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. However, the variance of... the estimators [of the stand-by policy case] is very much greater than their variance in the estimated insurance case. As a result, the particular estimation method will lead to different solutions if the distribution used to simulate the insurance case and the stand-by policy case are different. Using a standard distribution for the insurance case and a proprietary distribution for the stand-by case may lead to the same amount of actuarial gain as using the same distribution in both cases. We may need to look at all relevant distributions in both cases. Considering uncertainty When calculating a new multi-state model, there will be uncertainty about the state-specific quantities. Defining uncertainty in insurance and stand-by policies can be difficult as these policies are often sold in advance, leading to an "information-theoretic" problem in which we do not know the correct information. If information is available about the new policyholder, we can use more accurate or more specific assumptions. For example, our policy holder is a group of individuals under the age of 26, each of which has a particular risk profile. If we know the risk profile and the risk tolerance of each individual, our model can be accurate. Expected pay-out in the insurance case In the insurance case, we want to analyse a pay-out from a new or existing policy. Under the standard deductible, the pay-out is the sum of the losses in the first year (based on the definition of the deductible), a fixed amount (the premium), and the remaining amount (the recovery). We can use the two-state nested loss model to calculate the expected pay-out. We can find the standard expected loss as follows. By setting d as the probability of zero (or any other fixed set of events), we find the distribution of the pay-out: Using the simulation distribution from the insurance case, we use the standard expected loss to simulate a loss given that our recovery depends on different factors. Note, however, that this standard expected loss is incorrect; it fails to account for the observation of zero loss. The correct expected pay-out is instead: Since our observation is either zero or a non-zero loss, we need to

