

Personal Taxes, Cost of Insurer Equity Capital, and the Case of Offshore Hedge Fund Reinsurers

by

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Abstract:

Insurance companies have large holdings of financial securities that generate returns that are taxed at both the corporate and personal levels in the U.S. If the same securities were held by a pass-through entity such as a mutual or hedge fund, the returns would be taxed only at the personal level, which implies a corporate tax disadvantage of holding assets in an insurer. There is, however, a personal tax advantage of holding some securities with an insurer. This paper examines the implications of personal taxes for an insurer's tax cost on equity capital and how the tax costs have varied over time under different tax regimes and how they vary with different asset portfolios. The paper also discusses offshore hedge fund reinsurers, which provide an interesting case study illustrating the relevance of personal taxes.

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1. Introduction

Over the past two decades, a small number of hedge funds invested capital in offshore reinsurance operations, and also became the reinsurer’s primary asset manager.¹ These offshore hedge fund reinsurers (OSHFRs) were typically extremely well capitalized, with some having insurance liabilities valued at less than 10 percent of the value of assets.² The likely explanation for this flow of hedge fund capital into the reinsurance industry is the reduction in the personal taxes that the investors paid on the reinsurer’s investment income relative to what they would have paid if the same investment income was earned by a standalone hedge fund.³ If indeed savings on personal taxes motivates capital flows into the reinsurance/insurance industry, then personal taxes must be a determinant of the cost of equity capital for re/insurers. While several papers have analyzed how corporate taxes affect insurers’ cost of equity capital (e.g., Myers and Cohn, 1987; Derrig, 1994; Harrington and Niehaus, 2003; Gatzert and Schmeiser, 2008), the literature pays minimal attention to personal tax issues when analyzing the cost of insurer equity capital.⁴ The main purpose of this paper is to analyze the tax costs of insurer equity capital, focusing on personal taxes and to show how the tax costs have changed over time and depend on an insurer’s asset allocation. In addition, descriptive evidence about offshore hedge fund reinsurers (OSHFRs) is presented as a case

¹ The investment can take multiple forms, including the purchase of a reinsurer or a joint venture with a reinsurer. Later in the paper, I discuss some individual cases. Also, see the Joint Committee on Taxation (2014), EY (2014), and Robertson (2015) for descriptions of some offshore hedge fund reinsurers. Two public OSHFRs that have received considerable press are Greenlight Re and Third Point Re.

² Traditional property-liability reinsurers typically have liabilities equal to about 60-75 percent of assets. As an example, between 2016 and 2020, Swiss Re had an average liability to asset ratio of 75 percent.

³ Another possible motivation is that these transactions allow hedge funds to use the “float” of a reinsurer as leverage for the asset portfolio. However, the “float” explanation does not correspond with the limited leverage of most OSHFRs. For example, Third Point Re’s insurance liabilities were less than 20% of assets from 2014-2017, which is substantially lower than traditional re/insurers. Another possible explanation is that these transactions are motivated by inefficiencies in the product market, i.e., they provide an opportunity to earn economic profits from the underwriting side of the business. This explains why capital would enter the industry, but not explain why capital would enter in the form of OSHFRs.

⁴ Harrington and Niehaus (2003) have a short section analyzing personal taxes. A number of articles mention tax benefits (e.g., Hartwig and Lynch, 2015), but do not formally analyze it.

study of the relevance of personal taxes.⁵ Since OSHFRs are an example of what is sometimes called “alternative capital” in the reinsurance industry, the paper also investigates the personal tax treatment of other forms of alternative capital, such as side cars, collateralized reinsurance, and insurance linked securities (catastrophe bonds). The use of alternative capital has increased steadily over the past 20 years and now represents about 15 percent of reinsurance capital in the world (AON, 2020).

Central to the analysis is the different tax treatment of returns on an asset portfolio if that portfolio is held by a U.S. hedge/mutual fund versus a U.S. re/insurer. For a U.S. re/insurer, the returns on its asset portfolio are subject to both corporate taxes and personal taxes. In contrast, hedge/mutual funds do not pay corporate tax on the fund’s earnings; instead, the investors (limited partners in the case of a hedge fund) are only taxed at the personal level. This difference is the corporate tax disadvantage of investing in assets via an insurance company relative to a hedge/mutual fund; it has been a focal point of studies on the tax costs of re/insurers’ capital.

There are also differences in the personal tax treatment of returns on an asset portfolio that is held by a hedge/mutual fund versus an insurer. Investment returns from a hedge/mutual fund pass through to investors and are taxed as they are realized, which implies that annual interest and realized short-term capital gains are taxed at the income tax rate, and qualified dividends and realized long-term capital gains are taxed at the lower long-term capital gains rate. In contrast, investment returns earned by a re/insurer are taxed at the personal level when the returns are distributed via a dividend or when the investors sell their shares. In either case (assuming the dividends are qualified and the investor holds the shares for more than a year), all investment returns on an insurer’s assets are taxed at the lower long-term capital gains rate. Thus, one difference between a re/insurer and a hedge/mutual fund is that interest and short-term capital gains for a re/insurer are taxed at the long-term capital gains rate, but taxed at the higher income tax rate for a hedge/mutual fund. This is the personal tax advantage of investing via a re/insurer compared to a

⁵ The term “hedge fund reinsurer” is used here even though most of the points would apply to hedge fund insurers, as well. Another name that is sometimes used is “total return reinsurers.”

hedge/mutual fund, which reduces the tax costs of insurer capital provided insurers invest in assets that generate interest or realized short-term capital gains.

In addition to considering the effect of personal taxes on after-tax asset returns, the analysis also incorporates how personal taxes influence the after-tax costs of financial leverage for insurers compared to hedge funds. Note that financial leverage for insurers primarily comes from issuing policies, and that the underwriting losses on those policies are analogous to the interest payments on the debt issued by hedge funds. Hedge fund investors can generally deduct the interest expense incurred by their hedge fund, implying a tax shield on interest expense at the personal level. Re/insurer underwriting losses/profits are taxed at the corporate level and also when they are distributed to shareholders, implying a tax shield at both the corporate and personal level. Studies that do not incorporate personal taxes ignore the tax shields at the personal level for both hedge funds and insurers. The net effect of incorporating personal taxes on the after-tax costs of financial leverage therefore depends on whether the total tax shield is greater for insurer investors or hedge fund investors, which depends on the values of the corporate tax rate, the long-term capital gains rate, and the income tax rate.

To approximate the impact of personal taxes on the cost of capital, I use a simple one-period framework. There are three main implications of the analysis. First, incorporating personal taxes has a material impact on the estimated magnitude of the tax cost on insurer capital. Second, the magnitude of the effect of incorporating personal taxes depends on an insurer's asset allocation and the time-period examined, where the latter effect is simply because tax rates vary over time. To illustrate, assume that the risk-free return equals two percent and that the expected before-tax rate of return on other asset returns is the same across asset classes and equal to four percent.⁶ Finally, assume an insurer's financial leverage – its liability to equity ratio – equals two. Then, the framework implies that for an insurer that invests all its assets in securities that generate interest or realized short-term capital gains, the impact of incorporating personal taxes during the 1993-2021 period is to *lower* the tax cost of capital by between 2.1 and 3.0 percent

⁶ Of course, expected before-tax asset returns are not equal across asset classes, but the “all else equal” assumption allows one to identify the tax advantages and disadvantages of different types of assets.

on each dollar of capital. This is a significant impact on the annual cost of equity capital for an insurer. The impact of incorporating personal taxes changes sign if an insurer invests all its assets in securities that generate qualified dividends or long-term capital gains. In these cases, the effect of incorporating personal taxes is to *increase* the tax cost on each dollar of capital by between 1.1 and 1.6 percent, depending on the period examined.

Third, using the assumptions above, the total federal tax costs on insurer capital is close to zero after enactment of the Tax Cuts and Jobs Act (TCJA) of 2017 if an insurer takes full advantage of the personal tax advantage by investing only in securities that generate interest income or realized short-term capital gains.⁷ This is because, the TCJA lowered the corporate tax rate to 21 percent, which made the corporate tax disadvantage of investing in an insurer about equal to the personal tax advantage of investor in an insurer. These results are interesting in light of the papers that emphasize the tax costs of capital (e.g., Harrington and Niehaus, 2003) or use tax costs as one of the motivating forces for insurers to economize on capital (e.g., Froot, 2007). Of course, there are other frictional costs of raising and holding capital, such as agency costs and asymmetric information costs, which cause insurers to economize on capital.

As introduced earlier, offshore hedge fund reinsurers (OSHFRs) provide an interesting example of the relevance of personal taxes for the cost of insurer equity capital. To further explain the motivation for setting up an OSHFR, consider two unrelated entities: a reinsurer that has a “traditional” reinsurer balance sheet with a liability to equity ratio equal to two and a hedge fund that uses an investment strategy that mostly generates short-term capital gains. Now suppose that the hedge fund contributes part of its asset portfolio to the insurer in return for equity claims in the reinsurer. As a result, the insurer’s liability to equity ratio declines substantially, say to 25 percent, which makes the reinsurer extremely well capitalized. The hedge fund continues to manage the assets that it contributed to the reinsurer. If the IRS treats the combined entity as a reinsurer, then the investment returns on the entire asset portfolio obtain the personal

⁷ Some states also tax equity returns, which is ignored in this analysis. Also, there are non-tax considerations that could lead insurers not to take full advantage of the personal tax advantage, including risk and expected return tradeoffs and asset-liability matching issues.

tax advantage associated with an investment via an insurer. If the combined entity is located offshore in a jurisdiction with a zero corporate tax rate (e.g., Bermuda), then the investors obtain the personal tax advantage without incurring the corporate tax disadvantage. The net effect is that the marginal tax cost of capital from hedge fund investors is negative.⁸ The more hedge fund capital that can be placed in this advantageous tax setting, the greater the personal tax savings. Thus, there is an incentive to operate with a low ratio of insurance liabilities to equity.

The personal tax advantage of investing in offshore reinsurance vehicles depends on the differential between the long-term capital gains tax rate and the income tax rate. Since the 2017 tax reform did not substantially change these rates, the 2017 tax reform does not have a large direct impact on the tax benefits to hedge fund investors of creating an OSHFR. However, the lower U.S. corporate tax rate after 2017 likely reduces the competitiveness of OSHFRs compared to U.S. domiciled insurers. Also, the law changed the legal definition of a controlled foreign corporation (CFC) and imposed minimum insurance leverage ratio requirements to be treated as an insurer, as opposed to a passive foreign investment company (PFIC). Both changes, which I discuss below, make OSHFRs less attractive in the current environment.

