MassMutual BOLI Advisor/Client Q&A

As of April, 2020

Dear Clients,

At MassMutual, we are committed to serving our customers today, tomorrow, and well into the future. With the far-reaching impact of the COVID-19 pandemic, we are all adapting our lives to mitigate health risks on our communities, and we are managing our businesses with the same level of care.

While today's situation has its unique elements, managing through adverse economic times is nothing new at MassMutual. For nearly 170 years, we have delivered on our commitments — including during times of market uncertainty. It's our enduring financial strength, diligent risk management, and long-term investment approach that enables us to continue delivering performance and strength for our customers, plan sponsors, and financial professionals.

With our commitment to transparency and communication, we are working to provide you with relevant information pertaining to our business in today's market environment, and ways we can help you. Further, we are continuing our strong investment in technology to make us more efficient and nimble. Recently, Roger Crandall, our CEO, shared a message about our company's financial strength, strategy, and our people. In addition to his message and these talking points, other communications available for your reference include our Navigating Uncertainty Resource Page, and MassMutual Business Continuity Disclosure Statement.

The following Q&As is a summary of our response to the various requests that we have received from the BOLI/COLI community and supplemented by our team. Please note that unless otherwise specified, the information included in this document represents the consolidated statutory results of Massachusetts Mutual Life Insurance Company and its U.S.-domiciled life insurance subsidiaries: C.M. Life Insurance Company and MML Bay State Life Insurance Company (collectively MassMutual), as of December 31, 2019.

Should you have additional questions or wish to have a further discussion, please reach out to Eric Solfisburg, Head of BOLI/COLI Investment Product Consulting (esolfisburg61@massmutual.com, 617.695.4549) or Mike Dunn, Head of Institutional Insurance (mdunn@massmutual.com, 617.695.4554).

Thank you for your continued trust,

Mike Dunn & Eric Solfisburg

Investment Topics

1. Liquidity - How do you manage liquidity now versus 2019?

   Our view on liquidity management has remained unchanged from how we managed the portfolio in 2019. Liquidity management is a core component of our General Investment Account (GIA) portfolio management and overall risk management processes. We continue to ensure that we have sufficient liquidity to cover policyowner needs in the short and long run and in various market environments. Cash flow and liquidity needs are regularly addressed as part of ongoing portfolio management while we also perform periodic liquidity stress testing. Our testing looks at the excess of liquidity resources over liquidity needs from stress scenario analysis. We consider the provisions of the policies and contracts we issue, a range of policyowner behaviors, as well as the level of readily-saleable securities in the portfolio. This analysis shows we are in a strong liquidity position.

2. What is your cash on hand and access to additional liquidity? What is your organic monthly cash flow?

   As of December 31, 2019, the Company had $4,317 million of cash, cash equivalents and short-term investments. On the next page, we have included the Consolidated Statutory Statements of Cash Flow exhibit. It shows Company's cash flows by source (cash from operations, cash from investments, and cash from financing and miscellaneous sources) for years ended December 31, 2019 and December 31, 2018.

	Years Ended December 31, 2019	2018
	($ In Millions)	
Cash from operations:		
Premium and other income collected	$23,406	$24,101
Net investment income	8,658	7,073
Benefit payments	-25,209	-23,605
Net transfers (to) from separate accounts	6,019	3,279
Net receipts from group annuity reserves assumed	1,271	1,221
Commissions and other expenses	-4,034	-4,115
Dividends paid to policyholders	-1,700	-1,588
Federal and foreign income taxes recovered	535	128
Net cash from operations	$8,946	$6,494
Cash from investments:		
Proceeds from investments sold, matured or repaid:		
Bonds	$23,196	$20,013
Preferred and common stocks – unaffiliated	862	992
Common stocks – affiliated	1	1,730
Mortgage loans	2,507	2,410
Real estate	192	276
Partnerships and limited liability companies	1,240	2,226
Derivatives	1,076	592
Other	-1,087	-508
Total investment proceeds	$27,987	$27,731
Cost of investments acquired:		
Bonds	-$26,516	-$27,345
Preferred and common stocks – unaffiliated	-1,445	-316
Common stocks – affiliated	-204	-583
Mortgage loans	-6,308	-3,765
Real estate	-120	233
Partnerships and limited liability companies	-1,399	-1,697
Derivatives	-309	-930
Other	-96	217
Total investments acquired	-$36,397	-$34,186
Net increase in policy loans	-854	-550
Net cash from investing activities	-$9,264	-$7,005
Cash from financing and miscellaneous sources:		
Net deposits on deposit-type contracts	$855	$92
Change in repurchase agreements	-1,168	565
Change in collateral	624	21
Other cash (used) provided	-409	627
Net cash from financing and miscellaneous sources	-$98	$1,305
Net change in cash, cash equivalents and short-term investments	-$416	$794
Cash, cash equivalents and short-term investments:		
Beginning of year	$4,733	$3,939
End of year	$4,317	$4,733

