Direct Testimony of Leonard F. Herk

I. Qualifications

1. Q: Please state your name and business address.

A: Leonard F. Herk, National Council on Compensation Insurance, Inc., 901 Peninsula Corporate Circle, Boca Raton, Florida 33487.

2. Q. What position do you hold and how long have you been employed by National Council on Compensation Insurance (NCCI)?

A: I am Executive Director and Senior Economist in the Actuarial and Economic Services Division of NCCI and have been employed by NCCI since July 2013.

3. Q: What are your responsibilities at NCCI?

A: My primary responsibility is to organize and conduct economic and financial research at NCCI. The goal is to enhance NCCI's support of a healthy workers compensation marketplace capable of addressing the needs of all its stakeholders on a balanced and equitable basis. Since joining NCCI I have led research projects on impacts of the Affordable Care Act on workers compensation, impacts of the COVID-19 pandemic on labor markets and workers compensation, interstate variations in medical treatment for workers compensation claims, determinants of pricing power in regional hospital markets, quantitative comparison of alternative ratemaking methodologies, and internal rate of return models in the context of ratemaking. My responsibilities also include overseeing NCCI's analysis of the cost of capital and returns on financial assets in the context of internal rate of return analysis for ratemaking.

4. Q: Please provide a summary of your educational background.

A: I received an AB from Cornell University and earned a PhD in economics at the University of Virginia. I also hold a MS degree in computational finance from Carnegie Mellon University.

5. Q: Please provide a summary of your experiences in conducting cost of capital and internal rate of return and related analyses at NCCI.

A: As both a financial economist and professional money manager I have decades of experience with the theory and application of the cost of capital and internal rate of return models. At NCCI I have applied this knowledge to the specific issues related to the use of cost of capital and internal rate of return methodology in determining fair and adequate premium rates. During 2015, I was project leader of a comprehensive review of NCCI's Internal Rate of Return (IRR) Model with the goal of recommending changes to align the Model with modern theory and best practice in finance and economics.

6. Q: Please provide a summary of your employment experiences as they relate to the economics, finance, and actuarial professions prior to joining NCCI.

A: I began my professional career as an assistant professor of economics at Florida State University, and subsequently held appointments in the economics departments at Tulane University and Johns Hopkins University. During the 1990s, I was employed by the Institute on East Central Europe at Columbia University to co-design, co-direct, and teach a Western economics curriculum at the Master's level at Warsaw University, Poland. I have taught courses at undergraduate and graduate levels in micro-economic and macro-economic theory, financial theory, game theory, and the mathematics of optimization. I have published peer-reviewed articles in the *Journal of Economic Theory* and the *RAND Journal of Economics*.

From 2000 to 2012, I worked in the finance industry in several hedge funds and in private equity. I have originated, researched, and managed multi-million dollar investments with a focus on distressed credit situations, financial restructurings, and bankruptcies. I have performed numerous quantitative valuation and risk analyses for companies including manufacturers, energy producers, newspapers, and REITs, and have participated in financial restructurings both for distressed companies and for companies in bankruptcy.

7. Q: Are you a member of any professional associations?

A: Yes. I am a member of the American Economic Association.

II. Estimates of Certain Key Inputs Underlying NCCI's Rate Filing

A. General Considerations

8. Q: Please provide a brief description of NCCI's Internal Rate of Return (IRR) Model and explain how it is used to obtain an indicated profit and contingency factor.

A: NCCI's IRR Model estimates the time series of expected future cash flows – including premiums, losses, expenses, investment income, and taxes – for a representative insurer underwriting workers compensation (WC) coverage in Florida during the current Policy Year. Expected future cash flows are influenced by several key financial inputs – notably the cost of capital, return on invested assets, and the reserve-to-surplus ratio – all of which are assumed to characterize a representative insurer. In addition, expected future cash flows are affected by the profit and contingency factor, a variable which scales up or down the insurer's profitability from any modeled time path of future cash flows. The profit and contingency factor is not selected in advance but is determined by the IRR Model. The *indicated* profit and contingency factor has the property that the present value of expected future cash flows incorporating this factor, discounted at the representative insurer's cost of capital, equals zero. The indicated profit

and contingency factor realizes an all-in rate of return from underwriting that is just equal to the representative insurer's cost of capital.

