Framing the Individual Investor:

The Case of Capital Guaranteed Funds

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Abstract

Expected utility theory assumes that the representation of a decision problem does not affect the decision itself. Unfortunately, many examples of framing exist whereby a change in the wording of a problem leads to other preferences. We apply the idea of framing to capital guaranteed funds. Capital guaranteed funds provide individual investors with an efficient way to build in capital protection and still earn a return proportional to e.g. the performance of the stock market. Based on an experiment, we show that investors are willing to put the interest on a time deposit at stake in order to earn a higher income. In this way, capital guaranteed funds serve a good purpose. However, the frame used to disclose information about the fund to the investor, matters. Investors tend to choose in a different way when they know characteristics of the probability distribution of the potential gains/losses. These findings clearly call for a closer attention of regulators.

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1 Introduction

All over the world, primary market activities vis-à-vis the private investor are severely regulated. Legislators tend to be quite protective. They regulate the entrance to the profession and for new instruments launched they demand an extensive prospectus which has to be approved of by the national controlling bodies. Although the European passport facilitates the international distribution of funds within the EU, the approval of the prospectus normally needs to be obtained in every country where a bank wishes to commercialize mutual funds. The prospectus, however, turns out to be a bulky legal document which is hardly ever consulted by private investors. In Belgium, this deficiency was recognised and for mutual funds, a concise 2-page prospectus was advanced. Although this concise prospectus contains a risk indicator based on the variability of the returns of the fund, it can be questioned whether 'the right' information is disclosed. As far as mutual funds investing in stocks or bonds are concerned, the risk indicator surely is a step in the right direction. For the structured products that have been massively launched over the last decade, however, it is less clear whether or not the private investor gets what he wants.

Although all banks operating in Belgium have similar structures, we take an example from an important player in this important segment of mutual funds, to illustrate the kind of products the private investor finds in his set of opportunities. The "Clicketplus North America Best of 2" fund is an example of a Belgian capital guaranteed fund on a foreign index. Although the fund is listed as a fund with capital protection, this is not entirely true. The investor gets 100% capital protection in USD, but not in his home currency (the euro)! Of course, foreign exchange risk might erode the initial inlay. Then the fund gives the best of two pay-off functions. The first pay-off is a wealth increase of 20% (over a 7.5 year period, which boils down to a 2.15% effective annual return). The second pay-off is determined by a variable cap cliquet structure defined on the S&P500. The time to maturity is divided in 8 sub-periods. The potential increase of the S&P500 per sub-period will be paid out at maturity with a maximum of 8.25%. This amount is 'increased' with the decrease in the previous period. This decrease will be limited to a maximum of 3%.

The only thing which is obvious from the previous description is the fact that the private investor does not have any clue about the probability distribution of potential returns. It seems that products like the one above are being launched because the mutual fund business is quite profitable. Besides an entrance fees of 3%, also a management fee of 1% per annum is commonly charged.

Although many researchers have pointed out that the choice between various lotteries (or investments) depends significantly on the presentation or framing of the 'gamble', supervisors in general do not require a full disclosure of the probable outcomes of an investment *with* their probabilities. The lack of this information not only hampers correct decision making but creates an expectation gap in the mind of the private investor. Especially, the sellers of structured products tend to use push marketing strategies that overemphasise the positive outcomes (without stating probabilities) and underemphasise outcomes that are in the detriment of the investor.

In this paper, capital guaranteed funds are chosen to serve as an example for these practices that might balance on the edge of acceptable ethics. Given the lucrative nature of the products, banks have no incentive to refrain their financial engineers or their marketing people to launch new, trendy and catchy products. Also supervisors do not seem to pay much attention to the economic rational of these products and to the way the products are framed to the private investor. We claim that for the private investor, descriptions such as that of the "Clicketplus North America Best of 2", are not sufficient for him/her to form a solid opinion. The fund can be framed in such a way that it becomes a commercial success but in the end the private investor is framed because (s)he does not get what (s)he initially thinks. In this paper we want to draw attention to this void and we will experimentally show that people are very sensitive to framing. We do not claim that capital guaranteed funds should be banished. Indeed, our experiment also shows that many people are willing to sacrifice their interest on a time deposit in order to obtain a bet on the stock market. We do claim, however, that the information typically given to private investors through the prospectus and the advertisements in the newspapers are not sufficient to form an informed opinion.

We continue this paper by discussing some classical examples of framing (section 2). We document that framing is omnipresent in many domains of life. In section 3 we first discuss how to construct (plain vanilla) capital guaranteed funds. Then we propose two frames to represent the same funds to potential investors. Section 4 describes the results of an experiment which was performed with 128 students. We first validate the use of students as respondents by replicating a classical framing study. Then we proceed with the results of our experiment and finally we conclude.

2 Classical examples of framing

Expected utility theory assumes, among other things, descriptive invariance. The representation of a decision problem should not result in different choice behaviour. In practice, however, people turn out to be quite sensitive to framing. We first illustrate how framing can 'create' and 'solve' the well known Allais paradox. Next we give a few other classical examples of how framing affects people's choices.

2.1 Solving the Allais paradox by framing

A classical example (see e.g. Biswas, 1997) of a violation of expected utility theory is the Allais paradox. If an individual has to choose between lotteries L_1 and L_2

L_1: €30 000 (0.33); €25 000 (0.66) ; €0 (0.01)

L_2: €25 000 (1)

most individuals choose for L_2. Note that the probabilities are given between round brackets.

The same individuals quite often prefer L3 over L4 where

L_3: €30 000 (0.33); €0 (0.67)

L_4: €25 000 (0.34); €0 (0.66).

This choice (L_2 & L_3) violates the expected utility theorem since the first choice implies that

0.33 U(€30 000) + 0.66 U(€25 000) + 0.01 U(€0) < U(€25 000)

or 0.33 U(€30 000) + 0.01 U(€0) < 0.34 U(€25 000)

whereas the second choice implies that

0.33 U(€30 000) + 0.67 U(€0) > 0.34 U(€25 000) + 0.66 U(€0)

or 0.33 U(€30 000) + 0.01 U(€0) > 0.34 U(€25 000).

