Risk Based Capital Ratios and Impairment Risk: Are They Related and, If So, When?

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Agenda

- Background
- Assumptions and Methodology
- Results (updated)
- Takeaways



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Key Highlights from Previous Research

Author	Year	Title	Main Drivers of Impairment
Academy	2010	*Property/Casualty Insurance Company Insolvencies*	Inadequate loss reserves; inadequate pricing; rapid growth; mismanagement
CAS	2012	*A Review of Historical Insurance Company Impairments*	Middle-sized companies show highest impairment rates
SOA/CAS/CIA	2018	*Actuarial Review of Insurer Insolvencies and Future Preventions*	Premium growth; profitability; liquidity; investment mix; leverage; RBC ratio

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Definition of Impairment

"[S]ituations in which a company has been placed, via court order, into conservation, rehabilitation, or insolvent liquidation.

Supervisory actions undertaken by state insurance department regulators without court order are not considered impairments, unless there are clear indications that policyholder payments may be delayed or otherwise limited in some manner through the regulatory oversight process."

AM Best, *2023 US Property/Casualty Impairments Update*, Jan. 31, 2025, page 1.

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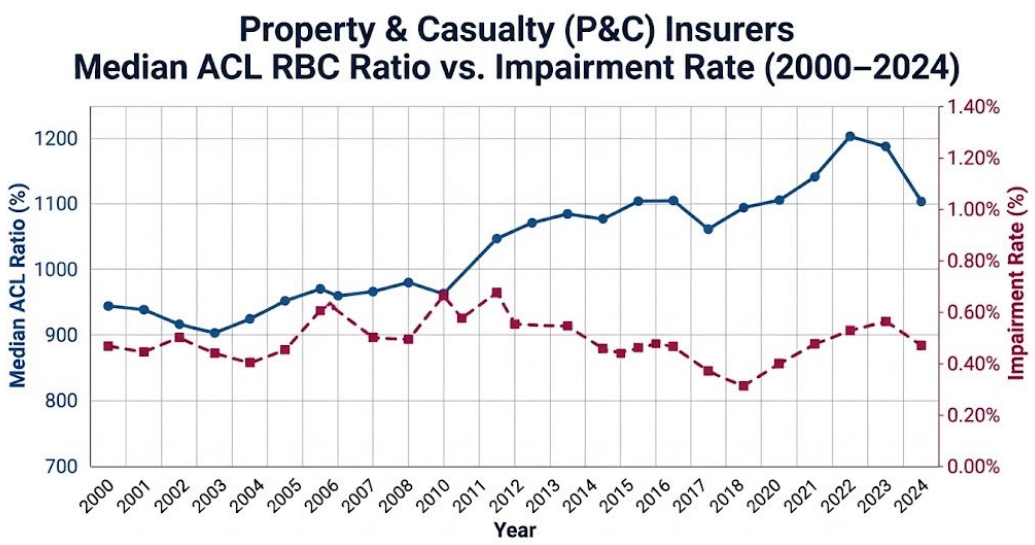
Data: Background, Acquisition, Validation, and Filters

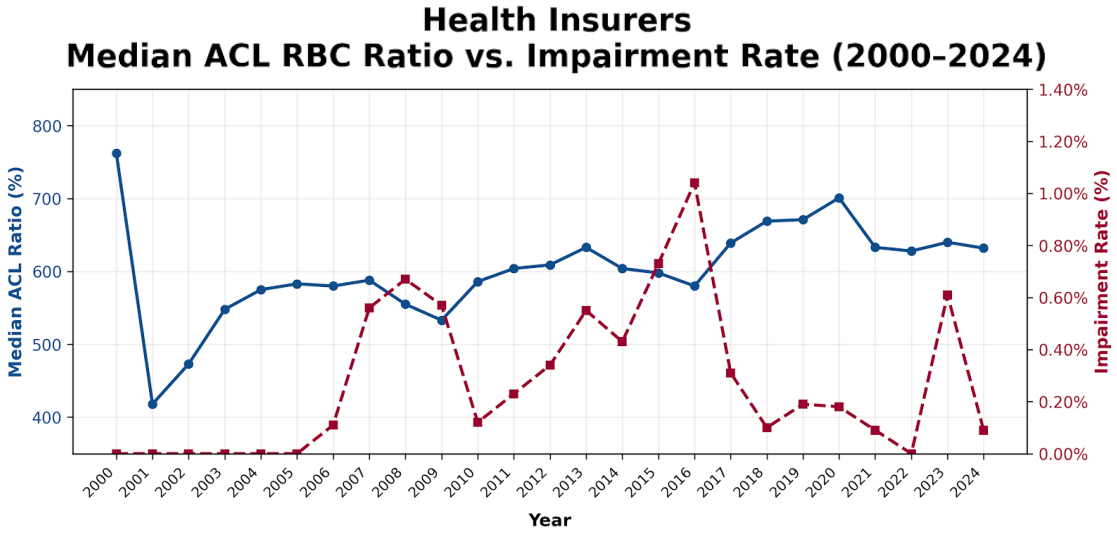
Results of matching impairment data with RBC ratio data				
	Companies with RBC data (S&P)	**Companies with impairment data (AM Best)**	**% Matched**	**% Impaired (total)**
P&C	4218	433	87%	10%
Health	2147	105	82%	5%
Life	1805	88	82%	5%
Total	**8170**	**626**	**86%**	**8%**