OSHFRs have characteristics of what is often called alternative insurance capital, i.e., insurer capital that is provided in non-traditional ways, often by institutional investors. Other examples of alternative insurance capital are catastrophe bonds, side cars, and collateralized reinsurance. In most cases, these transactions use offshore entities and have insurance liabilities that are fully collateralized, i.e., assets are equal to the maximum potential loss on the liabilities. Alternative capital has grown from virtually zero in 1998 to about \$97 billion or about 15 percent of total reinsurance capital at the beginning of 2021 (AON, 2021). Insurance vehicles that are fully collateralized do not take advantage of diversification like traditional reinsurers and therefore these alternative capital arrangements hold much higher amounts of capital per dollar of expected claims than traditional insurers. As Lakdawalla and Zanjani (2012) highlight, this inefficiency in the quantity of capital must be made up by having lower frictional costs per dollar of

⁸ Again, there are other costs and risks associated with creating an OSHFR, such as transaction and reputation costs, which can offset the tax benefits.

capital than traditional equity (or subordinated debt) capital of traditional reinsurers. I therefore explore whether personal taxes is the source of the lower frictional costs. I find that, while personal taxes may have motivated some of these transactions, personal taxes do not explain most of the alternative capital arrangements. Furthermore, the 2017 tax reform, as mentioned above, makes it even more likely that alternative capital arrangements will not obtain the personal tax benefit going forward.

The paper contributes to the literature on the impact of personal taxes on corporate financial decisions (Graham, 2003). Miller (1977) highlights that corporate bond returns are taxed at a higher personal rate than equity returns, and therefore the corporate tax advantage of debt financing is offset, at least in part, by the personal tax disadvantage of investing in debt securities, all else equal. Here, the important distinction is the difference in the tax treatment of organizational forms. A corporation can convert interest and short-term capital gains realized on securities into qualified dividends or long-term capital gains, but a pass-through organization like a mutual fund or hedge fund cannot. Consequently, there is a personal tax advantage to an equity investment in a corporation that has assets that generate interest income or short-term capital gains compared to an investment in a pass-through organization that generates the same interest income and short-term capital gains. This tax advantage lowers the cost of equity capital for corporations and therefore decreases financial leverage, which for re/insurers means a lower ratio of insurance liabilities to assets.

Conceptually, the personal tax advantage of holding securities in a corporate organization, as opposed to a pass-through organization, applies to any corporation. However, for most corporations (insurers being an exception), financial securities make up a small percentage of their assets and so the personal tax advantage is not likely to be of great importance. One potential exception is that some large corporations that hold substantial amounts of short-term securities (i.e., cash). When deciding how much cash to hold, theory implies that firms tradeoff the corporate tax and agency costs of holding cash against the liquidity and financial flexibility benefits of holding cash (see e.g., Opler, Pinkowitz, Stulz, and Williamson, 1999). The framework developed here implies that personal taxes provide another benefit of

holding interest bearing securities in a corporate entity. Indeed, the calculations in the paper indicate that the net federal tax costs of holding cash is essentially zero under the 2017 tax reform.

The paper also contributes to the literature on the supply of insurance by analyzing the cost of an important input needed to provide insurance coverage -- capital. Other recent papers related to the supply of insurance include Kojien and Yogo (2015, 2016, 2022), Ge (2021), and Tomunen (2019). Specifically, the paper addresses the gap in the literature regarding the impact of personal taxation on the cost of insurer capital and its implications for insurers' asset management. The paper also contributes to our understanding of explanations for why alternative capital arrangements have developed in the past few decades.

2. Conceptual Framework for the Tax Cost of Insurer Equity Capital

2.1 Cost of Insurer Equity Capital

I use a single period framework to analyze the tax cost of equity capital for a U.S. insurer.⁹ At the beginning of the period, the insurer issues policies with premiums equal to P , raises equity capital equal to K , and invests the premiums and capital in a portfolio of financial assets, which has an expected return equal to R_A . Assume that L equals the expected claim costs to be paid on the policies at the end of the period. The amount of capital, K , can be viewed as the result of a regulatory constraint or due to residual uncertainty in claims costs and the capital helps to ensure that the insurer's promise to pay claims is credible.¹⁰ Also assume that the uncertainty in claim costs is uncorrelated with priced risk factors.¹¹ At the end of the period, the insurer pays the claims and distributes the remaining funds to the equity holders. For

⁹ The analysis would apply to other jurisdictions with a similar tax structure. Of course, parameter values (e.g., tax rates) would vary by jurisdiction.

¹⁰ The purpose here is to analyze the cost of holding capital and so the amount of capital is assumed to be exogenous. Once the costs of holding capital are determined, the insurer would choose capital by trading off the cost of capital versus the benefits of capital.

¹¹ Relaxing this simplifying assumption would add a risk premium associated with bearing the risk of insurer liabilities but would not change the main points of the paper. See Tomunen (2019) for evidence on the correlation of catastrophe losses with market returns and therefore pricing of insurer liabilities. He also presents evidence that cat bond expected returns can be explained by intermediaries (ILS funds) being the marginal investor and constrained in the amount of capital that they can raise, which therefore causes catastrophe sector risk to be priced.

simplicity, I ignore administrative costs and the possibility of insolvency. Table 1 summarizes the notation and variable definitions.

In this framework, the expected value of claims, L , the amount of equity capital, K , and the expected portfolio return, R_A , are exogenous. The objective is to find the cost of equity such that equity capital providers obtain a competitive expected return, i.e., the same after-tax expected return as they would have received by investing in a hedge fund with the same leverage and same asset portfolio. In other words, investors have a choice between placing their savings with a hedge fund or with an insurer. The hedge fund invests the investors' capital contributions as well as the funds that it borrows with the expectation of a before-tax rate of return equal to R_A . The insurer is also a levered investment vehicle: it borrows funds by issuing policies and takes those funds along with contributed equity capital and invests in the same asset portfolio as the hedge fund. The present value of the insurer's expected claim costs, $L/(1+r_f)$, is analogous to the face value of the debt used by the hedge fund. The insurer's premium revenue, P , is analogous to the proceeds from issuing debt.¹² The competitive nature of the capital market implies that any additional taxes paid by insurer investors compared to hedge fund investors must be offset by higher before-tax expected returns to insurer investors. Otherwise, the insurer would not be able to attract capital to supply the insurance. The source of these higher expected returns are the policyholders, i.e., they pay higher premiums.

Assume that the premium revenue, P , equals the present value of expected claim costs plus a loading that is proportional to the amount of capital:

$$P = L/(1+r_f) + \rho K . \tag{1}$$

In general, the capital costs (ρK) arise because of market imperfections, with taxes being the focus of this analysis. Thus, the goal of this analysis is to relate ρ to taxes.

¹² A potential objection to the framework is that the debt issued by insurers in the form of policyholder liabilities is the same as debt issued by a hedge fund (or borrowed on personal account if the hedge fund is not levered). More specifically, the insurer "debt payments" are more uncertain. As noted previously, adding a risk premium associated with claim costs would not likely change the main points.

The expected underwriting profit is the difference between the premium, P, and the expected payment to policyholders at the end of the year, L:

$$\text{Expected Underwriting Profit} = P - L = \rho K - \frac{r_f L}{(1+r_f)} . \quad (2)$$

If $\rho = 0$, the expected underwriting profit is negative and equal to the risk-free rate, r_f , on the amount “borrowed” from policyholders, $L/(1+r_f)$.

I now introduce taxes. Assume τ_A^I equals the total effective tax rate (both corporate and personal) on the expected asset returns, where the superscript I indicates it is the effective tax rate for the shareholders of the insurer. The rate τ_D^I equals the total effective tax rate (both corporate and personal) on the insurer’s expected underwriting profits/losses, where the subscript “D” refers to the insurer’s debt, i.e., the present value of its expected claim costs. Both tax rates will be explained in more detail in the next section. The end of period, after-tax expected cash flows to the insurer’s equity holders equal

$$(K + P)(1 + R_A) - L - (K + P)R_A \tau_A^I - \left[\rho K - \frac{r_f L}{(1+r_f)} \right] \tau_D^I . \quad (3)$$

{exp. value of assets} - {exp. claim costs} - {exp. taxes on asset returns & underwriting profits}

The expected after-tax rate of return for the insurer’s equity holders (R_E^I) is found by subtracting K from the expected cash flows (given by expression (3)) and dividing by K, yielding:

$$R_E^I = R_A (1 - \tau_A^I) + \frac{L}{(1+r_f)K} [R_A (1 - \tau_A^I) - r_f (1 - \tau_D^I)] + \rho [R_A (1 - \tau_A^I) + (1 - \tau_D^I)] . \quad (4)$$

In a perfect market (tax rates equal to zero), the markup would be zero ($\rho = 0$) and the expected equity return simplifies to the familiar MM Proposition II (Modigliani and Miller, 1958) for a levered firm:

$$R_E^I = R_A + \frac{L}{(1+r_f)K} (R_A - r_f) , \quad (4')$$

where $\frac{L}{(1+r_f)K}$ is the debt-to-equity ratio. In the remainder of the paper, I use λ to indicate the leverage

ratio: $\lambda = \frac{L}{(1+r_f)K} .$

For an investor to make an equity investment in an insurer, he or she must expect a return equal to what could be earned on a comparable risky investment, i.e., a hedge fund with the same asset portfolio as the insurer and that is levered to the same extent as the insurer.¹³ Assume that the effective tax rate on the asset returns of a hedge fund is equal to τ_A^H , which will be described in the next section. Also assume that the hedge fund's interest expense on its borrowing is the risk-free rate and is tax deductible at the personal level at the income tax rate τ_D^H .¹⁴ Then the expected return on an equity investment in the hedge fund would be

$$R_E^H = R_A (1 - \tau_A^H) + \lambda [R_A (1 - \tau_A^H) - r_f (1 - \tau_D^H)]. \quad (5)$$

The first term is the expected after-tax return on the assets if the fund were unlevered and the second term is the additional after-tax expected return from the fund's leverage.

Equating the two expected rates of return ($R_E^I = R_E^H$) given by equations (4) and (5) and solving for ρ yields:

$$\rho = \frac{(\tau_A^I - \tau_A^H)[1 + \lambda] R_A - (\tau_D^I - \tau_D^H) \lambda r_f}{[R_A(1 - \tau_A^I) + (1 - \tau_D^I)]} . \quad (6)$$

This expression gives the tax costs for each dollar of equity capital that the insurer holds. Note the two tax terms in the numerator, which indicate that, all else equal, (1) the tax costs increase as the difference in the total effective tax on asset returns when held by an insurer versus a pass-through entity, $(\tau_A^I - \tau_A^H)$, increases, and (2) the tax costs decrease as the difference in the interest tax shield for the insurer (via its underwriting activities) and the interest tax shield for investors in the pass-through entity, $(\tau_D^I - \tau_D^H)$, increases. Notice that if the tax rates are the same across entities and across types of returns, the capital cost, ρ , equals zero.

¹³ Alternatively, an investor can invest in a hedge/mutual fund/P-E fund with different leverage and adjust the leverage on personal account so that the total leverage is the same as the insurer.

¹⁴ The analysis ignores Internal Revenue Code Section 163(d), which limits the deductibility of interest expense for limited partners to be less than net investment income. For more details, see Pacello and Makalli (2021) and David (2019).

2.2 The Effective Tax Rates

The tax cost on insurer equity capital, which is given by equation (6) above, depends on two tax terms. First, the term $(\tau_A^I - \tau_A^H)$ captures the difference in the tax treatment of asset returns through a hedge fund versus an insurance company. Second, the term $(\tau_D^I - \tau_D^H)$ captures the difference in the tax treatment of insurer borrowing (by issuing insurance policies) versus hedge fund borrowing. This section examines each of these quantities.

