- Section 2 Underwriting, Claims Handling and Market
 Conditions
- Section 3 Surety Reinsurance
- Section 4 Modeling A Surety Portfolio

WHAT IS SURETY?

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3rd Party Indemnity Contract

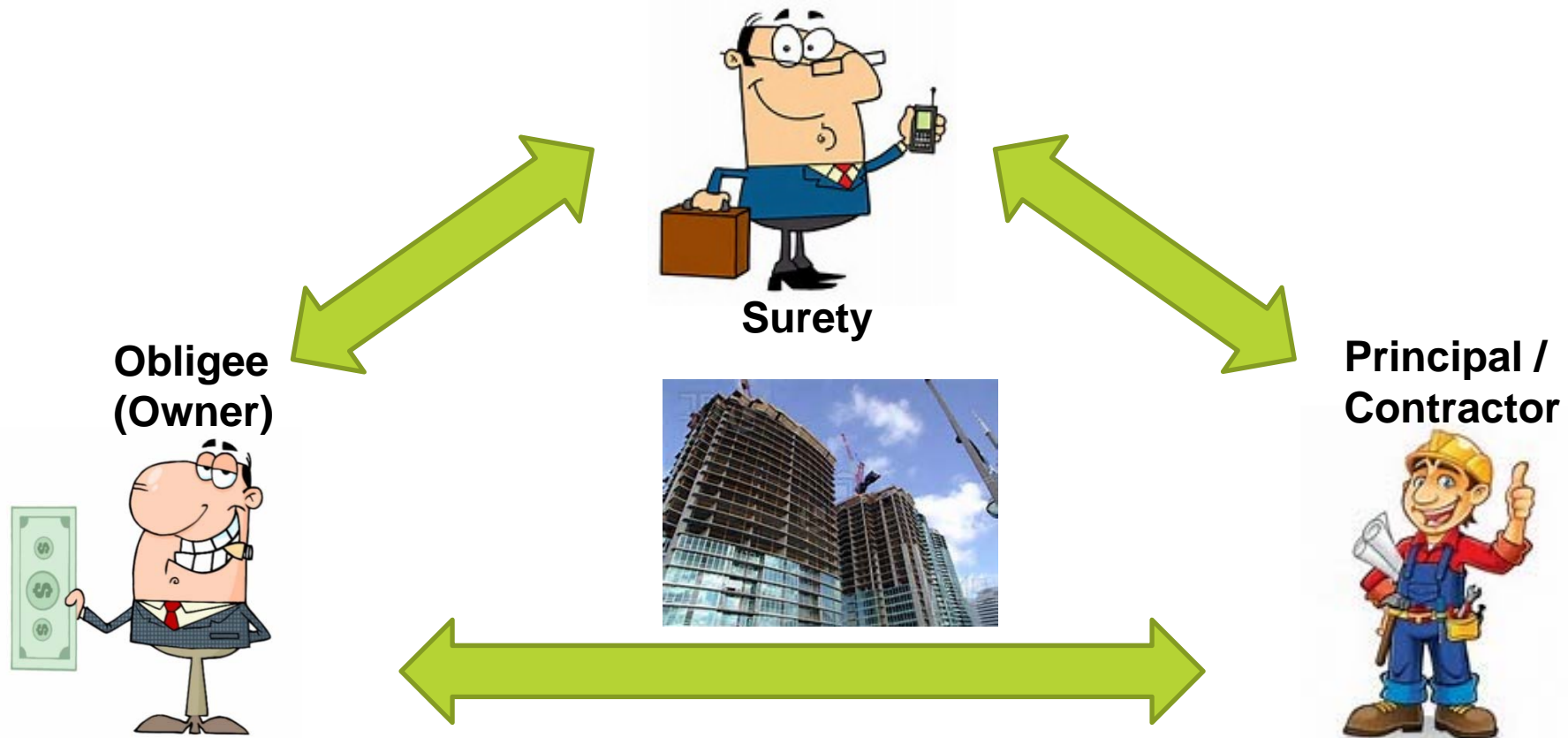
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Joint undertaking to fulfill a contractual obligation



Underwritten to ZERO LR

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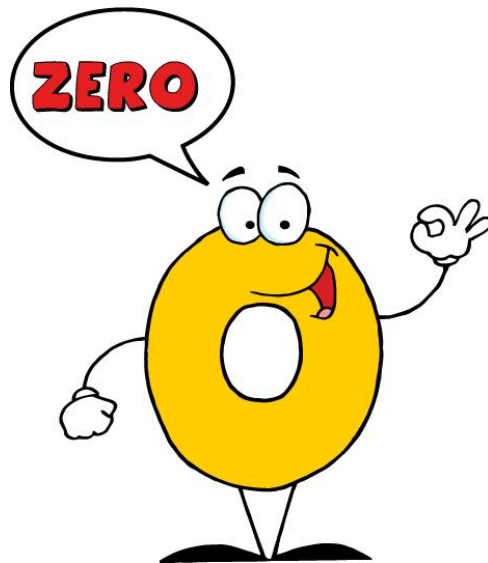
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Surety