See accompany notes to consolidated statutory financial statements by going to: Consolidated Statutory Financial Statements

In addition, the Company also has a commercial paper program through which it can issue up to $1.0 billion of commercial paper. The notes had a carry value of $250 million of December 31, 2019. This commercial paper program has been supported by a $1.0 billion backup revolving credit facility that expires in 2023. Under this revolving credit facility, the Company would be able to draw up to $1.0 billion (with an option to increase this capacity by an additional $500 million). Therefore, it is expected that the revolving credit facility would provide a full 100% backup to the commercial paper program.

The Company can borrow money using reverse repurchase agreements and, depending on the reasons for the need for funds, other borrowing, such as debt, may be considered in order to raise funds. The Company can access the public markets for term debt such as surplus notes that qualify as regulatory capital. As of December 31, 2019, the Company had $2.2 billion outstanding in surplus notes. We do not rely on outside funding sources in our liquidity reporting or adverse scenario testing.

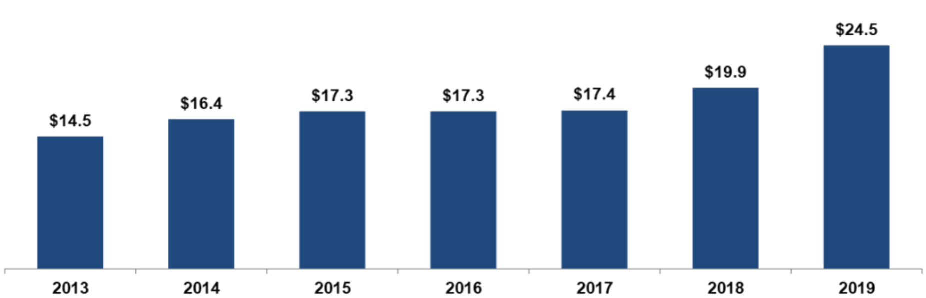
MassMutual became a member of the Federal Home Loan Bank (FHLB) of Boston in 2008 and currently can borrow up to $2.0 billion from the FHLB on a secured basis. As of December 31, 2019, we have drawn $1.1 billion. Eligible collateral presently includes commercial mortgage-backed and U.S. government securities as well as cash. The loans are overcollaterized by varying amounts depending on the type of collateral and require the purchase of FHLB stock in an amount equal to 4% of the borrowing. MassMutual currently owns $59 million of FHLB stock. MassMutual's borrowing capacity is subject to the lower of the limitation on the pledge of collateral for a loan set forth by law or by MassMutual's internal limit.

In addition, MassMutual Holding LLC, our downstream holding company, has provided steady dividends to the parent insurance company. However, the Company does not rely on dividends from its subsidiaries to meet its operating cash flow requirements.

3. Capital Strength – Please comment on your capital adequacy and financial strength.

Over the course of 2019, Statutory surplus grew 21 percent to $19 billion and total adjusted capital (TAC) rose 23 percent to $24.5 billion. TAC has risen over 60% since 2013.