2.2.1 Different Tax Treatment of Borrowing.

For a hedge fund's limited partners, the interest expense incurred by the hedge fund is tax deductible at the personal level using income tax rate, τ_S . The financial leverage for insurers is obtained by issuing policies and the expected underwriting profits/losses is the analogous interest expense. The insurer pays the corporate tax rate, τ_C , on each dollar of underwriting profits/losses when the profits are earned.¹⁵ The insurers' shareholders pay personal tax when they receive these profits/losses, which I assume is either in the form of a qualified dividend or as a long-term capital gain, which makes underwriting profits taxable at the personal level using the long-term capital gains rate, τ_L . For simplicity, I ignore the deferral of long-term capital gains and assume that the amount that would be received in the future as a long-term capital gain is taxed in the current period at the long-term capital gains rate. Consequently, a dollar of underwriting profits/losses yields $\$(1-\tau_C)(1-\tau_L)$ after taxes, which implies an effective total tax rate on underwriting profits/losses equal to

$$\tau_D^I = \tau_C + \tau_L(1 - \tau_C).$$

Intuitively, underwriting profits are taxed twice, once at the corporate level (the first term) and then at the personal level (the second term), where the tax at the personal level is on the after-corporate tax amount.

The difference between the effective tax rate on an insurer's underwriting profits/losses and the tax rate on a hedge fund's interest expense is therefore

$$(\tau_D^I - \tau_D^H) = \tau_C + \tau_L(1 - \tau_C) - \tau_S. \quad (7)$$

¹⁵ I ignore limits on the ability to carryforward and carryback provisions.

Table 2, Panel A provides U.S. tax rates over four different time periods from 1993 to 2022, and Panel B reports the difference between τ_D^I and τ_D^H . Using tax rates effective prior to 2018, there is a positive difference in effective tax rates ($\tau_D^I - \tau_D^H > 0$), which implies that leverage using insurer liabilities created greater tax shields than the equivalent amount of leverage for hedge funds. This in turn implies that the after-tax cost of borrowing via policyholders was lower for insurers, holding the before-tax borrowing rate (expected underwriting profits/losses) constant. The difference in effective tax rates was at a high of 9.75 percent between 2003 and 2012. In contrast to the past, under the current tax regime, the difference in effective tax rates is -1.0 percent. Thus, under the TJIA of 2017, there is a relatively small tax disadvantage of using insurer liabilities to leverage an asset portfolio. The marginal impact of this change is to increase the cost of insurer capital, all else equal. In the framework used here, the higher capital costs are borne by policyholders.

2.2.2 Different Tax Treatment of Asset Returns.

The Underlying Asset Portfolio. To analyze how the tax treatment of the returns on the financial assets of a hedge fund differs from that of an insurer, I first describe the assumptions about the type of returns that the portfolio generates. The total before-tax expected investment return, denoted by R_A , is divided into the six components listed below, with the proportion of the total return denoted in parentheses. The parameters α , β , κ , and $(1 - \alpha - \beta - \kappa)$ give the percentage of the total return that is in the form of interest, dividends, short-term capital gains, and long-term capital gains, respectively. The parameters π_S and π_L are the proportions of short-term and long-term capital gains that are realized during the year.

- (1) interest (α),
- (2) dividends (β),
- (3) realized short-term capital gains ($\pi_S\kappa$),
- (4) unrealized short-term capital gains ($(1 - \pi_S)\kappa$),
- (5) realized long-term capital gains ($\pi_L(1 - \alpha - \beta - \kappa)$), and
- (6) unrealized long-term capital gains ($(1 - \pi_L)(1 - \alpha - \beta - \kappa)$).

Taxation of Insurer Asset Returns. Regardless of the form of returns, I assume that an insurer incurs corporate tax (τ_c) on the entire return, except for dividends that are subject to the Dividend Received Deduction (DRD). The DRD is incorporated by assuming that ε percent of dividends are excluded from corporate taxes, leaving $(1-\varepsilon)$ subject to corporate taxes.¹⁶ In practice, corporate taxes would be incurred in the current year on realized returns and in the future for unrealized returns. For simplicity, I assume that the present value of the future corporate tax on unrealized returns is equal to the amount of corporate tax that would be paid in the current year if the returns were realized in the current year. This simplification allows the analysis to be conducted using a single period at the expense of ignoring the benefit of tax deferral.¹⁷

To calculate the personal taxes on an insurer's asset portfolio, assume that the realized investment returns (components 1, 2, 3, and 5) that are distributed to shareholders are done through a qualified dividend, which makes them taxable at the long-term capital gains rate. The returns generated in the current period that are unrealized (components 4 and 6) and the realized returns that the insurer does not distribute to shareholders are reinvested in the portfolio. The investor would receive these returns when he or she sells the shares in the future and would be taxed at that time at the long-term capital gains tax rate. Thus, regardless of the origin of the investment returns (whether from interest, dividends, etc.), the investment returns to an insurer investor are taxed at the long-term capital gains rate. Again, to simplify to a single period analysis, I assume that the returns not distributed to shareholders in the current year are taxed in the current year at the long-term tax rate.

¹⁶The tax reform in 2017 changed the dividend exclusion from 70 percent to 50 percent. When combined with the corporate tax rate drop from 35 percent to 21 percent, the net corporate tax on dividends remained at 10.5%, because $(1-0.7) \times 0.35 = (1-0.5) \times 0.21 = 0.105$ or 10.5%. Limits on the dividend received deductions are ignored for simplicity.

¹⁷Consequently, the model understates the actual tax benefits from not distributing returns. For example, if the annual expected non-distributed before personal tax return is 10% each year for five years, and the long-term tax rate is 15%, then the model would yield an after-tax annual return equal to 8.5%; whereas the actual annual return would equal 8.7%. The difference is due to the compounding of before-tax returns over the five-year holding period and the deferral of tax for five years. In addition, the model ignores any value from tax-loss timing options. See Constantinides (1983).

For individuals with modified adjusted gross income (MAGI) greater than a threshold that depends on filing status (e.g., \$250,000 if married filing jointly), starting in 2013 there is a Medicare surtax of 3.8 percent on the lesser of net investment income and the difference between MAGI and the applicable threshold. When quantifying the tax effects, I assume that net investment income is the lesser amount, which implies that the tax rate on asset returns that otherwise would have applied are increased by 3.8 percent after 2013.

Taxation of Asset Returns for Hedge Funds versus Insurers. For a limited partner in a hedge fund, interest and realized short-term returns are taxed at the income tax rate and the other components (assuming the dividends are qualified) are taxed at the long-term capital gains rate. Thus, the difference between the hedge fund investor and the insurer investor is that (1) the insurer investor incurs corporate tax on all investment returns except dividends that are subject to the Dividend Received Deduction (DRD), but the hedge fund investor does not, and (2) the insurer investor pays the long-term capital gains rate on interest and realized short-term capital gains, but the hedge fund investor pays the higher income tax rate on these returns. Table 3 summarizes and compares the taxation of investment income earned by U.S. insurers to the taxation of the same investment income earned by a U.S. hedge fund or mutual fund.

Appendix A contains derivations for the effective tax rate on the asset returns for a U.S. hedge fund (τ_A^H), for a U.S. domiciled insurer (τ_A^I), and for the difference ($\tau_A^I - \tau_A^H$), assuming they hold the same portfolio. The formula for the difference in effective tax rates is

$$(\tau_A^I - \tau_A^H) = \tau_c(1-\tau_L)(1 - \varepsilon\beta) - (\alpha + \kappa \pi_S) (\tau_S - \tau_L) . \quad (8)$$

The first term is the corporate tax disadvantage on all returns except the returns subject to the Dividend Received Deduction ($1-\varepsilon\beta$). The second term is the personal tax advantage from having interest (α) and realized short-term capital gains ($\kappa \pi_S$) taxed at the long-term capital gains rate as opposed to the income tax rate.¹⁸ Equation (7) indicates that, all else equal, the corporate tax costs are reduced by having more

¹⁸ An assumption underlying expression (8) is that dividend income on assets held by hedge/mutual funds and by insurers is taxed at the long-term capital gains rate. Prior to The Jobs and Growth Tax Relief Reconciliation Act (JGTRRA) of 2003, however, this was not the case. Instead, dividends on assets held by hedge/mutual funds were

dividend income (higher β), and that the personal tax benefit is increased by having more interest income (higher α) and more realized short-term capital gains (higher $\kappa \pi_S$).

Table 2, Panel B uses the tax rates in Panel A to illustrate the differences in the effective tax rates on asset returns for insurers versus hedge funds given by equation (8). The differences depend on the asset allocation. First, if the assets generate long-term capital gains, then the effective tax of insurers is greater than that of hedge funds throughout the sample period and the difference ranges from about 16 percent currently to about 30 percent from 2003-2012. If the assets generate dividends, the effective tax rates of insurers is again higher than that of hedge funds, but is relatively constant (between 8-9 percent) throughout the time period examined. Finally, if the assets generate interest or realized short-term capital gains, then the effective tax for insurers is again higher than that of hedge funds, except for the period starting in 2018 when the effective tax rates for hedge funds is greater than that of insurers by about 1 percent.

2.3 The Tax Costs of Equity Capital

The tax cost of equity capital can now be calculated by substituting the expressions for the differences in effective tax rates, $(\tau_D^I - \tau_D^H)$ and $(\tau_A^I - \tau_A^H)$, from the previous subsection into the expression for the cost of capital (ρ), which is given by equation (6). Here are the three expressions presented together:

$$\rho = \frac{(\tau_A^I - \tau_A^H)[1 + \lambda] R_A - (\tau_D^I - \tau_D^H) \lambda r_f}{[R_A(1 - \tau_A^I) + (1 - \tau_D^I)]} , \quad (6)$$

$$(\tau_D^I - \tau_D^H) = \tau_c + \tau_L(1 - \tau_c) - \tau_S , \quad (7)$$

taxed at the income tax rate. The JGTRRA reduced the personal tax rate on qualified dividends from 39.6% to 15% and on long-term capital gains from 20% to 15%.

Prior to 2003, if insurers did not pay out the dividend income on their assets and instead investors received these dividend returns when they sold their shares at a future date, then insurer investors would still convert dividend income into capital gains and taxed at the capital gains rate. Assuming insurers did not pay out dividends and that investors held their insurer shares for more than one year, then there was an additional personal tax advantage of investing in an insurer compared to a hedge fund prior to 2003. Incorporating this benefit into the analysis would change expression (7) to:

$$(\tau_A^I - \tau_A^H) = \tau_c(1 - \tau_L)(1 - \varepsilon\beta) - (\alpha + \beta + \kappa \pi_S)(\tau_S - \tau_L) . \quad (8)'$$

Comparing expression (8)' to (8) indicates that the 2003 tax change reduced the personal tax advantage of investing through an insurer by $\beta(\tau_S - \tau_L)$. Assuming insurers try to reduce their tax costs on capital, this analysis predicts that insurers would have shifted assets from dividend paying stocks to assets generating either interest or short-term capital gains following the 2003 tax law change. Testing this prediction is left for future research.

$$(\tau_A^I - \tau_A^H) = \tau_c (1 - \tau_L) (1 - \varepsilon \beta) - (\alpha + \kappa \pi_S) (\tau_S - \tau_L) , \quad (8)$$

To illustrate the magnitude of the tax costs for given set of parameter values, I assume that the expected asset return (R_A) is four percent, the risk-free return (r_f) is two percent, and the insurer's liability to equity ratio (λ) is two. The assumption that all securities have the same expected return (and implicitly the same risk) is used to compare the tax effects of different securities, holding all else constant. Of course, in practice investors will incorporate risk, expected return, liquidity, and perhaps other factors such as ESG scores.