Data for years 2000 - 2024

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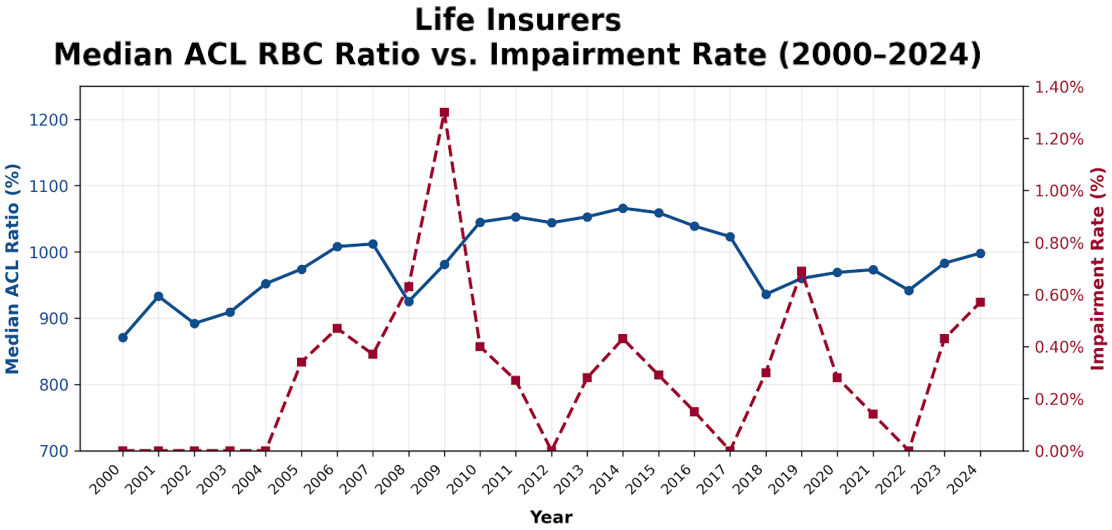
Trends in Impairment and ACL Ratios

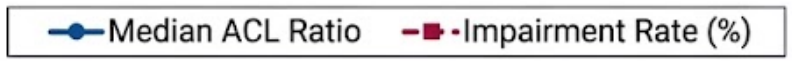




Question:

Is there a relationship between a company's probability of impairment and its Authorized Control Level (ACL) ratio?





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Methodology

Assumption: The RBC ratio may be related to impairment probability for some but not necessarily all companies

- Examined the relationship with 1- to 5-year lags between the ratio and impairment
- Examined the relationship for two time periods: 2011–2024 and 2000–2010
- Utilized logistic regressions with a binary dependent variable (Impaired or Not) with the lone independent variable (ACL Ratio)
  - Lagged the appropriate number of years for impaired companies

