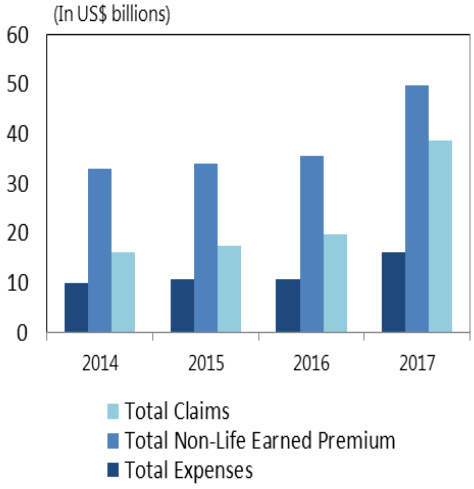
BMA
BERMUDA MONETARY AUTHORITY

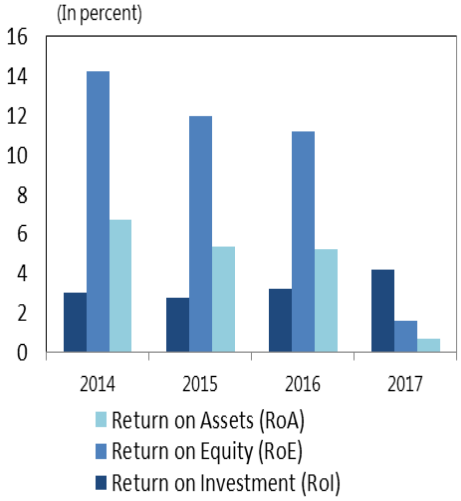
Macroprudential Risk: Annual Statutory Filings Report

FY-2017

Major Large Commercial (Re)insurers- Total Claims, Total Net Earned Premiums and Expenses
(In US$ billions)



Major Large Commercial (Re)insurers- Financial Ratios
(In percent)



Source: BMA staff calculations

HIGHLIGHTS

- **Due to significant catastrophe losses, large commercial (re)insurers recorded substantially lower net incomes in 2017.** Assets and premiums expanded, mostly due to several new Class 4 and Class 3B (re)insurers having registered in 2017.
- **Net written premiums increased by 33.6% year-on-year (y/y) due to the new (re)insurer registrations.** The combined ratio rose by 28.3% to 109.9% while total claims increased by 95.8%.
- **Liquidity conditions did not improve during the year as the share of "BBB-AAA"-rated securities relative to claims dropped 32.0%;** mostly due to an increase in claims from catastrophe losses.

(In US$ billions unless indicated otherwise)	2017	2016	2015	2014	2013	*Y/Y Change (%)*
Net Written Premiums	49.4	37.0	34.8	34.4	34.1	33.6
Net Earned Premiums	49.9	35.6	33.8	33.0	32.5	40.1
Net Income	1.5	10.0	8.7	10.6	11.1	-85.4
Total Claims	38.7	19.8	17.5	16.3	16.0	95.8
Total Assets	212.9	191.1	163.0	157.2	152.6	11.4
Combined Ratio	109.9	85.7	83.6	79.7	78.4	28.3
Current Assets/Current Liabilities (In percent)	1536.3	1638.3	2376.1	2694.4	2739.1	-6.2
"BBB-AAA" Assets/Claims (In percent)	159.7	234.9	297.6	335.5	343.6	-32.0

Source: BMA staff calculations. *Note:* The y/y change denotes the change between current and the last fiscal year, e.g., FY-2017 and FY-2016.

Information presented in this report relates to Capital and Solvency Return filings of Bermuda legal entities registered as either Class 4 or Class 3B commercial (re)insurers under the supervision of the BMA. The presented information is based on aggregated individual firm data. Class 3B companies are large commercial (re-)insurers underwriting 50% or more unrelated business and unrelated net premiums over $50 mln. Class 4 (re)insurers are large commercial (re)insurers underwriting direct excess liability and/or property catastrophe reinsurance.

Disclaimer: This document is produced by the Financial Stability Department of the BMA. It reflects an interpretation and analysis of market views and developments by BMA staff. Market views presented may or may not reflect the consensus of all market participants.

Minor changes are expected to numbers from previous versions as some data has been restated. Prior years may not be directly comparable due to the entry and exit of firms from the sample. Numbers may not add up due to rounding.

GENERAL DEVELOPMENTS

Due to a devastating hurricane season, 2017 was a year of significant losses for Bermuda's (re)insurers. Hurricanes Harvey, Irma and Maria caused major losses in North America, with Hurricane Irma making landfall in Florida and Hurricane Maria hitting Puerto Rico and other Caribbean islands.

Despite large losses, overall market dynamics did not change – although Hurricane Irma made landfall in Florida, it did not hit the densely-populated Miami region which made it an earnings not a capital event. Some CAT bonds were triggered but the overall pricing of property reinsurance did not harden to the extent that some analysts expected. On the other hand, despite experiencing some losses in the alternative capital market, investors did not shy away from injecting new capital into the market.

Mergers and acquisitions in the capital abundant (re)insurance sector are expected to continue, further consolidating the market into fewer, but larger players.

The new US presidential administration introduced major US tax reforms, reducing corporate income tax while implementing a profit anti-erosion tax targeting profit shifting overseas. Despite the new tax landscape in the US, Bermuda's (re)insurers have proven their resilience. Risk diversification and Bermuda's regulatory benefits have outweighed any relative reduction of tax advantages vis-à-vis US operations. In addition, inadequate US reinsurance capacity forced US firms to purchase reinsurance outside the US, while a growing US economy created opportunities for Bermuda (re)insurers.

Monetary tightening in the US was evident in 2017 and is expected to continue with a flattening yield curve for US treasuries. Some companies recorded capital losses due to increasing interest rates, nevertheless, the rise of interest rates improves potential future interest income.