For the same individual, these two statements obviously cannot hold simultaneously.

If the same lottery is framed as a compound lottery many investors change their choice behaviour. Consider L_1' to be a lottery of winning €25 000 with a probability of 0.66. Otherwise the decision maker can win €30 000 with a probability of 33/34 and €0 with a probability of 1/34. If you go for L_2', you are, like in L_2, sure to get €25 000. Most investors stay consistent and prefer L_2' over L_1'.

We also frame L_3' as a compound gamble. You get €0 with a probability of 0.66. Otherwise we play a second gamble where you have a probability of 33/34 to obtain €30 000 and a probability of 1/34 to end with nothing.

Lottery L_4' is the same as lottery L_4. Observe that while the unconditional probabilities of lotteries L_i' are the same as those of lotteries L_i, many decision makers now tend to prefer L_4' over L_3'. Although framing the Allais paradox differently saves the expected utility theorem, it clearly shows that individuals are sensitive to framing.

2.2 A plethora of other framing examples

2.2.1 Time estimation

An astonishingly simple example of framing was discovered when asking for the length of a movie that people just saw (Plous, 1993). When the question was framed "How long was the movie?", the average answer was 2 hours and 10 minutes. Alternatively stating the question as "How short was the movie?" diminished the average perceived length by half an hour.

2.2.2 Live and let die

McNeil, Parker, Sox and Tversky (1982) asked people (including patients and doctors) to choose between surgery and radiology. For half of the available respondents the information was stated in a survival frame as follows:

- Surgery: "Of 100 people having surgery, 90 live through the post-operative period, 68 are alive at the end of the first year and 34 are alive at the end of five years."
- Radiation: "Of 100 people having radiation therapy, all live through the treatment, 77 are alive at the end of one year and 22 are alive at the end of five years."

When people had to choose the most attractive treatment, only 18% of the respondents opted for radiation. Clearly, the lower long run survival probability was held against radiation.

For the other half of the respondents, the information was framed in a mortality frame reading:

- Surgery: "Of 100 people having surgery, 10 die during the surgery or the post-operative period, 32 die by the end of the first year and 66 die by the end of five years."
- Radiation: "Of 100 people having radiation therapy, none die during treatment, 23 die by the end of year one and 78 die by the end of five years."

This time 44 % of the respondents (patients and doctors alike) chose for radiation. The high probability of death caused by the operation caught more attention and induced a shift in the decision making.

2.2.3 Savings plans

When setting up a US 401(k) defined contribution savings plan, which is voluntary, the savings industry typically chooses to structure the plan with automatic enrolment (Utkus, 2004). Instead of letting an employee decide whether to join for a particular year, employees are nowadays automatically signed up to make contributions to the plan. They can still opt out but this requires an explicit act. Combined with human inertia and procrastination, this framing of the membership drastically impacts the number of employees contributing to the savings plan.

2.2.4 Asset allocation

The majority of investors does not appear to have a strong conviction of how to allocate their wealth. If they have to choose from a fixed investment menu, the proportion of equities versus fixed income instruments in the menu influences the final asset allocation they make. In a menu with more fixed income instruments, investors will, on average, end up with a larger stake in fixed income.

Also the way data are presented crucially affects investor behaviour. If investors are shown a long period of stock returns (say 30 years), they will be less averse to allocate a larger part of their wealth to stocks than in the case where only one year of returns is disclosed.

2.2.5 "Insurance" sounds well

Slovic, Fischhoff and Lichenstein (described in Plous, 1993) asked people to choose from:

- Alternative 1: A 100% probability of losing €50;
- Alternative 2: A 25% probability of losing €200 and a 75% probability of losing nothing.

Exhibiting a high degree of loss aversion, 80% of the respondents chose for alternative 2.

However, when choosing between:

- Alternative 3: Pay an insurance premium of €50 to avoid a 25% probability of losing €200;
- Alternative 4: A 25% probability of losing €200, and a 75% probability of losing nothing;

65% of the respondents chose Alternative 3. Reformulating the sure loss in terms of an insurance premium to avoid a bigger loss, is clearly perceived differently by a vast amount of people.

3 Constructing Feasible Capital Guaranteed Fund Strategies

If we want to test whether framing impacts the choice behaviour of (potential) investors, we have to set up an experiment in which people can choose between investments based on different information sets. In the first information set, we give a description of the pay-off function just like financial institutions tend to do nowadays. We do not take a complicated example, but we stick to a capital guaranteed fund that simply gives the upside potential of a stock market index. In the market we find e.g. a fund on the Euronext 100 where the investor faces a time to maturity of 6 years. At the end of the investment horizon, the investor gets the maximum of 0 and 65% of the change in the Euronext 100 index. In the second information set, we provide the (potential) investor with probabilistic information about the possible pay-offs and his/her chances to fall back on the capital guarantee. If we can show that the preference order for the same products changes depending on the information set, we have made our case. In our view, the probabilistic information set is richer and more closely describes the true nature of the products.

3.1 Construction of Capital Guaranteed Funds

Capital guaranteed funds can easily be constructed based on the European style put-call parity. The (European) put-call parity implies that a portfolio of a stock and a put, generates the same pay-offs as a portfolio consisting of a call and a bond. The put and the call both are written on the same stock, and have the same strike price K and the same time to maturity T. The bond has a market value equal to the discounted value of K and will compound to K at the time of maturity. We recognize that we can provide a capital guarantee (at level K) for the stock over period T, if we buy a put with strike K and time to maturity T. Alternatively, we could buy a zero bond, which will compound to K at maturity (the level of the capital guarantee) and a call (which provides us with the upward potential of the stock). In practice, accounting and tax purposes induce banks to apply a slight variation on this recipe. They will invest the nominal value received from the client in a time deposit and they will then swap the (e.g. quarterly) interest received for an option construction in line with the contractual promises to the customer. Initially, the option construction bought was pretty simple and in many cases boiled down to a plain vanilla call. Nowadays, option constructions based on multiple underlying values are bought that hinder every attempt of investors to assess the probability of getting a return higher than the risk free rate which they obviously put at risk.