9. Q: Please describe the concept of a representative WC insurer.

A: NCCI's implementation of its IRR Model relies on the concept of a representative WC insurer. To obtain an indicated profit and contingency factor, NCCI creates inputs to the IRR Model for capital structure (mix of equity and debt in financing), beta (the insurer's enterprise risk in relation to the publicly traded equity market), investment portfolio, and cash surplus holdings (via the reserve-to-surplus ratio). The representative insurer is a hypothetical entity possessing this collection of financial attributes who is assumed to underwrite a comprehensive book of WC coverage in Florida during the current Policy Year.

It is worth emphasizing that the representative WC insurer for whom the IRR Model calculates future cash flows and an indicated profit and contingency factor is fictional, not real. In fact, Florida's WC market contains a variety of insurers with diverse capital structures, investment profiles, and mixes of business. The representative insurer is not intended to be an accurate representation of any existing WC insurer; rather, the representative insurer is a hypothetical entity whose role is to produce profit and contingency indications in scenarios run under the IRR Model that are guidelines for aggregate ratemaking by Policy Year.

10. Q: Please provide an overview of NCCI's current methodology for estimating the future cost of capital and returns to invested assets in the context of the Internal Rate of Return (IRR) Model for ratemaking.

A: NCCI supports two forecasts – static and dynamic – of future rates of return to different asset classes. Since both the cost of capital and the return on investment are built up from projected future rates of return to various asset classes, there are correspondingly both static and dynamic scenarios for the cost of capital and the return on invested assets.

The static forecast assumes that an asset's future rate of return will remain fixed at a rate equal to the current (as of the time the filing is prepared) US Treasury yield at the appropriate maturity plus a historical average spread that is specific to the asset and its term to maturity.

Dynamic asset returns are not constant but vary in future time periods. The dynamic return to an asset in a future time period is a forecast US Treasury yield at the appropriate maturity for that time period plus a historical average asset- and maturity-specific spread. NCCI relies on forecasts from Moody's Analytics of future US Treasury yields across the maturity spectrum.

In both static and dynamic scenarios, future returns for all asset categories relevant to both the cost of capital and investment returns are forecast as historical average spreads to US Treasury debt at appropriate maturities.

Two general observations bear emphasis and apply to both static and dynamic scenarios for future asset rates of return.

First, NCCI forecasts the future rate of return to every asset on a Treasury-plus-spread basis. More specifically, the return to every asset is the sum of the future US Treasury yield at the appropriate maturity plus an asset- and maturity-specific spread that is an average historical spread for the given asset class. Thus, while future US Treasury yields differ between the static and dynamic forecasts, both scenarios apply identical return spreads to US Treasuries. The Treasury-plus-spread convention enforces logical consistency between forecast rates of return for different types of assets, and conceptually distinguishes two determinants of an asset's rate of return: future economic conditions (via static versus dynamic forecasts for US Treasury yields) and different degrees of riskiness across asset classes (via historical average return spreads).

Second, Treasury-plus-spread logic implies that methodologies employed to forecast the cost of capital or future investment returns are focused on estimating *return spreads* for the underlying asset relative to a common

reference set of securities (NCCI uses the yield curve for US Treasury bonds), not on estimating each asset's *nominal return* independently of other assets.

Weighted Average Cost of Capital

NCCI defines the cost of capital to be the weighted average cost of capital (WACC), which is the share-weighted average of the cost of equity capital and debt capital to a representative WC insurer, using share weights for equity and debt in the representative insurer's estimated capital structure.

The cost of equity capital is derived from a standard application of the Capital Asset Pricing Model (CAPM).

The cost of debt capital is the forecast yield to a single debt instrument selected as a proxy for debt in the representative WC insurer's capital structure.

Portfolio of Invested Assets

The investment portfolio for a representative WC insurer is the average investment portfolio held by the companies in AM Best's Commercial Casualty Composite index.

Specific Considerations Relating to Static and Dynamic Asset Returns

The static rate of return to an asset is the actual US Treasury yield at the appropriate maturity yield for a specific time period plus an asset- and maturity-specific spread. A static rate of return is a forecast that is constant in all time periods in the IRR Model.

The dynamic rate of return to an asset is a forecast US Treasury yield at the appropriate maturity for a specific time period in the IRR Model plus an asset- and maturity-specific spread. An asset's dynamic rate of return is not constant but varies with forecast US Treasury rates at different time periods in the IRR Model.

