Loyalty Rewards Programs - An Overview

Casualty Loss Reserve Seminar - Atlanta

Deloitte Consulting LLP

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Agenda

What are loyalty rewards programs?

Overview

Actuarial roles in loyalty programs

Basics of loyalty rewards

Customer behavior

Comparison to insurance

Current accounting treatment

Basic estimation methods

Loyalty programs in insurance

Which program(s) should I join?

Comparison to insurance

Both insurance and loyalty programs offer to fulfill a future obligation, there are some notable differences:

Insurance	Loyalty Rewards Programs
Governed by Contract law	Governed by Terms and Conditions (“T&C”)
Highly regulated	Loosely regulated
Highly standardized products	Heterogeneous programs
Significant downside risk for insurer	Limited downside risk for program administrator
Liability recorded as an accrued cost	Liability recorded as an accrued cost or as deferred revenue

Current accounting treatment

Companies commonly utilize one of two approaches to account for loyalty rewards:

- Accrued Cost approach– At time of sale, revenue is fully recognized and liability associated with issued points is established. The full revenue and full cost of the redemption are recognized at the time of sale.

- Deferred Revenue approach– At time of sale, a portion of the revenue associated with anticipated future redemptions is set aside as a deferred revenue liability to be recognized when the redemption occurs at a time in the future. The portion of the revenue that is not deferred at the time of sale can be recognized immediately. The deferred portion of revenue and the associated cost to fulfill the reward obligation are recognized at the time of redemption.

Key difference is the timing of the recognition of revenue and expenses.

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Basic estimation methods – ultimate redemption rates

Two most commonly applied ultimate redemption rate estimation methods:

Triangle Methods	Markov Chain Transition Matrix Methods
Examines redemption patterns at intermittent maturities to project ultimate redemption rate estimates	Examines member states, migrations between states over time, and the activities associated with each state to project ultimate redemption rates

Loyalty program rules and program member behavior may vary significantly between programs. Modifications to basic models and/or implementation of highly customized models are common. The appropriateness of any loyalty program model is highly dependent on the specific facts and circumstances surrounding each loyalty program.

Basic estimation methods – ultimate redemption rates Triangle methods

Phases in ultimate redemption rates estimation process using triangle methods

Triangle Construction	Development Pattern Estimation	Ultimate Value Projection
Historical redemption data summarized into format that captures redemption activities as function of time.	Future expected redemption development patterns parameterized by analysis of historical data and judgment.	Ultimate estimated redemption rates projected via development patterns.

Loyalty program ultimate redemption rate estimation methods share many similarities to insurance reserving methods. However, there are several key differences.

Basic estimation methods – ultimate redemption rates Triangle methods

Comparison between insurance reserving and loyalty reserving – key differences

Phase	Insurance Reserving - Analog	Loyalty Reserving
Triangle Construction	**Accident Period, Policy Period**, or other conventional basis. **Inventory system** (e.g. First-In-First-Out) not a consideration.	**Issue Period** basis or **Member Join Year** basis. **Inventory systems** (e.g. First-In-First-Out) common.
Development Pattern Estimation	Typically a **function of maturity (development period)**.	Typically a **function of maturity and additional dimensions** (e.g. issue period, calendar period).
Ultimate Value Projection	Ultimate loss estimates applied to estimates of: • Unpaid losses • Ultimate loss ratios.	Ultimate redemption estimates applied to estimates of: • Future redemptions • Ultimate redemption rates on issued points • **Ultimate redemption rates on outstanding points.**

Basic estimation methods – ultimate redemption rates
Triangle methods

Illustrative Triangle Dataset

<A>

Cumulative Redeemed Points					
Issue Period	Maturity				
	1	2	3	4	5
20X0	9	25	30	43	53
20X1	11	25	36	45	
20X2	12	26	35		
20X3	12	28			
20X4	13				

<B>

Issued Points
75
80
85
90
95

<C>

Cumulative Redeemed Points as Percentage of Issued Points					
Issue Period	Maturity				
	1	2	3	4	5
20X0	12%	33%	40%	57%	71%
20X1	14%	31%	45%	56%	
20X2	14%	31%	41%		
20X3	13%	31%			
20X4	14%				

<D>

Ultimate Redemption Rate
71%
69%
68%
68%
72%

Notes:

<A>, <B>: Raw data.