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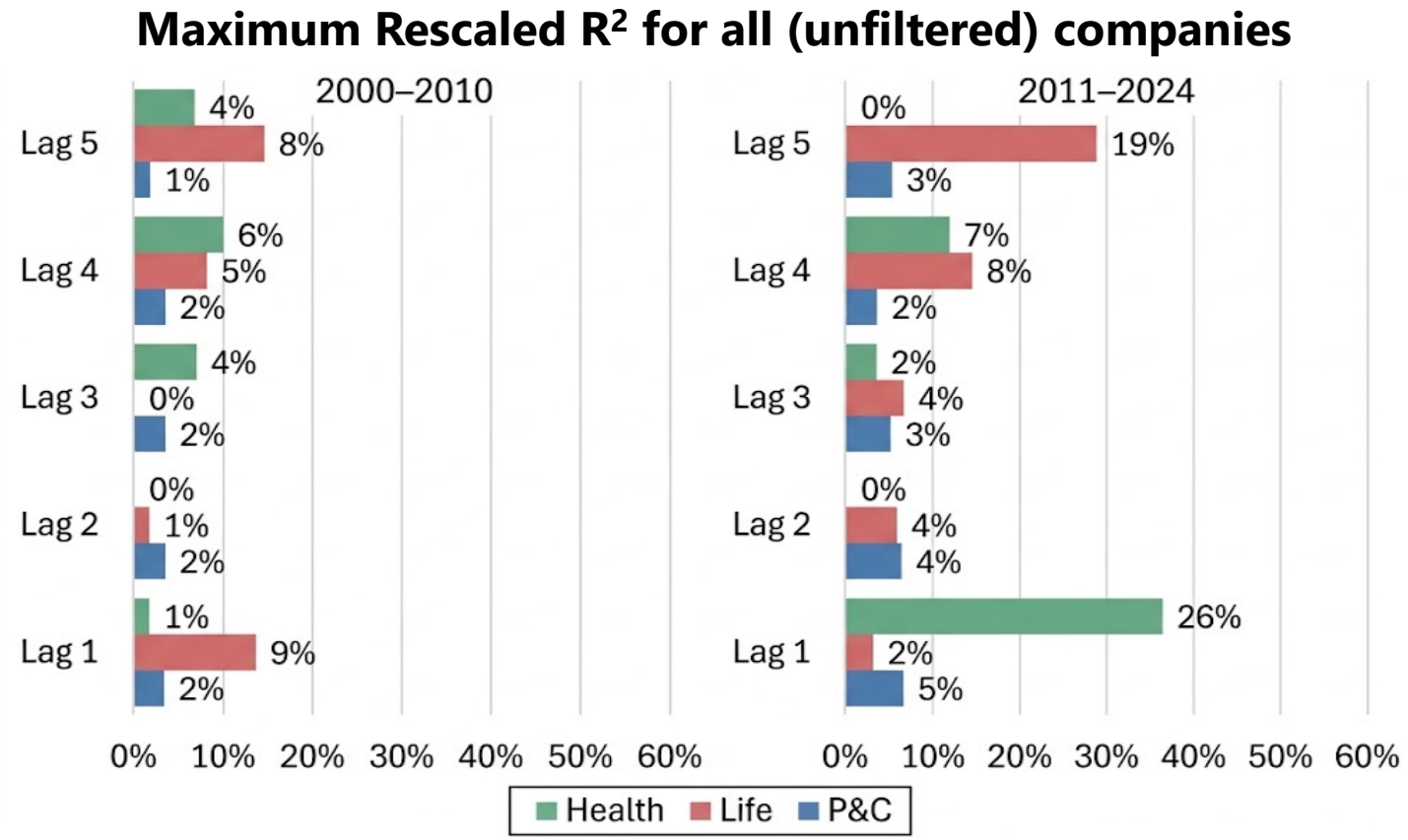
Methodology (cont'd.)

For each time period and each lag, we tested the following possible exclusion criteria:

- **Size of Company:** Excluding top 10th and/or bottom 10th percentiles vs. all companies regardless of size
- **Measurement of Size:** Net Total Assets (NTA) or Direct Premiums Written (DPW)
- **Maximum RBC ratio:** Is the ratio less than one of 31 levels, ranging from 200,000 to 100?

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Results: Extent of Variation in Impairments for All Companies by ACL RBC Ratios (R^2), by Lag



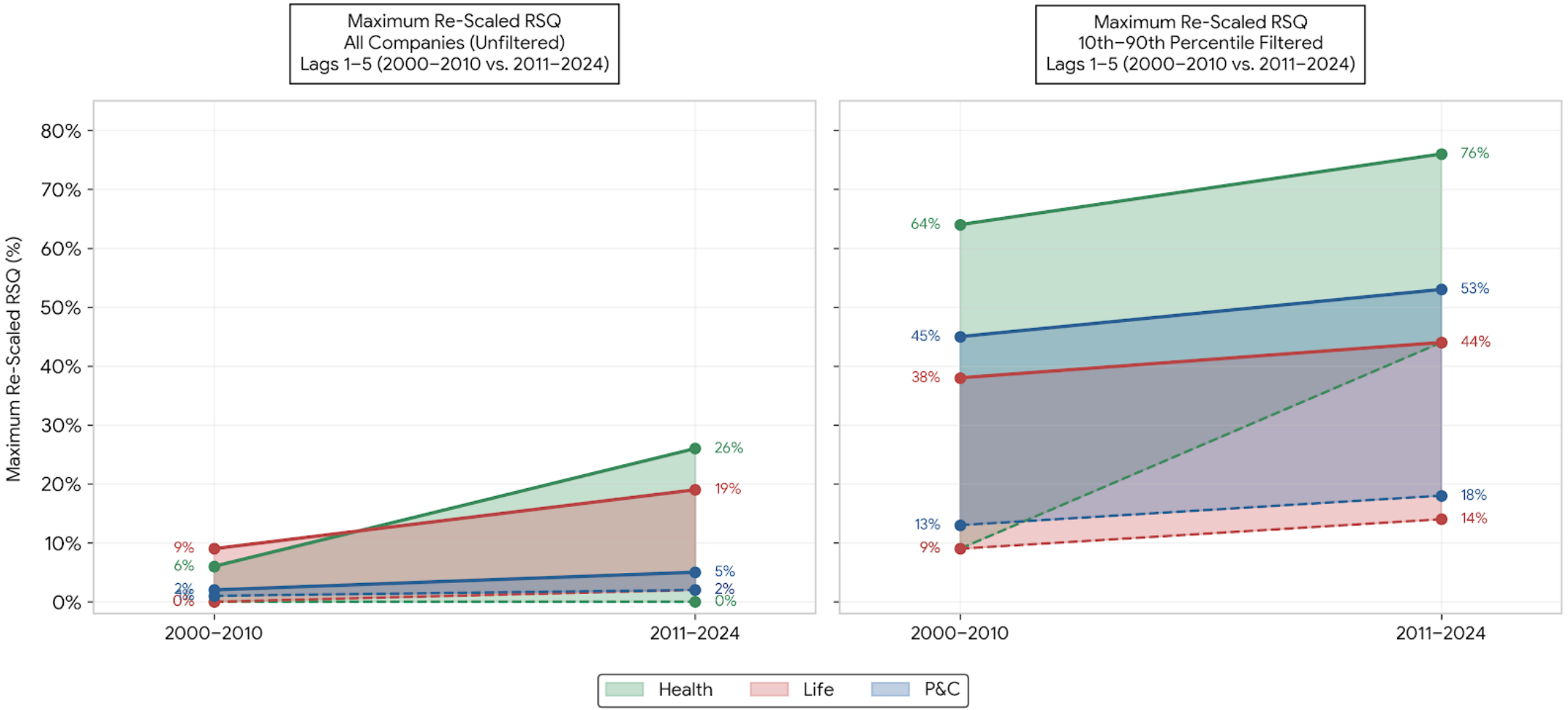
Average re-scaled R^2 across all lines rose notably after 2010