In calculating dynamic rates of return, the updating convention for US Treasury yields differs for investment returns to bonds and common stocks, and also for rates of return relevant to determining the cost of capital.

In the case of bonds held for investment, the dynamic rate of return is modeled on the concept of a coupon bond that is purchased at par, held to maturity, and then re-invested (rolled over). More specifically, when a coupon bond of a given maturity is purchased, its coupon rate is determined from the forecast US Treasury yield at the same maturity plus the appropriate spread. Until the bond matures, periodic interest payments at the coupon rate constitute the (cash) return to investment. When the bond matures, its par value is re-invested (rolled over) into a new bond with the same term to maturity. The new bond is re-couponed at the forecast US Treasury yield as of the original bond's maturity date plus a spread, as before. Rates of return for discount bonds reset similarly on their maturity dates.

In the case of common stocks held for investment, the dynamic rate of return for a given time period is the forecasted yield applicable to that time period for the relevant “risk-free” US Treasury security as per NCCI’s implementation of the CAPM, plus an appropriate equity risk premium. Common stocks held in the investment portfolio are “re-priced” in each time period regardless of the term to maturity for the underlying “risk-free” security. “Re-pricing” means that the “risk-free” rate of return is updated in every future time period for the purpose of calculating the dynamic rate of return to common stock held for investment. Consequently, the dynamic rate of return on common stocks held for investment updates continuously over time, whereas dynamic rates of return on bonds held for investment update periodically at maturity.

All dynamic rates of return relevant to calculating the WACC – comprising financing rates for equity and debt – are updated over successive periods of development time in the IRR Model. Updating the WACC for successive

time periods in the IRR Model is intuitive, since the cost of capital during a given time period is supposed to measure the cost of incremental financing during that period. Note that time updating is applied to both bonds and common stock in the dynamic scenario for the weighted average cost of capital, and follows the same procedure applied to "re-price" dynamic investment returns to common stocks.

11. Q: What analyses have you performed for NCCI's rate filing for workers compensation insurance for Policy Year 2022 in Florida?

A: Using NCCI's current methodology, I have produced updated estimates for a number of key variables that affect NCCI's proposed rates for Policy Year 2022 in Florida.

Estimates in this testimony include:

- the future cost of equity capital.
- the future cost of debt capital
- the future weighted average cost of capital
- the future return on invested assets,
- the future reserve/surplus ratio.
- the profit and contingency factor.

A summary of my findings is provided in Schedule LFH-1.

12. Q: Do NCCI's estimates of any of these key variables include adjustments to net out perceived impacts of COVID-19?

A: No. Data and methods pertaining to the calculation of profit and contingency indications in different scenarios do not incorporate any adjustments or offsets for COVID-19.

B. Equity/Debt Capital Structure

13. Q: How does NCCI estimate equity and debt shares in the capital structure of the representative WC insurer?

A: As shown in Schedule LFH-2 (with detail in Schedule LFH-3), the share of equity in the capital structure of the representative P&C insurer is estimated as the capitalization-weighted average equity share NCCI's reference set of publicly traded P&C insurers, based on balance sheet data and market valuations as of May 2021. The average debt share is obtained by subtracting the average equity share from one.

14. Q: What is your estimated equity/debt split in the capital structure?

A: The equity/debt split for the NCCI reference set of insurers is 84%/16%.

C. Cost of Equity Capital

15. Q: How does NCCI forecast the cost of equity capital?

A: NCCI forecasts the cost of equity capital by applying a standard version of the CAPM in two distinct scenarios. The static scenario assumes that the "risk-free" rate of return is constant in all future time periods; the dynamic scenario allows the "risk-free" rate to vary over time.

NCCI's version of the CAPM requires a "risk-free" rate of return, a market equity risk premium, and a beta coefficient applicable to property and casualty insurers.

NCCI proxies the "risk-free" rate of return as the rate of return to the US Treasury 5-year note. In the static scenario for Policy Year 2022, the "risk-free" rate of return is set equal to the US Treasury 5-year note yield during the first quarter of 2021 and is assumed not to vary thereafter in future. In the dynamic scenario for Policy Year 2022, the "risk-free" rate of return varies according to Moody's forecasts as of April 2021 for yields to the US Treasury 5-year note beginning in the first quarter of 2022 and varying thereafter.

The market equity risk premium (8.50%) is estimated as the difference between the arithmetic average nominal annual return to the S&P 500 index of common stocks (12.17%) and the arithmetic average yield to the US Treasury 5-year note (3.67%) over the last 30 years (from 1991 to 2020).

