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Retail banking and behavioral financial engineering: The case of structured products

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Abstract

We apply cumulative prospect theory and hedonic framing to evaluate discount reverse convertibles (DRCs) and reverse convertible bonds (RCBs) as important examples of structured products from a boundedly rational investor's point of view. While common expected utility theory would also conclude that DRCs and RCBs are of interest to investors with moderate return expectations and underestimated stock return volatility, that theory would overestimate the market success of DRCs and underestimate that of RCBs in comparison to a situation with bounded rationality. Hedonic framing and relatively low subjectively felt competence levels of investors are decisive for the demand for RCBs.

JEL classification: G31; G32; G35

Keywords: Behavioral corporate finance; Behavioral finance; Financial engineering; Structured products

1. Introduction

One of the core tasks of investment banking is the constant search for opportunities to create new financial instruments. Typically, this task is fulfilled by innovatively combining already existing components to form new financial instruments. By combining a set of

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elementary components, it is possible to cater to the special needs of individual groups of customers. This process is called "financial engineering", as investment bankers act similarly to engineers or natural scientists when planning and creating complex financial innovations, on the basis of some elementary building blocks, in order to meet their customers' needs.

One of the most prominent groups of newly introduced financial instruments resulting from such financial engineering is termed "structured products". These are combinations of derivatives and underlying financial instruments which exhibit structures with special risk/return profiles that may not be otherwise attainable on the capital market without significant transaction costs being incurred – at least for private investors (see, e.g., Das, 2000). Discount reverse convertibles (DRCs, henceforth) and reverse convertible bonds (RCBs, henceforth) are important examples of structured products. DRCs and RCBs can be interpreted as a combination of a zero bond or a coupon bond plus a short position in put options on stocks.

While the creation of new financial instruments of this kind is not too difficult, their market success depends on the costs of their reconstruction for the issuer and the benefits they offer to potential buyers. Certainly, for complex financial instruments like structured products, there is a special need for a quantification of these costs and benefits. Financial engineering thus comprises two quantitative subroutines. First, investment banks have to calculate the costs of creating a certain structured product as the outcome of the combination of several single modules. This is typically done with the help of arbitrage-theoretical tools for perfect capital markets, as investment banks can be considered as acting on capital markets that are near to perfection.

Second, however, one has to evaluate a customer's possible utility gains when he or she buys a certain financial product, whereby it is necessary to abstract from a perfect capital market – at least in the case of retail customers – because these customers do not have the same unhampered market access as investment banks do. Moreover, there would otherwise indeed be no need for any financial innovation at all, as we are told by the celebrated irrelevance theorem introduced by Modigliani and Miller (1958).

One straightforward idea would be to apply expected utility theory based on the axioms of rational decision making, as introduced by von Neumann and Morgenstern (1944) in order to assess the utility effects of new financial products. However, ever since Allais published his seminal work in 1953, there have been practically innumerable contributions, all pointing out that real-life human decision behavior is not governed by such rational axioms. In fact, even the evaluation of simple stock holdings by expected utility theory is troubled by a problem known as the "equity premium puzzle", which describes the fact that real-life risk premia are far higher than expected utility theory would suggest (see, e.g., Mehra and Prescott, 1985). Recent work on the equity premium puzzle, like that of Bernartzi and Thaler (1995), Barberis et al. (2001) and Barberis and Huang (2005), therefore tries to exploit the findings of the (cumulative) prospect theory suggested by Kahneman and Tversky (1979) and Tversky and Kahneman (1992). This alternative behavioral decision theory seems to be one of the most promising attempts to realistically describe many aspects of actual human decision making. With individuals' value functions being defined in wealth changes, instead of absolute wealth levels, and exhibiting loss aversion as well as the assumption of overweighting extremely low and underweighting extremely high probabilities, the (cumulative) prospect theory was originally designed for the subjective evaluation of lotteries as the typical form of uncertain prospects. However, this