Since we want to test whether the kind of information provided to the potential customer affects the decision making process, we stick to a

simple capital guaranteed mutual fund. If framing effects can be detected in a simple zero bond - call setting, framing effects will certainly be present when much more complicated pay-off definitions are involved.

Given a certain interest rate, r, we buy a T-year zero bond that has a nominal value of CG. The price of this bond, P, is equal to

$$\frac{CG}{(1+r)^T}.$$

Over the maturity T the zero bond will compound to CG, which is the level of capital protection. We assume that the fund manager will retain a yearly management fee, mf. Hence, the premium available to the fund manager can be written as: $Premium = CG - P - PV(mf)$. Note that we denote the present value of the management fee as $PV(mf)$. This premium can be used to buy w at-the-money call options, a number depending on the volatility of the underlying asset.

We study two investment horizons, 3 and 5 years, and two interest rate scenarios, 7% and 3%. Hence, we obtain four scenarios under which we examine the response to differently framed decision problems. Throughout, we assume the management fee to be 1% per annum and the dividend yield 3% per annum. The volatility of the underlying asset is chosen to be (as low as) 10% for a fictive index of large caps, and 20% for a fictive index of small caps. For each scenario we compute how many options we can buy and formulate this as the participation level that the investor will get in either the large cap or the small cap index. In each scenario we also provide the decision maker with a risk less alternative, a term deposit yielding either 7% or 3%.

3.2 The fund description frame

In the first frame, we let the respondent choose between 5 hypothetical investments over an investment horizon of e.g. 3 years: a time deposit rendering 7% per annum, a mutual fund guaranteeing 100% of the initial inlay and giving a 126% (89%) increase of a Large (Small) Cap Index, a mutual fund guaranteeing 90% of the initial investment and giving 192% (135%) the increase in the Large (Small) Cap Index.

Table 1: Upward Potential in the Fund Description Frame

	Term Deposit	100% Capital Guarantee	90% Capital Guarantee	100% Capital Guarantee	90% Capital Guarantee
Underlying Index		Large Caps	Large Caps	Small Caps	Small Caps
Investment	A/F/K/P	B/G/L/Q	C/H/M/R	D/I/N/S	E/J/O/T
3 year	7%	126%	192%	89%	135%
3 year	3%	90%	235%	45%	118%
5 year	7%	142%	183%	107%	138%
5 year	3%	120%	232%	60%	117%

Table 1 reports the upward potentials we can provide in the 4 scenarios under consideration. It is important to stress that in every row, we spend the same available (after management fees) premium in buying calls. Based on this table we can formulate capital guaranteed funds after the example of the fund on the Euronext 100.

3.3 The probability frame

In the probability frame, we used the time deposit (Investment A) as a benchmark. To make sure our respondents would take their potential investment seriously, we provided both the return (7% or 3%) and the compounded interest amount that would be earned for sure at the end of the investment horizon. For the first scenario, a 3 year €100 000 investment at 7%, this was €22 500. For the other 4 investments, we provided the students with 2 tables giving information about the probability of loss or status quo, and the probability to end up with a smaller return than the term deposit interest. In order to calculate the probability, we assumed the underlying indices to follow a geometric Brownian motion with a (real world) drift of 8% (12%) per annum for the Large (Small) Cap Index. Of course we can be criticised for choosing drifts that are deemed inappropriate. However, as long as a bank evaluates its probability information based on methodologically consistent estimates for its complete set of funds, the relative assessment remains relevant. Besides, also for Value at Risk calculations, several methods require similar input information.

Table 2: Some downside probabilities

	B	C	D	E
Probability of Loss or Status Quo	10%	16%	19%	26%
Probability to get less terminal wealth than by investing in the term deposit	36%	35%	42%	40%

Table 2 shows that e.g. for investment B and D (the 100% Capital Guaranteed funds) the probability that the investor pays the opportunity cost is respectively 10% and 19%. Moreover, the probability to get a return worse than the term deposit ranges from 35% to 42%. These capital guaranteed funds are neither second order nor third order stochastically dominated by the time deposit (see Hadar and Russell, 1969; Hanoch and Levy, 1969). In other words, the investments that we present to our respondents are included in the efficient set of any risk averse investor. We verified this by using the algorithm of Levy and Sarnat (1984).

In addition the students were also presented 5 percentiles of the profit and loss distribution. The 99% percent percentile, we (slightly incorrectly) presented as the maximum return the investor could get.

Table 3: Percentiles

		Perc25	Perc50	Perc75	Perc90	Max
B	Profit/Loss	14000	32000	51000	71000	110000
	Return	5%	10%	15%	20%	28%
C	Profit/Loss	12000	38000	68000	98000	158000
	Return	4%	11%	19%	26%	37%
D	Profit/Loss	6000	31000	63000	98000	180000
	Return	2%	9%	18%	26%	41%
E	Profit/Loss	-1000	37000	85000	139000	263000
	Return	0%	11%	23%	34%	54%

We explicitly provided the respondents with two examples of how to give a correct interpretation to Table 3. We stated that "*e.g. in the case of investment B, "Perc75 = €51 000" implies that 75% of the possible outcomes will be lower than €51 000 or alternatively that the return of the investment will be lower than 15% with a probability of 75%. Still framed differently, you have a probability of 25% to obtain a return higher than 15%.*" We additionally provided them with a second example stating that "*e.g. in case of investment E, Perc25 = -1000 implies that in 25% of the possible states of the world, a loss of €1 000 or more will be incurred. Observing Table 2 however, we notice that there is a probability of 10% that this investment will not deliver any profit."* The figures for the other scenarios studied (5 years, 3% interest rates) can be found in Table 8 (Appendix).

4 Empirical Results

We first describe our respondents. Next, we discuss the incentives we gave to our respondents and their representativeness. Finally, we discuss the choices they made and the effects of framing.