Estimation of the market equity risk premium reflects a change in methodology. In previous filings, the market equity risk premium was estimated similarly, but as the difference of average annual nominal returns for the S&P 500 index of common stocks and the US Treasury 5-year note over longer period from 1926 to the latest available year. The decision to adopt the shorter averaging period of 30 years was undertaken to allow the equity risk premium to move over time, compatibly with other financial inputs, while also smoothing out year-to-year volatility in annual returns to the S&P 500 index.

NCCI's beta coefficient is the simple average of company beta coefficients for a selection of publicly traded companies doing business in property and casualty lines. Company betas are obtained from Bloomberg; they are derived from weekly stock returns over the three-year period ending in most recent quarter (from the second quarter of 2018 through the first quarter of 2021) and include a Blume-style adjustment. The list of selected companies and their individual betas appears in Schedule LFH-3. The P&C beta obtained by averaging company betas for this group is 0.99.

Schedule LFH-2 shows forecasts for future "risk-free" rates of return, the market equity risk premium, and the beta coefficient applicable to P&C insurers. Also shown is the equity risk premium for property and casualty insurers, which is the product of the market equity risk premium and the averaged beta coefficient for NCCI's reference set of companies.

16. Q: What is the forecast cost of equity capital?

A: As shown in Schedule LFH-2, the forecast cost of equity capital is 9.03% in the static scenario and varies from 10.03% to 11.93% in the dynamic scenario over the 35-year development time horizon of the IRR Model.

D. Cost of Debt Capital

17. Q: How does NCCI forecast the cost of debt capital?

A: NCCI forecasts the cost of debt capital as the sum of the forecast future yield to the US Treasury 10-year note plus a long-term average forward-based spread of US investment-grade corporate debt to US Treasury debt. In the static scenario, the yield on the US Treasury 10-year note is fixed as of the first quarter of 2021. In the dynamic scenario, the US Treasury 10-year note yield varies according to Moody's forecasts as of April 2020 for US Treasury yields beginning in the first quarter of 2022 and varying thereafter. Forward-based spreads of investment-grade corporate debt to US Treasury debt are estimated from historical yield data from 2002 through 2020, the most recent year for which data are available.

In previous filings, NCCI benchmarked the cost of debt capital to the US Treasury 5-year note. NCCI's decision to switch to the 10-year maturity as the benchmark for the cost of debt capital is based on the judgment that this maturity more closely approximates the average duration of debt in the capital structures of companies in NCCI's reference set of companies.

18. Q: What is the forecast cost of debt capital?

A: As shown in Schedule LFH-2, the forecast pre-tax cost of debt capital in the static scenario is 2.74%. In the dynamic scenario, the pre-tax cost of debt capital varies from 3.53% to 5.18% over the 35-year development time horizon of the IRR Model. On a post-tax basis at the 21% corporate tax rate, the cost of debt capital is 2.16% in the static scenario and varies from 2.79% to 4.10% in the dynamic scenario over the 35-year development time horizon of the IRR Model.

E. Weighted Average Cost of Capital

19. Q. What is the forecast weighted average cost of capital (WACC)?

A: In the static scenario, NCCI's indicated WACC is 8.03% on a pre-tax basis for the cost of debt, and 7.93% on a post-tax basis. In the dynamic scenario, the indicated WACC ranges from 8.99% to 10.85% on a pre-tax basis for debt financing, and from 8.87% to 10.68% on a post-tax basis.

F. Return on Invested Assets

20. Q: How does NCCI model the investment portfolio of the representative WC insurer?

A: Portfolio shares for the representative WC insurer are averages of reported asset holdings of companies in AM Best's Commercial Casualty Composite index for the latest three years (2017–2019). The major asset categories are bonds, equities, cash and short-term investments, and all other assets.

Schedule LFH-4 shows portfolio shares and forecast future investment rates of return for major asset categories and subcategories in both the static and dynamic scenarios.

21. Q: How does NCCI forecast future rates of return to invested assets?

A: NCCI forecasts rates of return to invested assets in both static and dynamic scenarios for future US Treasury yields. In both scenarios, forecasts for the cost of capital and for rates of return to different classes of investments are internally consistent with one another.

