

Rainer Baule/Philip Blonski/Thomas Demmer/Arnd Wiedemann*

PERSUASION OF INDIVIDUAL INVESTORS BY SCENARIOS**

ABSTRACT

Banks are often accused of biasing their information documents in order to exploit less sophisticated investors. In this paper we analyze the sales prospectus scenarios that banks create to describe their structured financial products to retail investors. Based on a broad data set of prospectuses in U.S. and German markets, we find that, contrary to previous studies of single products, most banks do not bias their scenarios to make their products appear better than they are. In the light of these results, the usefulness of stricter regulation of information documents is questionable.

JEL Classification: G11, G21, G28.

Keywords: Individual Investor; Retail Derivative; Sales Prospectus; Structured Financial Product.

1 INTRODUCTION

The importance of the retail market for structured financial products has grown immensely in recent decades. The total market volume amounted to almost 50 billion euros in 2004, experienced a peak before the financial crisis in 2007 (about 140 billion euros),

* Rainer Baule, University of Hagen, Universitätsstraße 41, 58084 Hagen, Germany, E-Mail: rainer.baule@fernuni-hagen.de; Philip Blonski, Corresponding Author, University of Hagen, Universitätsstraße 41, 58084 Hagen, Germany, Phone: +49 2331 987-2589, E-Mail: philip.blonski@gmail.com; Thomas Demmer, University of Siegen, Hölderlinstraße 3, 57076 Siegen, Germany, E-Mail: demmer@bank.wiwi.uni-siegen.de; Arnd Wiedemann, University of Siegen, Hölderlinstraße 3, 57076 Siegen, Germany, E-Mail: wiedemann@bank.wiwi.uni-siegen.de.

** The authors gratefully acknowledge the financial support from the Frankfurt Institute of Risk Management and Regulation (FIRM). We also thank François Derrien and the participants of the 30th International Conference of the French Finance Association, Lyon; the 2nd European Retail Investment Conference, Stuttgart; the 2013 FIRM Research Forum; Benjamin Newell from the School of Psychology of the University of New South Wales; and two anonymous referees for their valuable comments and suggestions.

and dropped to a somewhat stabilized 100 billion euros in 2012 (Meier and Sandmeier (2012)). In Germany and Switzerland, structured products comprise about 6% of the total investment volume of individual investors (Rieger (2012)). In addition to the well-established market for mutual funds, it is now common for banks and other financial institutions to issue various types of structured financial instruments, also known as certificates, for individual investors. While the U.S. market is highly individualized and thus opaque, markets in Europe are more standardized and transparent. In terms of outstanding instruments, the German market is the largest worldwide, with more than one million single products.

The issuance of structured financial products goes hand in hand with the publication of term sheets, sales brochures, and other prospectuses that fulfill the purpose of providing information and promoting the financial products to customers. The preparation of certain documents is regulated by law. In the U.S., Title 17 Chapter II Part 230 of the Code of Federal Regulations (Securities Act of 1933) determines content and publication requirements for such sale prospectuses. In Germany, according to Section 31 of the Securities Trading Act, aside from providing a detailed prospectus, issuers are also required to provide a standardized Key Investor Information Document of no more than three pages.

The intention of these regulations is to create a heightened level of transparency and information for investors. To a certain degree, this intention is congruent with the goal of issuers, which is to sell their products. However, to achieve this goal, issuers might do more than merely provide objective information; they might use this document as an opportunity to promote their products, to make them appear better than they actually are.

To demonstrate the attributes of their products, issuers typically include scenarios in their sales prospectuses. Since structured products are usually linked to the development of one or more underlying securities (for example, stock indexes or single stocks), the issuer explains the structure of the product by using various hypothetical situations that are designed to show off the products' behavior and payoff possibilities. Each scenario provides objective information, but the selection of scenarios leaves banks with a degree of freedom in emphasizing favorable scenarios with positive returns and diverting attention from scenarios with negative returns. For the vast majority of structured products, and contrary to other investment classes, such as mutual or exchange-traded funds, issuers do not explicitly charge annual fees or agios, which could be objective figures for investors' choice.¹ Hence, illustrating the product in terms of risk and return is usually the most important information for investors in order to compare different products.