- Health rose from 3.0% to 7.0%
- Life from 4.6% to 7.4%
- P&C from 1.8%to 3.4%

Post-crisis regulatory enhancements, tightened ORSA practices, and higher baseline capitalization made RBC ratios more informative relative to actual distress.

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Extent of Variation in Impairments for P&C Companies Accounted For by ACL RBC Ratios: 2000-2010 vs. 2011-2024



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Characteristics of Best Fitting Regressions

P & C

Lag	NTA/DPW	Min/Max	Max RBC
-1	DPW	0.1/0.9	2500
-2	NTA	0.1/0.9	2500
-3	DPW	0.1/0.9	2500
-4	DPW	0.1/0.9	1500
-5	DPW	0.1/0.9	2500

Lag	NTA/DPW	Min/Max	Max RBC
-1	NTA	0.0/0.9	1000
-2	NTA	0.1/0.9	1400
-3	NTA	0.1/0.9	1400
-4	NTA	0.0/0.9	1500
-5	NTA	0.1/0.9	1500

Life

Lag	NTA/DPW	Min/Max	Max RBC
-1	DPW	0.1/0.9	200000
-2	DPW	0.1/0.9	200000
-3	DPW	0.1/0.9	200000
-4	DPW	0.1/0.9	5000
-5	NTA	0.0/0.9	200000

Lag	NTA/DPW	Min/Max	Max RBC
-1	DPW	0.1/1.0	200000
-2	DPW	0.0/0.9	500
-3	NTA	0.1/1.0	1400
-4	NTA	0.1/1.0	1300
-5	DPW	0.0/0.9	400

Health

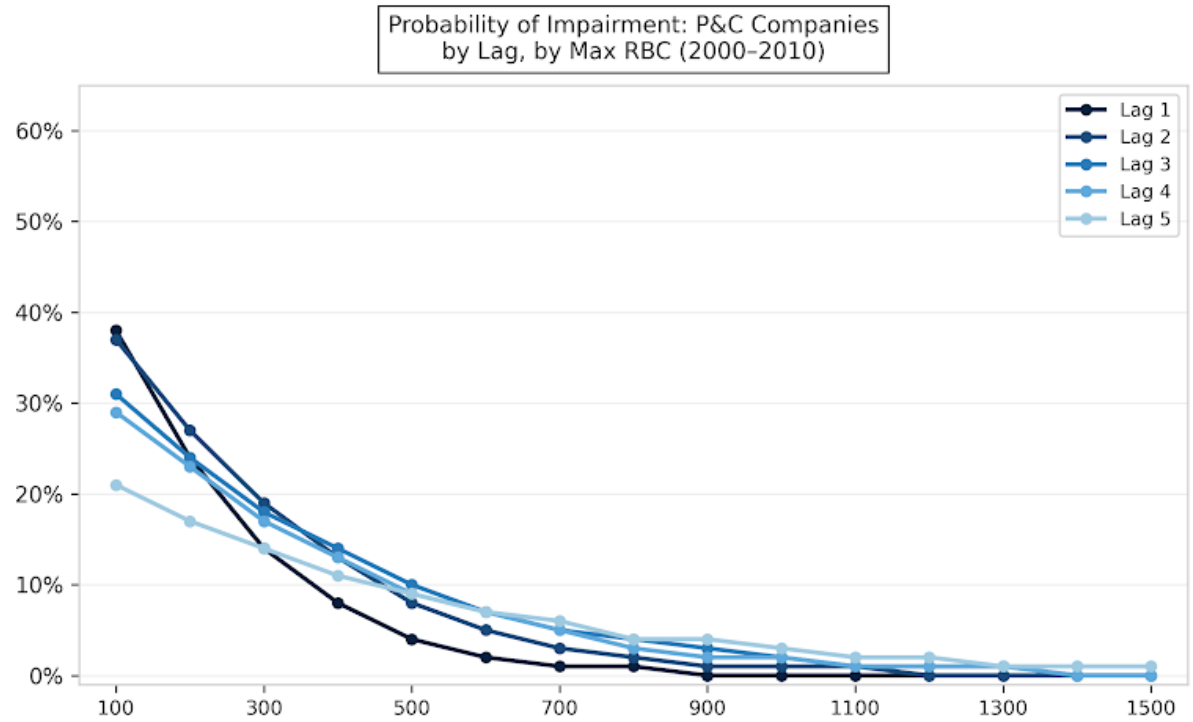
Lag	NTA/DPW	Min/Max	Max RBC
-1	DPW	0.1/1.0	600
-2	NTA	0.1/1.0	1500
-3	NTA	0.1/1.0	400
-4	NTA	0.1/1.0	900
-5	NTA	0.1/1.0	1500