4.1 Selection of the respondents

4.1.1 Students as respondents

First, we attempted to validate the seriousness of our students' behaviour by replicating a well known experiment. This experiment was performed in the first Bachelor of Applied Economics at the University of Antwerp. 140 students participated in this part of our study. We chose to replicate the McNeil, Parker, Sox and Tversky (1982) experiment with exactly the same wordings (see section 2.2.2). In line with what was found in the original experiment, Table 4 documents that our students showed an increased tendency to choose for radiation when the problem was presented in a mortality framework. The percentage of respondents choosing for radiation increased from 22% in the survival frame to 51% in the mortality frame. These results imply a highly statistically significant Chi-square statistic of 11.98 (p-value of 0.001). We infer from this replication that our economics students are equally likely to be vulnerable to framing as the students, patients and doctors of McNeil, Parker, Sox and Tversky (1982).

Table 4: Replicating the McNeil, Parker, Sox and Tversky (1982) experiment

	Survival Frame	Mortality Frame	**Total**
Surgery	52	36	**88**
Radiation	15	37	**52**
Total	**67**	**73**	**140**

4.1.2 Validation of our final respondents group

In order to test whether framing makes a difference when providing information about mutual funds, we selected a sample of 67 first year and 61 second year students in the faculty of Applied Economics at the University of Antwerp. The 67 first year students also had taken part in the replication of McNeil, Parker, Sox and Tversky (1982) (See section 4.1.1). The students varied between the age of 17 and 27. As one can infer from Table 5, they are predominantly 18 to 19 years old. 56.25% (72) of the respondents was male, 43.75% (56) was female.

Table 5: Age distribution of the respondents

Age	**17**	**18**	**19**	**20**	**21**	**22+**	**Total**
Frequency	1	35	69	13	4	6	128

The fact that these students were first and second year students does not hamper our research design in any way. At the time the questionnaire was taken, these students have neither a financial background nor knowledge of decision sciences. Since most investors do not possess a deep financial knowledge either, these students are not expected to have worse decision skills than the average investor.

4.2 Incentives to and validation of the respondents

We asked the students to imagine themselves that they had inherited €100 000. We made sure the available investment amount was high enough in order to mentally frame the available sum of money as real investment money and not as a windfall which could be gambled away. For the same reason, we expressed the outcomes of the investment not only as percentages, but also as absolute amounts of money. We hoped that this would give the respondents a better view on how much money they could win or loose as a result of their choices. We finally explained them that they should take the investments seriously and that they should be willing to do the investments they choose in real life.

In order to stimulate the respondents to take the questionnaire seriously, we announced to reward three students with two movie tickets (value of approximately €15). Before the questionnaire was filled in, we explained them that we would select the winning students based on criteria used in investment analysis. After the questionnaire was filled in, we explained that most of the time there was no single preference order that was independent of the investors' degree of risk aversion. Consequently, we drew the three winning respondents at random.

In order to have a last control on the validity of the students' answers, we included some funds in the opportunity set that were very unlikely to be selected by persons who studied the alternatives carefully. Funds I, J, S and T were explicitly taken into the opportunity set since they are second order stochastically dominated by respectively G, H, Q and R. Under the expected utility hypothesis, no rational risk averse investor should violate this dominance relation. As we will show in Table 6, 90% (89%) of our students in the Fund Frame (Probability Frame) preferred G to I, 94% (97%) preferred H to J, 90% (89%) preferred Q to S and 93% (9%) preferred R to T. These high percentages document that the respondents did not lightly go over the questionnaire. Instead of interpreting this result as a practical test of second order stochastic dominance, we consider it to be an implicit check on the validity of the respondents' answers.

Taking these results into account, we cannot find reasons to question our set of respondents.

4.3 Effects of framing

Table 6 summarizes the main results of our experiment. Every rectangle in the table gives a comparison between investment alternatives in one of the four scenarios. We denoted the Fund Frame Scenario with *FF*, the Probability Frame Scenario with *PF*. The upper left cell e.g. shows that in the choice problem between A (the time deposit) and B (a 100 % capital guaranteed fund based on the Large Cap Index), 58% of our respondents preferred the capital guaranteed fund in the fund frame whereas 51% of our respondents preferred the time deposit in the probability frame. We tested whether a difference in opinion arose by using a different frame by using a Chi-squared test. The p-value of the contingency table is given between brackets. In the first cell, no shift is detected by using a different frame.

Table 6: Table of Preferences (expressed in percentages)

	Time to Maturity = 3 year								Time to Maturity= 5 year							
	r = 7%				r = 3%				r = 7%				r = 3%			
		FF	*PF*			*FF*	*PF*			*FF*	*PF*			*FF*	*PF*	
Term Deposit	A	42	51		F	21	15		K	39	51		P	9	16	
LC 100% CG	B	58	49	(0.40)	G	79	85	(0.37)	L	61	49	(0.17)	Q	91	84	(0.20)
Term Deposit	A	37	33		F	13	8		K	48	33		P	13	10	
LC 90% CG	C	63	67	(0.59)	H	87	92	(0.34)	M	52	67	(0.09)	R	87	90	(0.53)
Term Deposit	A	75	84		F	58	70		K	72	84		P	46	64	
SC 100% CG	D	25	16	(0.21)	I	42	30	(0.15)	N	28	16	(0.11)	S	54	36	**(0.05)**
Term Deposit	A	75	92		F	45	82		K	70	87		P	36	38	
SC 90% CG	E	25	8	**(0.01)**	J	55	18	**(0.00)**	O	30	13	**(0.02)**	T	64	62	(0.83)
LC 100% CG	B	40	18		G	27	8		L	61	20		Q	28	10	
LC 90% CG	C	60	82	**(0.01)**	H	73	92	**(0.01)**	M	39	80	**(0.00)**	R	72	90	**(0.01)**
LC 100% CG	B	84	80		G	90	89		L	94	80		Q	90	89	
SC 100% CG	D	16	20	(0.63)	I	10	11	(0.85)	N	6	20	**(0.02)**	S	10	11	(0.85)
LC 100% CG	B	79	92		G	67	87		L	85	75		Q	85	74	
SC 90% CG	E	21	8	**(0.04)**	J	33	13	**(0.01)**	O	15	25	(0.17)	T	15	26	(0.11)
LC 90% CG	C	79	93		H	85	95		M	67	92		R	78	95	
SC 100% CG	D	21	7	**(0.02)**	I	15	5	(0.06)	N	33	8	**(0.00)**	S	22	5	**(0.01)**
LC 90% CG	C	87	98		H	94	97		M	93	87		R	93	90	
SC 90% CG	E	13	2	**(0.01)**	J	6	3	(0.47)	O	7	13	(0.29)	T	7	10	(0.63)
SC 100% CG	D	49	77		I	34	54		N	58	43		S	45	26	
SC 90% CG	E	51	23	**(0.00)**	J	66	46	**(0.02)**	O	42	57	(0.08)	T	55	74	**(0.03)**