Global net issuance volume of the CAT bond market in 2017 was $4.5 bln, while the global outstanding volume reached $31.2 bln. Out of this total outstanding volume, Bermuda-issued Insurance Linked Securities (ILS) represented 74.8% of total volume, or $23.3 bln.

Bermuda (re)insurers reported negative underwriting income of $1.3 bln in 2017, compared to an underwriting profit of $6.2 bln in 2016. Higher claims volume, increased the combined ratio by 28.3% y/y from 85.7% to 109.9% in 2017. As a proxy of liquidity, the ratio of "A-AAA[1]"-rated assets compared to claims dropped by 32.0%.

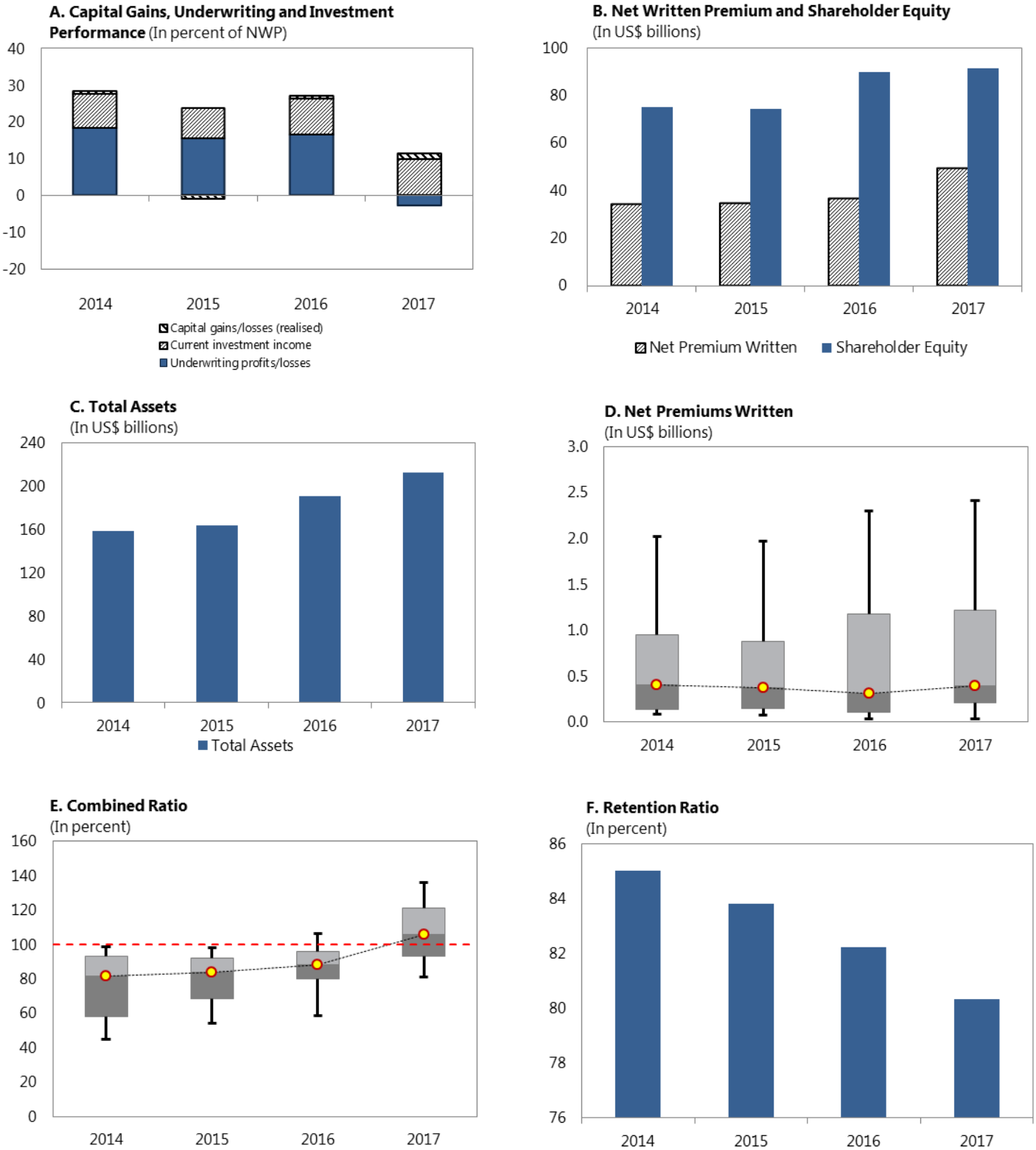
Investment income increased significantly for 2017 on aggregate. Bermuda (re)insurers achieved a higher Return on Investment (RoI) at 4.2% for FY-2017, while Return on Equity (RoE) dropped by 85.7% to 1.6% and Return on Assets (RoA) dropped by 86.9% to 0.7%.

The BMA performed forward looking simulations on the asset side of the balance sheets of Bermuda (re)insurers using a bespoke economic scenario generator. The results indicated very strong capital positions coupled with conservatism and asset mixtures with short durations. This combination shielded (re)insurers from extreme movements in the yield curve.

Note: *Due to M&A activity, de-registrations and new registrations of Class 3B and Class 4 (re)insurers, results may not be directly comparable y/y.*