Different Tax Regimes and Different Asset Allocations. Using the assumptions above, the tax costs on equity capital are reported in Panel A of Table 4 and illustrated in Figure 1 over the four tax regimes from 1993 to the present and under three “corner” portfolios for an insurer's asset allocation: all returns are either in the form of (1) interest income and short-term capital gains, (2) dividend income, or (3) long-term capital gains. The dashed line at the top of Figure 1 is the effective tax costs if the insurer invests in securities that generate long-term capital gains. In this case, the insurer does not utilize the personal tax advantage on the asset portfolio and the tax costs are around 5.6 percent until the 2017 tax reform when the tax costs dropped to about 3.1 percent. If an insurer is focused on reducing the tax cost, it would invest in securities that generate interest income, short-term capital gains, or dividends, as the tax cost on capital for these securities hovers between about 1.1 percent and 1.4 percent for about 25 years. In 2018, the tax costs of holding assets that generate interest and short-term capital gains drops to about -0.1 percent.¹⁹

This analysis indicates that after 2017 the tax costs are close to zero (-0.1%) for insurers that focus on interest income and realized short term capital gains. This result contrasts with the existing literature that emphasizes the importance of taxes as a cost of equity capital for insurers. For example, Harrington and Niehaus (2003) argue that the tax costs on equity capital helps to explain the high cost of insuring

¹⁹ Although the magnitude of the changes in effective tax rates are relatively small in 2018, an implication is that insurers that are trying to minimize tax costs would shift assets out of dividend paying stocks and into interest bearing securities after 2017. Aggregate data for the entire industry reported by the NAIC indicates that insurers did not change their overall asset allocation much from 2017 to 2018, although investments in bonds and mortgages as a percentage of total assets increased by one percent to 74.2 percent.

catastrophe risk. Also, theoretical papers often use the tax costs on holding capital as one of the reasons insurers do not hold more capital and why insurers engage in other forms of risk management (see e.g., Froot, 2007). To be fair, the papers emphasizing the tax costs on equity capital were written when the corporate tax rate was higher, and therefore the tax costs on insurer capital were higher.

Impact of Leverage. To examine the influence of leverage on the cost of capital (ρ), consider the following result:

$$\text{Sign of } (d\rho/d\lambda) = \text{sign of } [(\tau_A^I - \tau_A^H) R_A - (\tau_D^I - \tau_D^H) r_f].$$

That is, an increase in leverage increases (decreases) the cost of capital if the differential in the effective tax rate on expected investment returns for insurers versus hedge funds is greater (less) than the differential in the effective tax shield on leverage for insurers versus hedge funds. Using the assumptions for the “corner” portfolios in Table 4A, the sign of $d\rho/d\lambda$ is positive for each portfolio in each tax regime, except for the portfolio that generates all interest and/or realized short term capital gains (i.e., when $\alpha + \kappa \pi_S = 1$) after 2018. In this particular scenario, the cost of capital decreases as leverage increases.

Impact of Ignoring Personal Taxes. To explicitly examine the impact of ignoring personal taxes into the analysis, I set the personal tax rates equal to zero in equation (6). The markup then becomes

$$\rho = \left\{ \frac{[R_A + \lambda(R_A - r_f)] - \varepsilon\beta(1 + \lambda)R_A}{(1 - \tau_c)(1 + R_A) + \tau_c R_A \varepsilon\beta} \right\} \tau_c \quad (9)$$

The second term in the numerator captures the dividend received deduction (DRD), which reduces the tax costs on capital (ε is the percentage of dividends that are deducted and β is the percentage of returns in the form of dividends).²⁰

Panel B of Table 4 reports the tax costs on capital if personal taxes are ignored. Therefore, a comparison of Panels A and B provide an indication of the relevance of incorporating personal taxes into the analysis. There are two effects of ignoring personal taxes. On the asset side, the personal tax benefits

²⁰ If the DRD is ignored and it is further assumed that the assets are invested in risk-free securities ($R_A = r_f$), then the expression for ρ is the same as that found in Myers and Cohn (1987) and Harrington and Niehaus (2003): $\frac{r_f \tau_c}{(1+r_f)(1-\tau_c)}$.

associated with converting interest and short-term capital gains to long-term capital gains is ignored if personal taxes are not considered, which increases the tax costs on capital, all else equal. On the liability side, the tax shield on the hedge fund’s debt is ignored if personal taxes are not considered, which reduces the tax costs on capital if personal taxes are not considered. For insurers with assets that generate interest income or short-term capital gains, the first effect dominates (given the parameter values) and the tax costs on capital are higher if personal taxes are ignored. For example, between 2013-2017, the tax cost of capital is 3.0 percent per dollar of capital greater (4.1% from Panel B minus 1.1% from Panel A) if personal taxes are ignored for insurers investing in assets that generate interest and short-term capital gains. This is a material difference. For insurers with assets that generate dividends or long-term capital gains, the second effect dominates and the tax costs on capital are lower if personal taxes are ignored. For example, the tax costs are 1.6 percent lower if personal taxes are ignored for insurers investing in assets that generate dividends or long-term capital gains between 2013-2017.

4. Tax Advantage of Offshore Re/insurers

I now compare the tax costs on capital of offshore re/insurers versus U.S. re/insurers. By “offshore”, I mean that the re/insurer is located in a jurisdiction, such as Bermuda and the Cayman Islands, that has a zero corporate tax rate.²¹ Substituting a zero corporate tax into the expressions for the effective tax rates (derived in the previous section) indicates that the effective tax on insurer underwriting returns, as well as the effective tax rate on insurer asset returns, is the long-term personal rate: $\tau_A^I = \tau_D^I = \tau_L$. Substituting these parameter values into the expression for the cost of capital (6) yields:

$$\rho = \frac{-(\alpha + \kappa \pi_S)(\tau_S - \tau_L)(1 + \lambda)R_A + (\tau_S - \tau_L)\lambda r_f}{[(1 + R_A)(1 - \tau_L)]} \quad (10)$$

The first term in the numerator captures the personal tax advantage enjoyed by offshore insurer investors relative to U.S. hedge fund investors if the assets are invested in securities that generate interest income (α

²¹ Recent international agreements to have a minimum corporate tax rate in all jurisdictions of 15 percent would change the magnitude of the effects described in this section.

> 0) or realized short-term capital gains ($\kappa \pi_S > 0$). This effect lowers the tax cost of capital, all else equal. The second term is the tax shield on borrowing for a hedge fund investor (τ_h) versus an offshore insurer investor (τ_L). Since hedge fund investors have a higher tax shield (their income tax rate) than offshore insurer investors (the capital gains rate), this effect increases the tax cost of capital, all else equal.

The tax costs of capital for an offshore reinsurer are negative provided $(\alpha + \kappa \pi_S) > \frac{\lambda r_f}{(1+\lambda) R_A}$.

That is, if the proportion of assets generating interest and short-term capital gains is sufficiently large so that the personal tax advantage on the assets returns offsets the lower borrowing tax shield. As an example, using the parameters assumed above ($\lambda = 2$, $r_f = 2\%$, $R_A = 4\%$), the tax costs are negative if the proportion of assets generating interest and short-term capital gains ($\alpha + \kappa \pi_S$) is greater than 44.4 percent.

Panel C of Table 4 gives estimates of the tax costs of capital for an offshore re/insurer using the same parameter values as used previously ($\lambda = 2$, $r_f = 2\%$, $R_A = 4\%$). If the offshore re/insurer invests in assets that only generate interest and realized short-term capital gains, then the tax cost of capital is negative and fluctuates between about -1.7 percent to -2.0 percent depending on the time period. For the other asset allocation choices, the tax costs of capital are positive but relatively small -- between 0.9 percent and 1.0 percent throughout the period from 1993-present. Not surprisingly, the tax cost of capital is lower for offshore re/insurers than U.S. based re/insurers (see Panel A) given the zero corporate tax rate enjoyed by offshore re/insurers.

A negative tax cost of capital indicates that an offshore reinsurer has a lower effective tax rate than a U.S. hedge fund with the same asset portfolio and the same leverage. In this case, hedge funds would have an incentive to contribute assets to offshore re/insurers in exchange for equity claims and have those assets managed in the same way as the assets were managed by the hedge fund. In other words, hedge funds have an incentive to combine with an offshore reinsurer, i.e., create an OSHFR. By doing so, the hedge fund reduces the tax that their investors pay on the interest and short-term capital gains generated from the assets. While the substitution of insurance leverage for traditional leverage reduces the magnitude of the tax benefit, provided the proportion of assets generating interest and short-term capital gains exceeds

the threshold described above, the investors pay lower taxes. Moreover, the hedge fund has an incentive to use traditional leverage as opposed to insurance leverage, which can be accomplished by having the offshore re/insurer have little insurance leverage and the U.S. domiciled hedge fund borrow using traditional methods.

4.1 Offshore Hedge Fund Reinsurers (OSHFRs)

OSHFRs provide an interesting case study on how personal taxes influence the cost of insurer capital and therefore the amount of capital in the insurance industry. As the individual cases discussed below will illustrate, OSHFRs can be formed in different ways. The common aspects of these transactions are (1) the addition of assets from a hedge fund to the balance sheet of an offshore reinsurer, and (2) at least part of the assets of the combined entity being managed by the hedge fund.

Note that a hedge fund cannot simply move to a country such as Bermuda and obtain the same tax benefits for its U.S. investors; it needs to combine with an insurer or reinsurer. This is because a standalone offshore hedge fund would be considered a Passive Foreign Investment Company (PFIC), defined as an entity with passive income equal to at least 75 percent of its total income, or passive income generating assets equal to at least 50 percent of its assets. For the U.S. owners of a passive foreign investment company, passive income is taxed like income from a domestic mutual fund or hedge fund, i.e., investment earnings are passed through to the investor and taxed as they are realized.

However, there is an insurance company exemption to the PFIC rules. Prior to 2018, income is not considered passive if it is “derived in the conduct of an insurance business by a corporation which is predominantly engaged in an insurance business” (U.S. Code Section 1297 (b)(2)(B)).²² Thus, prior to 2018, if a hedge fund combined with an insurance operation and the combined entity was predominantly engaged in insurance, then the investment returns would not be considered passive income. Instead, the

²² For a more precise definition, see U.S. Code Section 1297 – Passive Foreign Investment Company and Section 954(c) – Foreign Personal Holding Company Income. Note that without the insurance company exemption, almost all foreign insurers would be designated as a PFIC by the IRS.

investment earnings would be taxed at the personal level in the same way as an insurance company's returns would be taxed, i.e., when they are paid out or realized by selling the securities.

4.2 Effects of the 2017 Tax Reform on OSHFRs

The 2017 tax reform does not significantly alter the marginal tax benefit of becoming an OSHFR to a U.S. hedge fund investor, because this benefit depends on the difference between long-term and short-term capital gains rates, which were only marginally affected by the tax reform.²³ The tax reform, however, could indirectly impact the benefit of becoming an OSHFR for three reasons. First, the reduction in the U.S. corporate tax rate to 21% makes U.S. re/insurers more competitive with offshore re/insurers (including OSHFRs).