Note: FF denotes the fund description frame, PF the probability frame. P-values of a Chi-Squared test are given between round brackets. N_{FF} = 67 and N_{PF} = 61.

4.3.1 Discussion of the results under the probability frame

First of all, we can start with a positive message to the industry. We notice that, in several scenarios, our respondents perceive capital guaranteed funds as interesting products. In order to draw this conclusion, we take look at the PF results since this frame reveals the true probabilities. We notice that especially in a low interest environment (r=3%), investors are seduced to take a bet on the stock market since the opportunity cost is perceived as being low (See FG,FH,PQ,PR,PT for a low interest environment versus AC and KM for a high interest environment).

When choosing between a 100% capital guarantee and a 90% capital guarantee (BC, GH, LM and QR for a bet on the large cap index, DE, IJ, NO and ST for a bet on the small cap index), we observe that our respondents uniformly choose for the 90% capital protection when the fund is built on the large cap index. For funds based on the small cap index they opt for 90% capital protection in the long run (5 years) but not in the short run (3 years). If we compare the probabilities of obtaining less than the risk free rate, we notice only slight differences (of maximum 4%) between the 90% and 100% capital guarantee prospects. The comparison of the percentiles, however, is for all the cases very favourable to the 90% capital guarantee funds. The positive 25%-percentiles do not withhold investors to put 10% of their capital at risk. Still, in DE and IJ, respondents opt for a 100% capital guarantee because the table of percentiles shows a loss in 25% of the cases and their probabilities of loss (or of falling back on the capital guarantee) are as high as 26%. Loss aversion clearly pops up.

The choice between capital guaranteed funds constructed with options on low volatility large caps and high volatility small caps is clearly made in favour of the low volatility underlying. Two effects are in play. First, a higher volatility obviously results in a higher option premium. Hence, as Table 1 shows, fewer options can be bought for the available option premium. Secondly, since the options are always written at the money, the probability of expiring out of the money is lot higher with the high volatility underlying. This can clearly be seen in the Figures in Appendix B. These two effects even result in funds (I,J,S and T) that are second order stochastically dominated.

4.3.2 Discussion of the comparison between the two frames

Finally, our point of departure, the fact whether or not framing affects the decision process, still has to be examined. We notice in Table 6 that at a 5% significance level for 18 of the 40 comparisons, significant shifts are detected. At a significance level of 10%, we even have 21 significant differences. We recognize that these comparisons are not independent from each other but this nevertheless is strong evidence for the existence

of framing effects. We find slightly more effects of framing in higher interest periods. In comparison with the risk free instrument all shifts, that are significant at a 5% level, are from the capital guaranteed fund toward the risk free investment! Seemingly, if probability information is disclosed, investors tend to take less risk.

In comparing the funds with different levels of capital guarantees we need to make a distinction between the funds depending on the underlying asset chosen to implement the capital guarantee. Without any exception, we find that for funds based on a low volatility underlying (BC, GH, LM and QR), the knowledge of the probabilities shifts the investment preference from 100% capital guaranteed funds to 90% capital guaranteed funds. This result also holds for funds based on a high volatility underlying but only for funds with a relatively long time to maturity (NO and ST). When the time to maturity is short (DE and IJ) we see the reverse effect. Recall that E and J are these investments where a negative 25%-percentile is disclosed and where the probability of loss or status quo mounts up to 26%. Increasing the time to maturity from 3 to 5 years also decreases the probability of loss (or status quo) from 26% (E and J) to 17% (O) and 18% (T).

4.3.3 Logit analysis

To complement our previous analysis, we introduce 10 logit models to examine impact of the investment horizon, the interest rate and the frame on each of the 10 pair wise investment decisions L_i (1: first investment option; 0: second investment option). The logit model we estimate can be written as follows:

$$\hat{L}_i = \hat{\beta}_1 + \hat{\beta}_2 IH_i + \hat{\beta}_3 IR_i + \hat{\beta}_4 F_i$$

and is estimated using weighted least squares, using $\sqrt{w_i} = \sqrt{N_i \hat{P}_i (1-\hat{P}_i)}$ as weights. In this model the three independent variables are dummy variables, where *IH* represents the Investment Horizon (0: 3-year period; 1: 5-year period), *IR* the Interest Rate (0: 3%; 1: 7%) and *F* the Frame (0: Fund Frame; 1: Probability Frame).

In Table 7 we report the parameter estimates from our logit analysis, together with their p-values. This table reveals that the frame, the interest rate (and to a lesser extent the time to maturity) play an important role in the investor's product preference at the 5% significance level. Focussing on panel A, in which the results of the choice between the term deposit and a capital guaranteed fund is depicted, we infer that the interest rate is clearly a significant factor. High interest rates direct the investors' preference towards the risk free investment. When distinguishing between funds providing different capital protection (100% or 90%), however, the

large interest rate inclines the investor to prefer the fund with the highest amount of capital protection The influence of the time horizon is of a smaller extent. However, table 7 Panel A clearly shows that as the time to maturity increases, the term deposit becomes less attractive compared to small cap funds.