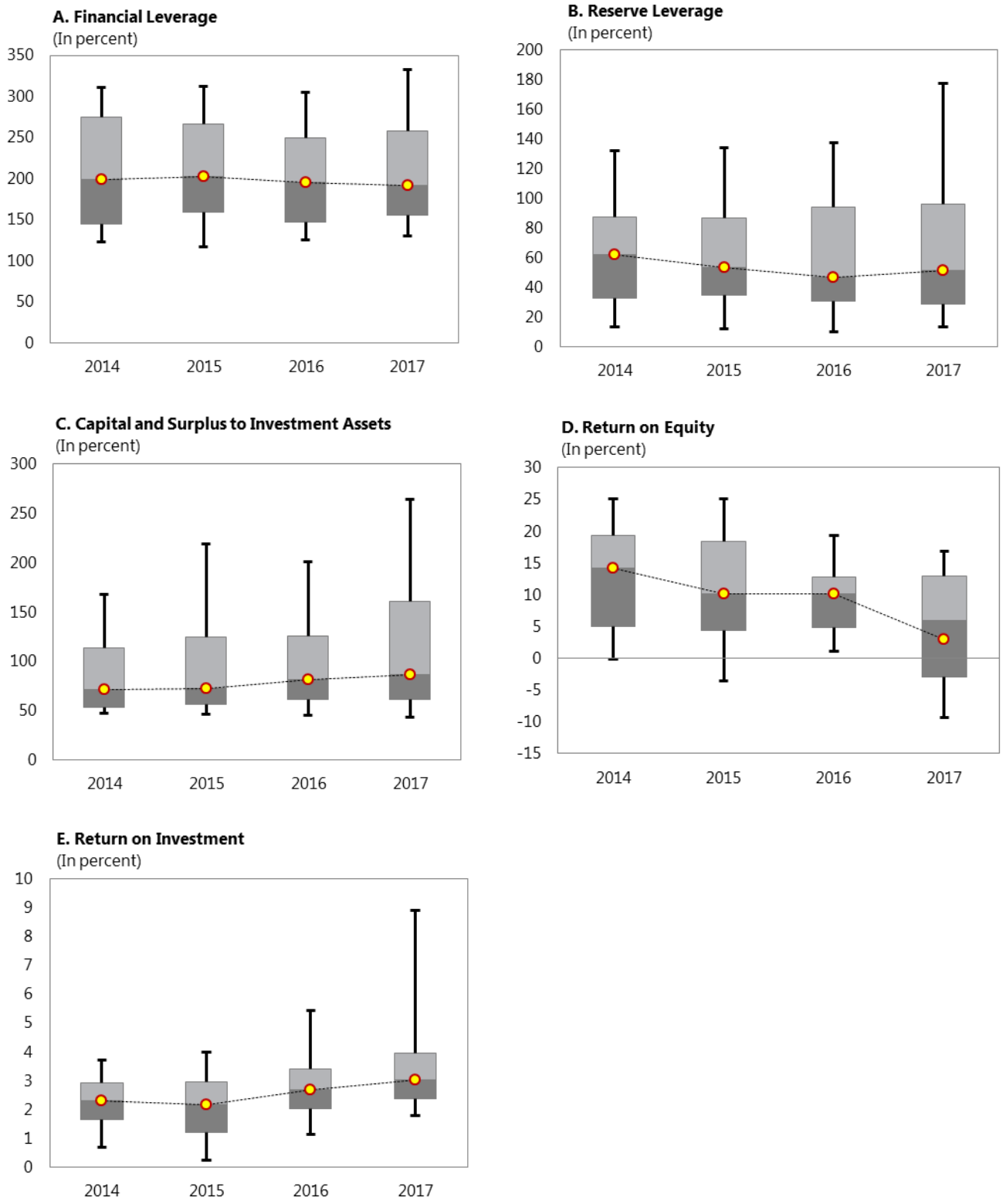
[1] A-AAA-rated is the sum of all securities rated as A, AA and AAA.

Figure 1: Large Commercial (Re)Insurers (Classes 4 and 3B) in Bermuda—Performance Indicators



Source: BMA staff calculations and Bloomberg. *Note:* Boxplots include the median (yellow dot), the 25th and 75th percentiles (grey box, with the change of shade indicating the median), and the 10th and 90th percentiles (whiskers).

Figure 2: Large Commercial (Re)Insurers (Classes 4 and 3B) in Bermuda—Performance Indicators



Source: BMA staff calculations and Bloomberg. *Note:* Boxplots include the median (yellow dot), the 25th and 75th percentiles (grey box, with the change of shade indicating the median), and the 10th and 90th percentiles (whiskers).

Figure 3: Large Commercial (Re)Insurers (Classes 4 and 3B) in Bermuda—Asset Quality