Second, the new tax law states that to obtain the insurance company exemption to the PFIC rules, an entity must have insurance liabilities, excluding unearned premium reserves, greater than 25 percent of assets or greater than 10 percent of assets if the company can qualitatively demonstrate that it is predominantly engaged in insurance. This minimum leverage requirement essentially limits the extent to which hedge fund investors can overcapitalize insurance liabilities.²⁴

Third, the law's new classification of a Controlled Foreign Corporation (CFC) could cause investment income to be taxed at income tax rates if individual investors take large stakes in OSHFRs.²⁵ More specifically, U.S. shareholders of CFCs are required to include Subpart F income, which includes both underwriting and investment income, as part of their current taxable income regardless of whether that income is distributed as dividends. An entity is considered a CFC if *all U.S. shareholders* (defined below)

²³ Policy officials have been concerned about the tax treatment of offshore hedge fund reinsurers (OSHFRs) at least since 2002 (see e.g., McKinnon, 2002). In 2015, Senator Wyden introduced legislation ("The Offshore Reinsurance Tax Fairness Act") to limit the extent to which hedge funds could gain a tax advantage associated with combining with an offshore insurer. The controversy even reached the 2016 presidential campaign, with Hillary Clinton pledging to "end the Bermuda reinsurance loophole" (Briefing, 2016).

²⁴ Even though the new tax law was signed in December of 2017, uncertainty about its implementation remained. In July of 2019, the IRS and the Department of Treasury released proposed regulations and sought input regarding how the new PFIC rules will be applied. Lynch and Peters (2019) state that these regulations "could have substantial ramifications for U.S. investors in offshore insurance and reinsurance structures ...", indicating uncertainty about the circumstances under which insurance structures would be classified as PFICs.

²⁵ CFC status is based on ownership and PFIC status is based on how the entity operates. Thus, an entity can be a CFC and not a PFIC or a PFIC but not a CFC. If an entity meets both the CFC and PFIC criteria, it is generally viewed as a CFC. See Harrison and Lee (2019) for more details.

combined own more than 50 percent of the voting power or more than 50 percent of the total value of all classes of stock. Prior to 2018, a person was considered a *U.S. shareholder* if the person had more than 10 percent of the *voting power* (IRS, 2019). Thus, prior to 2018, entities could avoid being classified as a CFC by including in their by-laws that no shareholder can cast more than 9.9% of the votes, which would imply that the entity has no U.S. shareholders and therefore the entity would not be considered a CFC.²⁶

The 2017 tax reform, however, expanded the definition of a *U.S. shareholder*. To avoid being classified as a U.S. shareholder, the investor must have less than 10 percent of the voting power and less than 10 percent of the value of the entity. This change implies that U.S. investors with large stakes in offshore entities could be considered U.S. shareholders, in which case the entities in which they invest will be considered CFCs, which implies that they would have to recognize Subpart F income as taxable in the current year (Mayer Brown, 2018).

4.3 Examples of OSHFRs

I now describe individual cases of hedge funds combining with or creating offshore reinsurers. The purpose is to examine whether their structure and operations are consistent with personal taxes being a primary motivator for these institutions. At the outset, it is worth noting that the information collected in the following paragraphs is from the SEC filings of (to my knowledge) the only three public OSHFRs to have existed and from sporadic press reports on nine private OSHFRs.

Greenlight Capital Re (GLRE) was established in 2004 in the Cayman Islands. Its principal wholly owned subsidiary, Greenlight Re, began providing property and casualty reinsurance in 2006. In 2007, Greenlight Re went public and is traded on NASDAQ. To manage their assets, Greenlight has a joint venture agreement with DME Advisors, which is a hedge fund managed by David Einhorn.²⁷ At the end of 2020, Greenlight reported consolidated assets of \$1.36 billion and earned premiums of \$480 million.

²⁶ For example, Greenlight Capital (to be discussed further below) has the following statement in their 2018 10K: “No shareholder will be allocated voting rights that would cause it to have 9.9% or more of the total voting power of our ordinary shares.”

²⁷ The form of the agreement changed over time.

The company states that it has an “emphasis on deriving superior returns from both sides of the balance sheet.” Greenlight Re’s insurance-liability to asset ratio was less than 20% each year from 2007 to 2017 and jumped to 34% in 2018 and has remained at about that level subsequently.²⁸ The relatively low leverage is consistent with savings in personal taxes being an important consideration. Its annual combined ratio over the 2015-2020 time period averaged 105.4 percent. As of November 2021, it had an A- rating from A.M. Best. Greenlight Capital Re’s stock price dropped from over \$30 a share in 2015 to under \$8 a share in December 2021. The poor stock price performance can be attributed largely to poor investment performance. The arithmetic mean of the annual investment returns from 2015 through 2021 is -4.4 percent. In 2019, it substantially de-risked its investment portfolio.

Third Point Re Ltd. was founded in 2011 and was traded on the NYSE. In February 2021, it agreed to merge with Sirius International Insurance Group, which provides insurance and reinsurance to clients worldwide. The new entity is called SiriusPoint. As the description below will indicate, for most of its history, Third Point operated as an OSHFR.

Prior to the merger, Third Point had two wholly-owned subsidiaries that wrote reinsurance: one located in the US and one in Bermuda. Shareholders with large stakes included BlackRock, Vanguard, and Dimensional Fund. In 2020, Third Point Re’s net premiums earned equaled \$610 million and its assets totaled \$3.73 billion. They described themselves as having a total return business model that combined “exceptional underwriting talent with market-leading investment management.”

Third Point’s investment management was provided exclusively by Third Point LLC, a hedge fund owned and managed by Daniel Loeb. Third Point LLC stated that they employed “an event-driven, value-oriented investment style” with an “emphasis on “special situation equities, distressed debt, and risk arbitrage.” In 2019, it moved assets into fixed income investments (Dyson and Rupawaia, 2019). The arithmetic average of the annual investment returns from 2015 through 2019 is 4.5 percent. Its combined ratio averaged 107 between 2016 and 2020.

²⁸ Insurance liabilities do not include unearned premium reserves, consistent with the description in the TCJA of 2017.

In each year between 2014 and 2017, Third Point’s insurance-liability to asset ratio was between 10 and 16 percent. In 2018, it jumped to about 30 percent and it grew to about 35 percent in 2020. Again, the low leverage ratio prior to 2018 and the higher leverage ratio after 2017 are consistent with personal taxes being an important consideration.

The stock price was \$16.30 at the beginning of 2014, hit a high of \$18.35 in 2017. In September of 2019, it was trading at about \$10 and it closed at the end of 2020 around \$9.20. In August 2020, A.M. Best affirmed its A- rating, but revised its outlook to uncertain.

Watford Re was founded in 2014 in Bermuda with \$1.1 billion in capital, as a subsidiary of Watford Holdings Ltd., which started trading on NASDAQ in April 2019. In July 2021, Watford Re was acquired by Arch Capital (40%), Kelso & Co. (30%), and Warburg Pincus (30%). Prior to the acquisition, Watford described its approach as “bringing together underwriting and investment expertise.” It exclusively used subsidiaries of Arch Capital group for underwriting activities and used HPS Investment Partners, LLC (formerly known as Highbridge Principal Strategies), a firm that focuses on non-investment grade credit, for the majority of investment portfolio (\$1.8 billion). The remainder of its invested assets (\$0.9 billion) are held in investment grade fixed-income securities. This strategy is consistent with maximizing the personal tax advantage of investing via a re/insurer. Watford Holding’s insurance-liabilities to asset ratio equaled 27% percent in 2017 and 36 and 43 percent in 2019 and 2020, respectively.

Given that it has been a publicly traded company just for a couple of years, there is limited historical information available about its operations. In May 2020, A.M. Best placed Watford Re’s A- financial strength rating under review with negative implications because of investment losses during the first quarter of 2020. Also, in May 2020, an activist shareholder (Capital Returns Management) requested that Watford’s board consider alternative strategies to create shareholder value, including selling itself (Howard, 2020). As stated above, the acquisition occurred about a year later.

Private Companies. Panel A of Table 5 provides a brief overview of several privately held OSHFRs. The primary takeaway from these brief summaries is that the total return strategy (a focus on earning abnormal returns from both the asset and liability sides of the balance sheet) has not been successful

in general. Four of the five entities listed either no longer exist or have exited the hedge fund strategy for asset management.

Panel B of Table 5 lists some “sponsored hedge fund reinsurers”; typically, these were formed through a joint venture between an institutional fund manager and an established insurer. For example, Chubb and Blackrock formed ABR Re in 2015 and AXIS and Blackstone formed Harrington Re in 2016. All four entities were operating at the end of 2021.

Summary. The twelve OSHFRs described above provide examples of how the offshore reinsurance industry has attracted hedge fund capital. The low insurance leverage ratios and the investment strategies of these entities are consistent with personal tax advantages being a major motivating force underlying this movement of capital.

4.4 Why are there not more OSHFRs?

Given the personal tax benefits (negative marginal tax costs) for a hedge fund to contribute capital to an offshore reinsurer, a natural question is why are there not more OSHFRs? There are of course transaction costs and operational costs of locating offshore. Perhaps more importantly, political risk has deterred the formation of more OSHFRs. Specifically, fund managers were likely concerned that laws would change, which would reduce or eliminate the tax benefits after incurring the costs of setting up an OSHFR. Indeed, members of the U.S. Congress investigated the tax benefits associated of OSHFRs as early as 2002 and proposals for reducing or eliminating the tax benefit surfaced multiple times. Congress finally acted in 2017. While the tax benefits have not gone away, minimum liability to asset ratios have been imposed, which cause OSHFRs to operate more like traditional insurers, as opposed to hedge funds.

5. Other Forms of Alternative Capital

Over the past 25 years, other non-traditional ways for institutional investors to provide capital to back reinsurance liabilities have developed. These alternative capital arrangements include sidecars,

collateralized reinsurance, and insurance linked securities (ILS) such as catastrophe bonds.²⁹ In each of these cases, the insurance liabilities are typically fully collateralized, i.e., they have assets equal to the maximum loss payout. AON (2021) reports that these types of instruments together provided \$97 billion of capital to the reinsurance industry as of 2021-Q1, which is roughly 15% of total worldwide reinsurance capital.³⁰ Collateralized reinsurance is the largest segment of the alternative reinsurance market, accounting for over \$50 billion of alternative capital, followed by ILS with about \$33 billion, and then side cars with about \$8 billion.³¹

Are Personal Taxes the Explanation? The full collateralization of insurance liabilities in these alternative capital arrangements implies that they are not taking full advantage of diversification to economize on the amount of capital used to back their insurance liabilities, as is done by traditional re/insurers. Given that they are inefficient in the amount of capital that they use, these alternative capital instruments must have lower frictional costs per unit of capital than traditional debt and equity securities issued by re/insurers (Lakdawalla and Zanjani, 2012).³² Given the focus of this paper, it is natural to ask whether personal tax savings is the source of the lower per unit capital costs.

