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PDR Evaluation for Mortgage Insurers

David Kaye, FCAS, MAAA

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Agenda

Background

Deterministic Framework for Evaluating MI PDR

Background
Mortgage insurance

What is mortgage insurance?

Mortgage insurance (MI) is an insurance policy that compensates lenders or investors for losses due to the default of a mortgage loan.

- Often required by lenders for loans the down payment is less than 20% of the value of the property (a loan-to-value ratio above 80%)
  - Provides "credit enhancement" for borrowers who do not have funds sufficient for a 20% down payment
  - The GSEs (Freddie Mac / Fannie Mae) may buy and securitize loans with less than a 20% down payment provided the loans are covered by MI

Background
Terminology

Common mortgage insurance (MI) terminology

- Loan-to-value ratio (LTV)
  - The ratio of the mortgage loan amount to the value of the home
    - Example: Home purchase price - $100,000; Down payment - $20,000; Mortgage amount - $80,000 → LTV = 80%
- Unpaid principal balance (UPB)
  - The remaining mortgage amount
    - In the example above, the UPB is $80,000 before any payments are made.
    - Declines over time as payments are made.
- Policy persistency

Background
Features of MI policies

Some of the common MI policy features include:

- Policies issued at loan origination
- Policy premium paid as a single up front amount or monthly
  - Monthly payment is more common
  - Monthly premium is generally part of the monthly mortgage payment
- Coverage provided is a percentage of UPB
  - Typically 25%

Background
Features of MI policies

Some of the common MI policy features include:

- MI policies reimburse for:
  - The coverage percentage stipulated in the contract
  - Lost interest payments
  - Certain foreclosure-related expenses
- MI policies are generally in force for several years
  - No set termination date
  - Policy termination may occur for any of the following reasons
    - › Defaulting, refinancing the loan, paying down the loan so it no longer requires MI

❖ **A "cohort" of MI policies shrinks as time passes**

Background
Accounting for MI

MI accounting results in mismatch between revenue and expense

Premiums

- Monthly pay premiums are "earned" in the period in which they are "written"

❖ For a cohort, the largest amount of premium is earned in year 1 and declines thereafter

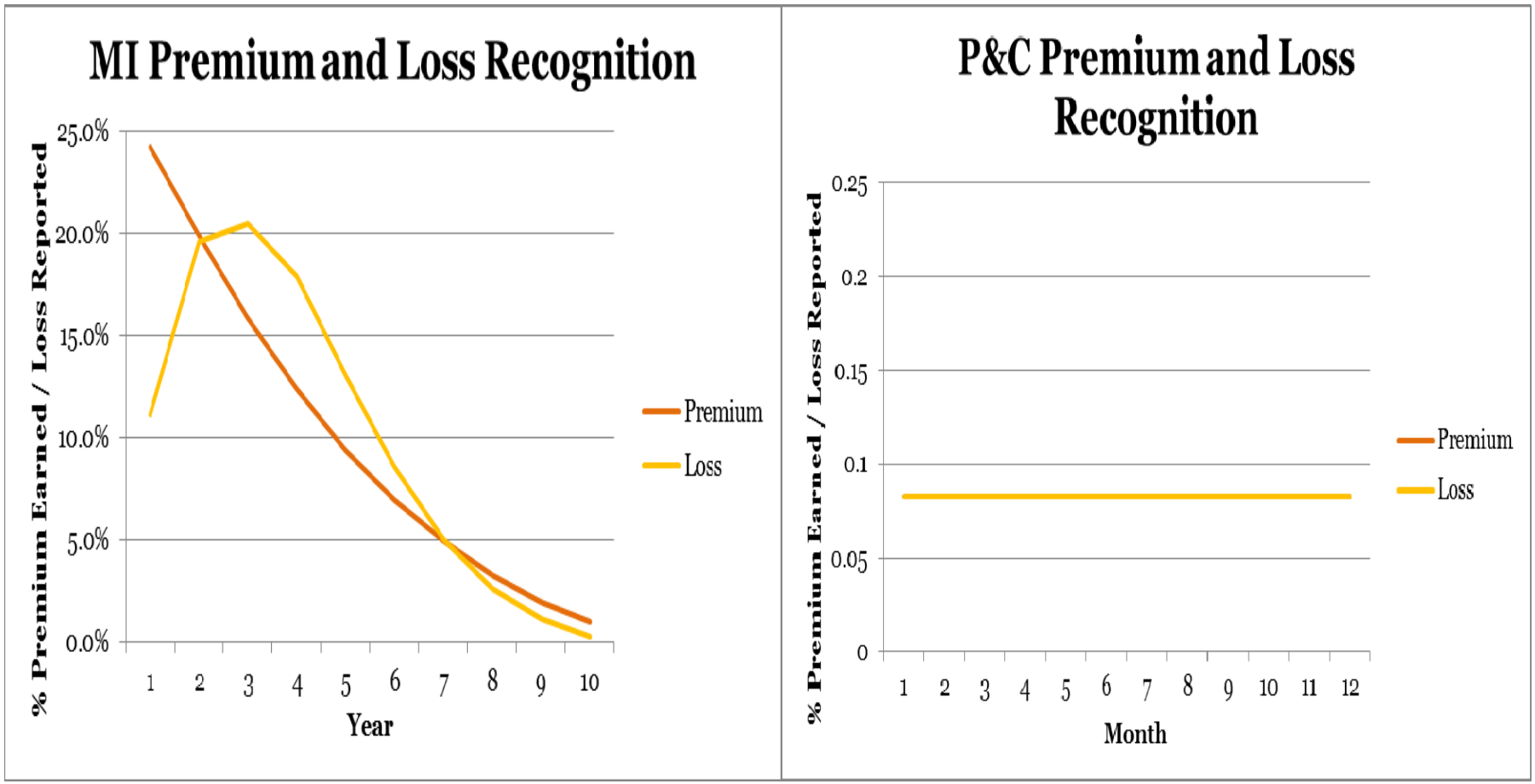
Losses (claims)