<C> = <A> / <B>.

<D>: Projected ultimate redemption rates based on <C>.

Basic estimation methods – ultimate redemption rates Markov Chain methods

Phases in ultimate redemption rates estimation process using Markov Chains

Generally constructed under following assumptions:

- Members exist in **specified states**
- Each specified state has an associated **activity level**
- Members may **transition between states** over time.

Iterative application of matrices to member point balances captures member lifetime activities.

Cumulative activities (e.g. redemptions) over all iterations gives estimates of ultimate redemption rates.

Basic estimation methods – ultimate redemption rates Markov Chain methods

Matrix construction phase: A simple Markov Chain Model can generally be reduced to three general classes of matrix

State Matrix

Describes the activity state of members at any given evaluation time

Transition Matrix

Tracks movement of points between member states across evaluations.

Activity Matrix

Describes activities members engage in while in a given state

- **Iterative multiplication of matrices captures incremental customer activities while in various states.**
- **Summing up the incremental activities provides the cumulative activity.**

Caution: Matrices must be defined carefully as matrix multiplication is generally not commutative.

Basic estimation methods – ultimate redemption rates Markov Chain methods

Case Study:

Member states - A program has three potential member states: active, inactive for one period, and inactive for two or more periods. At time = 0, there are 100 points outstanding and all members are active.

Transitions between states - Active members have a 75% probability of remaining active next period and a 25% chance of becoming inactive. Members inactive for one period have a 50% chance of becoming active again by the end of the period and a 50% chance of remaining inactive. Members inactive for two or more periods will never become active again.

Activity while in a given state - Members who are active at the end of the period will have redeemed 1/3 of their available points during that same period. Member who convert to inactive during a period will have redeemed nothing in that same period.

Basic estimation methods – ultimate redemption rates
Markov Chain methods

Case Study (cont'd):

Given the description above, we can establish our State, Transition, and Activity matrices.

Matrix Construction → **Ultimate Value Projection**

State Matrix*

$$\begin{pmatrix} 100 & 0 & 0 \end{pmatrix}$$

Transition Matrix

$$\begin{pmatrix} 0.75 & 0.25 & 0.00 \\ 0.50 & 0.00 & 0.50 \\ 0.00 & 0.00 & 1.00 \end{pmatrix}$$

Activity Matrix

$$\begin{pmatrix} 0.667 & 0.000 & 0.000 \\ 0.000 & 1.000 & 0.000 \\ 0.000 & 0.000 & 1.000 \end{pmatrix}$$

Iterative Multiplication**

Time	Active	Inactive 1	Inactive 2+	Total Outstanding Points	Cumulative Redeemed Points
0	100.00	0.00	0.00	100.00	N/A
1	50.00	25.00	0.00	75.00	25.00
2	33.33	12.50	12.50	58.33	41.67
3	20.83	8.33	18.75	47.92	52.08
…	…	…	…	…	
30	0.00	0.00	30.00	30.0	70.00

At program's end, 30 points remain. This implies that 70 points were redeemed. Therefore, the ultimate redemption rate in this program is 70% (0.70 = [100 – 30] /100)

* State at time = 0.

** Order of operations is State times Transition. Resulting matrix then multiplied by Activity.

Loyalty programs in insurance

Personal lines insurers are developing and deploying loyalty rewards programs as part of their go-to-market strategies

PROGRESSIVE®

Liberty Mutual® INSURANCE

Allstate®

Benefits to Policyholders

ILLUSTRATIVE EXAMPLES

- Accident Forgiveness
- Priority service calls
- Renewal guarantees
- Merchandise
- Enhanced experience
- Apps

Benefits to Insurers

ILLUSTRATIVE EXAMPLES

- Increased policyholder renewal rates
- Increased policyholder touchpoint opportunities
- Increased price inelasticity
- Increased Net Promoter Score®