1 There are of course implicit fees, as the offer price is usually above the theoretical fair value of the structured product (see the literature cited in Section 2). But under current legislation both in Germany and in the U.S., issuers need not reveal these implicit fees in their sales documents. Therefore, most private investors will not be able to include information about implicit fees in their investment decision.

Recent studies demonstrate that prospectuses for structured products do indeed exhibit a tendency towards biased information. Bernard, Boyle, and Gornall (2011) analyze the prospectuses of 29 locally capped products (which basically aggregate short-term, e.g., quarterly, performances of an underlying, where each short-term performance is subject to a cap), and show that they often contain unreasonably optimistic scenarios. They surmise that such scenarios may contribute to the popularity of these products. Olazábal and Marmorstein (2010) also examine example prospectuses for locally capped products and find similar results. These authors go so far as to call for stricter regulations in creating these scenarios for structured retail products.

Since evidence is limited as to how issuers actually choose scenarios, we conduct a comprehensive empirical study of scenarios for structured products in sales prospectuses. Our goal is to find out whether the anecdotal evidence of biased scenarios reported in the literature is actually standard practice or the exception. We achieve our objective by analyzing all prospectuses filed with the Securities and Exchange Commission (SEC) in May and June 2012, incorporating more than 1,200 products in our study. We also analyze Key Investor Information Documents from major issuers of popular product types on the German market, incorporating more than 18,000 products. As a simple measure, we look at the (equally weighted) arithmetic mean of product returns within the scenarios.

We find that in fact, the average scenario return is *negatively* biased. In both the U.S. and the German markets, the average product return within all analyzed prospectuses is negative (-3% and -15%, respectively). However, there are differences among the issuers. In particular, some U.S. issuers do provide positively biased scenarios with an average product return of 10% or more.

From a marketing perspective, there are reasons why issuers should use positively biased scenarios, as argued by Bernard et al. (2011). But there are other reasons why issuers should use unbiased or even negatively biased returns: keeping expectations low could result in positive surprises and generate further business. As a further explanation, issuers use a level of caution to ensure that they are abiding by the industry's regulatory requirements. Although no explicit rules for the selection of scenarios exist, laws in both the U.S. and Germany state that information in such documents must not be misleading. Accordingly, issuers could fear legal consequences and compensation payments if courts interpret positively biased information as misleading and thus illegal.

According to our empirical survey, although the majority of issuers put more weight on these reasons against positively biased returns, a few issuers see larger benefits in the marketing effect and do bias their scenarios.

The paper is structured as follows. In Section 2 we discuss prior studies. In Section 3 we present an extensive market study of scenarios within prospectuses which is the first in the U.S. and German markets. Section 4 concludes.

2 RELATION TO THE LITERATURE

We contribute to the growing body of studies on structured products for individual investors. Early research in this area focuses mainly on the prices of the products with respect to their theoretical fair values. Several of these empirical studies find an average overpricing; that is, issuers charging prices that are a few percentage points above the theoretical fair product value. These studies include, for example, Burth, Kraus, and Wohlwend (2001) on the Swiss market; Wilkens, Erner, and Röder (2003) on the German market; and Benet, Giannetti, and Pissaris (2006) on the U.S. market.

With markets developing and products becoming more standardized, issuer margins are decreasing. Baule (2011) reports an average overpricing of as little as 0.4% for the subsegment of discount certificates on the DAX, the German market index. He argues that on the one hand, standardization and economies of scale reduce issuer costs and on the other hand, that increased competition and transparency forces issuers to price more aggressively. Supporting this argumentation, Baule and Blonski (forthcoming) find that individual investors can even exploit small price differences between similar products. However, this argument only holds for highly standardized products, when the investor has the choice of buying virtually the same product from competing issuers. Stoimenov and Wilkens (2005) show that margins increase with the complexity of the product. Henderson and Pearson (2011) analyze 64 offering prices of structured equity products on the U.S. retail market and find an average overpricing of almost 8% above the fair product value.