Table 7: Logit Estimates

		C	*Time to Maturity*	*Interest rate*	*Frame*	R^2
Panel A: Choosing between a capital guaranteed fund and the term deposit						
Term Deposit	**Parameter Estimate**	-1.70	-0.18	1.44	-0.01	0.970
LC 100% CG	**P-value**	**0.000**	0.345	**0.000**	0.969	
Term Deposit	**Parameter Estimate**	-1.97	0.19	1.58	-0.43	0.993
LC 90% CG	**P-value**	**0.000**	0.062	**0.000**	**0.000**	
Term Deposit	**Parameter Estimate**	0.23	-0.27	0.91	0.63	0.991
SC 100% CG	**P-value**	**0.006**	**0.002**	**0.000**	**0.000**	
Term Deposit	**Parameter Estimate**	-0.10	-0.75	1.53	0.93	0.879
SC 90% CG	**P-value**	0.780	**0.046**	**0.000**	**0.017**	
Panel B: Choosing between two capital guaranteed funds						
LC 100% CG	**Parameter Estimate**	-1.13	0.38	0.95	-1.44	0.977
LC 90% CG	**P-value**	**0.000**	**0.037**	**0.000**	**0.000**	
LC 100% CG	**Parameter Estimate**	2.18	0.19	-0.41	-0.37	0.982
SC 100% CG	**P-value**	**0.000**	0.443	0.103	0.141	
LC 100% CG	**Parameter Estimate**	1.16	-0.03	0.30	0.14	0.901
SC 90% CG	**P-value**	**0.004**	0.953	0.509	0.760	
LC 90% CG	**Parameter Estimate**	1.71	0.00	-0.46	1.51	0.997
SC 100% CG	**P-value**	**0.000**	**0.000**	**0.000**	**0.000**	
LC 90% CG	**Parameter Estimate**	2.71	-0.27	-0.46	0.09	0.966
SC 90% CG	**P-value**	**0.000**	0.570	0.301	0.859	
SC 100% CG	**Parameter Estimate**	-0.25	-0.39	0.66	0.11	0.443
SC 90% CG	**P-value**	0.543	0.370	0.126	0.803	

Note: LC denotes Large Cap Index, SC Small Cap Index. CG denotes Capital Guarantee. The table also reports the relatively high R^2, although its value as a measure of goodness of fit is questionable in dichotomous dependent variable models.

Panel B of table 7 presents the influence of the interest rate, the time to maturity and the frame on the choice between different kinds of capital guaranteed funds. Panel B reveals that the three variables influence the investment decision in merely two cases at the 5% significance level: (1) in the choice between two low volatility funds with distinct capital protection and (2) in choosing between the low volatility fund with 90% capital protection and the 100% capital guaranteed small cap fund. From the results we conclude that higher interest rates lead investors to prefer the fund guaranteeing to payback the full initial inlay. In the probability frame, however, in both significant cases, investors give preference to the 90% capital guarantee fund. Notice here, however, that the (absolute) size of the frame parameter is considerably larger than the interest rate parameter.

5 Policy Implications and Conclusions

The policy implications of this paper are complex. First of all, we have to recognize that capital guaranteed funds clearly provide the investor with an attractive product by limiting the potential downside loss. The home made solution based on the put-call parity does not seem to be cost effective for the individual investor and hence capital guaranteed funds provide an efficient way to make capital protection available to the general public.

For banks, capital guaranteed funds are a lucrative business in which relatively high entrance and management fees can be charged. This obviously creates incentives to maximize the sales in this market segment through push marketing strategies. Obviously, framing can play an important role in maximizing the sales of capital guaranteed funds. It was shown that high potential returns (in the Fund Frame Scenario) attracted at least our respondents' attention. Providing our respondents with information about the likeliness of both the high returns and the odds that they would fall back on the capital guaranty significantly changed the choice behaviour of our respondents. These changes clearly demonstrate that investors choose differently when provided with the probabilities of gains and losses. Withholding this information can frame the individual investor in a serious way.

Individual investors clearly do not possess the skills that are necessary to 'see through' the framing used to describe investment possibilities. Although the legislator has always been concerned with the protection of the retail investor, it appears that framing issues have not received a lot of (if any) attention. Without pointing a finger at any particular bank or structure, formulations like the "Clicketplus North America Best of 2" do

not serve the industry. The lack of transparency is used in a subtle way. Luring private investors to this kind of products by drawing the attention to a (relatively) high interest or percentage as focal point, is probably a profit maximizing strategy for the bank. For the individual investor, the capital guaranteed fund bought might perfectly match his expectations but the probability that this is the case decreases to almost zero the more sophisticated the structured product gets.

This paper shows that basic principles of civil law can easily be jeopardized by using framing. Is it not a fundamental premise of every contractual transaction that both parties contract willingly and with full knowledge of the underlying transaction? If we notice that our respondents quite often change their decision behaviour as a function of the information disclosed, we fear that an expectation gap will be created in a lot of cases.

Is it a task of the courts to put a firm halt to this kind of practices? Or can a prospectus still be approved without probabilistic information about the profits/losses of an investment? In our point of view, good practices should advance. Banks have experience with these calculations since they are clearly in line with Value at Risk determination. Hence, it is not a question of the availability of data, knowledge or technology, only of willingness to provide a level playing field and transparent information to the retail investor.

