



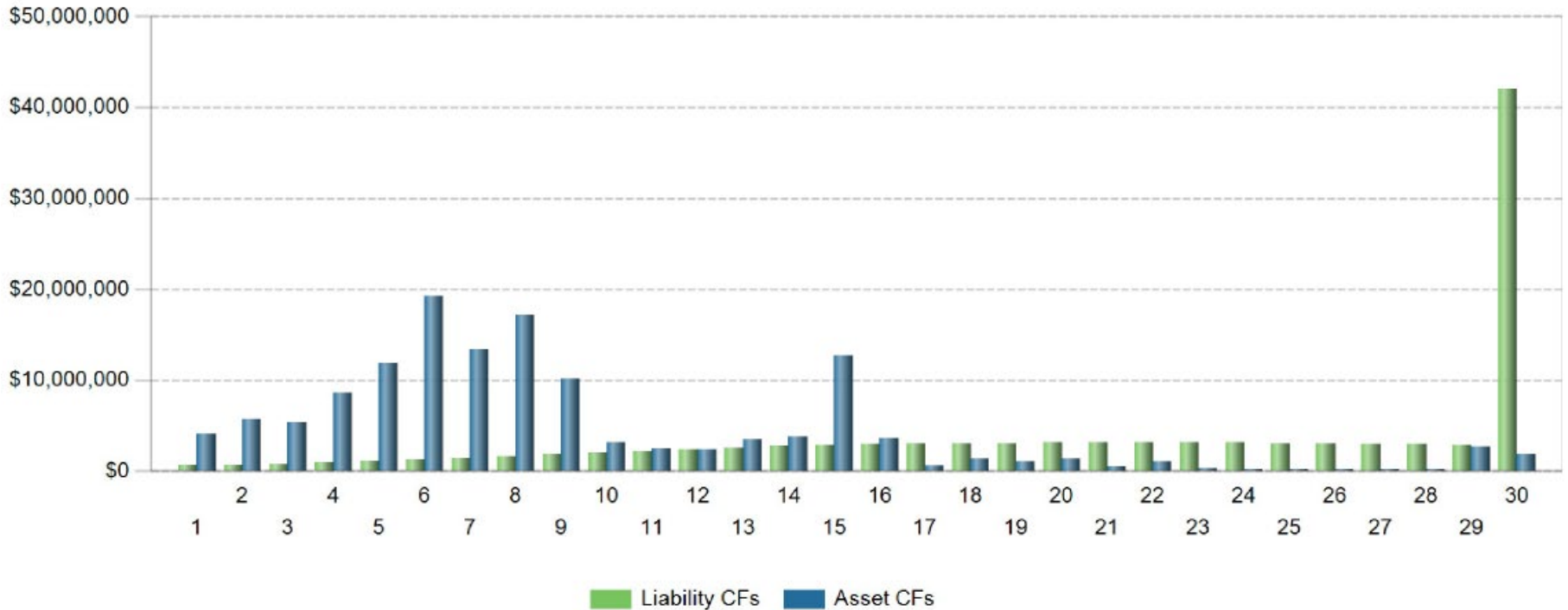
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ALM Analysis and Implications



June 2020

Cash Flows: Assets vs. Liabilities



- **Asset cash flows reflect principal and interest on the investment portfolio, while liability cash flows reflect claims and benefits, net of corresponding premiums**
- **Asset cash flows are significantly higher than liability cash flows**
- **Reinvestment of excess cash flows is critical**

Notes:

1. Source: LICOA 2019 cash flow testing results ; Asset cash flow projections as of 5/31/2020
2. Year 1 CFs start from 5/31/2020
3. Liability cash flows past 30 years are brought forward to the 30th year

Duration is a measure of how sensitive bond prices are to interest rate movements. The concepts of **Effective Duration**, **Dollar Duration**, and **Key Rate Duration** are explained below.

- **Effective Duration**
 - Definition: The **percentage change in price** caused by a 100 bps change in interest rates (yield curve shift is parallel)
- **Dollar Duration**
 - Definition: The **dollar change in price** caused by a 100 bps change in interest rates (yield curve shift is parallel)
- **Key Rate Duration** (effective or dollar)
 - This metric measures the price sensitivity (percentage or dollar change in price) at a specific point on the yield curve. Instead of a parallel shift, the yield curve shift is largest at the key rate year.