A second strand of current literature deals with the question of why investors buy such products, despite the unfavorable conditions they face. When considering only rational arguments, it is hard to explain the large demand for structured products. Hens and Rieger (2014) show that compared to standard investments in the underlying security and the risk-free instrument, a utility gain from structured products either does not exist, or is so small that it is offset by issuer margins (even for standardized products with low margins). Thus, only irrational or behavioral arguments, such as loss aversion or misestimating unfavorable outcomes resulting from high product complexity, can explain the popularity of structured products. These findings are in line with Breuer and Perst (2007), who show that investors place too much weight on small probabilities. (This result is, in turn, consistent with the transformation of probabilities according to the prospect theory of Kahneman and Tversky (1979).) In a similar context, Hoffmann and Broekhuizen (2010) explain innovative adoption behavior based on the investor's psychological and sociological roots. Helberger (2012), and also Das and Statman (2013), state that the purchase of capital-guaranteed products can be justifiable and beneficial for individual investors in line with the prospect theory and mental accounting.

Some experimental studies shed more light on investors' inclination to buy structured products. Fischer (2007) asked approximately 750 individuals to provide their reasons for and against investing in structured products. In addition to rational strategies like diversification, risk-prone strategies such as gambling play an important role. In an experi-

mental approach with 190 participants, Rieger and Hens (2012) find evidence that the majority of investors would prefer capital-guaranteed products, for example, as savings instruments. Since such a behavior cannot be observed in reality, they argue that financial advisors do not provide unbiased counseling, but instead boost demand for structured products. Analyzing the investment decisions of more than 50 undergraduate students, Rieger (2012) explains the demand for popular structured products (especially for bonus certificates) with a tremendous underestimation of the probability of downside risks.

Many researchers argue that banks exploit private investors by mainly issuing very complex and almost incomprehensible structured products. Based on a two-stage pricing-complexity game, Carlin (2009) uses a theoretical model to show that competitors strategically add complexity to their products, thereby improving their profitability by exploiting uninformed investors. This argument is supported by evidence from Henderson and Pearson (2011) and could, in combination with the evidence for overpricing, call for stronger regulations to protect individual investors. Such an argument is supported by studies that find that demand for structured products depends negatively on an investor's financial literacy (Chang, Tang, and Zhang (2010)) and that higher product complexity lowers an investor's return (Entrop, Schober, and Wilkens (2012)).

In addition to legal sales restrictions in both the U.S. and German markets, regulation focuses primarily on governing information requirements. In the U.S., structured products are treated as securities, as defined in Section 2(a)(1) of the Securities Act of 1933. This section states that U.S. issuers are required to provide information on all products newly issued with the SEC. According to Rule 405, legislation differentiates between seasoned (well-known) and unseasoned issuers. Due to this regulation, seasoned issuers are able to shelf-register multiple products autonomously by filing one single form (Rule 424(b) (2)), which simplifies the regulatory procedure. Section 7(a) of the Securities Act gives full authority concerning the kind of submitted information to the SEC. Basically, issuers are required to provide any and all accurate information needed by investors to form a reasoned opinion about the product.

The European market is regulated by the Markets in Financial Instruments Directive (MiFID). It was introduced to harmonize European regulation and to offer investors a higher level of protection. According to Section 2, Article 19, issuers are required to act honestly, fairly, and professionally in the best interests of their clients. Hence, issuers must provide fair, clear, unambiguous, and appropriate information in a comprehensible form, concerning, for example, the risks associated with a certain investment. In addition to this European directive, German legislation requires issuers to summarize the main product facts in a Key Investor Information Document of no more than three pages (Section 31(3)(a) of the Securities Trading Act). In comparison to U.S. brochures, which can be as long as 100 pages, this makes it easier for investors to extract relevant information. Neither U.S. nor German issuers are required by law to publish scenarios in their information documents. Nevertheless, scenarios displaying potential future returns of a structured product based on the development of the underlying have become a common part of prospectuses.