Total Adjusted Capital



TAC is defined as Surplus + Consolidated Asset Valuation Reserve + ½ Consolidated Apportioned Policyowner Dividend Liability – Affiliated Foreign Insurance Operations

4. Asset Quality - Could you comment on general trends in the credit quality of the assets owned in your portfolio?

As of December 31, 2019, the credit quality of MassMutual's long-term bond portfolio remains strong, with 90% rated investment grade (NAIC 1 or NAIC 2). Relative to December 31, 2018, the exposure to below investment grade bonds (NAIC 3 or below) increased 3% to 10% of total long-term bonds. The increase in below investment grade bonds was primarily due to the Securities Valuation Office downgrade of an affiliate debt investment, and does not reflect an increase in the purchases of high yield bonds or indicate general credit deterioration of the portfolio. There are credit quality limits set for the General Investment account (GIA), and the overall credit quality remains within these limits.

		December 31,			
		2019		2018	
NAIC Class	Equivalent Rating Agency Designation	Carrying Value	% of Total Long-Term Bonds	Carrying Value	% of Total Long-Term Bonds
		(In $ Millions)	(%)	(In $ Millions)	(%)
1	AAA/AA/A	$54,777	52%	$55,933	55%
2	BBB	40,361	38%	38,415	38%
3	BB	6,526	6%	2,977	3%
4	B	1,808	2%	2,132	2%
5	CCC and lower	2,050	2%	1,674	2%
6	In or near default	501	0%	373	0%
	Total	$106,023	100%	$101,504	100%

The quality of the bond portfolio is determined by the use of Securities Valuation Office (SVO) of the NAIC ratings and the equivalent rating agency designations, except for RMBS and CMBS that use third-party modelers. The information above sets forth the NAIC class ratings for the bond portfolio including residential mortgage-backed securities (RMBS) and commercial mortgage-backed securities (CMBS).

5. Duration and Maturity - Has the low interest rate environment led to changes in your portfolio duration and/or maturity?

Duration information is proprietary. However, Asset/Liability Management (ALM) is a key component of our approach to managing the GIA, and we have continued to remain disciplined in the current low interest rate environment. ALM involves the analysis of cash flows and maturities of the liabilities and their corresponding assets. These cash flows can differ based on their sensitivity to various economic conditions. We project liability cash flows under various economic and behavioral scenarios for the products supported by each portfolio. We then construct asset portfolios with duration profiles similar to those of the liabilities. By closely managing the duration of the assets relative to that of the liabilities, we strive to mitigate the impact that changes in interest rates will have on our ability to meet *policyowner needs. The maturity and the duration profile of the asset portfolio will depend on the characteristics of the liabilities.*

6. What types of securities have you been adding to the general account portfolio?

Reflecting the conservative approach that best helps us provide value to our policyowners, the core of our GIA is primarily comprised of bond holdings, or debt instruments issued by governments, corporations, and other entities. The conditions and expectations related to the debt of specific issuers determine the relative value and expected performance of a security. Industries and security classes differ as to their sensitivity to economic cycles, the impact of future conditions and events, and idiosyncratic risk factors, leading us to regularly monitor market conditions as we assess relative value.

A by-product of this monitoring is our ability to regularly invest in attractive opportunities while limiting or reducing our exposure to fully valued sectors. This consistent approach translates into holding investments across vintage, sector, and maturity spectrums. By always being in the market for opportunities, we believe we increase our awareness of and access to attractive opportunities.

Finally, the regular cash flow of a debt security helps provide the funds we use to pay policyowner benefits and enables us to be steady asset buyers in all market environments. Consistent market participation across asset classes promotes market intelligence. Other asset classes in which we invest can provide returns in the form of price appreciation, earnings, and dividends, or other distributions that may, unlike the required coupon of a debt security, fluctuate in value.

MassMutual has re-underwritten exposures impacted by COVID-19, relying on experienced teams of specialists from our investment subsidiary, Barings. In addition, MassMutual uses diversification to manage credit risk by limiting exposures to issues or issuers. As of December 31, 2019, the largest corporate bond obligor represented less than 0.2% of Total Invested Assets.