Pre-tax rates of return for each asset category and maturity are forecast as the sum of the future return for the matched maturity of US Treasury debt, plus a maturity-specific spread for that asset category. Post-tax rates of return are obtained by tax affecting the pre-tax rates of return at estimated tax rates specific to each asset category.

NCCI recognizes four main categories of bonds in the investment portfolio: US Treasury bonds, collateralized securities, tax-exempt bonds (primarily

municipal bonds), and corporate bonds. Future yields to US Treasury bonds are current spot yields (static scenario) or Moody's forecasts (dynamic scenario). Future yields to collateralized securities are forecast as a point spread to yields on US Treasury debt at matching maturities. Future yields to tax-exempt bonds and corporate bonds are forecast as average historical forward-based spreads to yields on US Treasury debt at matching maturities. For tax-exempt bonds and corporate bonds, NCCI estimates average forward-based, maturity-specific spreads to US Treasury debt from historical yield data for the years 2002 through 2020, the latest year for which data are available.

The rate of return to common stock is forecast as the sum of the future return to the US Treasury 5-year note plus the market equity risk premium.

Rates of return to mortgage loans, real estate, and other assets are not forecast separately, but instead are set equal to the average rate of return to the rest of the investment portfolio.

The forecast return for the investment portfolio is the share-weighted return over all assets in the portfolio, reported on a post-tax basis and net of investment expenses.

22. Q: What federal income tax rates are applied to investment income?

A: Schedule LFH-5 presents estimates of federal tax rates on income derived from different categories of invested assets.

The top corporate tax rate applies directly to four asset categories: US Treasury bonds, collateralized securities, unaffiliated corporate bonds, and cash and short-term investment. Tax rates for each of these asset categories are the same at 21%.

Tax-exempt bonds and affiliated corporate bonds are both subject to proration for tax-exempt income at 25%, which results in a final tax rate of 5.25% (= 25% x 21%).

The investment return to preferred stock is assumed to come entirely from qualifying dividends. Of qualifying dividends, 50% is tax-deductible and the remaining 50% is taxable. Accordingly, the tax rate on preferred stock is 13.13% (= 50% x 5.25% + 50% x 21%), where the 5.25% component reflects proration for otherwise tax-exempt income.

The return to common stock is assumed to be partially from capital gains and partially from qualifying dividends. The shares of common stock return attributable to capital gains and dividends are estimated from the long-term historical share averages of both as components of the return to common stock. In this way, the share of common stock return from capital appreciation is 67.2% and the share from dividends is 32.8%. Dividends received from common stock, like dividends from preferred stock, are 50% tax-deductible. Accordingly, the tax rate on common stock is 18.42% (= 67.2% x 21% + 32.8% x 13.13%).

23. Q: What is the forecast post-tax rate of return on investment?

A: In the static scenario, the post-tax investment net rate of return is 1.74%. In the dynamic scenario, the post-tax investment net rate of return varies from 2.40% to 4.07% over the IRR Model's 35-year development time horizon.

G. Reserve-to-Surplus Ratio

24. Q: How does NCCI estimate the reserve-to-surplus ratio?

A: NCCI's estimate of the reserve-to-surplus ratio for a representative WC insurer is obtained as a ratio whose numerator is the sum of unpaid losses plus unpaid loss adjustment expense plus unearned premium reserves, and whose denominator is policyholder surplus. As shown in Schedule LFH-6, these ratios are calculated by calendar year for companies in AM Best's Commercial Casualty Composite *in aggregate* (components in the numerator and denominator are totals for all companies), then averaged over the latest five calendar years (2015–2019). The reserve-to-surplus ratio resulting from this calculation is 1.84.

H. Derivation of the Profit and Contingency Factor

25. Q: How is the information just described used to derive a profit and contingency factor?

A: NCCI's weighted-average cost of capital, return on invested assets, and reserve-to-surplus ratio are utilized in an internal rate of return analysis to derive the proposed profit and contingency factor. Expense provisions and cash flows for premium collection, loss payout, and expense flows are also included in the analysis.

26. Q: What analyses were performed to update the cash flow patterns used in this year's IRR model for Florida?

A: NCCI actuaries used information on the distribution of premium by policy size (along with the pool premium collection rules) for policies written in the voluntary market for workers compensation in Florida to update the premium collection pattern. A monthly premium collection pattern was used to generate a premium collection pattern for a representative set of policies written over twelve months. A policy year loss payout pattern for a 35-year payment horizon was determined based on the experience component included in the rate filing. The expense provisions in the IRR model are those proposed in the present filing.