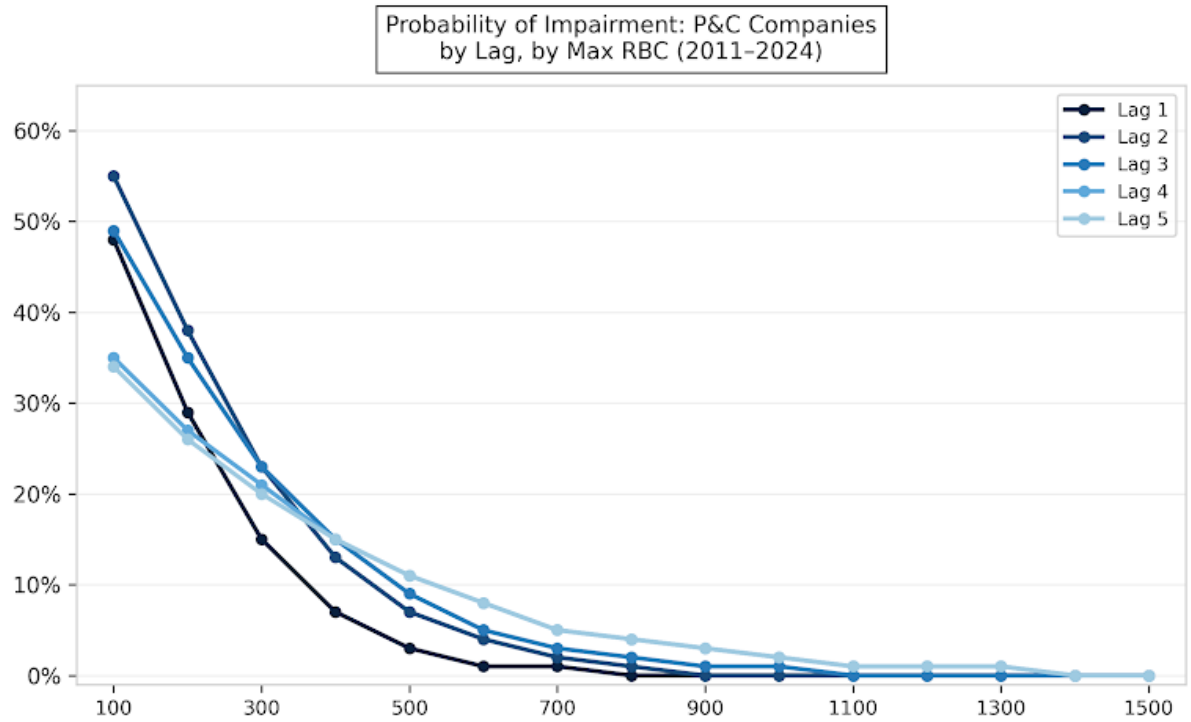
Lag	NTA/DPW	Min/Max	Max RBC
-1	NTA	0.1/1.0	300
-2	NTA	0.1/1.0	400
-3	NTA	0.1/1.0	300
-4	NTA	0.1/1.0	1500
-5	NTA	0.1/1.0	1300