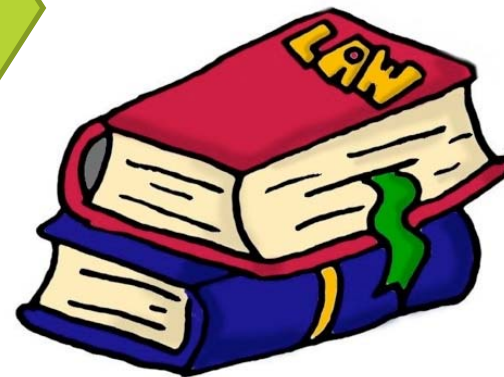
In theory, underwritten to **ZERO** loss ratio



VS

Insurance

Law of Large Numbers



Contract Bonds

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BID BONDS

- If bid accepted, will enter into contract and post required bonds
- Cost – no charge if performance/payment bonds required

PERFORMANCE BONDS

- Contractor will fulfill all terms of the construction contract
- Cost – 0.5 - 2% of contract price

PAYMENT BONDS

- Contractor will pay labor and material bills associated with the contract
- Cost – price included with performance bond

Surety bonds mandated on public works

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Heard Act (1894)

Miller Act (1935)

- Sureties must be T-Listed

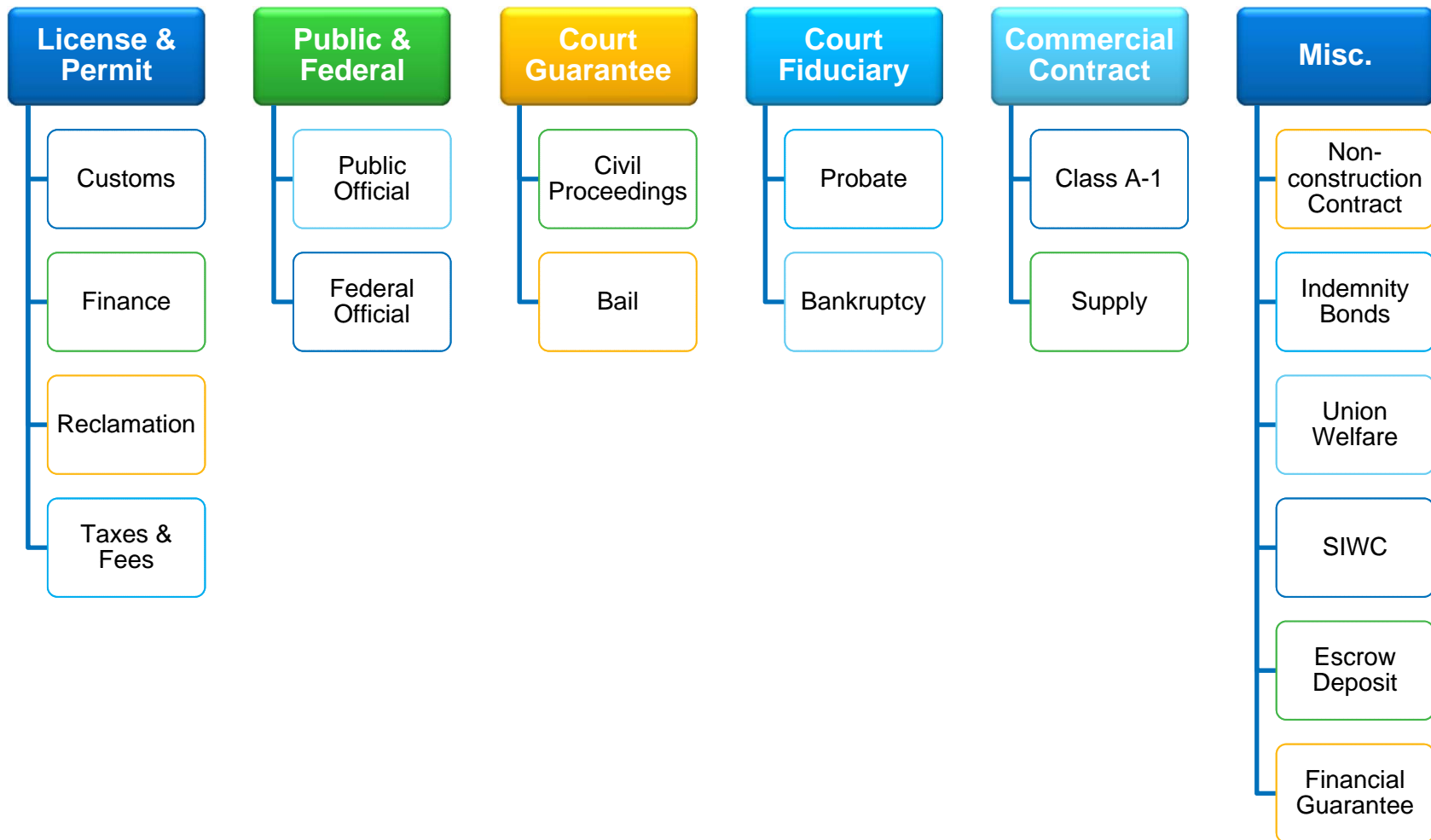
“Little Miller Acts”

- State level





Commercial Bonds



The Surety & Fidelity Association of America (SFAA)