According to Breaban, Saez, Tarrazona, and Franch (2012), scenarios could influence the investment decision process. In their experiment with undergraduate students, they show that the order in which scenarios are presented substantially affects investor behavior. Bernard et al. (2011) analyze the prospectuses of 29 locally capped products and show that there are indeed highly optimistic projections with very low probabilities (for example, a highly unlikely sequence of quarterly index returns equaling or exceeding 6% each quarter) that might mislead investors. Similarly, Olazábal and Marmorstein (2010), who also consider term sheets of principal-protected notes, criticize the way in which issuers display possible future outcomes of a product investment, and call for greater regulation.

Some researchers have made suggestions for improving investor information. Rieger (2012) states that providing relevant information such as the historical probabilities of certain events positively impacts investors' product comprehension. Based on theoretical considerations and former research results, Wallmeier (2011) proposes a risk/return survey as a part of the prospectuses, including innovative elements such as presenting risk and return as an analogy to six-sided dice.

Our analysis gains further relevance in the light of potentially unsuitable or biased advice given by the bank (e.g., Inderst and Ottaviani (2009) and Inderst (2010)) that often does not even help to increase the risk-adjusted performance of individual investors (Kramer (2012)). The information brochures we analyze here are intended to provide investors with fair and appropriate information and can hence be interpreted as a tool that is meant to protect investors against "mis-selling" through sales agents. Bhattacharya, Hackethal, Kaesler, Loos, and Meyer (2012) show that individual investors with the highest need for financial advice (due to a low level of financial literacy) are least likely to obtain it, a problem which can at least partly be cured with the help of fair and informative documents. Until now, however, there is no study that focuses on the extent to which issuers actually provide unbiased information. We fill this gap by this paper. We address the actual practice of biasing information by asking:

Do issuers indeed try to persuade investors to buy their product by means of biased scenarios?

We present an extensive market study of scenarios within prospectuses to answer this question. While Bernard et al. (2011), as well as Olazábal and Marmorstein (2010), only analyze a small number of term sheets, we provide the first extensive analysis of both the U.S. and German markets.

3 RESULTS

The data set we analyze contains information documents published by different banks in the US and in Germany. The data for the U.S. market consists of prospectuses for all structured products issued in May and June 2012. We obtain this data manually from

the SEC's Electronic Data Gathering, Analysis, and Retrieval system (EDGAR). We consider Form 424(b)(2), which well-known, seasoned companies are required to file in accordance with Rule 424(b)(2). During the two-month period, more than 2,500 products were issued, of which 1,294 contain tabular scenarios suitable for our analysis. We note that some products include interest payments that are not covered in the tabular scenarios. We evaluate all product descriptions manually and incorporate clearly stated additional payments appropriately.

Because the German market for structured products is more standardized and much larger in terms of new issues than the U.S. market (exceeding 100,000 issues per month), we concentrate on two of the most popular products to create a uniform data set. Regulation measures in Germany not only require information brochures to fulfill certain criteria, but also that these criteria be made available to the investor upon investment. Most banks meet this requirement by offering these brochures for downloading on their websites. We downloaded all available Key Investor Information Documents of discount certificates and bonus certificates from the nine largest issuers outstanding in March 2012, resulting in a total data set of 18,666 prospectuses.

Discount certificates enable investors to buy an underlying at a discount from the current market value. As compensation for the discount, possible gains are capped at a certain level; that is, the payoff at maturity is either the terminal underlying value or the cap, whichever value is smaller. Bonus certificates feature conditional capital protection, meaning that as long as the underlying does not fall below a certain threshold (barrier) during the certificate's lifetime, the payoff is at least as high as the bonus level (usually equal to the issue price). Otherwise, the payoff equals the underlying price at maturity. A subtype of bonus certificates additionally features a cap similar to discount certificates.

The focus of our investigation is the scenarios presented in these documents. We are particularly interested in the "suggested return" implied by these scenarios, which we define as the arithmetic mean of product returns of all scenarios within one document. Further, to examine the risk perspective, we consider the standard deviation of product returns across all scenarios of a single prospectus as the "suggested risk". For both measures, we weight each scenario equally by using the same probability for each scenario. We do so because scenarios are arbitrary and the prospectuses do not give any indication about the probability of occurrence of a certain scenario.