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Appendix A

Table 8: Probabilistic Information used in the Other Scenarios

Panel A

	G	H	I	J
Probability of Loss or Status Quo	10%	15%	19%	26%
Probability to get less terminal wealth than by investing in the term deposit	23%	20%	37%	33%

		Perc25	Perc50	Perc75	Perc90	Max
G	Profit/Loss	10000	23000	37000	51000	79000
	Return	3%	7%	11%	15%	21%
H	Profit/Loss	17000	49000	86000	122000	195000
	Return	5%	14%	23%	31%	43%
I	Profit/Loss	3000	16000	32000	50000	91000
	Return	1%	5%	10%	14%	24%
J	Profit/Loss	-2000	31000	73000	120000	229000
	Return	-1%	9%	20%	30%	49%

Panel B

	L	M	N	O
Probability of Loss or Status Quo	5%	8%	13%	17%
Probability to get less terminal wealth than by investing in the term deposit	29%	28%	34%	34%

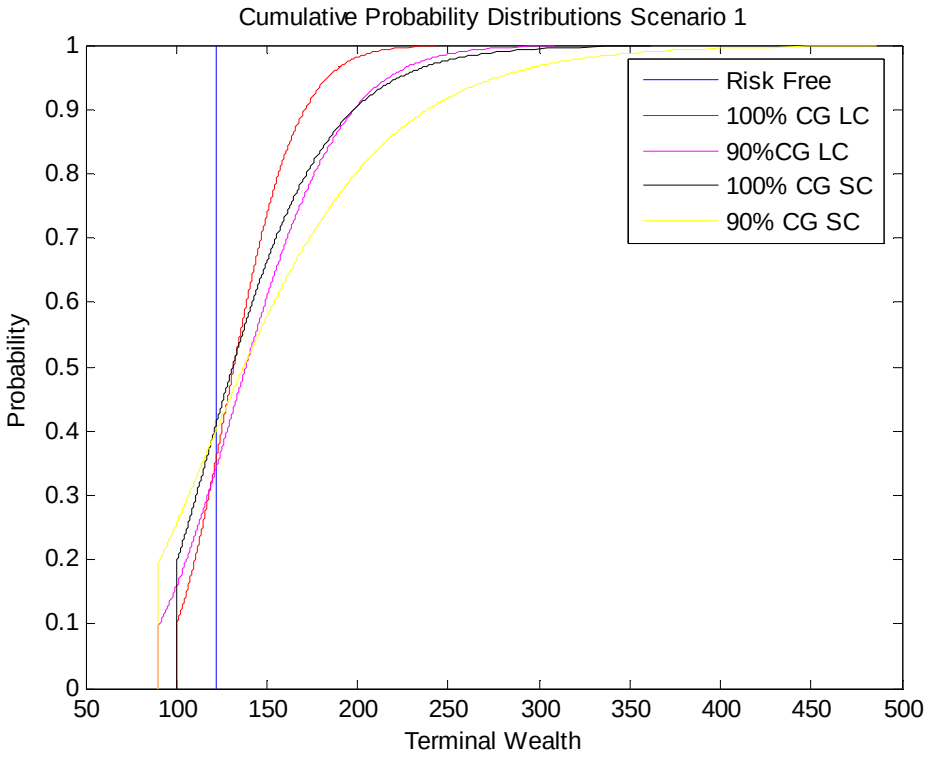
		Perc25	Perc50	Perc75	Perc90	Max
L	Profit/Loss	36000	65000	98000	133000	206000
	Return	6%	10%	15%	18%	25%
M	Profit/Loss	36000	73000	117000	162000	255000
	Return	6%	12%	17%	21%	29%
N	Profit/Loss	23000	69000	131000	206000	392000
	Return	4%	11%	18%	25%	38%
O	Profit/Loss	20000	79000	160000	255000	496000
	Return	4%	12%	21%	29%	43%

Panel C

	Q	R	S	T
Probability of Loss or Status Quo	5%	7%	13%	18%
Probability to get less terminal wealth than by investing in the term deposit	13%	12%	28%	25%

		Perc25	Perc50	Perc75	Perc90	Max
Q	Profit/Loss	30000	55000	83000	113000	174000
	Return	5%	9%	13%	16%	22%
R	Profit/Loss	48000	95000	150000	208000	326000
	Return	8%	14%	20%	25%	34%
S	Profit/Loss	13000	39000	74000	115000	220000
	Return	2%	7%	12%	17%	26%
T	Profit/Loss	16000	66000	134000	215000	419000
	Return	3%	11%	19%	26%	39%