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- Non-profit corporation
- Licensed as a rating or advisory organization
- Designated by state insurance departments as a statistical agent for the reporting of fidelity and surety experience
- Member companies collectively write the majority of surety and fidelity bonds in the United States

UNDERWRITING, CLAIMS HANDLING AND MARKET CONDITIONS

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“Three Cs” of Surety

Character

- Without this nothing else matters
- History of paying subs/suppliers (any liens on property), reputation within community, personal credit score, prior bankruptcies
- How will he/she react in bad times (test of “true character”)

Capacity

- Ability to perform a project
- Manpower/equipment, estimating ability, experience with type and size of job, geographical area, history with owner of project, good cost records, continuity planning

Capital

- Financial ability to assume the risks of business activity
- Equity, working capital, personal net worth, bank line of credit, interest bearing debt

Common Reasons for Contractor Failure

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Project Size Increase

Geographic Unfamiliarity

New Types or Sectors of Construction

Key Personnel Replacement

Managerial Immaturity



Credit Scoring Models for Surety

Development

- Actuaries/Surety Product Side
- Around for 20 years, strong presence last 5-10 years
- Look at various risk factors (capital, liquidity, leverage ratios) and weight together to get one number on an account

How Used

- Surety U/W's (never sole tool!)
- Portfolio management
- Pricing reinsurance
- Sophisticated companies assign P(D) to credit score

- Have credit scoring models contributed to lower loss ratios over recent years?

Top 15 Writers of Surety Bonds for Calendar Year 2013

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	GROUP/COMPANY	Direct Premium Written	Market Share	Direct Premium Earned	Direct Losses Incurred	Direct Loss Ratio
1	TRAVELERS BOND	778,689,161	14.8%	779,834,246	(81,104,048)	-10.4%
2	LIBERTY MUTUAL GROUP	738,271,612	14.0%	728,010,646	248,978,084	34.2%
3	ZURICH INSURANCE GROUP	492,737,467	9.4%	478,892,261	116,217,008	24.3%
4	CNA INSURANCE GROUP	408,605,990	7.8%	403,673,851	73,481,675	18.2%
5	CHUBB & SON INC GROUP	210,242,628	4.0%	214,183,692	5,151,889	2.4%
6	IFIC SURETY GROUP	167,316,158	3.2%	174,232,454	18,729,998	10.8%
7	HCC SURETY GROUP	166,419,402	3.2%	165,165,349	8,148,854	4.9%
8	HARTFORD FIRE & CAS GROUP	160,693,912	3.1%	160,352,691	38,280,140	23.9%
9	ACE LTD GROUP	143,061,872	2.7%	136,107,632	26,291,852	19.3%
10	RLI INSURANCE GROUP	110,594,591	2.1%	110,565,524	12,573,088	11.4%
11	GREAT AMERICAN INSURANCE COMPANIES	110,364,998	2.1%	103,887,714	26,157,739	25.2%
12	LEXON/BONDSAFEGUARD INSURANCE COMPANIES	96,284,806	1.8%	97,589,369	37,055,123	38.0%
13	NAS SURETY GROUP	79,919,971	1.5%	79,342,787	1,157,520	1.5%
14	THE HANOVER INSURANCE GROUP	77,266,258	1.5%	78,634,850	52,735,185	67.1%
15	MERCHANTS BONDING CO GROUP	76,211,560	1.5%	74,666,330	9,213,258	12.3%

Source: SFAA, U.S. & Territories, Canada & Aggregate Other Alien

Construction Put in Place Trends

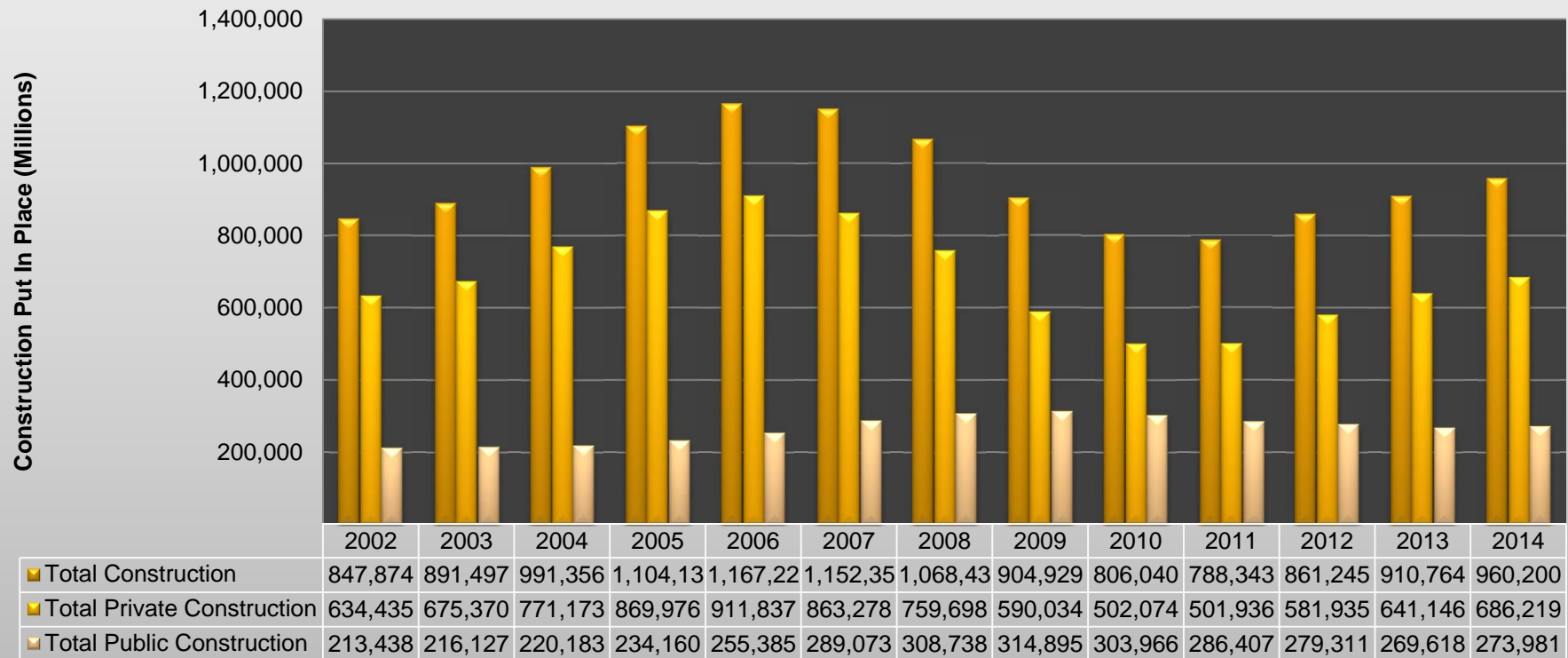
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Construction Put In Place Trends