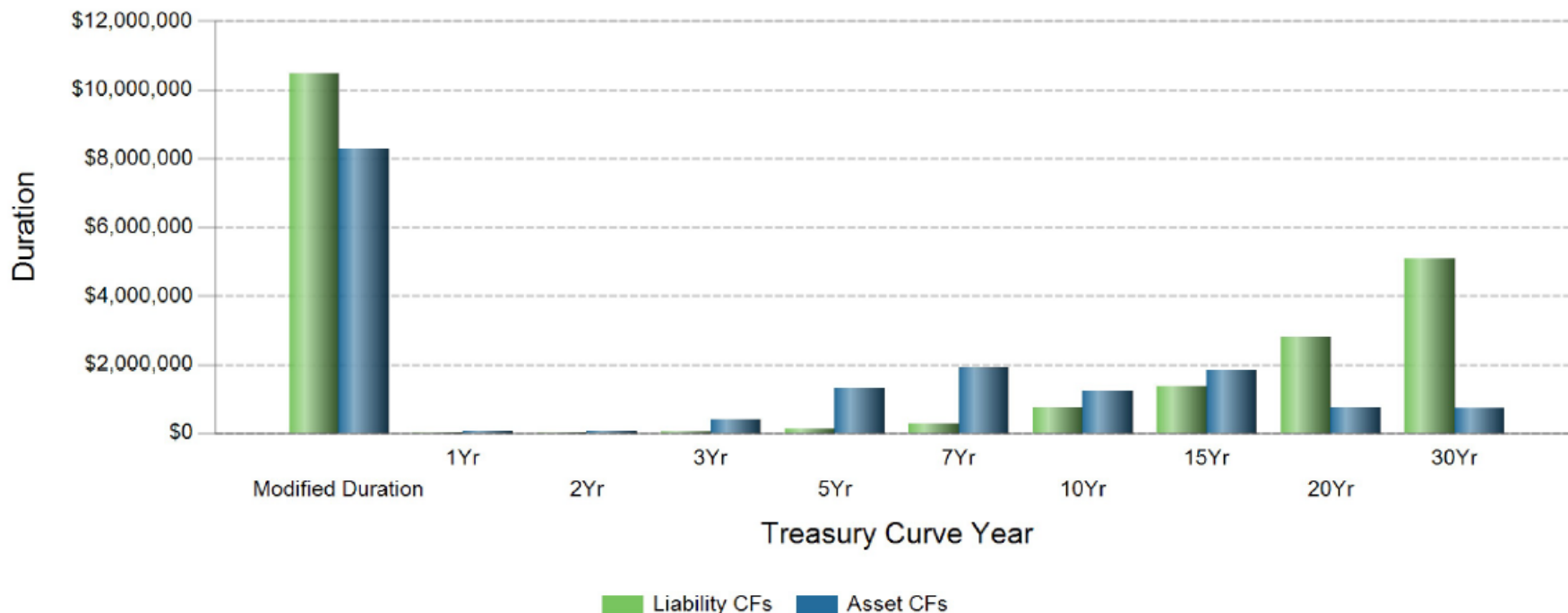
Durations: Assets vs. Liabilities



| | Principal & Interest | | Net | Duration | 1 Yr | 2 Yr | 3 Yr | 5 Yr | 7 Yr | 10 Yr | 15 Yr | 20 Yr | 30 Yr |
|---------------|----------------------|---------------|---------------|----------|--------|--------|--------|--------|--------|-------|-------|-------|-------|
| Asset CFs | \$114,484,413 | | \$114,484,413 | 7.24 | 0.07 | 0.08 | 0.35 | 1.15 | 1.66 | 1.07 | 1.60 | 0.67 | 0.63 |
| | | Premiums | Net | | | | | | | | | | |
| Liability CFs | \$444,015,917 | \$388,060,119 | \$55,955,798 | 18.71 | 0.01 | 0.03 | 0.09 | 0.21 | 0.47 | 1.33 | 2.44 | 5.01 | 9.10 |
| Difference | | | | 11.47 | (0.06) | (0.05) | (0.26) | (0.94) | (1.19) | 0.26 | 0.84 | 4.34 | 8.47 |

- Duration of assets shorter than the duration of liabilities
- Present value (market value) of assets higher than the present value of liabilities
- Duration metrics not meaningful or relevant for LICOA ALM purposes

Dollar Durations: Assets vs. Liabilities



| | Principal & Interest | | Net | Duration | 1 Yr | 2 Yr | 3 Yr | 5 Yr | 7 Yr | 10 Yr | 15 Yr | 20 Yr | 30 Yr |
|---------------|----------------------|---------------|---------------|--------------|------------|------------|-------------|---------------|---------------|-------------|-------------|-------------|-------------|
| Asset CFs | \$114,484,413 | | \$114,484,413 | \$8,291,614 | \$77,501 | \$86,013 | \$402,348 | \$1,316,569 | \$1,897,999 | \$1,228,328 | \$1,833,013 | \$763,339 | \$722,845 |
| | Claims & Expenses | Premiums | Net | | | | | | | | | | |
| Liability CFs | \$444,015,917 | \$388,060,119 | \$55,955,798 | \$10,467,216 | \$6,640 | \$15,537 | \$49,154 | \$116,353 | \$265,462 | \$746,755 | \$1,367,495 | \$2,805,362 | \$5,092,016 |
| Difference | | | | \$2,175,602 | \$(70,861) | \$(70,476) | \$(353,194) | \$(1,200,216) | \$(1,632,537) | \$(481,573) | \$(465,518) | \$2,042,024 | \$4,369,170 |

- The difference of dollar duration of present (market) value of assets and liabilities is \$2.2MM, which represents the marked-to-market valuation exposure per 100bps change in interest rates
- However, only a portion of assets needed to support reserves (liabilities)

- Under a market (present) value basis, LICOA's assets are significantly higher than its liabilities
- Traditional ALM duration metrics are not meaningful in the context of asset allocation for LICOA
- However, it is critical that LICOA manages reinvestment opportunity/risk to support long-dated liability cash flow requirements
- **LICOA's asset allocation requires a top-down, holistic enterprise approach focusing on NAIC RBC sensitivity, while monitoring micro metrics (duration, default losses, capital charges, etc.) throughout the optimization process**