Multiple-prior valuation of cash flows subject to capital requirements

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Abstract

We study market-consistent valuation of liability cash flows motivated by current regulatory frameworks for the insurance industry. Building on the theory on multiple-prior optimal stopping we propose a valuation functional with sound economic properties that applies to any liability cash flow. Whereas a replicable cash flow is assigned the market value of the replicating portfolio, a cash flow that is not fully replicable is assigned a value which is the sum of the market value of a replicating portfolio and a positive margin. The margin is a direct consequence of considering a hypothetical transfer of the liability cash flow from an insurance company to an empty corporate entity set up with the sole purpose to manage the liability run-off, subject to repeated capital requirements, and considering the valuation of this entity from the owner's perspective taking model uncertainty into account. Aiming for applicability, we consider a detailed insurance application and explain how the optimisation problems over sets of probability measures can be cast as simpler optimisation problems over parameter sets corresponding to parameterised density processes appearing in applications.

Keywords: market-consistent valuation; capital requirements; model uncertainty; optimal stopping

1 Introduction

We consider the valuation of an aggregate insurance liability cash flow in run-off. The valuation approach is a direct consequence of considering a hypothetical transfer of the liability cash flow from an insurance company to an empty corporate entity set up with the sole purpose to manage the liability run-off. The owner of this entity needs to make sure at any time, in order to continue ownership of the entity, to pay claims and also to provide buffer capital according

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