27. Q: What are your findings regarding indications for the profit and contingency factor?

A: For Florida's voluntary workers compensation insurance market, the indicated profit and contingency provision for Policy Year 2022 is 5.41% in the static scenario for financial inputs (WACC and asset rates of return). In the dynamic scenario for the same financial inputs, the indicated profit and contingency provision is 3.78%. Based on his evaluation of these estimates and the currently approved factor, Mr. Jay Rosen, NCCI's state actuary for Florida, proposes a profit and contingency provision of 1.5% in this year's Florida filing for Policy Year 2022.

28. Q: Does this conclude your testimony?

A: Yes.

Derivation of Profit Factor

Component	NCCI Static	NCCI Dynamic	
		Starting	Ending
Cost of Equity Capital	9.03%	10.03%	11.93%
Cost of Debt Capital (Pre-tax)	2.74%	3.53%	5.18%
Cost of Debt Capital (Post-tax)	2.16%	2.79%	4.10%
Share of Equity Capital	84%	84%	84%
Share of Debt Capital	16%	16%	16%
WACC (Pre-tax Debt Cost)	8.03%	8.99%	10.85%
WACC (Post-tax Debt Cost)	7.93%	8.87%	10.68%
Is Debt Interest Tax Deductible?	Yes	Yes	Yes
Return on Invested Assets (Post-tax)	1.74%	2.40%	4.07%
Reserve-to-Surplus Ratio	1.84	1.84	1.84
	NCCI Static	**NCCI Dynamic**	
Indicated Profit Factor	5.41%	3.78%	

Notes

- For NCCI Static estimates, financial returns in all IRR Model time periods are derived from US Treasury rates during 2021Q1.
- For NCCI Dynamic estimates:

  Starting financial returns (IRR Model time 0.25) are derived from Moody's forecasts for US Treasury rates during 2022Q1.

  Ending financial returns (IRR Model time 35.00) are terminal values derived from Moody's forecasts for US Treasury rates.

Weighted Average Cost of Capital

Component	NCCI Static	NCCI Dynamic	
		Starting	Ending
"Risk-free" Rate of Return	0.62%	1.61%	3.52%
Market Equity Risk Premium	8.50%	8.50%	8.50%
P&C Beta	0.990	0.990	0.990
P&C Equity Risk Premium	8.42%	8.42%	8.42%
Cost of Equity Capital	**9.03%**	**10.03%**	**11.93%**
Pre-tax Cost of Debt Capital	2.74%	3.53%	5.18%
Tax Rate	21.00%	21.00%	21.00%
Post-tax Cost of Debt Capital	**2.16%**	**2.79%**	**4.10%**
Share of Equity Capital	84.00%	84.00%	84.00%
Share of Debt Capital	16.00%	16.00%	16.00%
WACC (Pre-tax Debt Cost)	8.03%	8.99%	10.85%
WACC (Post-tax Debt Cost)	**7.93%**	**8.87%**	**10.68%**

Notes

- Components of the NCCI PY2022 Static and Dynamic CAPM Costs of Equity Capital:
  - "Risk-free" Rate of Return: US Treasury 5-year note yield during 2021Q1 (static) or forecasts for future time periods (dynamic)
  - Market Equity Risk Premium: Arithmetic average annual return to large-cap stocks 1991–2020 – "Risk-free" Rate of Return
  - P&C Beta: average of betas for selected P&C insurers.
    Insurer betas from weekly stock returns for the 3-year period from beginnning of 2018Q2 to end of 2021Q1, Blume-adjusted.
  - P&C Equity Risk Premium: Calculated.
  - Cost of Equity Capital: Calculated
- Components of the NCCI PY2022 Static and Dynamic Costs of Debt Capital:
  - Pre-tax Cost of Debt Capital:
  - (Static) US Treasury 5-year note yield during 2021Q1 + Investment-grade forward rate spread
  - (Dynamic) US Treasury 5-year note yield estimated for future time periods + Investment-grade forward-rate spread
  - Tax rate: Statutory federal income tax rate.
  - Post-tax Cost of Debt Capital: Calculated.
- Components of the NCCI PY2022 Equity/Debt Shares:
  - Share of Equity Capital: Weighted average of market capitalization to total capitalization for NCCI collection of P&C insurers, 2021Q1.
  - Share of Debt Capital: Calculated.