2000-2010 **2011-2024**

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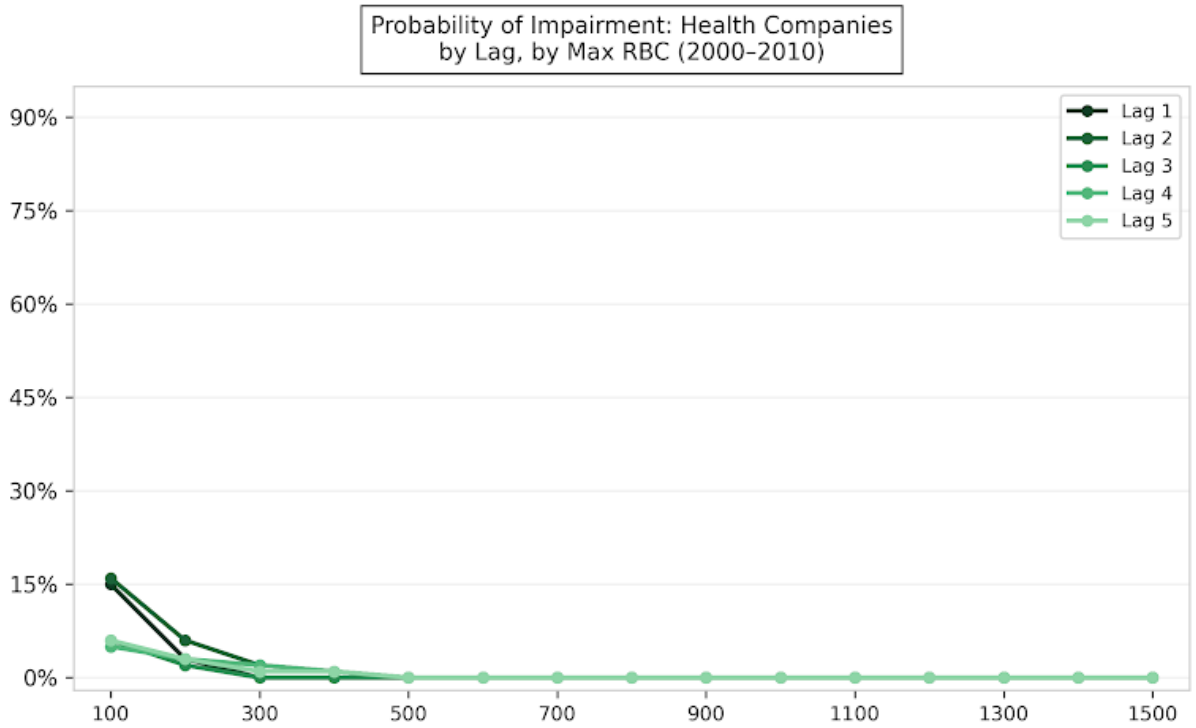
P&C Companies: Probability of Impairment