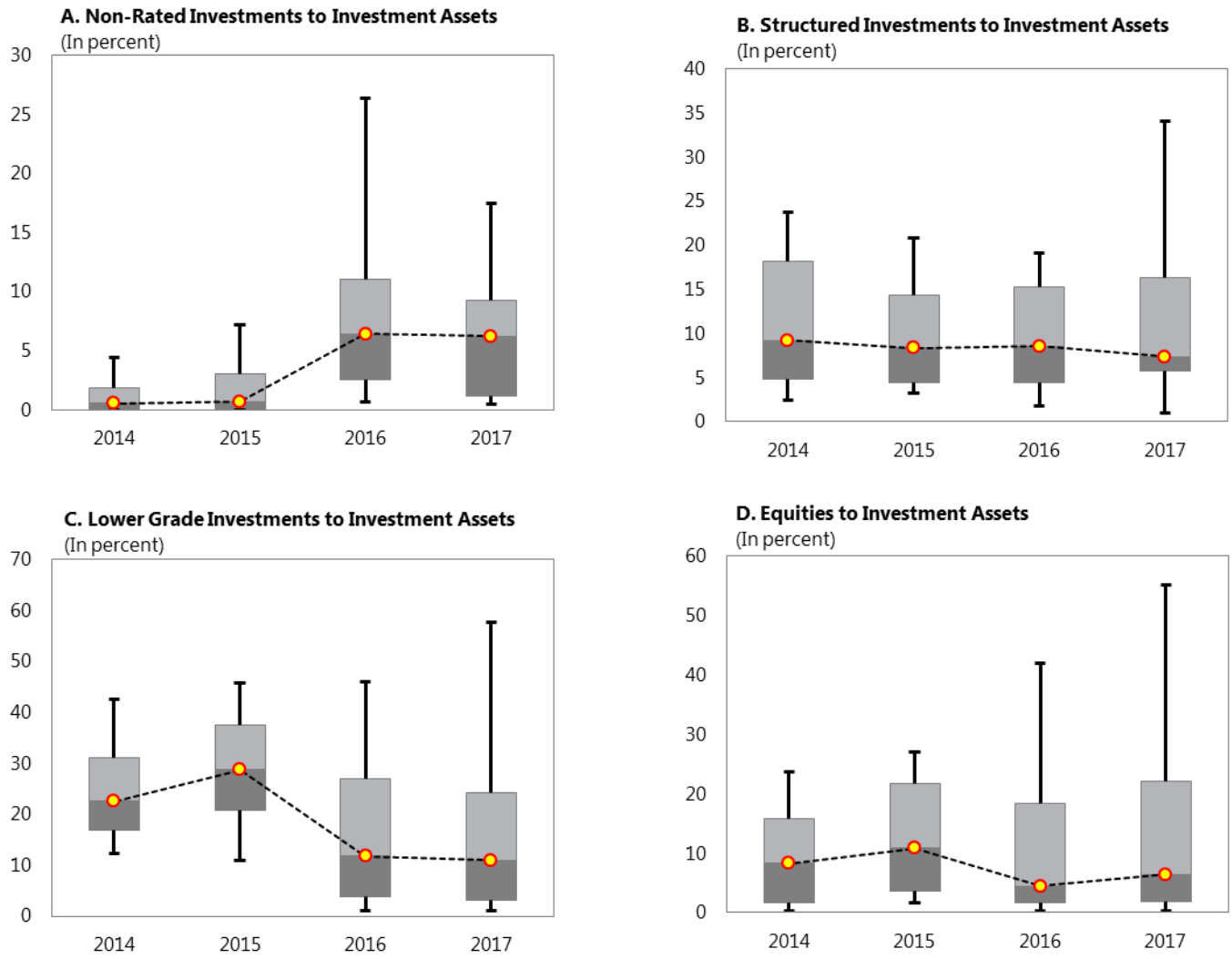
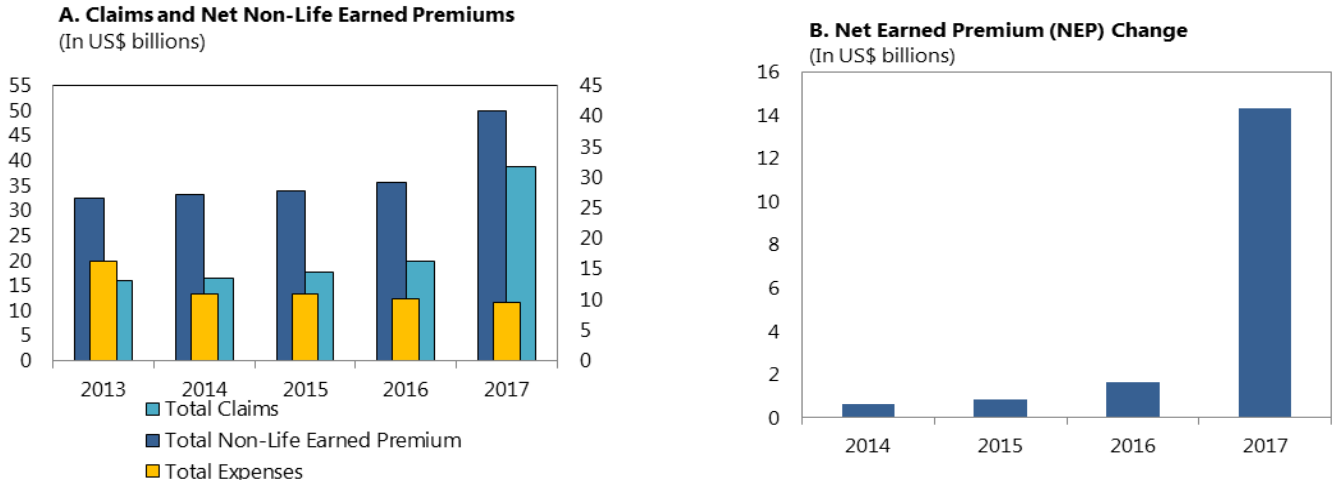


Figure 4: Large Commercial (Re)insurers (Classes 4 and 3B) in Bermuda—Claims Experience



Source: BMA staff calculations and Bloomberg. *Note:* Boxplots include the median (yellow dot), the 25th and 75th percentiles (grey box, with the change of shade indicating the median), and the 10th and 90th percentiles (whiskers).

Capital Conditions

The capital position of Bermuda (re)insurers changed in 2017 (Table I and Table III). Capital and surplus relative to total assets (equity ratio)[2] dropped by 8.4% y/y and stood at 43.0%. Reserves increased by 27.1% y/y and amounted to 38.8% of assets held by firms—almost 90.2% of capital and surplus.

Table I: Key Balance Sheet Indicators

(In US$ billions unless indicated otherwise)	2017	2016	2015	2014	2013	Y/Y Change (%)
Capital and Surplus	**91.6**	89.7	73.8	74.8	73.4	2.1
Total Assets	**212.9**	191.1	164.2	158.4	156.2	11.4
Total Liabilities	**121.4**	101.4	90.4	83.6	82.8	19.7
NWP/Equity (In percent)	**54.0**	41.2	47.3	46.2	46.4	31.0
Reserve Leverage (In percent)	**90.2**	72.5	75.4	73.0	76.5	24.5

Table II: Key Income Statement Indicators

(In US$ billions)	2017	2016	2015	2014	2013	Y/Y Change (%)
Net Earned Premiums	**49.9**	35.6	34.0	33.2	32.5	40.1
Net Written Premiums	**49.4**	37.0	34.9	34.6	34.1	33.6
Total Expenses	**16.2**	10.8	10.8	10.1	9.6	50.1
Total Claims	**38.7**	19.8	17.6	16.3	16.0	95.8
Investment Income	**4.9**	3.6	3.0	3.2	3.5	33.7
Underwriting Income	**-1.3**	6.2	5.4	6.3	6.6	-
Net Income	**1.5**	10.0	8.8	10.6	11.1	-85.4

The operational performance of Bermuda (re)insurers worsened during the year. Claims increased by 95.8% y/y, which resulted in a higher combined ratio of 109.9%, up by 28.3% y/y (Tables II and VI). The expense ratio increased by 7.1% y/y.