Below we have included an exhibit of Invested assets for the years ended December 31, 2019 and December 31, 2018.

	December 31,			
	2019		2018	
Invested Assets	(In $ Millions)	(%)	(In $ Millions)	(%)
Bonds	$106,023	54%	$101,504	58%
Mortgage Loans	28,408	15%	24,548	14%
Common & Preferred Stocks	17,198	9%	11,974	7%
Policy Loans*	14,973	8%	14,119	8%
Derivatives & Other Assets	14,950	8%	10,229	6%
Partnerships & LLCs	9,172	5%	8,767	5%
Short-Term & Cash	4,317	2%	4,733	3%
Real Estate	358	0%	488	0%
Total	$195,399	100.0%	$176,362	100.0%

*Policy loans are loans taken by policyowners against the cash surrender value of their policies and, as such, are secured by the cash surrender value of those policies.

7. Where are you more or less exposed than other life insurance companies?

   MassMutual cannot comment on other companies' financials.

8. What has been the Impact of mortgage and corporate bond prepayments?

   As interest rates decline, certain debt securities may experience accelerated amortization and prepayment speeds than what was assumed at purchase. During such periods, the Company is at risk of lower net investment income as it may not be able to reinvest the proceeds at comparable yields. However, covenants, such as prepayment penalty fees, will mitigate potential income losses associated with increased prepayment speeds.

9. Comment on the challenge of earning spread income while maintaining asset quality.

   Changes in overall interest rates are rigorously managed through our ALM process. That same rigor exists for our portfolio of spread product. MassMutual prefers private placements and CMLs as we can directly negotiate spread levels and covenants. In our public portfolio, we have not stepped down in credit quality to increase spread. We continue to maintain our credit discipline.

10. Please comment on your exposure to below investment grade corporates.

    Every security considered for inclusion in the portfolio is considered from multiple perspectives, including: risk and return, impact on issuer and industry concentrations, and aggregate portfolio exposures to the variety of economic factors that drive portfolio risks and returns. Further, the portfolio is subject to a range of regulatory expectations, including asset quality and risk limits. A summary of long-term bond credit quality has been included in the response to question #4, which shows our exposure to below investment grade bonds at 10% of the total long-term bond portfolio.

11. What is your mortgage asset mix, retail vs. commercial, single vs. multi family?

    Mortgage loans are comprised of commercial mortgage loans and residential mortgage loans.

    As of December 31, 2019, the Company had $24.9 billion exposure to commercial mortgage loans. Commercial mortgage loans are diversified by geography and by property type, and are typically secured against properties with stabilized cash flows. An exhibit of diversification by property type has been included below.

Commercial Mortgage Loans
December 31, 2019

Property Type	Statement Value	% of Total Commercial Mortgage Loans	% of Total Invested Assets
Apartments	$7,032	28%	4%
Hotel	2,761	11%	1%
Industrial/Warehouse	2,628	11%	1%
Office	8,663	35%	4%
Other	736	3%	0%
Retail	3,173	13%	2%
Total	$24,993	100%	13%

As of December 31, 2019, the Company had $3.4 billion exposure to residential mortgage loans. Residential mortgage loans include seasoned pools of homogeneous residential mortgage loans substantially backed by Federal Housing Administration (FHA) and Veterans Administration (VA) guarantees. As of December 31, 2019, the Company did not have any direct subprime exposure through the purchases of unsecuritized whole-loan pools.

Schedule D also holds investments to securitized investments backed by commercial and residential mortgage collateral.

As of December 31, 2019, the Company had $3.0 billion exposure to bonds backed by pools of commercial mortgages. The mortgages in these pools have varying risk characteristics related to underlying collateral type, borrower's risk profile and ability to refinance and the return provided to the borrower from the underlying collateral.