Nonetheless, psychological research shows that particularly the first and the last item of a series of information have the strongest impact on an individual's perception (the primacy and the recency effects, e.g., Tyson and Kramer (1981)). The ordering of scenarios (descending compared to ascending) might thus have an impact on the perception of a product. We account for these effects by additionally including a "primacy-adjusted" and a "recency-adjusted" suggested return. These two additional measures put double weight on the first and the last scenario, respectively.

A further bias might stem from total loss scenarios. Several of the prospectuses we study include a scenario in which the investor loses the total investment amount (scenario return -100%). As investors might ignore such scenarios as unrealistic, we also calculate the suggested return as an average over all scenarios, excluding total loss scenarios. Finally, we report the average median scenario return, where we calculate the median for each prospectus, and perform averaging over all prospectuses. *Table 1* illustrates the calculation of the different measures for an exemplar U.S. product.

Table 1: Example of Scenarios Illustrated in a Key Investor Information Document (Leveraged Buffered Basket-Linked Note, CUSIP 38143U3N9)

Hypothetical Final Basket Level (as % of Initial Basket Level)	Payment Amount (as % of Face Amount)	Return
150.00%	113.80%	+13.80%
145.00%	113.80%	+13.80%
125.00%	113.80%	+13.80%
106.90%	113.80%	+13.80%
105.00%	110.00%	+10.00%
103.00%	106.00%	+6.00%
100.00%	100.00%	0.00%
97.00%	100.00%	0.00%
95.00%	100.00%	0.00%
90.00%	100.00%	0.00%
85.00%	94.44%	-5.56%
75.00%	83.33%	-16.67%
50.00%	55.56%	-44.44%
25.00%	27.78%	-82.22%
0.00%	0.00%	-100.00%

The table provides hypothetical performance scenarios for an underlying basket and the corresponding development of the structured product. In this example, the average suggested return is -11.8%, the primacy-adjusted suggested return is -10.2%, the recency-adjusted suggested return is -17.4%, the suggested return ex total loss is -5.5%, the median scenario return is 0.0%, and the suggested risk, defined as the standard deviation of scenario returns, is 35.7%.

Tables 2 and *3* summarize the descriptive statistics of the two markets. In addition to the measures of suggested return and suggested risk, as described above, the tables also report the shares of documents with a total loss scenario, the share with a descending order of scenario returns, the share of positive scenarios, and the average number of scenarios per document.

Table 2: Descriptive Statistics of Prospectuses for the U.S. Market

Issuer	docs	total loss scenarios	descend- ing	positive scenarios	scenarios per doc	total	average suggested return				stddev. sugg. returns	avg. sugg. risk
							primacy- adjusted	recency- adjusted	ex total loss	Median		
Bank of America	28	0%	29%	60%	14.7	+11.1%	+9.5%	+11.5%	+11.1%	+14.9%	12.1%	22.8%
Bank of Montreal	136	7%	49%	61%	14.9	-6.0%	-5.7%	-7.5%	-5.1%	+10.2%	11.4%	31.3%
Barclays	232	18%	72%	63%	28.4	-4.8%	-3.8%	-6.6%	-4.1%	+7.0%	10.2%	30.2%
Citigroup	45	4%	80%	57%	7.8	-2.7%	-2.2%	-6.1%	-2.4%	+6.1%	8.0%	24.8%
Credit Suisse	98	26%	73%	66%	21.7	-0.5%	+1.0%	-2.8%	+0.9%	+10.5%	9.3%	33.2%
Deutsche Bank	56	29%	89%	57%	18.9	-6.2%	-3.8%	-10.4%	-4.8%	+6.0%	18.9%	39.2%
Goldman Sachs	191	71%	90%	54%	16.9	+0.1%	+3.4%	-4.5%	+5.0%	+5.4%	11.4%	40.2%
HSBC	74	31%	80%	59%	22.3	+0.5%	+2.4%	-2.5%	+2.1%	+5.5%	9.8%	34.4%
JPMorgan Chase	156	26%	87%	61%	18.8	-8.3%	-6.6%	-13.0%	-7.3%	+6.7%	13.0%	34.6%
Morgan Stanley	38	5%	68%	66%	7.3	+6.9%	+9.3%	+4.4%	+7.1%	+7.6%	10.8%	28.9%
Royal Bank of Canada	135	15%	70%	60%	14.3	-5.1%	-3.8%	-8.6%	-3.9%	+6.8%	6.9%	27.5%
UBS	72	32%	88%	58%	17.2	-3.7%	-1.1%	-6.8%	-2.2%	+2.7%	16.4%	33.5%
Wells Fargo	33	0%	97%	60%	14.2	+5.5%	+9.1%	+1.7%	+5.8%	+1.7%	9.1%	35.4%
Total	1,294	26%	76%	60%	18.8	-3.0%	-1.4%	-6.1%	-1.5%	+7.0%	11.1%	32.8%