Schedule LFH-3
October 7, 2021

Equity and Debt Shares for Property/Casualty Insurers, NCCI Companies

Ticker	Company Name	($ millions) Total Capitalization	(% of Group) Total Capitalization	Equity Share	Debt Share	Beta
CB	Chubb Limited	$ 86,712	20.0%	82%	18%	1.05
PGR	The Progressive Corporation	61,842	14.2%	90%	10%	0.81
ALL	The Allstate Corporation	44,781	10.3%	77%	23%	1.05
TRV	The Travelers Companies, Inc.	44,376	10.2%	85%	15%	1.07
HIG	The Hartford Financial Services Group, Inc	28,577	6.6%	84%	16%	1.23
MKL	Markel Corporation	19,836	4.6%	79%	21%	1.18
CINF	Cincinnati Financial Corporation	17,502	4.0%	95%	5%	1.04
WRB	W. R. Berkley Corporation	16,871	3.9%	79%	21%	1.04
CNA	CNA Financial Corporation	14,901	3.4%	81%	19%	1.12
RE	Everest Re Group, Ltd.	11,843	2.7%	84%	16%	0.97
AFG	American Financial Group, Inc.	11,829	2.7%	82%	18%	1.42
Y	Alleghany Corporation	10,811	2.5%	81%	19%	1.13
ERIE	Erie Indemnity Company	10,299	2.4%	99%	1%	0.38
RNR	RenaissanceRe Holdings Ltd.	9,669	2.2%	83%	17%	0.99
ORI	Old Republic International Corporation	7,603	1.7%	88%	12%	1.16
KMPR	Kemper Corporation	6,393	1.5%	81%	19%	1.13
AXS	AXIS Capital Holdings Limited	6,195	1.4%	68%	32%	0.95
THG	The Hanover Insurance Group, Inc.	5,467	1.3%	86%	14%	1.00
RLI	RLI Corp.	5,211	1.2%	97%	3%	0.87
SIGI	Selective Insurance Group, Inc.	5,103	1.2%	85%	15%	0.95
MCY	Mercury General Corporation	3,797	0.9%	89%	11%	0.86
XL	XL Group plc	3,118	0.7%	100%	0%	0.43
HCC	HCC Insurance Holdings, Inc.	1,324	0.3%	66%	34%	0.88
GLRE	Greenlight Capital Re, Ltd.	$ 399	0.1%	76%	24%	1.07
	Average (see notes below)	$ 434,459	100.0%	**84%**	**16%**	**0.99**

Notes

- Source: Bloomberg. Company capitalization and equity/debt shares as of May 2021.
- Averages for equity and debt shares are weighted by each company's capitalization share in the group.
- The average beta is a simple average over all companies in the group.

Investment Portfolio and Return on Invested Assets

Asset Description	NCCI Static			
	Portfolio Share	Pre-tax Return	Tax Rate	Post-tax Return
Bonds, of which	**74.3%**	**1.43%**		**1.19%**
U.S. Treasury Bonds	6.7%	0.44%	21.00%	0.35%
Collateralized Securities	8.0%	1.26%	21.00%	1.00%
Tax-Exempt Bonds	22.0%	1.22%	5.25%	1.15%
Corporate Bonds (unaffiliated)	37.4%	1.76%	21.00%	1.39%
Corporate Bonds (affiliated)	0.2%	1.46%	5.25%	1.38%
Stocks, of which	**11.4%**	**8.95%**		**7.31%**
Preferred Stock	0.5%	4.87%	13.13%	4.23%
Common Stock	10.9%	9.12%	18.42%	7.44%
Cash & Short-Term Investment	3.7%	0.05%	21.00%	0.04%
Mortgage Loans	2.4%	*2.43%*	*21.00%*	*1.92%*
Real Estate	0.5%	*2.43%*	*21.00%*	*1.92%*
All Other Assets	7.6%	*2.43%*	*21.00%*	*1.92%*
Total Gross Investment Return	**100.0%**	**2.34%**		**1.92%**
Investment Expense		-0.23%	21.00%	-0.18%
Total Net Investment Return		**2.11%**		**1.74%**

Notes

- Bond and total portfolio distribution is a 3-year average of net admitted assets for insurers in the Commercial Casualty Composite as reported in Best's Aggregates and Averages--Property-Casualty, Column 3, Net Admitted Assets (2018, 2019, and 2020 Editions).
- For Static estimates, asset returns for all IRR Model time periods are derived from U.S Treasury rates during 2021Q1.

