



## A note on receptiveness to loss in structured Investment<sup>☆</sup>



Maya Lazar, Amir Levkowitz, Amit Oren, Doron Sonsino\*

COMAS, College of Management Academic Studies, P.O.B 9017, Rishon LeZion 75190 Israel

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### ABSTRACT

The close to zero interest rates past the economic crisis open possibility to directly test for loss aversion in framed field structured investment tasks. We use a Web-survey platform to compare the willingness to invest in LOSS-GAIN deposits that pay positive return  $G$  in favorable market conditions, but bring a loss  $L$  in the complementary states, to the valuation of parallel GAIN-ONLY deposits that pay small positive return  $G-|L|$  in the favorable scenario but bring zero return in the opposite case. While common models of choice predict that investors should refrain from LOSS-GAIN designs but may strongly approve the GAIN-ONLY, the participants rank the LOSS-GAIN significantly higher and show similarly strong willingness to invest in both versions. The results suggest that loss aversion may attenuate in retail structured investment, when small losses come with increased compensating gain possibilities.

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### 1. Introduction

While the contribution of Kahneman and Tversky's (1979) loss aversion to economics is indisputable (Camerer, 2004; Barberis, 2013), a growing body of research challenges the global loss aversion assumption, illustrating that decision makers may accommodate the possibility of loss in particular contexts and applications. This note reports the results of a brief Google Forms experiment, illustrating that loss aversion may diminish in retail structured investment, when the investors can increase their gain opportunities by accepting the possibility of a small loss.

The prospective investors of our incentivized survey reveal preference for structured deposits that may bring small loss or larger gain (LOSS-GAIN designs) over parallel deposits that provide full capital protection with a possibility of small gain (GAIN-ONLY). A deposit that pays 5% or -3% annual return depending on the 2017 performance of the S&P500 index, for example, is ranked as significantly more appealing than a deposit that similarly pays 2% or 0%. Participants' median predictions for the S&P500 2017 return are elicited first, to define deposits with 50-50 likelihoods for positive

or non-positive return, and personal attitude to gain-domain risk is controlled using a choice problem between riskier and safer deposits. As Prospect Theory implies clear preference for GAIN-ONLY designs, our results strongly contradict the predictions of leading choice models. Since the preference for LOSS-GAIN also shows for risk averse respondents, we more specifically conclude that loss aversion locally mitigates, as 3% increase in gains appears to have stronger impact than 3% loss.

Our brief framed field experiment (Harrison and List, 2004) importantly exploits the close to zero deposit interest rates prevailing in September 2016. The risk free annual rates that commercial banks paid on large deposits did not exceed 0.15% around the experiment. If the risk free deposit rates were substantially higher, so that to compensate for 3% loss we should have offered the investor 12% return in the favorable market condition, then the GAIN-ONLY version paying 9% or 0% could still be preferred to the 12% or -3% LOSS-GAIN design (as a marginal increase in gains from 9% to 12% does not compensate for 3% loss). The very low interest rates however open a possibility for comparing the impact of 3% loss to almost parallel 3% increase in gain, from 2% to 5%. We intuitively suspect that loss aversion may fail in such close comparison.

The note proceeds as follows: the limited loss aversion literature is briefly surveyed in Section 2 and the methodology of the Web experiment is explained in Section 3. The sample is described in Section 4, while Section 5 presents the results. Section 6 concludes.

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\* Corresponding author.

E-mail addresses: [sonsino.doron@gmail.com](mailto:sonsino.doron@gmail.com), [sonsinod@colman.ac.il](mailto:sonsinod@colman.ac.il) (D. Sonsino).

## 2. Motivation and literature review

The lingering economic uncertainty and close to zero world-wide interest rates have increased the retail demand for structured investments in general, and structured instruments with capital protection in particular (Hens and Rieger, 2014; Entrop et al., 2016). Some structured notes and certificates offer 100% capital protection, with limited positive return possibilities. In other cases, the investor may lose given percentile of the investment, but the limited loss comes with compensating larger gain possibilities to keep the investment instrument attractive (see Web supplement A for recent field examples).<sup>1</sup> This note posits that loss aversion may decrease in retail structured investment context, to the extent that investors would prefer small loss designs to parallel, full capital protection instruments. The hypothesis links to 3 lines of findings in the emerging limited loss aversion literature:

Several papers propose that loss aversion may attenuate in deliberate or calculated choice. Sokol-Hessner et al. (2009) show that loss aversion almost disappears when subjects are requested to assume a trader's role. Vieider (2009) relatedly shows that loss aversion reduces when subjects have to explain their choices in post-experiment personal interviews. Klapper et al. (2005) find that consumers' loss aversion decreases with quality consciousness, while Ert and Erev (2008) illustrate that rejection of mixed loss-gain gambles is more frequent in hallway questionnaires compared to laboratory experiments.

A complementary line of research suggests that loss aversion intensifies with emotion. Endowment effect studies show that the minimal price that owners demand for departing from a possession strongly increases with attachment (Ariely et al., 2005). Hartley and Phelps (2012) show that personal disposition to anxiety enhances loss aversion, while Inesi (2010) contrarily illustrates that power priming mitigates the aversion. Sokol-Hessner et al. (2012) find neuroimaging links between emotion regulation and the decreased loss aversion of subjects assuming the role of professional traders.