The columns list the total number of documents with scenarios issued in May and June 2012, the percentage of documents that contain a total loss scenario, the percentage of documents with descending scenarios, the percentage of positive scenarios, the average number of scenarios per document, the average suggested return (arithmetic mean of scenario returns equally weighting each scenario), the average suggested return doubling the weight of the first (primacy-adjusted) and the last (recency-adjusted) scenario, the average suggested return excluding total default scenarios, the average median scenario return, the standard deviation of average suggested returns across all documents, and the average suggested risk (standard deviation of scenario returns).

Table 3: Descriptive Statistics of Key Investor Information Documents for the German Market

Issuer	docs	total loss	descending	positive	scenarios per doc	average suggested return						average suggested risk				
						total set	discount	bonus	primacy adjusted	recency adjusted	ex total loss	median	stddev. sugg. returns	total set	discount	bonus
BNP	4,442	100%	100%	43%	12.8	-16.4%	-20.8%	-14.0%	-14.2%	-23.1%	-8.0%	+0.6%	5.2%	34.4%	37.9%	32.5%
Citigroup	856	0%	100%	61%	8.0	-5.1%	-5.1%	-3.8%	-3.8%	-7.9%	-5.1%	+1.3%	2.8%	13.9%	13.9%	.
DZ Bank	1,993	100%	100%	46%	11.7	-26.1%	-31.4%	-18.7%	-23.3%	-32.5%	-18.3%	-6.2%	7.9%	39.9%	41.6%	37.3%
DB	949	0%	0%	43%	7.5	-21.8%	-21.3%	-23.9%	-28.3%	-18.7%	-21.8%	-3.8%	2.8%	32.4%	32.0%	34.3%
Goldman	1,645	100%	100%	48%	7.0	-20.6%	.	-20.6%	-15.9%	-30.6%	-0.1%	+1.5%	10.3%	47.3%	.	47.3%
HSBC	2,043	0%	0%	63%	7.3	-3.0%	+1.6%	-8.6%	-5.5%	-2.0%	-3.0%	+4.3%	6.9%	13.2%	7.5%	20.0%
RBS	3,202	100%	0%	65%	11.5	-9.6%	-13.2%	-3.6%	-17.2%	-7.2%	-0.3%	+5.9%	8.5%	38.3%	38.0%	38.7%
Soc. Gén.	815	100%	100%	57%	11.0	-17.2%	.	-17.2%	-15.2%	-24.1%	-8.9%	+6.2%	7.2%	38.6%	.	38.6%
UBS	2,721	100%	100%	56%	10.0	-15.5%	-15.5%	.	-13.5%	-23.2%	-6.2%	-5.6%	6.5%	32.9%	32.9%	.
Total	18,666	79%	67%	53%	10.4	-14.8%	-15.4%	-14.2%	-15.1%	-18.9%	-7.5%	+0.2%	6.7%	33.4%	32.1%	34.8%

The table covers all downloadable documents for discount and bonus certificates as of March 2012. The columns list the total number of documents, the percentage of documents that contain a total loss scenario, the percentage of documents with descending scenarios, the percentage of positive scenarios, the percentage of scenarios per document, the average suggested return (arithmetic mean of scenario returns equally weighting each scenario) for the total set, for discount certificates, and for bonus certificates, the average suggested return doubling the weight of the first (primacy-adjusted) and the last (recency-adjusted) scenario, the average suggested return excluding total default scenarios, the average median scenario return, the standard deviation of average suggested returns across all documents, and the average suggested risk (standard deviation of scenario returns) for the total set, for discount certificates, and for bonus certificates.