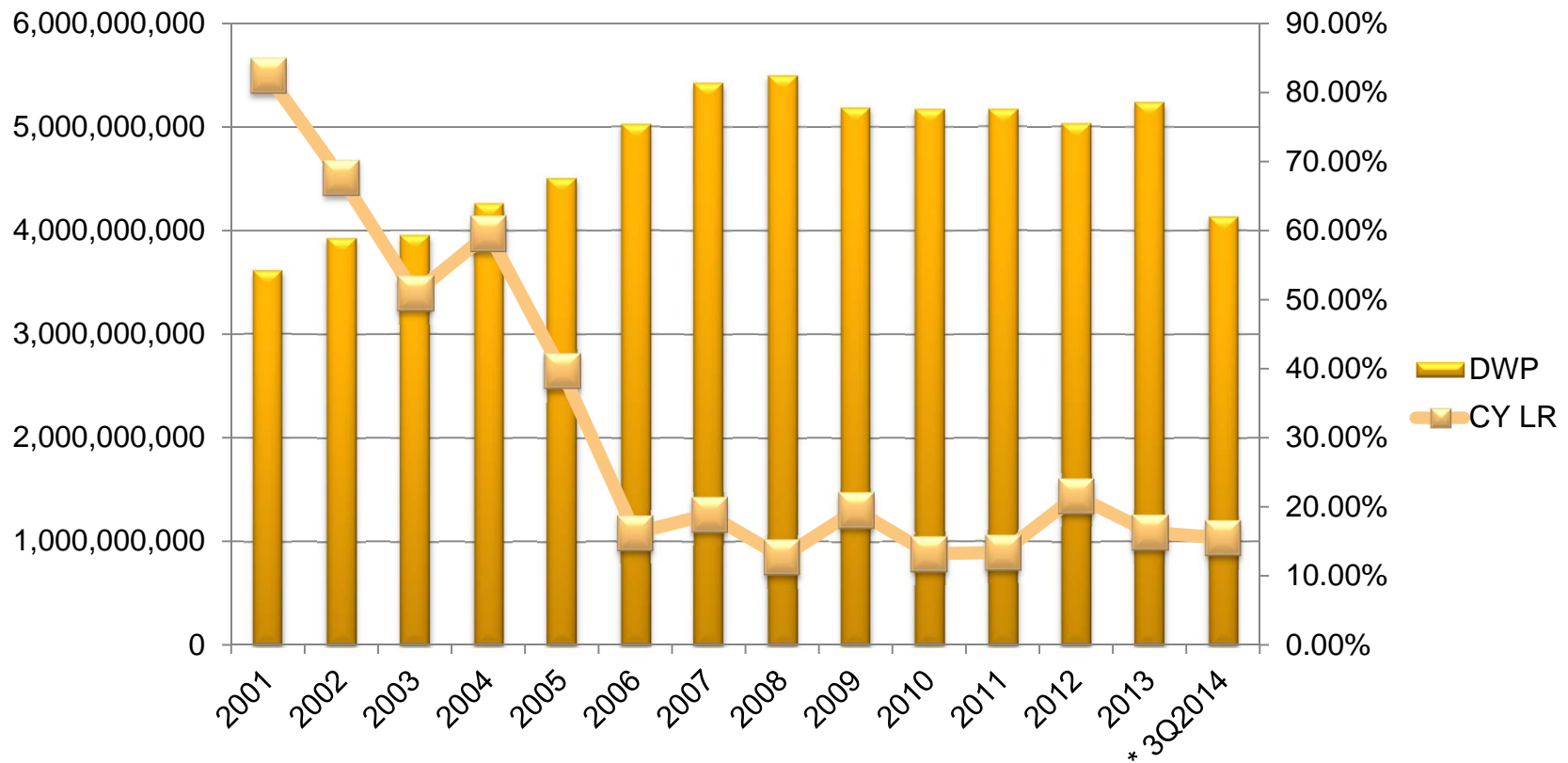
Source: Census Bureau

Surety Industry Results (2001 – 3Q2014)

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Source: SFAA

Surety Losses – When Public Construction Recovers?