- Losses are recognized when the MI company is made aware that the borrower is "delinquent"

❖ **Very small provision for "pure" IBNR**

❖ **Highest number of delinquencies occur around year 4**

Background
Accounting for MI



Background

Accounting for MI (PDR)

A Premium Deficiency Reserve (PDR) is required when the sum of future outflows exceeds the sum of future inflows

"Inflows"

- Future estimated premiums (including recognition of unearned premium reserves)

"Outflows"

- Future paid losses and LAE
- Other acquisition and maintenance costs

Offsetting items

- Previously recorded loss and LAE reserves
- Investment income (disclosure required)
- Contingency reserve (Stat only)

Background
Additional terminology and definitions

- Risk in force (RIF)
  - UPB x coverage percentage
  - Claim amount = RIF + lost interest + foreclosure expenses
- Policies in force (PIF)
- Book year / book half year
  - The year or half year when a policy or cohort of policies becomes effective
- Outstanding delinquency
  - A loan where the borrower has missed two or more mortgage payments at the accounting date

Deterministic Framework

Cash "Inflows"

Cash inflows are a function of PIF (and policy persistency) and monthly average premium

PIF Decay				
2014-1	958	398	199	0
2014-2	961	394	179	*0*
2015-1	1,037	394	*179*	*0*
2015-2	1,083	*411*	*187*	*0*
2014-1	41%	50%	0%	
2014-2	41%	45%		
2015-1	38%			
2015-2				
Selected decay rate	38%	45%	0%	

Deterministic Framework

Cash "Inflows"

Cash inflows are a function of PIF (and policy persistency) and monthly average premium

Average projected PIF				Total
2014-1	0			0
2014-2	89			89
2015-1	286	89		376
2015-2	747	299	93	1,140

	Proj. PIF	Avg. Prem	Scaling Factor	Proj. Prem.	Discount Factor	Disc. Prem.
2014-1	0	80	6	-	0.000	-
2014-2	89	80	6	42,880	0.995	42,668
2015-1	376	80	6	180,320	0.993	179,009
2015-2	1,140	80	6	546,993	0.991	542,011
					Total	763,688
					Policy Maintenance Expense	5%
					Total Net of Expenses	725,504

Deterministic Framework
Cash "Outflows"

Cash outflows (paid claim counts) are developed using traditional actuarial methods

Claim count development				
2014-1	10	15	18	18
2014-2	11	15	17	
2015-1	9	13		
2015-2	9			
Claim count development factors				
2014-1	1.500	1.200	1.000	
2014-2	1.364	1.133		
2015-1	1.444			
2015-2				
Selected Factor	1.440	1.150	1.000	1.000
Cumulative Factor	1.656	1.150	1.000	1.000

Deterministic Framework

Cash "Outflows"

Cash outflows (paid claims) are developed using traditional actuarial methods

	Original PIF	Paid Claims	Count Dev't Factor	CDM Estimate	CDM / Loan Count	Initial Expected Claims / Loan Count	BF Estimate	Ultimate Claim Counts	Average Claim Size	Est. Ultimate Claims
2014-1	958	18	1.000	18	0.019	0.019	18	18	40,000	720,000
2014-2	961	17	1.000	17	0.018	0.019	17	17	40,000	680,000
2015-1	1,037	13	1.150	15	0.014	0.019	16	16	40,000	621,446
2015-2	1,083	9	1.656	15	0.014	0.019	17	17	40,000	681,761
									Total	2,703,207
									Discount factor	0.992
									LAE Load	5%
									Discounted loss and LAE	2,814,395

Deterministic Framework
Determining whether a PDR is required

Compare net cash flows to recorded financial statement items

Cash Flows			
(1)	Discounted Premium Net of Policy Maintenance Flows		906,880
(2)	Discounted Loss & LAE Flows		2,814,395
(3)	Net Cash Flows	(1)-(2)	(1,907,515)
Financial Statement Items			
(4)	Recorded Loss and LAE Reserves		700,000
(5)	Unearned Premium Reserve		100,000
(6)	Statutory Contingency Reserve		500,000
(7)	Total - Financial Statement Items	Sum (4) - (6)	1,300,000
(8)	Net Cash Flows Plus Financial Statement Items	(3)+(7)	(607,515)

- *Record a PDR of $607,515*

Deterministic Framework
Additional notes about data organization

- The actuary should consider factors that are closely correlated with claim behavior in choosing appropriate data segmentation
  - Foreclosure laws
  - Unemployment
  - Creditworthiness of borrowers
  - Home price appreciation / depreciation

Deterministic Framework
Benefits and limitations

Benefits	Limitations
• Simple and easy to explain (i.e., not a "black box" model) • Framework is familiar to actuaries • Allows monitoring of "book year" loss ratios through time	• There is no way to explicitly model the macroeconomic factors that are most correlated with persistency and claim behavior

Questions and answers