A third relevant stream in the restricted loss aversion literature deals with sociodemographic correlates, illustrating that loss aversion may reduce with education (Booij and Van de Kuilen, 2009; Gächter et al., 2007) and sophisticated financial literacy (Bateman et al., 2015). Dimmock and Kouwenberg (2010) find that direct investment in stocks associates with smaller loss aversion. Payne et al. (2015) expose negative correlation between loss aversion and personal life expectancy.<sup>2</sup>

Intuitively, these findings suggest that loss aversion may play smaller role in retail structured investment decision. The minimum investment in structured instruments frequently exceeds 1000 Euros (dollars), and the retail clientele that opt for these instruments are typically affluent, educated, and financially literate (cf., Chao-Hung, 2013). It is reasonable moreover to assume that structured investment decisions are non-emotional and calculated (Blümke, 2009). These characteristics match the contexts within

which loss aversion shows smaller affect, motivating the current exploratory examination.

Moreover, in a related paper Sonsino et al. (2017) find evidence for limited loss aversion in the valuation of investment instruments with composite return structure. A composite is defined as a structured instrument with at least two underlying assets; e.g., an ETN (Exchange Trade Note) that tracks the S&P500 and COMEX GOLD contracts in equal weights (<http://us.spindices.com/indices/strategy/sp-500-gold-hedged-index>). The 2016 paper shows that prospective investors tend to value such composites "by tranche", weighting the values of underlying components, instead of valuating the reduced-form prospect.<sup>3</sup> Moreover, within valuation-by-tranche, loss aversion only emerges for losses exceeding thresholds around 5%. The investors of the composite-instruments experiments thus appear relatively receptive to losses, when these come with increased structured gain possibilities. These former results additionally motivate the current test of attitude to loss in the context of simple, non-composite, structured investment.

## 3. The 3-step design

We use a 3-step design to compare the valuation of framed field 2017 deposits with and without possible loss:

At the first step, the respondent was asked to provide a median prediction for the 2017 return of a leading U.S. stock market index such as the Standard & Poor's 500 (henceforth: SP500) or the Dow Jones Industrial Average (DJIA). The instructions (Appendix A.1) explained that a median prediction is a point forecast such that the predictor assigns equal 50-50 chances to larger or smaller return, and the realized return in each of the years 2013–2015 and at the first 8 months of 2016 were presented on screen to facilitate the forecasting. Ten participants were randomly selected for receiving a prize that decreases with their absolute prediction error. The potential prize was set at 200 NIS (about 54 \$US) for prediction errors smaller than 1%, and decreased at slope of 10 NIS so that errors of 20% and higher canceled the payoff completely. As the median minimizes the expected absolute prediction error (e.g., Bloomfield and Steiger, 2012), the incentivization method matches the explicit call for predictions with equal 50-50 chances for lower or higher return.<sup>4</sup>

The median forecast was used at the next screen of the questionnaire (step 2), where the respondent was asked to evaluate a structured deposit that pays given positive return  $G$  if the underlying index return in 2017 exceeds (or is equal to) the previously submitted median prediction, but pays negative or zero return  $L$  if the 2017 index return falls below the previously submitted forecast. The  $G = 5\%$  and  $L = -3\%$  assignment is presented in Appendix A.2. The participant is asked to decide how much, of a free investment budget of 250,000 NIS she chooses to invest in the deposit, and also rank the deposit in 1–10 scale in terms of its general appeal to well-off investors.<sup>5</sup> Since the median prediction is defined as a prediction with equal chances for lower or higher return, the deposit actually represents a prospect with 50–50 chances for positive or negative return. The expected return is only 1%, which suits the close to zero risk-free deposit rates at the time of the experiment.

To compare the willingness to invest in such limited-loss deposits to the willingness to invest in parallel gain-only struc-

<sup>1</sup> Structured investment instruments typically consist of an underlying asset (or basket of assets) and a return function, deriving the structured return from the underlying's performance. A general typology of structured products is provided at <http://www.svsp-verband.ch/en/>. In examples A.1–A.2 of Web supplement A the investment capital is 100% protected (gain-only), while in examples A.3–A.4 the capital protection is 90% (maximal loss 10%). The industry uses terms such as "structured deposit note" or "structured certificate". We use "structured deposits" henceforth.

<sup>2</sup> Limited loss aversion also shows in choice from experience experiments; e.g., in Erev et al. (2008) subjects prefer a gamble paying +1000 or –1000 on a certain outcome of 0 in almost 50% of 100 trials. Another segment of literature argues that loss aversion does not show for money exchanged in routine no-risk transactions (Novemsky and Kahneman, 2005).

<sup>3</sup> Using  $V$  to denote the valuation functional, valuation by-tranche is based on  $0.5 \cdot V(\text{S\&P500}) + 0.5 \cdot V(\text{GOLD})$ , contrarily to the rational model where  $V$  is applied to the reduced-form prospect:  $V(0.5 \cdot \text{S\&P500} + 0.5 \cdot \text{GOLD})$ .

<sup>4</sup> If the decision-maker holds subjective beliefs represented by some density  $f$  regarding the target return  $r$ , then the median solves the problem  $\text{MIN}_P E_f(|P - r|)$ .

<sup>5</sup> The US dollar was traded for 3.7 New Israeli Shekel around the experiment.

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