CAPITAL STRUCTURE

Table III: Aggregate Capital Structure

(In US$ billions unless indicated otherwise)	2017	2016	2015	2014	2013	Y/Y Change (%)
Capital and Surplus	**91.6**	89.7	73.8	74.8	73.4	2.1
Insurance Reserves	**82.6**	65.0	55.7	54.6	56.2	27.1
Financial Leverage (In percent)	**232.5**	213.0	222.4	211.8	212.7	9.2
Equity Ratio (In percent)	**43.0**	47.0	45.0	47.2	47.0	-8.4
Reserve Ratio (In percent)	**38.8**	34.0	33.9	34.5	36.0	14.0

Between 2016 and 2017, financial leverage (i.e., assets relative to capital and surplus) increased by 9.2% to 232.5% due to the slower rate of increase of capital and surplus compared to assets. The reserve ratio increased by 14.0% y/y. Reserves increased by 27.1% y/y.

PROFITABILITY AND FINANCIAL INDICATORS

Table IV: Summary Profitability Indicators

(In percent unless indicated otherwise)	2017	2016	2015	2014	2013	Y/Y Change (%)
Loss Ratio	**77.6**	55.5	51.7	49.2	49.2	39.8
Investment Income/Net Income	**332.6**	36.3	33.6	30.3	31.6	815.8
Investments Income/Reserves	**5.9**	5.6	5.3	5.9	6.2	5.2
Investment Income/Assets	**2.3**	1.9	1.8	2.0	2.2	20.0
Total Investments (In US$ billions)	**116.7**	114.1	106.6	107.6	105.6	2.3
Investment Income (In US$ billions)	**4.9**	3.6	3.0	3.2	3.5	33.7

Profitability, measured by net income, dropped by 85.4% y/y. Underwriting income stood at -$1.3 bln during the year (Table II). Investment income represents 332.6% of total net income, an increase from FY-2016 of 815.8%.

[2] Equity Ratio=1/Financial Leverage. See Table III.

Table V: Summary Financial Indicators

(In percent)	2017	2016	2015	2014	2013	*Y/Y Change (%)*
Return on Assets (RoA)	**0.7**	**5.2**	5.4	6.7	7.1	-86.9
Return on Equity (RoE)	**1.6**	**11.2**	11.9	14.2	15.1	-85.7
Return on Investment (RoI)	**4.2**	**3.2**	2.8	3.0	3.3	30.8

Financial indicators painted a mixed picture in 2017. Aggregate RoA dropped 86.9% y/y to 0.7%. RoE dropped 85.7% to 1.6% while RoI increased 30.8% y/y to 4.2%.

Actuarial Indicators

Table VI: Actuarial Indicators

(In percent unless indicated otherwise)	2017	2016	2015	2014	2013	*Y/Y Change (%)*
Loss Ratio	**77.6**	55.5	51.7	49.2	49.2	39.8
Expense Ratio	**32.4**	30.2	31.8	30.4	29.4	7.1
Combined Ratio	**109.9**	85.7	83.5	79.6	78.6	28.3
Claims/ Reserves	**46.9**	30.4	31.5	29.9	28.4	54.1
Reinsurance Assets (US$ bln)	**20.9**	11.2	8.1	7.9	7.7	87.5

The combined ratio increased by 28.3% y/y to 109.9% due to a significant increase in claims from North American catastrophes. The loss ratio increased by 39.8% y/y during the year while the expense ratio increased by 7.1%. Reinsurance assets increased by 87.5% reaching $20.9 bln.

Asset Quality Indicators

Table VII: Asset Quality Indicators

(In percent)	2017	2016	2015	2014	2013	*Y/Y Change (%)*
Non-Rated Investments/ Investment Assets	**4.6**	6.4	2.0	1.3	1.4	-28.3
Structured Investments/ Investment Assets	**10.1**	9.3	10.8	11.4	10.4	8.6
Lower Grade Investments/ Investment Assets	**14.2**	13.1	32.6	27.7	32.6	8.6
Equities/ Investment Assets	**7.6**	5.4	9.9	5.0	9.9	40.6
US Government Agency - MBS/ Investment Assets	**12.2**	12.9	13.2	13.0	13.3	-6.1
US Government Agency - Other/ Investment Assets	**0.8**	1.5	1.4	1.8	2.4	-50.6
MBS Residential/ Investment Assets	**0.7**	0.7	0.0	0.1	0.1	7.3
MBS Residential Subprime/ Investment Assets	**0.1**	0.2	0.8	1.0	1.3	-69.2
MBS Commercial/ Investment Assets	**3.6**	3.3	4.0	4.7	4.3	8.3
High Grade (A-AAA) Investments/ Investment Assets	**39.1**	40.7	49.5	51.3	52.0	-4.0
Sovereign Assets/ Investment Assets	**26.7**	26.2	26.7	24.6	25.2	1.9

Note: Structured investments refer to any non-agency structured finance investment i.e. MBS, CLO, CDO, etc. Lower grade investments consist of lower investment grade fixed income securities plus non-rated investments, plus quoted equities plus unquoted investments. Sovereign investments consist of U.S. treasuries and GSE agency paper.

(Re)insurers decreased their share of non-rated securities by 28.3% y/y, standing at 4.6% of the total investment portfolio. Structured investments increased by 8.6% to 10.1% of the investment book, while the share of lower grade securities of investment portfolio increased by 8.6%. Lower grade investments comprised 14.2% of the total investment portfolio, while equities comprised 7.6% of total investments. Non-agency MBS and subprime residential were in trivial amounts while overall structured investments comprised 10.1% of the total investment portfolio. Sovereign assets comprised 26.7% of the total investment portfolio, a minimal increase of 1.9%.