Asset Description	NCCI Dynamic					
	Portfolio Share	Starting Pre-tax Return	Ending Pre-tax Return	Tax Rate	Starting Post-tax Return	Ending Post-tax Return
Bonds, of which	**74.3%**	**2.23%**	**4.21%**		**1.86%**	**3.51%**
U.S. Treasury Bonds	6.7%	1.11%	3.29%	21.00%	0.88%	2.60%
Collateralized Securities	8.0%	2.06%	4.03%	21.00%	1.63%	3.18%
Tax-Exempt Bonds	22.0%	2.06%	3.92%	5.25%	1.95%	3.71%
Corporate Bonds (unaffiliated)	37.4%	2.57%	4.59%	21.00%	2.03%	3.62%
Corporate Bonds (affiliated)	0.2%	2.29%	4.44%	5.25%	2.17%	4.20%
Stocks, of which	**11.4%**	**9.94%**	**11.84%**		**8.12%**	**9.68%**
Preferred Stock	0.5%	5.86%	7.77%	13.13%	5.09%	6.75%
Common Stock	10.9%	10.11%	12.02%	18.42%	8.25%	9.80%
Cash & Short-Term Investment	3.7%	0.18%	2.72%	21.00%	0.14%	2.15%
Mortgage Loans	2.4%	*3.27%*	*5.37%*	*21.00%*	*2.58%*	*4.24%*
Real Estate	0.5%	*3.27%*	*5.37%*	*21.00%*	*2.58%*	*4.24%*
All Other Assets	7.6%	*3.27%*	*5.37%*	*21.00%*	*2.58%*	*4.24%*
Total Gross Investment Return	**100.0%**	**3.14%**	**5.15%**		**2.58%**	**4.24%**
Investment Expense		-0.23%	-0.23%	21.00%	-0.18%	-0.18%
Total Net Investment Return		**2.91%**	**4.92%**		**2.40%**	**4.07%**

Notes

- Bond and total portfolio distribution is a 3-year average of net admitted assets for insurers in the Commercial Casualty Composite as reported in Best's Aggregates and Averages--Property-Casualty, Column 3, Net Admitted Assets (2018, 2019, and 2020 Editions).
- For Dynamic estimates, starting asset returns (at IRR Model time 0.25) are derived from Moody's forecasts for U.S. Treasury rates during 2022Q1.
- For Dynamic estimates, ending asset returns (at IRR Model time 35.00) are terminal values derived from Moody's forecasts for U.S. Treasury rates.

Tax Rates on Different Categories of Invested Assets

NCCI	
Asset Description	**Tax Rate**
Bonds, of which	
U.S. Treasury Bonds	21.00%
Collateralized Securities	21.00%
Tax-Exempt Bonds	5.25%
Corporate Bonds (unaffiliated)	21.00%
Corporate Bonds (affiliated)	5.25%
Stocks, of which	
Preferred Stock	13.13%
Common Stock	18.42%
Cash & Short-Term Investment	21.00%
Mortgage Loans	*21.00%*
Real Estate	*21.00%*
All Other Assets	*NA*

Reserve-to-Surplus Ratio
$ billions

Year End	(1) Unpaid Losses	(2) Unpaid Loss Adjustment Expense	(3) Unearned Premium	(4) Policyholder Surplus	(5) Ratio excl. Unearned Premium {(1)+(2)} /(4)	(6) Ratio incl. Unearned Premium {(1)+(2) +(3)}/(4)
2019	$ 201.634	$ 45.254	$ 88.026	$ 177.424	1.39	1.89
2018	$ 198.071	$ 43.050	$ 84.425	$ 169.658	1.42	1.92
2017	$ 194.692	$ 42.697	$ 77.537	$ 171.665	1.38	1.83
2016	$ 186.424	$ 41.741	$ 72.717	$ 169.831	1.34	1.77
2015	$ 185.919	$ 42.816	$ 73.469	$ 169.017	1.35	1.79
2015 - 2019	$ 966.742	$ 215.558	$ 396.174	$ 857.595	1.38	1.84

Selected Ratio including Unearned Premium: 1.84

Notes

Source: Columns (1) - (4) for the latest year are taken from Liabilities, Surplus and Other Funds in Best's 2020 Aggregates & Averages, for Commercial Casualty Composite.