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ECONOMIC CAPITAL COST FOR A PUBLICLY OWNED INSURER WRITING PANDEMIC RISK

Any (re)insurer that obtains its capital on the financial markets incurs market-consistent capital costs. These costs are based on the return an investor requires when investing in the insurer. There are two cost components: frictional costs and a market risk charge for market-dependent risks that the investor cannot diversify.

Frictional Capital Cost

There are four major components of frictional capital cost: The cost of double taxation arises from the fact that insurance companies are taxed on their investment return before it can be distributed to shareholders. The cost of financial distress arises because selling insurance introduces the risk that an insurer will experience financial distress. Financial distress can be costly due to both direct costs – such as the dead-weight costs of needing to raise fresh capital, legal fees and lost value from distressed sales – and indirect costs – primarily loss of reputation and associated franchise value.

Agency costs are associated with difficulties of shareholders to ensure that their interests are aligned with those of the management. Finally, the cost of regulatory restrictions is linked to restrictions in the form of e.g. conservative reserving standards, minimum capital requirements or fungibility constrains. (Koch et al. 2001)

The frictional cost charges are associated with insurance activities. For a typical insurer, they amount to 3.5-4% of the *available* capital. A certain portion must be allocated to pandemic risk. Usually, the allocation key is chosen according to the contribution of the risk to the *required* capital.

In order to obtain concrete figures, let us assume a required return on investment of 3.75% above risk-free, a corporate tax rate of 20%, a solvency ratio of 200% and a diversification benefit of pandemic risk within the insurance related activities of 70%. In a pandemic, the cover is likely to experience a total loss. Therefore, the capital required to cover the risk without considering diversification it the full cover. Consequently, the proceeds required from the pandemic business to finance a 3.75% return above the risk-free rate to the investor is 3.75% / (1-20%) * 200% *(1-70%) = 2.81% rate on line, i.e. as a percentage of the cover. Note that this could be lower if the pandemic risk benefits from a higher diversification or the solvency ratio is lower.

Market Risk Premium

As pandemic risk is clearly correlated with the financial markets, investors need to earn a corresponding market risk premium on the capital *that is exposed to that risk*. To estimate this premium, we observe that the pandemic cover correlates totally with pandemic related recessions affecting a broad range of sectors. Similarly, bond defaults correlate strongly with

recessions affecting the respective industry segment. The basic assumption is that the market risk premium for a pandemic cover and a corporate bond with the same expected loss is similar.

Let us assume a 33-year return period for the pandemic event, i.e. a 3% expected loss. Duffie (Duffie et al, page 431) analyse the decomposition of the total credit charge of bonds into a component for the expected loss and for the market risk premium. According to this study, a factor of 2.35 needs to be applied to the expected loss in order to obtain the market risk premium. This yields a market risk premium of 705bps.

Total Cost
Some components of the frictional capital cost, see above, are also accounted for in the market risk premium, particularly the cost of financial distress and to a lesser extent agency costs. To avoid double counting, the fictional capital cost needs to be appropriately adjusted. A reduction of 30% seems appropriate leading to frictional cost of 1.97% of the cover. The total rate on line, apart from administration cost amounts to 3% (for the expected loss) + 1.97% (to cover frictional cost) + 7.05% (to finance the market risk premium) = 12%. Note that the capital cost component amounts to 75% of the total cost. Such high percentages are typical for highly correlating risks.

Koch et al. (2001): J. Hancock, P. Huber, P. Koch: The economics of insurance; Swiss Re publishing 2001. https://media.swissre.com/documents/pub_economics_of_insurance_en.pdf

Duffie et al. (2018): A. Berndt, R. Douglas, D. Duffie, M. Ferguson: Corporate Credit Risk Premia; Review of Finance, 2018, p419–454

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