Table VIII: Liquidity Indicators

(In percent)	**2017**	2016	2015	2014	2013	*Y/Y Change (%)*
Cash Investments/ Total Assets	**23.1**	15.2	10.3	10.2	10.5	52.0
Cash Investments/ Total Liabilities	**40.6**	28.7	18.7	19.2	19.8	41.5
Cash Investments/ Reserves	**59.6**	44.7	30.3	29.4	29.2	33.3
Cash Investments/ Claims	**127.2**	147.0	96.2	98.5	102.7	-13.5
BBB-AAA Assets/ Total Assets	**29.1**	24.3	32.2	34.8	35.1	19.5
BBB-AAA Assets/ Total Liabilities	**51.0**	45.8	58.5	66.0	66.3	11.2
BBB-AAA Assets/ Insurance Reserves	**55.2**	71.4	94.9	101.1	97.7	-22.7
BBB-AAA Assets/ Claims	**159.7**	234.9	301.0	338.2	343.6	-32.0
Current Assets/ Current Liabilities	**1536.3**	1638.3	2392.1	2711.8	2739.1	-6.2

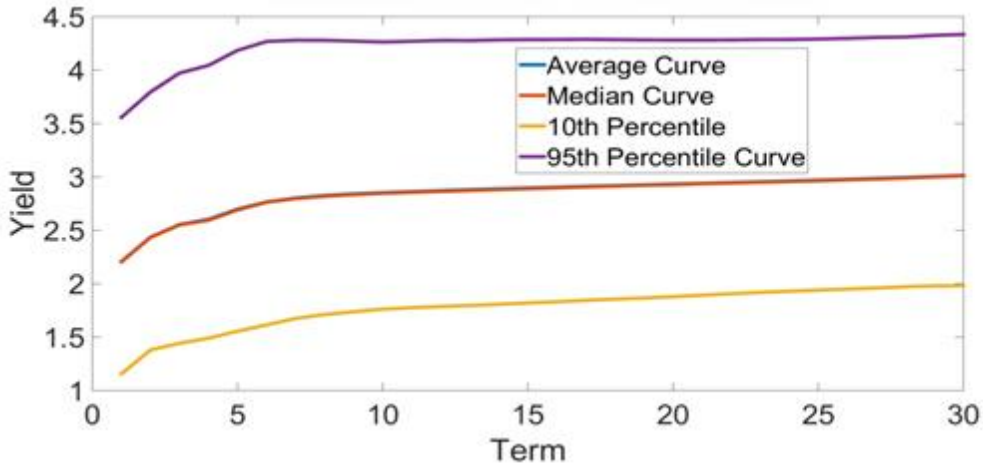
Note: "AAA" refers to the rating category of investment assets held by firms. Cash Investments are: i) sovereign debt issued by a country in its own currency that is rated AA- or better, ii) debt issued by government-owned and related entities that were explicitly guaranteed by that government, with the exception of mortgage-backed securities.

Firms hold sufficient liquidity buffers. A balanced cash-to-claims position eliminates any liquidity risk from declining investment returns. Cash investments comprise 23.1% of total assets, 40.6% of total liabilities, and 127.2% of quarterly claims. The sum of BBB, A, AA and AAA securities can cover 29.1% of total assets, 51.0% of total liabilities and 159.7% of quarterly claims. Despite some decrease of these indicators within 2017, the firms remain sufficiently liquid.

Forward Looking Indicators[3]

In this section, the BMA provides forward looking forecasts on US monetary policy and stock market effects on the investment book of Class 3B and Class 4 Bermuda (re)insurers. The BMA has created and validated an in-house economic scenario generator which generates forecasts about US yield curves based on the historical evolution of interest rates and stock market returns. The model is run for 12 months forward, as it is calibrated for monthly data, for 20,000 simulations and produces averages and percentiles of pertinent economic variables.

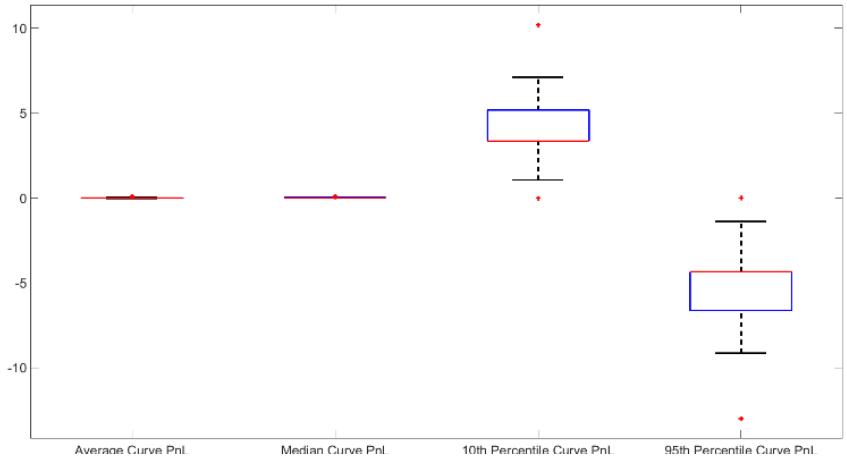
Figure 5: Projected Yield Curves (In percent)



Source: BMA staff calculations

Figure 5 above shows the projected yield curves for maturities ranging from 1 to 30 years. The model produces a so-called average and median yield curve which are the estimated mean and median values of US interest rates from the simulation. In our simulation, the mean and the median curves are almost identical. The BMA also projected the 95th percentile curve and the 10th percentile curve as extreme cases of yield curve movements. Given these projections, the BMA calculated marked to market gains and losses both for the sovereign assets and the corporate bonds in various rating categories.

Figure 6: Projected Sovereign Portfolio Returns (In percent)



Source: BMA staff calculations. *Note:* Boxplots include the median (red line). The tops and bottoms of each box are the 25th and 75th percentiles of the samples, respectively. Whiskers are drawn from the ends of the interquartile ranges to the furthest observations within the whisker length (the adjacent values). Observations beyond the whisker length are marked as outliers. An outlier is a value that is more than 1.5 times the interquartile range away from the top or bottom of the box.