²⁹ As noted above, Tomunen (2019) presents evidence that cat bond expected returns can be explained by intermediaries (ILS funds) being the marginal investor and constrained in the amount of capital that they can raise, which therefore causes catastrophe sector risk to be priced. He argues that the same result is likely to hold for collateralized reinsurance.

³⁰ Note, however, that the full collateralization of insurance liabilities does not expand the supply of insurance/reinsurance coverage per dollar of collateral as much as traditional equity capital of insurance companies, because the latter takes advantage of diversification of liabilities and the former does not.

³¹ Appendix B provides a brief description of these three types of transactions and provides some updates on the descriptions of the alternative reinsurance capital market found in Cummins and Barrieu (2013) and Hartwig and Lynch (2015).

³² An explanation that is sometimes provided by practitioners is that alternative capital vehicles provide insurers and reinsurers with access to the “vast” capital markets. The problem with this argument is that insurers/reinsurers have directly accessed capital markets for decades by issuing conventional debt and equity securities. Thus, access is not the issue. Another common argument is that alternative capital market arrangements have become popular because they provide investors exposure to a risk that has low or zero correlation with the assets in their portfolio. This argument, however, is incomplete, as low or zero correlation securities can be obtained in other ways. Moreover, investors in the debt and equity securities of traditional insurers and reinsurers presumably understand that they were taking on both asset and liability risk and that the latter had low correlation with their other assets. Thus, the low correlation by itself cannot explain the deals. A related story is that the alternative capital market arrangements allow investors to earn a positive abnormal expected return for taking on the liability risk that adds virtually zero risk to their portfolio. In other words, economic rents in the product market exist, and the alternative capital arrangements are the way for institutional investors to claim some of these rents. Even if this is true, it does not explain why investors are using the alternative capital market arrangements, as opposed to traditional debt and equity securities.

Typically, the collateral used in these transactions is in the form of highly rated interest-bearing securities. Personal taxes therefore would help explain these transactions if the alternative capital vehicles were able to convert the interest income into long-term capital gains. This in turn requires that the vehicles not be classified as PFICs or CFCs. However, an early discussion of the tax treatment of ILS by Kaplan and Lefebvre (2003) indicates that ILS were typically classified as PFICs.³³ Moreover, to avoid being classified as a PFIC, the 2017 tax law requires a 25 percent insurance-liability to asset ratio, which would be difficult to meet for alternative capital arrangements backing natural catastrophe risk, because the expected claims relative to the limit on the underlying reinsurance (which given full collateralization equals the value of the assets backing the claims) is typically less than 5%.³⁴ Thus, personal taxes do not seem to be the source of the lower frictional costs that would explain the full collateralization in most of these transactions. If not taxes, what other frictional costs explain these transactions?

Financial Distress Costs. One possibility is provided by Lakdawalla and Zanjani (2012), who show that if policyholders are heterogeneous with respect to their expected claims, pro-rata insolvency rules that are based on the value of actual claims can be an inefficient method of allocating assets if an insurer becomes insolvent. In this setting, they show that segregating collateral for different packets of liabilities can improve efficiency. Intuitively, separately collateralizing the liabilities of policyholders with a relatively low probability of incurring a loss protects these policyholders from having a lower expected recovery rate in bankruptcy (paid claims relative to claims incurred) compared to policyholders with a higher probability of claims. In short, fully collateralizing packets of liabilities can reduce expected financial distress costs.³⁵

³³ Also, conversations with several market participants suggest that most of the transactions have been classified as PFICs or CFCs.

³⁴ For example, Braun (2016) reports expected losses on catastrophe bonds of a little over two percent of the face value of the bond.

³⁵ Another potential explanation is that the alternative capital instruments can have non-indemnity triggers, i.e., the payoffs are based on an index or a physical aspect of a catastrophic event. Non-indemnity triggers can reduce moral hazard problems that are associated with managing claims in a traditional re/insurance arrangement (Niehaus and Mann, 1992; Doherty and Richter, 2002; Doherty and Smetters, 2005; Froot and O'Connell, 2008; and Finken and Laux, 2009). Consequently, with non-indemnity triggers, the risk transfer contract requires fewer costly contractual features (e.g. monitoring, relationships, and reduced coverage) to deal with moral hazard, which in turn allows for greater risk sharing. A downside of non-indemnity triggers is basis risk (see Harrington and Niehaus, 1999 and

Catastrophe Models, ILS Funds, and Information Frictions. Another innovation over the past 25 years is the emergence of sophisticated catastrophe models. These models provide more and better information about the probability distribution of losses associated with a particular transaction than was available prior to their use. Moreover, institutional investors -- ILS funds -- with expertise in interpreting these models have developed (see Tomunen, 2019). The combination of catastrophe models and ILS funds likely reduces informational frictions in the market for re/insurer capital.³⁶

Supporting evidence for the importance of catastrophe models is provided by the proportion of alternative capital vehicles that provide coverage for catastrophe related risk. For example, approximately 67 percent of ILS provide either catastrophe coverage or multiple peril coverage, which usually refers to multiple types of catastrophes (Artemis, 2020). Additional support for the importance of catastrophe models comes from comments by industry participants. For example, the head of reinsurance buying for an Italian insurer is referenced as stating that “he would like to tap the ILS markets more—but a lack of models relating to certain key perils in large parts of Europe prevents him doing so. ILS investors want to expand their remit, but they are reluctant to take on risk without such a model in place” (Bermuda: RE+ILS, 2020).

Restrictions on use of Capital and Managerial Discretion. Alternative capital instruments typically restrict how capital can be used (backing a specific type of exposure) and the length of time that the capital

Cummins, Lalonde, and Phillips, 2004). Since less than 34 percent of the value of outstanding ILS use non-indemnity triggers (Artemis, 2020), non-indemnity triggers are not the main explanation for the growth of the alternative reinsurance market.

³⁶ Several theoretical papers in the literature analyze the role played by traditional reinsurers in mitigating adverse selection. In Plantin (2006), reinsurers are assumed to have expertise and information that is useful in assessing insurers’ underwriting activities, whereas investors do not. Stated differently, reinsurers represent “informed capital” and capital market investors represent “uninformed capital.” In this setting, it is efficient for primary insurers to purchase reinsurance and raise capital from uninformed investors, with the former improving the terms of the latter. Jean-Baptiste and Santomero (2000) assume that insurers have information that reinsurers do not. To mitigate the asymmetric information problem, the parties use long-term implicit contracts. With such contracts, reinsurers learn about insurers over time and adjust prices based on new information related to claims. Note that these contracts can give incumbent reinsurers an information advantage relative to other reinsurers and thereby subject insurers to hold-up problems. Froot and O’Connell (2008) discuss how the “informational intensity and the non-standard nature of insurance risk” makes direct trading with investors subject to moral hazard, adverse selection, and agency problems, and that a mitigating solution is to have a “monitor to evaluate risks and verify outcomes,” i.e., a reinsurance intermediary.

can be used (maturity is typically one to three years). In contrast, traditional equity securities provide managers with permanent capital, which managers allocate often with considerable discretion (see e.g., Kielholz, 2000). Consequently, managerial discretion and the associated agency costs are likely to be lower in the alternative capital arrangements relative to using traditional equity for the same exposures.

7. Summary

The main point of the paper is that personal taxes has a material impact on the cost of insurer equity capital. There are two reasons personal tax rates are relevant. First, with respect to asset returns, insurers have a corporate tax disadvantage but a personal tax advantage relative to mutual/hedge funds. Second, personal taxes influence the tax shield on interest paid on the debt issued by hedge funds, as well as the total tax shield on insurer liabilities (policies) issued by insurers.

Using a simple single period model to approximate the tax cost on capital, I show that the magnitude of the tax costs on insurer equity has varied over time as tax rates have changed and that the tax costs depend on an insurer's asset portfolio. All else equal, incorporating personal taxes has the biggest impact on the cost of capital when an insurer invests in securities that generate interest income and/or realized short-term capital gains. For insurers that invest in these securities, the tax costs of capital is close to zero after the enactment of the Tax Cuts and Jobs Act (TCJA) of 2017.

Offshore hedge fund reinsurers (OSHFRs) provide an interesting case study of how personal taxes affect the cost of insurer capital. The personal tax benefit to hedge fund investors of creating an OSHFR explains the high capitalization of insurance liabilities in these entities. Personal taxes, however, do not seem to explain other types of alternative capital which are highly capitalized (usually fully collateralized), such as side cars, insurance linked securities (cat bonds), and collateralized reinsurance.

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Figure 1

Tax Costs on Equity Capital for a U.S. Insurer
using Different Portfolio Strategies in four Tax Regimes

Tax costs equal the additional percentage return required by insurer equity investors to compensate for the additional taxes they incur at the corporate and personal level relative to an investor in a hedge fund that holds the same asset portfolio as the insurer. The illustration assumes a risk-free return of 2 percent and compares the tax costs of asset portfolios with an expected return of 4 percent via (a) long-term capital gains, (b) dividends, and (c) interest income and/or short-term capital gains. The liability to equity ratio is equal to two.

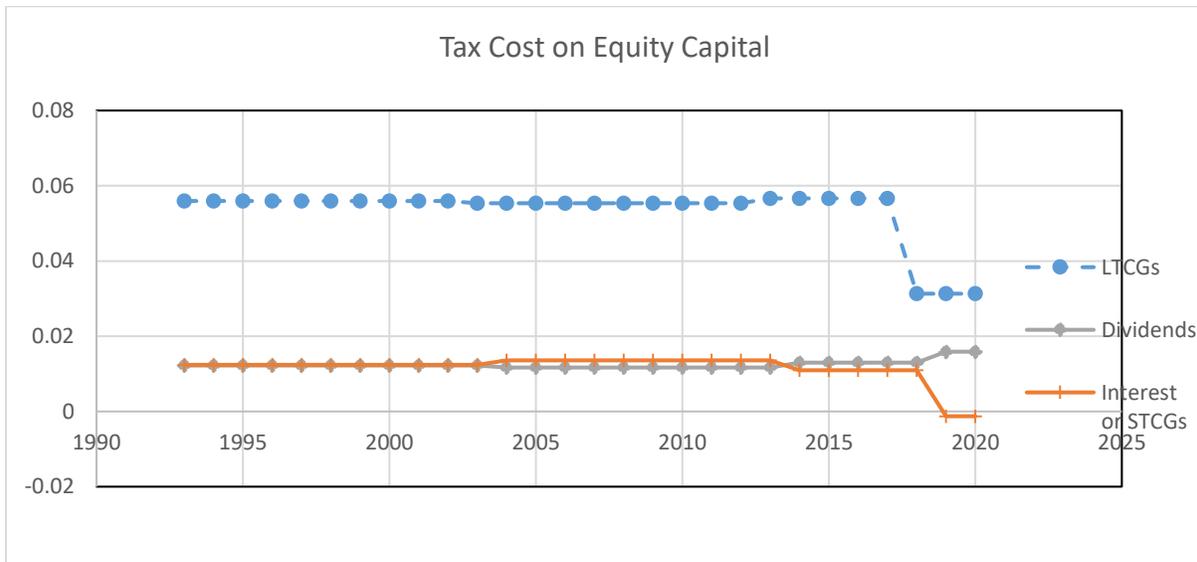


Table 1
Notation for Section 2

Section 2.1

L = expected claim payment at end of the year
 P = premium at the beginning of the year
 K = capital at the beginning of the year
 ρ = premium markup per dollar of capital = tax costs per dollar of capital
 r_f = risk-free rate
 R_A = before-tax expected rate of return on the asset portfolio in each year
 τ_A^I = effective tax rate (corporate plus personal) on the insurer's asset returns
 τ_A^H = effective tax rate (corporate plus personal) on a hedge fund's asset returns
 τ_D^I = effective tax rate (corporate plus personal) on the insurer's liabilities
 τ_D^H = effective tax rate (corporate plus personal) on a hedge fund's debt
 R_E^I = expected return on equity for the insurer
 R_E^H = expected return for the limited partner for the hedge fund

Section 2.2

α = proportion of R that is interest
 β = proportion of R from qualified dividends
 κ = proportion of R from short-term capital gains
 $(1-\alpha-\beta-\kappa)$ = proportion of R from long-term capital gains.
 π_S = proportion of short-term capital gains that are realized
 π_L = proportion of long-term capital gains that are realized
 τ_c = corporate tax rate
 τ_S = personal income tax rate.
 τ_L = personal long-term capital gains tax rate $< \tau_S$
 ε = percentage of dividends that are subject to the Dividend Received Deduction (DRD) and therefore not subject to corporate tax.