Appendix B


Cumulative Probability Distributions Scenario 1
Probability
Terminal Wealth
Risk Free
100% CG LC
90%CG LC
100% CG SC
90% CG SC
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0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
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150
200
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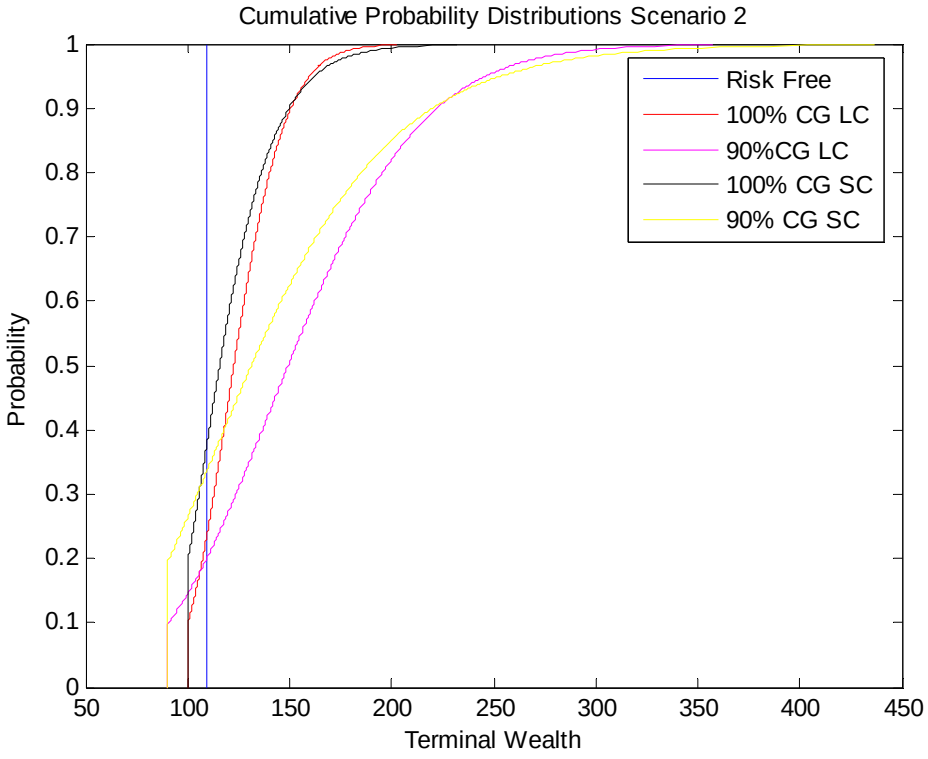
Cumulative Probability Distributions Scenario 2
Probability
Terminal Wealth
Risk Free
100% CG LC
90%CG LC
100% CG SC
90% CG SC
0
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0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
50
100
150
200
250
300
350
400
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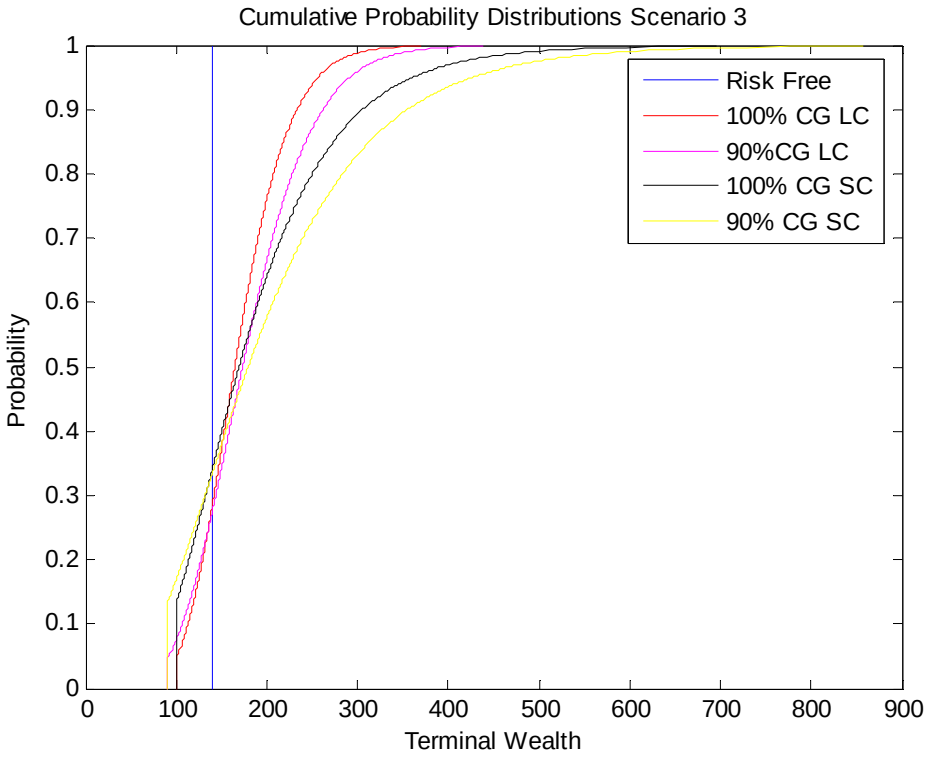
Cumulative Probability Distributions Scenario 3
Probability
Terminal Wealth
Risk Free
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90%CG LC
100% CG SC
90% CG SC
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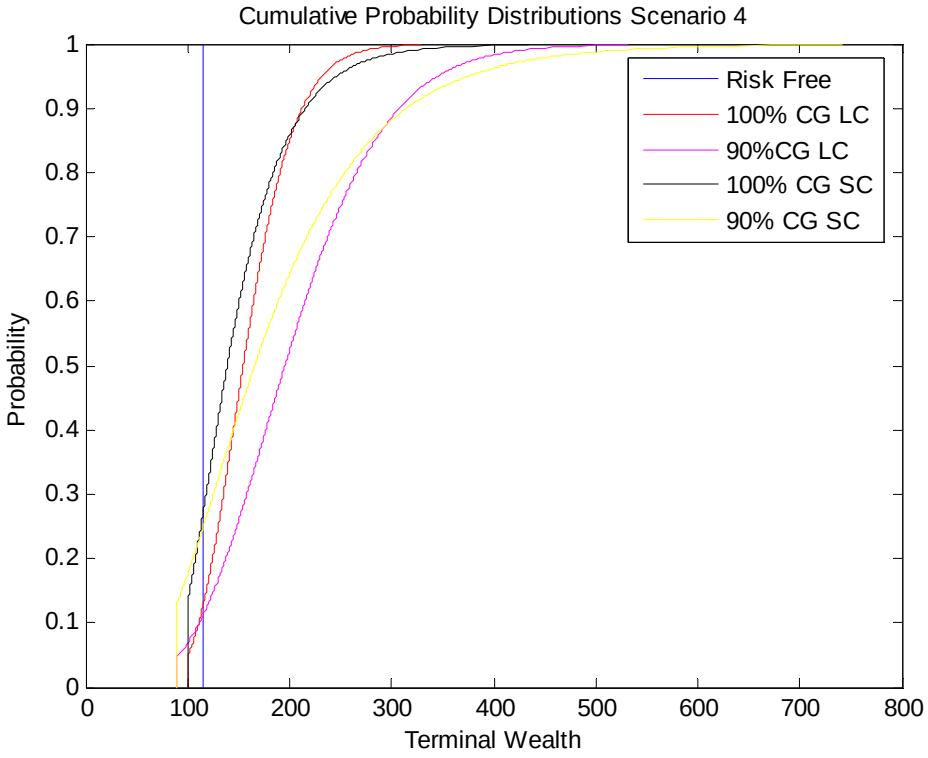
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
0
100
200
300
400
500
600
700
800
900


Cumulative Probability Distributions Scenario 4
Probability
Terminal Wealth
Risk Free
100% CG LC
90%CG LC
100% CG SC
90% CG SC
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0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
0
100
200
300
400
500
600
700
800