[3] BMA assumes no management actions for these projections

Figure 6 above, shows the evolution of marked to market losses of the sovereign portfolio of Bermuda (re)insurers based on the scenarios in figure 5. The mean and median scenarios produce very little if any losses. Bermuda Class 3B and Class 4 (re)insurers have short duration bonds to match short term liabilities mainly in property and natural catastrophe (re)insurance. The 10th and the 95th percentile curves produce marked to market profits and losses since they deviate from the current yield curve, at the day of the simulation exercise.

For the 95th percentile curve, the median loss is around 3.0%. For the 10th percentile curve, the median marked to market gain is around 3.0% with the reverse picture in the 95th percentile curve with median losses of around 3.0%. The BMA repeats this exercise by shocking the values of corporate bonds for all rating classes by switching yield curves as in figure 5, but assuming that credit spreads are constant.

Figure 7: Projected Corporate Bond Portfolio Returns

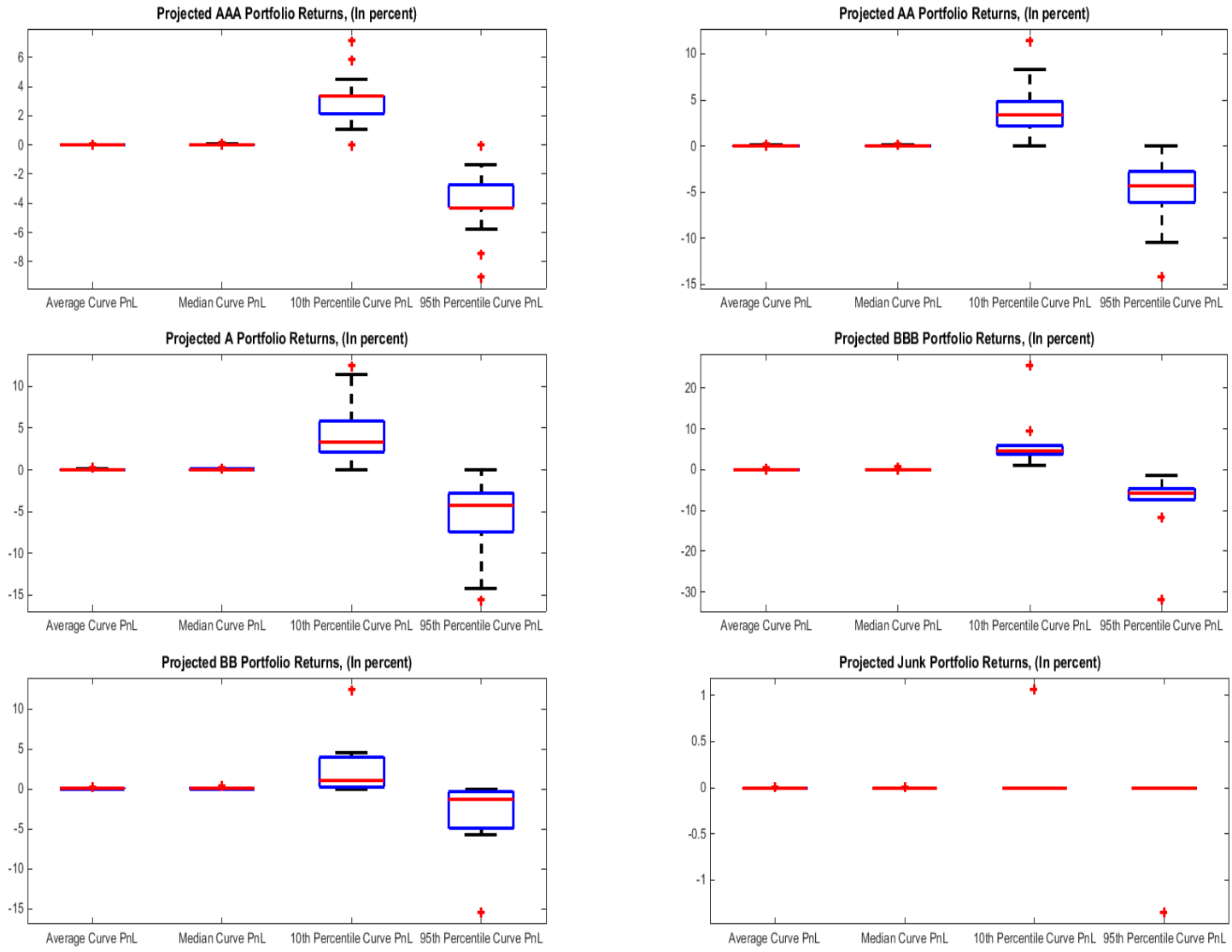


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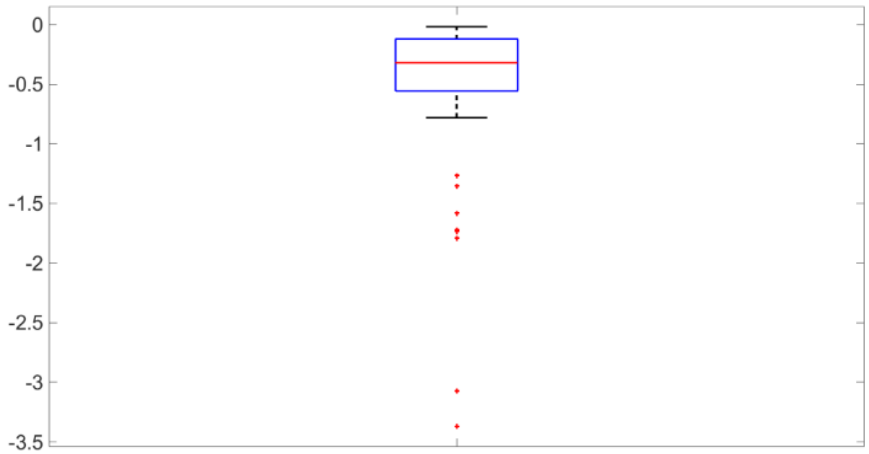
Figure 7 above, shows the profits and losses of the corporate bond portfolios of Bermuda (re)insurers, by switching yield curves. In all rated classes except "junk bonds" there are significant movements for the valuations for both the 95th and 10th percentile curves, similar to the sovereign case with some outliers due to exposure to longer term corporate bonds. Nevertheless, the median and average curves produce on average very little, if any, losses. This is due to the fact that most bond durations are short and the change of yields is not projected to be large compared to the extreme scenarios of the 95th and 10th percentile curves. In some cases, for the extreme scenario curves, there are significant capital gains and losses for shocked assets due to longer durations.