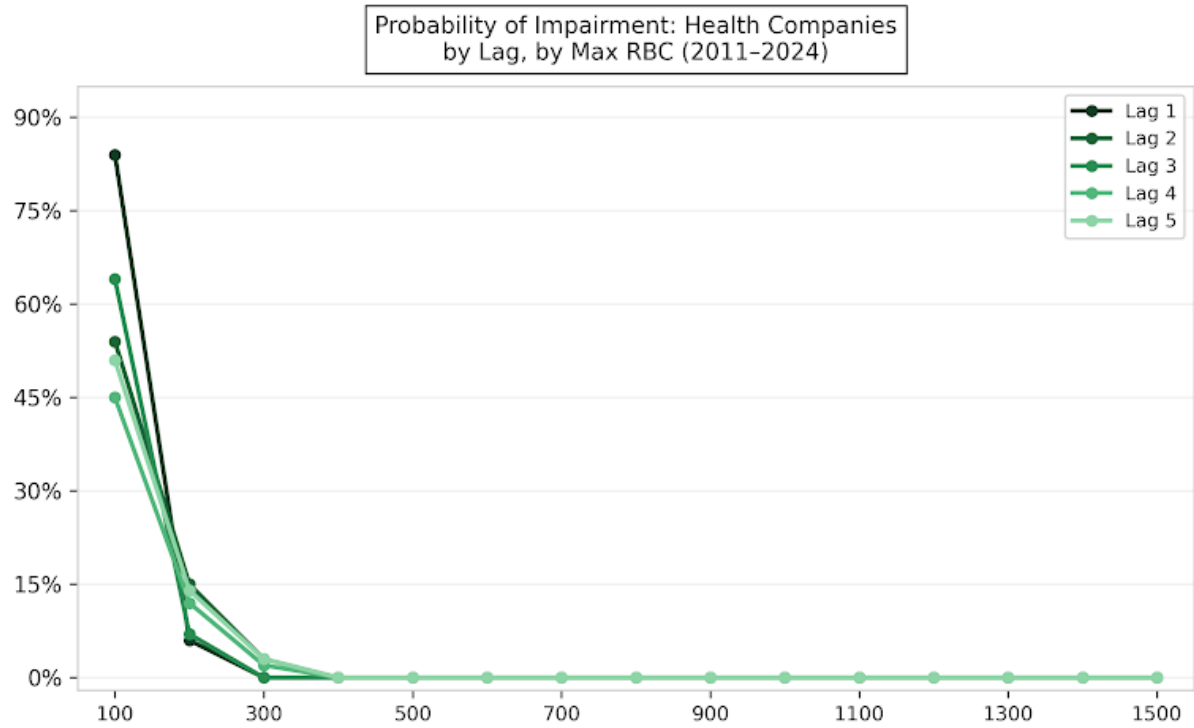




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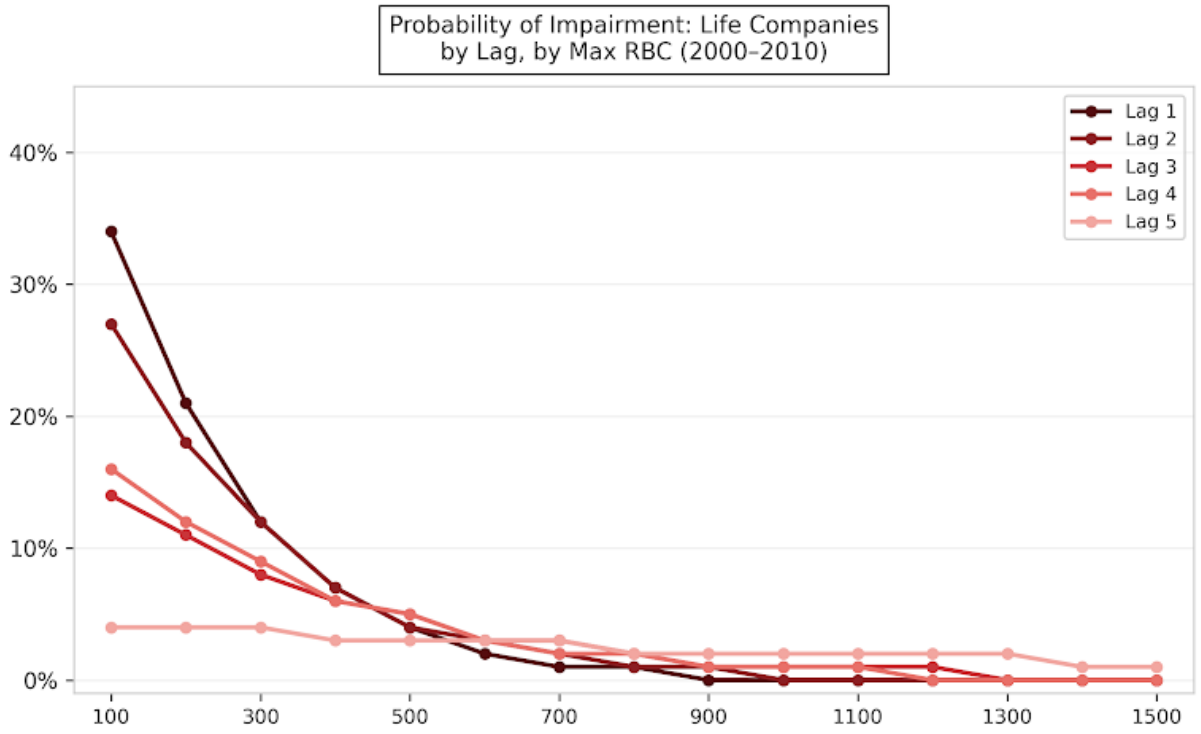
Health Companies: Probability of Impairment