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- Two Divergent Themes

Overextension of Credit

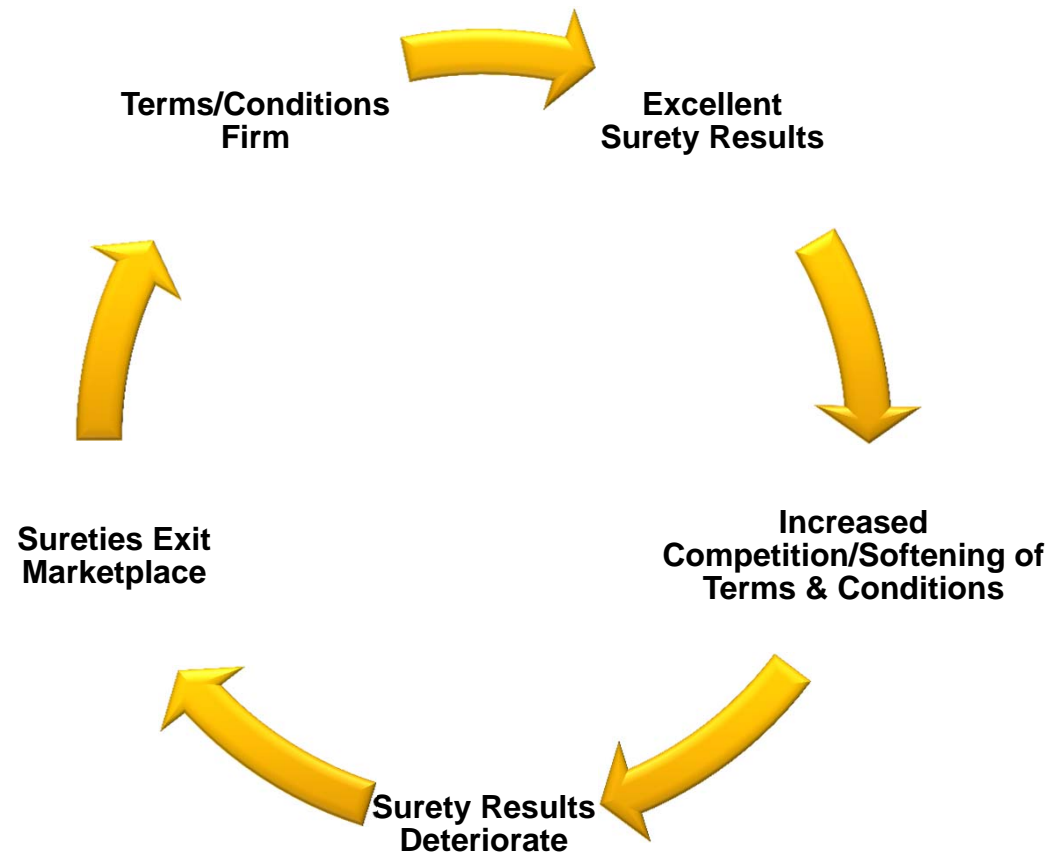
Skilled Workers?
Increased Surety Competition
New Geographical areas for
contractors

Slow Landing

Contractors made adjustments
Private construction helping some b/s



Surety Underwriting Cycle



What does surety have to do with Jay-Z?

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The surety stepped in

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- When subcontractor on Barclays Center project ASI Ltd went bankrupt, the surety stepped in ensuring Jay-Z would be able to open there on Sept. 28th, 2012

- One-of-a-kind façade covered in weathered steel
- The goal was to give the Barclays Center an outside shade similar to the typical Brooklyn brownstone architecture

Barclays Center – ASI Surety Loss Case Study

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- **Feb 2010** – ASI Limited, a steel fabricator outside of Indianapolis awarded **\$32.4 million subcontract** to Hunt (General Contractor) to produce the **12,000 panels** that cover 85% of the façade. Hunt required full performance payment bonds.
- **Dec 23, 2011** – ASI **defaults on bank loan** and shuts door. ASI's bank shut the manufacturing plant down and locked the doors. Bank had a blanket lien on all of ASI's assets, including the plant.
- ASI immediately shut its doors. At time of default, ASI had **completed 57%** of the panels.
- **By Jan 8, 2012**, surety had bought out bank's position and reopened the plant. Surety tried to re-let the contract, but could not find anyone who could do it in a timely manner. Surety hired 190 of ASI's employees offering incentives to finish.
- The surety assumed responsibility for the project management. The surety hired a rust expert, a consultant to manage the job and leased a second, more sophisticated cutting machine. Two crews working back to back 12-hour shifts, 7 days a week to timely complete ASI's scope of work.
- **Sept 28, 2012, Barclays Center opens on-time with Jay-Z kicking off the concert.**

Barclays Center – What Factors Impacted Surety Loss?