In figure 8 below, the BMA shows the projected Return on Investment (RoI) for Bermuda (re)insurers by simulating all economic variables simultaneously. This simulation exercise includes interest rate shocks in the corporate and sovereign bond portfolio, in addition to rating transitions and defaults of corporates. This simulation exercise includes the simulation of the path of the Bermuda (re)insurers' equity portfolio. For the equity portfolio the S&P 500 was used as a proxy for stock market returns.

Figure 8: Projected RoI for Baseline Scenario (In percent)



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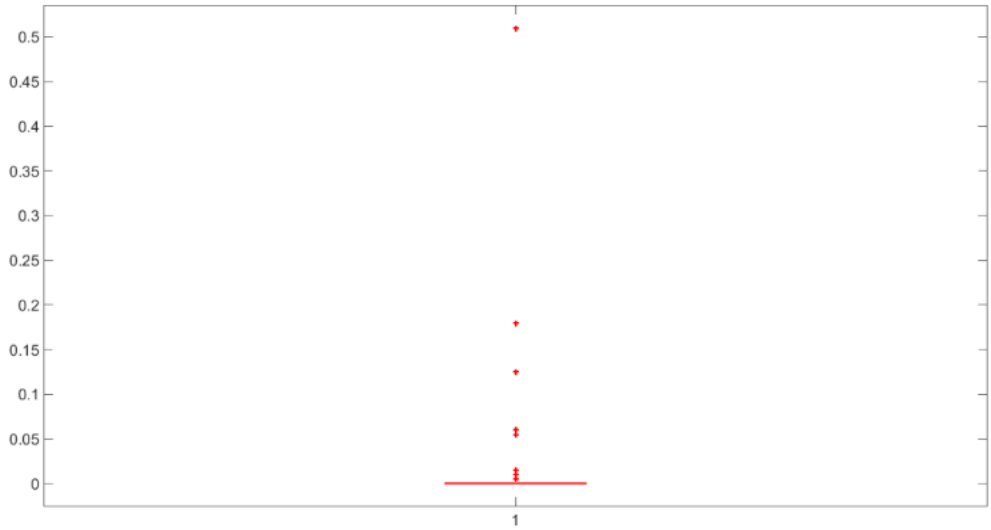
The BMA observes that the median (re)insurer will suffer some capital losses due to the fact that the median and mean yield curves are slightly upwards when projected. However, there are some firms which are affected more adversely since they are more exposed to rating classes that have higher probabilities of migration from higher to lower rating classes.

Finally, the BMA estimated the probability of technical default, that is assets being less than liabilites. This revealed how the simulation results affected the capital positions of Bermuda (re)insurers. In figure 9 a boxplot of results is displayed, which shows that most Bermuda (re)insurers will survive at least 99.5% the paths of interest rates, rating transitions and equity returns, a result which shows the strong capital position of Bermuda (re)insurers.

Figure 9: Projected Probability of Assets lower than Liabilities (In percent)



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Glossary

"AAA" is the generic classification of the highest rating assigned by a rating agency for an asset/security/entity whose credit risk is so low that it is regards as virtually risk-free.

Actuarial indicator is an indicator based on outcomes from the evolution of a portfolio of insured risks. Each actuarial indicator excludes any investment or financing activity.

Capital gain is the realized profit from the sale of a financial asset due to its appreciation.

Capital structure is the composition of liabilities that fund the operations and the assets of a (re)insurance company.

Loss ratio is the ratio of claims incurred within a period over the net written premium written within that period.

Combined Ratio is the sum of expense ratio and claims ratio.

Earned premium is the premium which is recorded as income in the income statement of a (re)insurer. It is usually calculated on a pro-rata basis.

Expense ratio is the ratio of expenses paid within a period over the net written premium written within that period.

Financial leverage is based on average total assets divided by average total common equity, with the average taken between the beginning and ending balance.

Gross premium is the premium with loadings such as expenses, commissions and fees.

Insurance-linked securities (ILS) are financial instruments whose payoffs are contingent on the realization of an insurable risk.

Insurance reserves are provisions held by the (re)insurer in order to meet future obligations that stem from the underwriting activities.

Net premium is the premium left after reinsurance premium has been paid.

Reinsurance recoverables are estimates of the expected payments made to the cedant by the reinsurer.

Reserve leverage is the ratio between premium reserve and shareholder's equity (defined as share capital plus additional paid-in capital plus retained earnings.

Return on Assets is calculated by dividing the net income by the value of total assets over the same period.

Return on Equity is calculated by dividing net income by the value of shareholder equity over the same period.

Return on Investment is calculated by dividing investment income by the value of investment assets over the same period.

Seniority (capital structure) is the specified way in which holders of financing instruments of a corporation, incur its losses and distribute its assets and profits.

Shareholder equity is the difference between assets and liabilities, including subordinated debt.

Subordinated debt is debt whose seniority is junior to policyholder claims on a (re)insurer.

Underwriting profit (loss) is the profit (loss) attributed to the operations of a (re)insurer by excluding all other activities than underwriting and claims processing.

Written premium is the premium that the (re)insurer collects from the policyholder but is not recorded as income in the profit and loss statement.