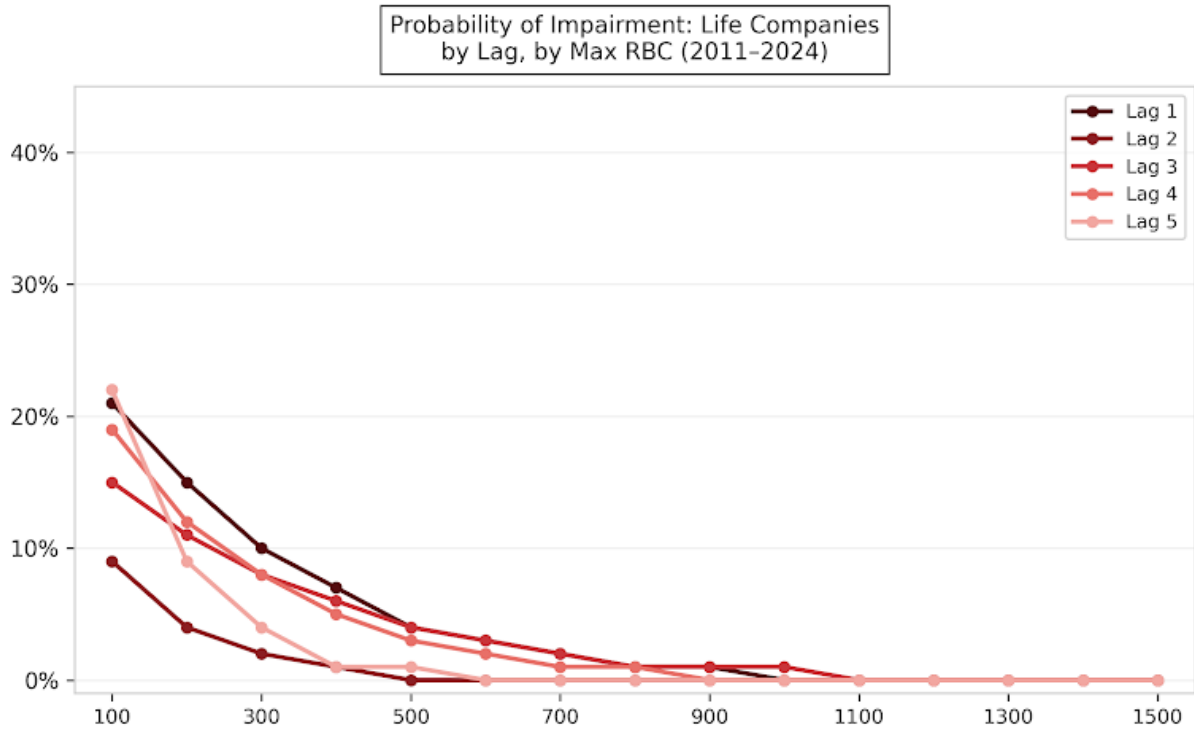




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Life Companies: Probability of Impairment





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Takeaways: Size and Outlier Effects

- Raw RBC ratios carry greater noise, are less helpful
- Size filtering to exclude very large and very small companies reveals patterns
- A predictive power multiplier exists



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Takeaways: Comparison of Time Periods

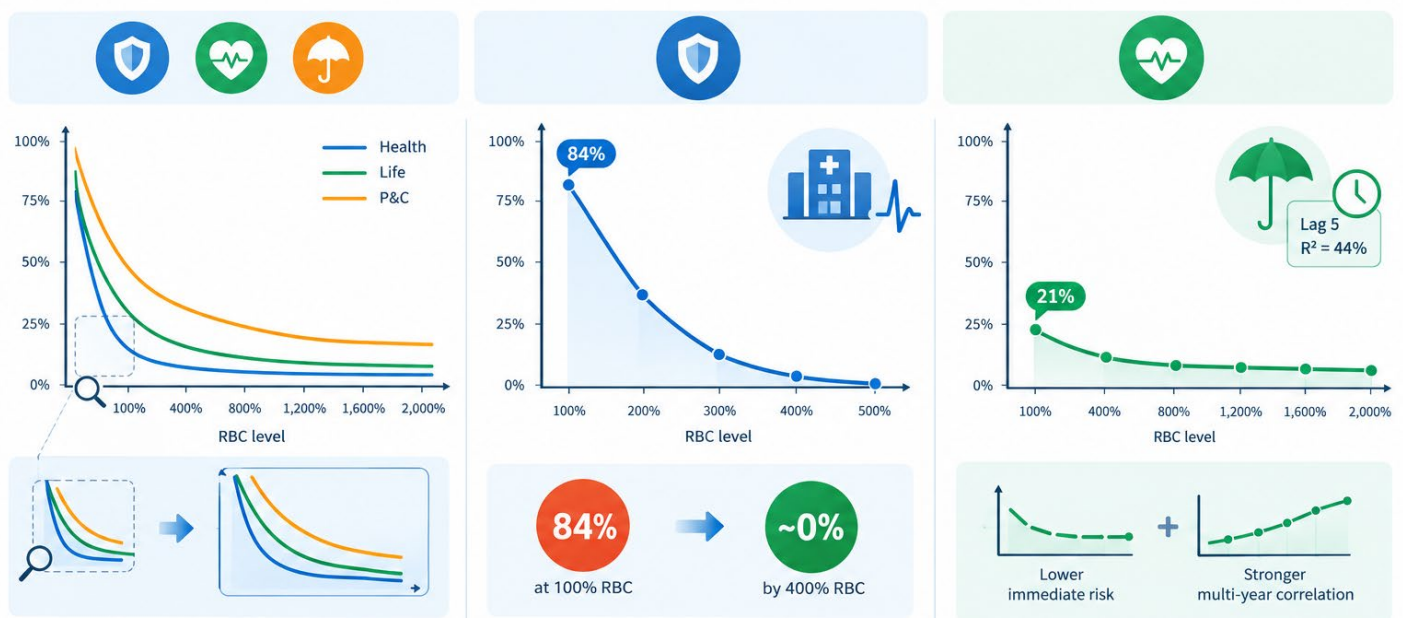
- Post-crisis correlations are more predictive
- The RBC ceiling for predictive value has lowered from ~2,500% to around %1,500
- Impairment probability drops dramatically below ~1,200%



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Takeaways: Sector-specific Impairment Dynamics

- Predicted probabilities steepened at the extremes
- Health risk is acute and immediate
- Life risk is cumulative



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Next Steps

Add 8 control variables identified by the SOA (2018) as likely related to the probability of impairment for regression analysis

- Company Size; Number of Years in Operation; Geographic Concentration; Product Concentration; Growth; Profitability; Liquidity; Investment; and Leverage

Test the final models for all five lags as predictive models

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Questions?

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