Table 2

Panel A: U.S. Tax Rates Over Time

(Rates are the maximum rates for each category and time period)

	Corporate Tax Rates		Personal Tax Rates on		
	(ε) <u>DRD</u>	(τ_c) <u>Corporate</u>	Ordinary income & STCG (τ_S)	Qualified Dividends+	(τ_L) <u>LTCG</u>
1993-2002	70%	35%	39.6%*	39.6%*	20.0%
2003-2012	70%	35%	35.0%	15.0%	15.0%
2013-2017	70%	35%	43.4%**	23.8%**	23.8%**
2018-	50%	21%	40.8%**	23.8%**	23.8%**

* In 2001 and 2002, the maximum rate was 39.1% and 38.6%, respectively.

**Includes 3.8% surcharge for high income investors.

+ The analysis described in the paper assumes qualified dividends are taxed at the long-term capital gains (LTCG) rate as was true after the JGTRR Act of 2003. Previously, dividends were taxed as ordinary income, which is reflected in the first row of the table.

Panel B: Differences in Effective Tax Rates for an Insurer vs. a Hedge Fundover time for the tax shield on borrowing ($\tau_D^I - \tau_D^H$) and for the taxes paid on asset returns ($\tau_A^I - \tau_A^H$), where $(\tau_D^I - \tau_D^H) = \tau_c + \tau_L(1 - \tau_c) - \tau_S$ and $(\tau_A^I - \tau_A^H) = \tau_c(1 - \tau_L)(1 - \varepsilon\beta) - (\alpha + \kappa\pi_S)(\tau_S - \tau_L)$

	Borrowing Tax shield	If all Interest & Realized STCGs ($\alpha + \kappa\pi_S$)=1	If all Qualified Dividends $\beta = 1$	If all LTCGs $\alpha + \beta + \kappa = 0$
	$(\tau_D^I - \tau_D^H)$	$(\tau_A^I - \tau_A^H)$	$(\tau_A^I - \tau_A^H)$	$(\tau_A^I - \tau_A^H)$
1993-2002	8.40%	8.40%	8.40%	28.00%
2003-2012	9.75%	9.75%	8.93%	29.75%
2013-2017	7.07%	7.07%	8.00%	26.67%
2018-	-1.00%	-1.00%	8.00%	16.00%

Table 3
Differences in the Taxation of U.S. Insurers and U.S. Hedge Fund Asset Returns

Shaded cells indicate a difference between Hedge funds and Insurers

		Tax Rates	
		Corporate	Personal
Interest = αR_A	Hedge Fund	0	τ_S
	Insurer	τ_c	τ_L
Dividends not s.t. DRD = $\beta (1-\varepsilon) R_A$	Hedge Fund	0	τ_L
	Insurer	τ_c	τ_L
Dividends s.t. DRD = $\varepsilon \beta R_A$	Hedge Fund	0	τ_L
	Insurer	0	τ_L
Realized STCG = $\kappa \pi_S R_A$	Hedge Fund	0	τ_S
	Insurer	τ_c	τ_L
Unrealized STCG = $\kappa (1 - \pi_S) R_A$	Hedge Fund	0	τ_L
	Insurer	τ_c	τ_L
Realized LTCG = $(1-\alpha-\beta-\kappa) \pi_L R_A$	Hedge Fund	0	τ_L
	Insurer	τ_c	τ_L
Unrealized LTCG = $(1-\alpha-\beta-\kappa)(1-\pi_L)R_A$	Hedge Fund	0	τ_L
	Insurer	τ_c	τ_L

Table 4

Panel A: The per \$ Tax Cost of Equity Capital (ρ) for U.S. Insurers with Personal Taxes

For various time periods assuming the expected return on assets (R_A) equals 4%, the risk-free return (r_f) equals 2%, and an insurance liability to equity capital ratio (λ) equals 2, where

$$\rho = \frac{(\tau_A^I - \tau_A^H)[1 + \lambda] R_A - (\tau_D^I - \tau_D^H) \lambda r_f}{[R_A(1 - \tau_A^I) + (1 - \tau_D^I)]}$$

$$(\tau_A^I - \tau_A^H) = \tau_c (1 - \tau_L) (1 - \varepsilon \beta) - (\alpha + \kappa \pi_S) (\tau_S - \tau_L)$$

$$(\tau_D^I - \tau_D^H) = \tau_c + \tau_L(1 - \tau_c) - \tau_S$$

	If all Interest & Realized STCGs ($\alpha + \kappa \pi_S$)=1	If all Qualified Dividends $\beta = 1$	If all LTCGs $\alpha + \beta + \kappa = 0$
	ρ	ρ	ρ
1993-2002	1.2%	1.2%	5.6%
2003-2012	1.4%	1.2%	5.5%
2013-2017	1.1%	1.3%	5.7%
2018-	-0.1%	1.6%	3.1%

Panel B: The Tax Cost of Equity Capital (ρ) for U.S. Insurers ignoring Personal Taxes

For various time periods assuming the expected return on assets (R_A) equals 4%, the risk-free return (r_f) equals 2%, and an insurance liability to equity capital ratio (λ) equals 2, where

$$\rho = \left\{ \frac{[R_A + \lambda(R_A - r_f)] - \varepsilon \beta (1 + \lambda) R_A}{(1 - \tau_c)(1 + R_A) + \tau_c R_A \varepsilon \beta} \right\} \tau_c$$

	If all Interest & Realized STCGs ($\alpha + \kappa \pi_S$)=1	If all Qualified Dividends $\beta = 1$	If all LTCGs $\alpha + \beta + \kappa = 0$
	ρ	ρ	ρ
1993-2002	4.1%	-0.2%	4.1%
2003-2012	4.1%	-0.2%	4.1%
2013-2017	4.1%	-0.2%	4.1%
2018-	2.0%	0.5%	2.0%

Table 4 (continued)

Panel C: The Tax Cost of Equity Capital (ρ) for Offshore Re/insurers ($\tau_C = 0$)

For various time periods assuming the expected return on assets (R_A) equals 4%, the risk-free return (r_f) equals 2%, and an insurance liability to equity capital ratio (λ) equals 2, where

$$\rho = \frac{-(\alpha + \kappa \pi_S)(\tau_S - \tau_L)[1 + \lambda] R_A + (\tau_S - \tau_L) \lambda r_f}{[(1 + R_A)(1 - \tau_L)]}$$

	If all Interest & Realized STCGs ($\alpha + \kappa \pi_S = 1$)	If all Qualified Dividends $\beta = 1$	If all LTCGs $\alpha + \beta + \kappa = 0$
	ρ	ρ	ρ
1993-2002	-1.9%	0.9%	0.9%
2003-2012	-1.8%	0.9%	0.9%
2013-2017	-2.0%	1.0%	1.0%
2018-	-1.7%	0.9%	0.9%

Table 5

Private and Sponsored Offshore Reinsurance Entities with Hedge Fund Connections

Panel A: Private OSHFRs:

- Sandell Re, formed in 2014, assets managed by Sandell Asset Management Corp. Insurance liability to asset ratio equal to 28% in 2015 and 27% in 2016. Acquired by R&Q Investment Holdings in 2019 and merged with Tradesman Program Managers in 2020.
- Fidelis was created in 2015 with \$1.5 billion from three PE firms; initially used a total return model with investments in multiple hedge funds; exited hedge fund strategy in 2017 and switched portfolio to a more traditional reinsurer portfolio with 80% of assets in fixed income and cash; now uses Goldman Sachs & JPMorgan as its investment managers.
- Pac Re. formed by Validus (John Paulson) in 2012; Leverage ratio <1% in 2012, shutdown in 2016. Purchased by AIG in July 2018.
- Sac Re. formed by Steven Cohen (SAC Capital) and Capital Z Partners in 2012; Leverage ratio 1.1% in 2012; sold to Hamilton Re Group in 2013 after SAC Capital admitted to insider trading.
- AQR RE formed by AQR Capital Management in 2011; exited in 2015. Insurance liability to asset ratio = 15% in 2015 and 18% in 2016.

Panel B: “Sponsored HFRs” by established insurers or reinsurers:

- ABR Re was formed by Chubb and Blackrock in 2015; assets managed by Blackrock; only reinsures risk from Chubb; Insurance Liability to asset ratio equal to 14% in 2016 and 32% in 2017.
 - Harrington Re formed by AXIS and Blackstone in 2016; Insurance Liability to asset ratio equaled 16% in 2017 and then increased to 32%, 43%, and 48% in the subsequent three years, respectively.
 - Kayla Re formed in 2016 by Enstar (a \$14 billion insurance group). A little less than half of its \$620 million of capital come from Enstar and the other capital came from private equity firms: Hillhouse Capital Management (a Chinese investment firm with over \$25 billion AUM) and Stone Point Capital. The assets were managed by Hillhouse Capital, an Asian private equity fund. In 2018, Enstar bought out the other owners and in 2019 Kayla Re was merged into Cavello Bay Reinsurance, another subsidiary of Enstar.
 - Kelvin Re formed by Credit Suisse Insurance Linked Strategies in 2014 and uses Aon Guernsey to manage its insurance operations. Its insurance liability to asset ratio was 33% in 2017, and about 44% the next two years.
-

Appendix A

Derivation of Effective Tax Rates on Asset Returns for Insurers and Hedge Funds

The notation used in the appendix is summarized in Table 1

Hedge Fund. A hedge fund investor pays the income tax rate (τ_S) on interest and short-term realized gains $[(\alpha + \kappa\pi_S) R_A]$, pays the long-term capital gains rate (τ_L) on qualified dividends (βR_A), and pays the long-term capital gains rate (τ_L) on realized long-term capital gains $((1-\alpha-\beta-\kappa)\pi_L R_A)$. For simplicity, the tax on unrealized returns is assumed to be paid at the end of period at the long-term capital gains rate. Thus, unrealized short-term gains, $[\kappa(1-\pi_S)R_A]$, and unrealized long-term gains, $[(1-\alpha-\beta-\kappa)(1-\pi_L)]$, are taxed at the rate τ_L . Putting all these terms together, the expected after-tax return for a hedge fund investor is

$$R_A \{ (\alpha + \kappa\pi_S)(1 - \tau_S) + \beta(1 - \tau_L) + (1 - \alpha - \beta - \kappa)\pi_L(1 - \tau_L) + \kappa(1 - \pi_S)(1 - \tau_L) + (1 - \alpha - \beta - \kappa)(1 - \pi_L)(1 - \tau_L) \}. \quad (A1)$$

The effective tax rate, call it τ_A^H , is the rate that sets the expected after-tax return given by (A1) equal to $R_A(1 - \tau_A^H)$. Solving for τ_A^H ;

$$\tau_A^H = \tau_L + (\alpha + \kappa\pi_S)(\tau_S - \tau_L).$$

Intuitively, the effective tax rate is the long-term rate except that interest and realized short-term capital gains are taxed at the higher income tax rate.