As of December 31, 2019, the Company had $1.8 billion of exposure to residential mortgage-backed securities (RMBS) of which approximately 19% was classified as Alt-A. Alt-A and subprime RMBS had a total carrying value of $0.9 billion. RMBS are included in the U.S. government and agencies, special revenue and industrial and miscellaneous bond categories. The Alt-A category includes option adjustable-rate mortgages and the subprime category includes 'scratch and dent' or reperforming pools, high loan-to-value pools and pools where the borrowers have very impaired credit but the average loan-to-value is low, typically 70% or below. In identifying Alt-A and subprime exposure, management used a combination of qualitative and quantitative factors, including FICO scores and loan-to-value ratios.

12. What are your exposures to the following industries: Airlines, Cruise lines, Hotels, Casinos, Restaurants, Oil/Energy?

In response to the oil-price war and economic impacts of COVID-19, MassMutual is actively monitoring and re-underwriting our portfolio exposure to a number of industry sectors, including energy, airlines and aircraft leasing, hotels and lodging, gaming and leisure, and restaurants. As of December 31, 2019, exposure to energy and industries impacted by COVID-19 as a percent of Invested Assets was 3.1% and 4.1%, respectively. The Company maintains a diversified *investment portfolio and we believe diversification is a prudent appropriate response to managing risks through market fluctuations.*

13. Describe any specific hedging strategies you had in place that have helped militate against the recent movements in equity and interest rate markets.

    One of the primary goals of our ALM program is the management of interest risks. We project liability cash flows under various economic and behavioral scenarios for the products supported by each portfolio. This modeling includes interest rate floors and guarantees. We then construct asset portfolios with duration profiles similar to those of the liabilities. By closely managing the duration of the assets relative to that of the liabilities, we strive to mitigate the impact. Hedging of interest rate guarantees and floors are part of the overall ALM program.

    The Company adopted a clearly defined hedging strategy (CDHS) to enable the Company to incorporate currently held hedges in risk-based capital (RBC) calculations. The CDHS is used to significantly mitigate the impact that movements in capital markets have on the liabilities associated with annuity product guarantees. The hedge portfolio consists mainly of interest rate swaps, equity swaps, interest rate swaptions and equity futures, and provides protection in the stress scenarios under which RBC is calculated. The hedge portfolio has offsetting impacts relative to the total asset requirement for RBC and surplus for guaranteed minimum death benefits and variable annuity guaranteed living benefits.

    Strict adherence to ALM processes and orderly execution of the hedging strategies have served the company well during this time of market volatility.

Additional Information

Financial Strength Ratings

MassMutual's financial strength ratings are A++, (Superior, highest rating) from A.M. Best Company, AA+ (Very Strong, second highest rating) from Fitch Ratings, Aa3 rating (High Quality, fourth highest rating) from Moody's Investors Service, Inc. and AA+ (Very Strong, second highest rating) from Standard &Poor's. Each of the above ratings agencies have a Stable outlook on MassMutual. Ratings apply to Massachusetts Mutual Life Insurance Company and its subsidiaries, C.M. Life Insurance Company and MML Bay State Life Insurance Company. Ratings are as of 4/1/2020 and are subject to change.

Generally speaking, the rating agencies are focused on estimating the impact COVID-19, interest rate decreases and equity market volatility will have on the life insurance industry and all rated companies as a whole.

Expense Strategies

In these times of unprecedented low interest rates, driving efficiency in our expense base is important. In all markets, as part of its regular course, MassMutual re-examines its expenses to look for improvements in how we do business and execute upon strategic initiatives. We focus on lowering run-rate expenses annually and growing bottom-line results.

Product/Sales

Our top priorities during this time are ensuring the safety of our employees, our most valued resource, and providing exceptional service and counsel to customers and policyowners, consistent with our purpose of helping people secure their financial future and protect the ones they love.

COVID-19 has had an impact on sales of life insurance through our field force, given "shelter in place" restrictions that are limiting agent/client interactions and the public health emergency that all Americans are confronting.

We have seen sales continue through our online platforms. We continue to invest in technology innovations that enable our team to provide products and services online to meet the needs of our customers.