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- Inter-creditor Risk
 - The bank had a blanket lien on all of ASI's assets, including the material purchased for the project
 - In the event of a default, a surety competes with other creditors, including banks, for the assets of the principal
- Specialized Assets
 - The job was to be performed on an extremely tight schedule, and ASI had specialized manufacturing equipment that not only enabled it to timely manufacture 12,000 panels (with no two alike), but it had also constructed a 2,500' conveyor system designed to accelerate the weathering process of the panels (60 days)

Options Available to Surety in Claims Situation

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Finance
the
Contractor

Takeover
and
Completion

Tender a
New
Contractor

Owner
Completion

Bond Buy
Back

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Surety Reinsurance Structures

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Pro Rata

- Per Bond
- Risk Attaching
- Capacity driven – U.S. Treasury Listing
- Tail Coverage

Excess of Loss (XOL)

- Per Principal
- Inforce, new and renewal
- Loss Discovered Basis, fixed threshold
- Flat rated with limited reinstatements
- Capacity & Risk Appetite varies by Cedant (PML or upward of 100%)
- Cost Effective
- Extended Discovery Option

Surety Reinsurance Structures

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- Combined Program
 - Pro Rata & XOL
 - Pro rata inures to the benefit of XOL cover
- Facultative/Large Bond QS
 - Individual larger risks
- Some sureties express an interest in
 - Per Principal Risk Attaching XOLs
 - Aggregate Stop Loss Cover
 - Multi-year treaties

Surety Reinsurance Landscape

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- Very competitive (over 40 surety reinsurers, normal about 15!)
- Results for surety reinsurers remain good
- Surety reinsurance premium has been shrinking
 - Primary sureties buying less QS
 - Higher retentions on XOLs
 - A few sureties not buying reinsurance
- Reinsurers showing interest in longer tail exposures
- Continue to monitor aggregations

MODELING A SURETY PORTFOLIO

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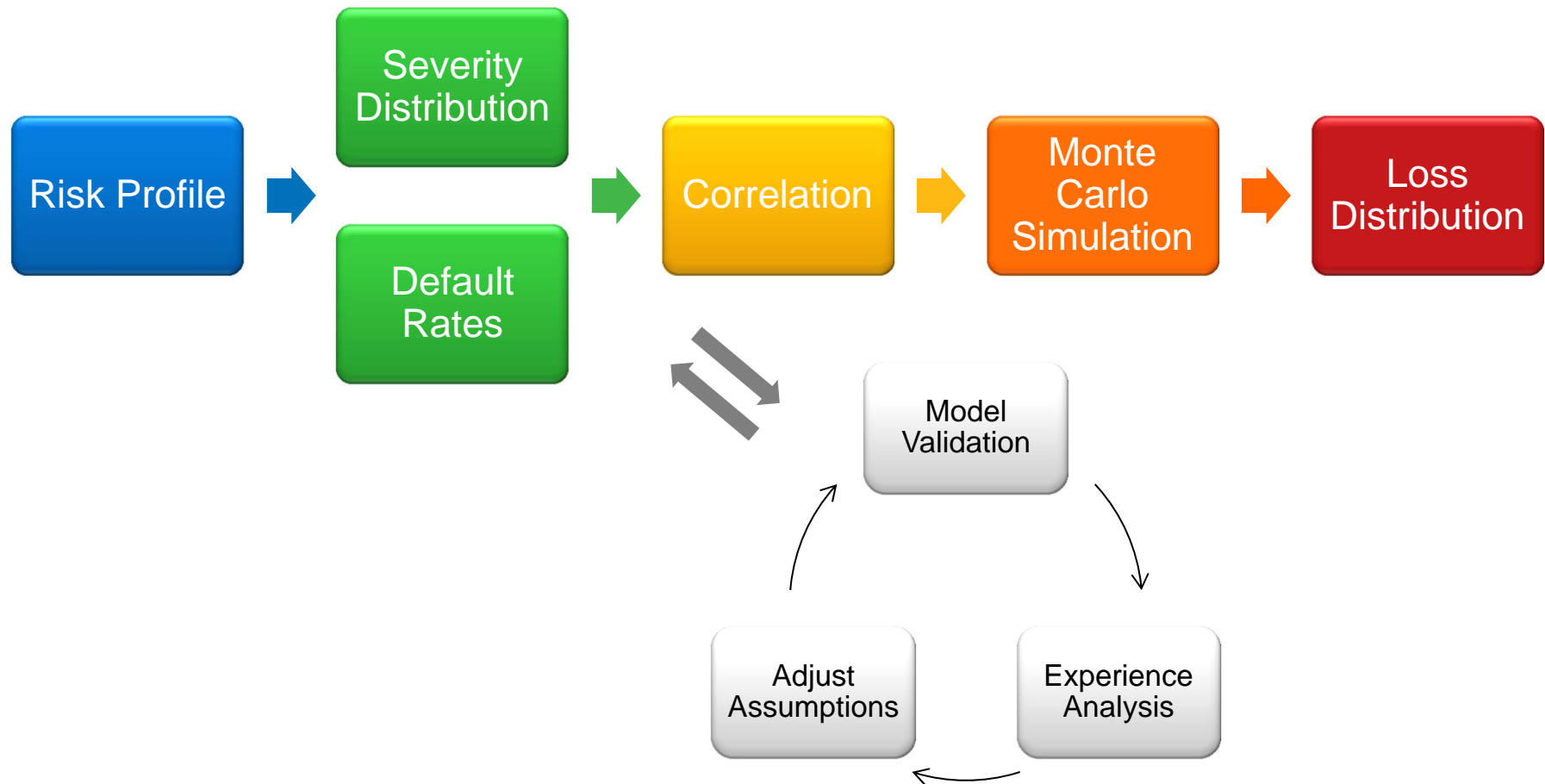
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Surety Modeling Process



What information do we need?