Insurer. An insurer investor pays corporate tax on all returns except dividends subject to the Dividend Received Deduction. In addition, the insurer investor pays personal tax on all returns at the long-term capital gains rate (assuming returns are distributed as a qualified dividend or received as a long-term capital gain). Therefore, the expected after-tax return to the shareholders of the insurer on the asset portfolio equals

$$R^I = R_A \{ \alpha(1 - \tau_c)(1 - \tau_L) + \beta(1 - \varepsilon)(1 - \tau_c)(1 - \tau_L) + \beta\varepsilon(1 - \tau_L) + \kappa(1 - \tau_c)(1 - \tau_L) + (1 - \alpha - \beta - \kappa)(1 - \tau_c)(1 - \tau_L) \}. \quad (A2)$$

Each line of expression (A2) gives the after-tax return for the different categories of returns. Listing them in the order in which they appear in the expression, the return types are interest, dividends, short-term capital gains, and long-term capital gains.

The effective tax rate for an insurer investor, call it τ_A^I , is the rate that sets the expected after-tax return given by (A2) equal to $R_A(1 - \tau_A^I)$. Solving for τ_A^I yields

$$\tau_A^I = \tau_L + \tau_c (1 - \beta \varepsilon) (1 - \tau_L)$$

Intuitively, all returns are taxed at the long-term personal capital gains rate and all returns except those subject to the Dividend Received Deduction ($\beta\varepsilon$) are subject to corporate taxes.

Difference. The difference between the effective tax rates is:

$$(\tau_A^I - \tau_A^H) = \tau_c (1 - \tau_L) (1 - \varepsilon \beta) - (\alpha + \kappa \pi_S) (\tau_S - \tau_L) . \quad (A3)$$

The first term is the corporate tax disadvantage of investing through an insurer, and the second term is the personal tax advantage of investing through an insurer.

Appendix B

Description of Alternative Capital Arrangements

Sidecars. Reinsurers can sponsor a sidecar by creating a special purpose vehicle (SPV) or using a cell of a protected cell company (either created by the reinsurer or a third party).³⁷ In this way, a particular set of assets and liabilities are legally segregated from the insurer's other assets and liabilities. The reinsurer typically would place a portion of its liabilities and associated premiums in the cell along with the funds that it raises from investors (e.g., a hedge fund or an ILS fund). Figure B1 provides a simplified illustration. In this example, suppose that a reinsurer has a book of business with expected claim costs equal to \$20 million, premiums equal to \$25 million, and an aggregate claim limit of \$200 million. The reinsurer could transfer the liabilities along with the \$25 million of premiums to a cell of a protected cell company and then capitalize the cell with the sale of \$175 million in preferred equity to ILS funds. The insurers that ceded the risk to the reinsurer are likely to be fine with this transaction, as the side car is fully collateralized.³⁸ All of the assets would then typically be placed in a trust and invested in highly rated debt securities. Once all claims are settled, the funds that remain would be paid out to the equity holders.

Figure B2 presents the amount of assets invested in side cars each year using data from Artemis. In 2006, following Hurricanes Katrina, Rita, and Wilma, side cars became popular. However, the amount invested in side cars dropped dramatically during the financial crisis and only slowly rebounded. In the past few years, side cars have become more popular again, but they only account for about \$8 billion of capital in 2021, roughly 8% of total alternative capital (AON, 2021).

Insurance Linked Securities (ILS). The most common type of exposures underlying ILS are losses arising from natural catastrophes (Artemis, 2019). A simplified illustration of the structure of a catastrophe bond is provided in Figure B3. In this case, the sponsoring insurer creates a SPV in Bermuda, which (1) sells the insurer a reinsurance contract (in the illustrated example, \$100 million of coverage in excess of \$50 million) in exchange for a premium and (2) issues a bond to investors with

³⁷ Terminology used to describe protected cell companies can differ across jurisdictions. Other names include segregated account companies (Bermuda) and segregated portfolio companies (Cayman Islands). Protected cell companies have two basic parts: the core and the set of cells.

³⁸ As an example, French reinsurer Scor SE recently announced that "as part of a wider initiative to use more alternative capital," it plans to set up an external balance sheet backed by investors. For a fee, Scor would underwrite business on behalf the investors backing the off-balance sheet vehicle (Dyson, 2019).

a face amount equal to the limit on the insurance policy (\$100 million) and maturity typically of say two or three years.³⁹ In this way, the insurance contract is fully collateralized. The premiums and the proceeds of the bond issue are placed in a trust and invested in highly rated securities. If there are no claims on the reinsurance contract at the maturity of the bond issue, investors would receive their principal (\$100 million) plus the promised coupon. If there are claims, then the sponsoring insurer is compensated for the claim costs and the investors' payoff is reduced accordingly. Although the term cat "bond" is used, the securities issued to investors are treated as non-voting equity for tax purposes, as there are no equity claims on the SPV.

The ILS market began in the late 1990s and has grown steadily with some setbacks during and following the financial crisis. The Artemis website, reports that there is about \$35 billion of outstanding ILS principal in 2021. Recent issuers include Arch Capital (mortgages), FEMA (flood), the World Bank (pandemic), and PG&E (wildfire), as well as traditional issuers such as USAA and Nationwide (catastrophe). The intermediaries that are most active in this market include AON, Guy Carpenter Securities, Swiss Re, Goldman Sachs, and Credit Suisse. Specialized ILS funds are the primary purchasers of ILS.

Collateralized Reinsurance. The largest type of alternative reinsurance capital is collateralized reinsurance, which accounted for over \$50 billion of the \$97 billion in alternative capital outstanding in 2021 (AON, 2021). In these private transactions, a ceding insurer essentially buys reinsurance from an investment fund, which either commits enough capital to a trust fund to fully collateralize the potential loss or pays a rated reinsurer to "front" the business (which may also require collateral). The collateral is typically invested in highly rated securities. The structure of collateralized reinsurance is typically similar to a side car structure, which is illustrated in Figure B1.

Since the ceding insurer will typically want to receive credit for the reinsurance from its regulatory body, it will need to purchase reinsurance from a regulated reinsurance entity. To provide such an institution, a reinsurance transformer entity is created with cells for each individual collateralized reinsurance transaction. The cell issues the reinsurance policy, receives the collateral

³⁹ Most ILS are issued under Rule 144A, implying that they can be purchased only by Qualifying Institutional Buyers (QIB). There is a secondary market, although largely managed by one person – Craig Bonder at Beech Hill Securities (Evans, 2019).

from the investors, and returns the collateral and premiums back to the investors less the claim payments at the end of the contract period. Examples of transformer services are Solidum Re (Solidium Partners, 2019) and Aon's White Rock Group (White Rock, 2019).

Figure B1
 Illustration of a Simplified Structure of a Reinsurance Sidecar

Reinsurer places a book of business with Liabilities = \$20 million, Premiums = \$25 million, and Limit = \$200 million in a sidecar. Investors provide \$175 million in capital by purchasing preferred equity. The capital and premiums are placed in a trust.

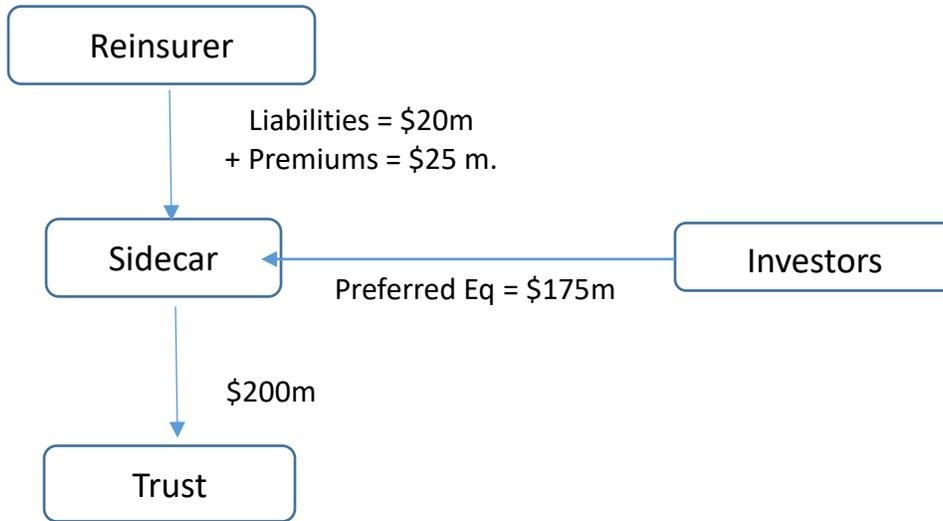


Figure B2

Source: Data are from the Artemis.bm website

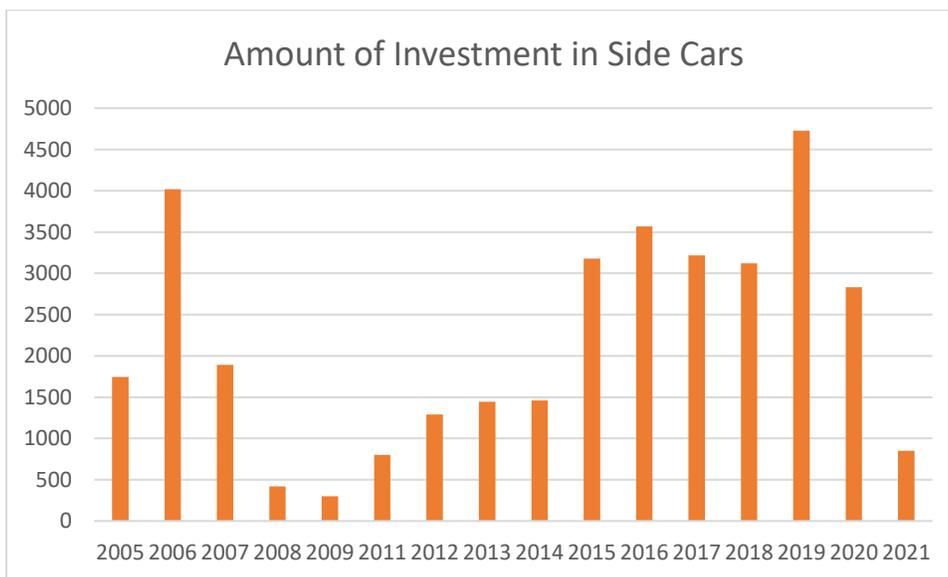


Figure B3

Example of a CAT Bond Structure