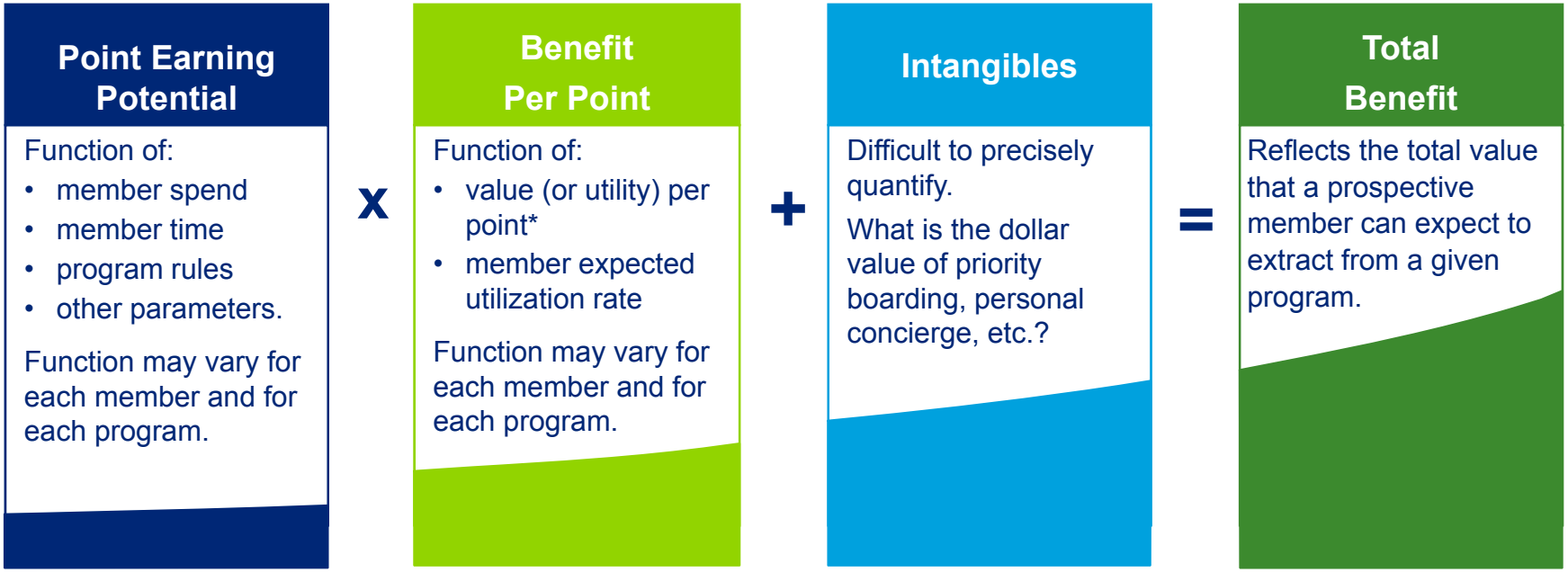
Challenges

- Pricing
- Marketing
- Customer engagement
- Regulatory
- Other

Which program(s) should I join?

With so many options out there, savvy consumers often ask themselves which programs are “the best.” Two-step actuarial approach.

STEP 1: Define the problem



STEP 2: Determine maximum benefit

Find maximum **Total Benefit: t**ake partial derivatives with respect to various inputs. Apply constraints to inputs as appropriate.

Alternative: Assuming fixed inputs, simply solve using fixed inputs and rank Total Benefit of various programs to determine maximum benefit.

*Not to be confused with the program sponsors’ cost per point.

Which program(s) should I join? (cont'd)

The Simple Approach

1. Think about the behaviors you do on a normal basis: e.g. "I stay in hotels," "I fly on airplanes," "I own a cellphone", "I drink coffee"
2. Search for loyalty programs that provide benefits (tangible and intangible) for the behaviors identified in step 1 above.
3. Compare benefits provided by various programs and select those that provide the most benefit to you as an individual.

Example loyalty websites:

- *flyertalk.com*
- *nerdwallet.com*

Credits

- Special thanks to Albert Zhou at Third Point Re.

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