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- Data aggregated to the principal level
 - Per principal vs per bond modeling

Separately for Contract & Commercial

- Exposure
- Premium

Characteristics that Impact Loss Severity

- Contractor type
- Largest individual bond
- Region
- Bond type

Additional Information

- Credit rating
- Collateral
- Co-surety
- % bond

What is an appropriate exposure base?

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- Exposure base criteria
 - Proportional to expected loss
 - Practical: easy and inexpensive to obtain
 - Verifiable: objective
- Commercial Surety
 - Sum of all in-force bond amounts

Contract Exposure Base

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- Work on Hand / Cost to Complete
 - Estimate of uncompleted work
 - Historical industry standard
 - Subject to interpretation and timing
- SFAA Exposure
 - Total Open Bond Limits = In-Force Bond Limits + Bond Limits Expired in Last 12 Months
 - Accounts for exposure to defective workmanship and payment bonds after job has been completed

Exposure Base Calculation

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Exposure Base Calculation at 12/31/2014

Bond #	Effective Date	Expiration Date	Bond Amount	In-Force	Expired 12 Months	Estimated CTC
101	11/20/2012	8/20/2013	280,195	-	-	-
102	12/5/2012	9/5/2013	276,000	-	-	-
103	11/20/2013	11/20/2014	600,000	-	600,000	-
104	12/13/2013	6/13/2014	150,000	-	150,000	-
105	1/2/2014	1/2/2015	450,000	450,000	-	2,466
106	4/29/2014	10/29/2014	125,750	-	125,750	-
107	5/13/2014	5/13/2015	600,000	600,000	-	218,630
108	7/3/2014	7/3/2015	875,500	875,500	-	441,348
109	7/10/2014	10/10/2014	350,000	-	350,000	-
110	11/20/2014	11/20/2015	630,500	630,500	-	559,677
Total			4,337,945	2,556,000	1,225,750	1,222,121

- Cost to Complete = \$1,222,121
- SFAA Exposure = \$3,781,750

What is PEL?

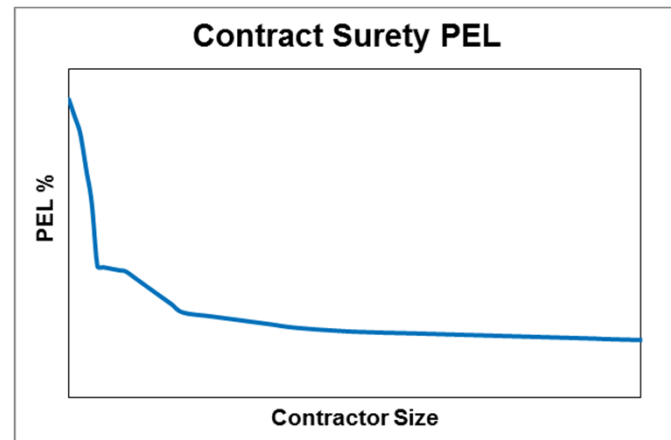
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- Probable Expected Loss
 - Is the average loss severity typically expressed as a percent of exposure
 - For Contract surety, PEL decreases as contractor size increases
 - For Commercial surety, this relationship does not exist



2012 SFAA Construction Loss Severity Study

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- 75% surety market participation
- Based on 1,785 claims over 13 years
 - \$250K loss threshold
 - Indemnity and ALAE net of salvage
 - As of 12/31/2011
- For contractors operating in the US and Puerto Rico
- Model for calculating
 - PEL
 - Probable Maximum Loss (PML) at 90th percentile

SFAA PEL



$$\text{PEL \%} = \left(\text{Base PEL\%} + \frac{\text{Concentration Factor}}{\text{Total Open Bond Limits}} \right) \times \left(1 + \frac{\text{Region Factor}}{\text{Total Open Bond Limits}} \right)$$

- Base PEL varies by contractor type and size
- Concentration = $\frac{\text{Largest Open Bond}}{\text{Total Open Bond Limits}}$
 - PEL increases as concentration increases
- A contractor's region of operation also has an impact on the average size of loss

SFAA Contractor Type
General Contractor - Building
General Contractor - Other
Heavy Highway - Road
Heavy Highway - Other
Sub-Contractor - Building
Developers/Subdivision
Other/Specialty

SFAA Region	PEL Impact
New York City/Metropolitan	Highest
Non-Continental	Low
Northeast	High
Southeast	Medium
Mid-north	Low
Mid-south	Medium
West	High
Multi-Region	Medium

How do we account for co-surety?