As with any disruption in financial markets, institutional clients often become more contemplative and deliberative in decision making during periods of economic uncertainty. We would expect similar behavior in these market conditions, with activity to return to more recent levels once the market outlook becomes clearer and capital markets stabilize.

Minimum Guaranteed Crediting Rates

Crediting rates are typically based on both portfolio rates, as well as long-term expectations for reinvestment rates. Should this low interest rate environment continue, we would expect to see credited rates decrease, probably slowly, subject to minimum guarantees.

Contingency Reserves

We are seeing volatility in variable annuity reserves, as they are very reactive to current market conditions. We do hedge assets backing the reserves, which mitigates the company's surplus impact.

Mortality

As a normal practice we assess mortality and the impact to capital under various stress scenarios. We manage this risk on an ongoing basis to ensure it is within our tolerance and expectations even in periods of stress. Our use of highly rated and well diversified reinsurers and current reserves help mitigate impact to capital. The current pandemic is something we continue to watch closely and is within the stresses we evaluate on a regular basis.

Regulatory Topics

MassMutual remains engaged with regulators as they consider and implement temporary changes to existing requirements in light of COVID-19.

Workforce

We implemented companywide remote work at all offices effective March 16th until further notice.
- Before company-wide remote work was implemented, Enterprise Risk Management reviewed all continuity plans to validate responses to the current outbreak and identify any gaps that needed to be addressed. Critical functions participated in a work from home test for one week prior with no systemic issues.

- All campuses will remain open to support onsite dependencies. For those associates remaining on campus, social distancing measures have been implemented as needed, and enhanced cleaning protocols continued.

- A number of large-scale meetings and conferences have been cancelled. Additionally, all non-essential business travel has been restricted. Essential travel will require leadership approval.

- Non-essential visitors have been restricted from MassMutual Offices.

Support for Claims

As part of our regular stress testing, we ensure that our operational areas can work remotely and in scenarios with reduced staffing. To date we have implemented work from home capabilities and have not had any notable issues as it relates to claims payments.

Claim Eligibility

MassMutual's life and individual disability income (DI) insurance products do not exclude pandemic events such as the coronavirus (COVID-19).

MassMutual is dedicated to monitoring federal and state compliance updates and advisories for our customers. We are prepared to act quickly to ensure we adhere to any federal or state insurance department decisions. As of today, we have not identified any necessary changes to our claim handling or business protocols.

Enterprise Risk Management Topics

At MassMutual we have a prudent risk management framework that utilizes the three lines of defense model. The first line is the business areas managing risks, on a daily basis, to their specific strategies. The second line, ERM, regularly performs risk assessments to identify and quantify risks in order to appropriately monitor and manage to an acceptable level. The third line is a corporate audit that evaluates business operations and company practices relative to industry and company policies and standards.

ERM's stress testing includes, but is not limited to, market conditions, policyowner behavior, and adverse events, including a pandemic, on a prospective basis to provide an enterprise view used to understand and manage risks to the company's operations, liquidity and financial strength. Stress testing results, through various methods, are used to inform management of potential outcomes against stated limits to drive action before a risk materializes. This diligent risk management practice prepares us well when market turbulence comes our way, so we can continue to maintain operations and meet our obligations under the most stressful scenarios.

Stress Testing Capital/Liquidity and Related Results

We routinely run pandemic scenarios to understand potential impacts to our diversified portfolio of products and the resulting claims.

We hold adequate reserves and reinsurance coverage to respond to claims in both normal and stress conditions and reduce the impact to capital.

Our reinsurance business partners are highly rated and well diversified; potential claims would be spread across multiple reinsurers reducing the counterparty exposure.

Managing Counterparty Risk

We do not have a supply chain in the traditional sense. However, in terms of our agents and third-party service providers, we have not experienced any issues and are working with our top tier providers to ensure adequate contingency plans.

MassMutual relies on reinsurance companies as a normal course of business and in times of mortality stress. These counterparties are highly rated and diversified across insurance products. We remain in close contact with these companies as the situation develops and do not expect them to have any issues honoring their obligations.