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- Co-surety is when a bond is guaranteed by 2 or more sureties
 - Can be arranged so that each surety is jointly and severally liable for the full bond amount or a stated limit
 - Typically used for large construction projects
- Since the SFAA model is at the contractor level, exposures will need to be adjusted to 100% for calculating PEL
 - The exposure to apply to the PEL is the surety's share only

What about percentage bonds?

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- Outside of the US, projects are typically not required to be bonded at 100%
 - In Canada, the bond % (bond amount / contract price) is typically 50% or 100%
 - Outside of North America, the bond %'s are much lower
- To adapt the SFAA study for percentage bonds, lookup the PEL at the 100% level
 - The exposure to apply to the PEL is also at 100%, but the liability is capped at the bond amount
 - Caveat: the SFAA study was developed off of US losses

An Example

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- Contractor XYZ has a \$10M bond with ABC Surety
- XYZ has only 1 project and no bonds that expired in the last 12 months

PEL % = 15%, Severity = \$10M x 15% = \$1.5M

- Co-surety of 10% (ABC's share)

PEL % = 10%, Severity = \$10M x 10% = \$1M

- % bond of 10%

PEL % = 10%

Unlimited Severity = \$100M x 10% = \$10M

Severity Limited to \$10M = \$6.8M

Limit (\$M)	PEL %
10	15%
25	12%
50	11%
100	10%

Commercial PEL

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- Commercial PEL varies by bond type
 - On the high end are worker's comp bonds
 - On the low end are compliance bonds
- Currently there is no industry study
 - Lack of large loss data
 - SFAA is considering performing a commercial surety severity study

Fitting a Severity Distribution

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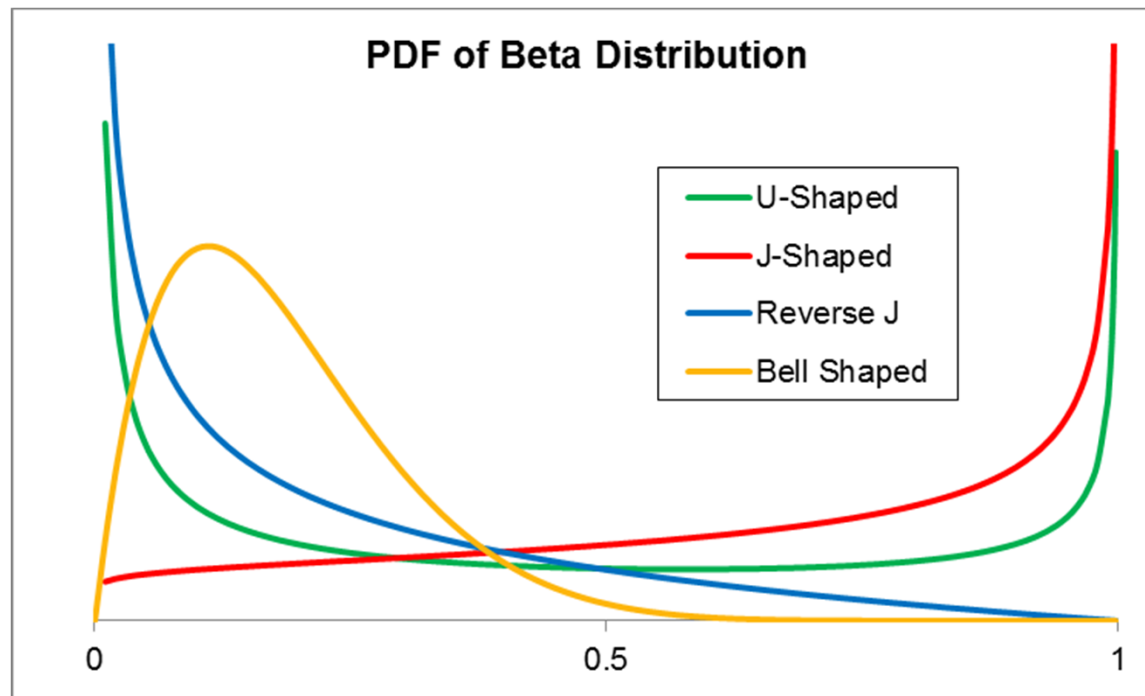
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- Most in the industry use a Beta distribution
 - Is defined from 0 to 1
 - Can take a wide variety of shapes
 - Can be parameterized with just the mean and standard deviation
- Some options for determining standard deviation
 - Use Solver to target 50th and 90th percentile
 - Target a specific shape
 - Assume alpha = 1 (See Curtis's 2006 presentation "Unique Applications of Exposure Rating: Surety")

Beta Distribution



- Avoid parameterizations that result in increase of probability in the tail: U and J – shaped

Determining Default Rates

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- Using target LR for portfolio
 - Assume each principal has the same probability of default
 - Assume relativities based on credit scores
- Using financial instrument default rates (e.g. Moody's, S&P)
 - Each principal is mapped to a probability of default
 - Need to adjust financial default to a surety default
 - Validation: compare LR implied by model with historical LRs

Other Considerations

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- Growth/decline in prospective period
 - In number of accounts → scale frequency
 - In size of accounts → scale open bond limits
- Collateral
 - Treat as an attachment point
- Compare exposure loss costs with historical experience
 - Some credibility for working layers
 - Consider refining assumptions

So, is surety interesting?

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