For the U.S. market, the average suggested return is negative with a mean of -3%. Although there are some fluctuations across the issuers, nine out of 13 issuers (the exceptions being Bank of America, Goldman Sachs, Morgan Stanley, and Wells Fargo) suggest a negative return for their products on average. Also, both the average primacy- and recency-adjusted returns are negative. Furthermore, the effect of total loss scenarios is limited: after excluding such scenarios, the average suggested return remains negative (-1.5%). Notable, however, is the large proportion of positive scenarios, which comprise about 60% of all scenarios. The selection of scenarios is obviously skewed. This skewness results in an average median scenario return over all prospectuses of +7%. The largest average medians are found for Bank of America (+14.9%) and Credit Suisse (+10.5%).

An overall average median return of +7% is significantly larger than zero, but is not necessarily an upward-bias. Nearly all of the products bear a degree of market risk, as they are linked to the equity market. In line with an average suggested risk of 33%, an excess return of nearly 7% is still justifiable with common risk-return arguments. (According to a survey by Welch (2000), this value is rather close to the consensus of academic financial economists on the value of the equity premium.) Thus, there is no market-wide upward bias of scenario returns in prospectuses issued by U.S. banks. But there are some banks that do bias their scenarios upward to a certain extent by choosing a larger proportion of positive scenarios, resulting in average median returns above 10%.

For the German market, there is a pronounced negative bias. All nine issuers suggest a negative return of their products on average, with the overall mean being as low as -15%. Fluctuations across issuers range from -26% (DZ Bank) to -3% (HSBC).

The primacy- and recency-adjusted returns are also both negative. These results are qualified by the existence of total loss scenarios to a larger extent than they are on the U.S. market. After excluding these scenarios, the average suggested return increases by seven percentage points to -7.5% which is still a large negative value. Nevertheless, median values are slightly positive, with an overall average of +0.2%, while the range across issuers covers -6% to +6%.

Contrary to the situation for the U.S. market, the sample is more homogeneous and comprises two large product groups, discount and bonus certificates. A closer look at these product groups reveals no large differences on average. Some issuers suggest larger returns for bonus certificates (e.g., DZ Bank: -31.4% for discount and -18.7% for bonus certificates), while others suggest larger returns for discount certificates (e.g., HSBC: +1.6% for discount and -8.6% for bonus certificates).

Hence, for the German market, scenarios are reasonably selected. Compared to the U.S. market, German banks are even somewhat more conservative in their scenario selection. We note that there is no single issuer deviating from this policy.

Table 4: Regression Analysis of the Mean of Suggested Certificate Returns for Discount and Bonus Certificates in the German Market

	Discount Certificates	Bonus Certificates
<i>MATURITY</i>	+0.0285*** (0.0005)	+0.0448*** (0.0010)
<i>CAPLEVEL</i>	-0.0073*** (0.0002)	
<i>BARRIER</i>		+0.0503*** (0.0008)
<i>BONUSLEVEL</i>		+0.0046*** (0.0004)
<i>CAP</i>		-0.0324*** (0.0015)
<i>SCENARIOS</i>	+0.0283** (0.0101)	+0.0485*** (0.0014)
BNP	+0.156*** (0.010)	+0.074*** (0.003)
Citigroup	+0.294*** (0.002)	
Deutsche Bank	+0.145*** (0.010)	+0.308*** (0.011)
Goldman Sachs		+0.417*** (0.014)
HSBC	+0.428*** (0.030)	+0.690*** (0.058)
RBS	+0.170*** (0.010)	+0.234*** (0.003)
Société Générale		+0.277*** (0.009)
UBS	+0.124*** (0.020)	
Constant	-0.424*** (0.101)	-1.281*** (0.024)
Observations	10,174	7,559
<i>R</i> ²	0.858	0.652

MATURITY is the remaining time to maturity in years, *CAPLEVEL* is the cap level of discount certificates in 1,000 index points, *BARRIER* and *BONUSLEVEL* are the barrier and the bonus level of bonus certificates in 1,000 index points, respectively. *CAP* is a dummy indicating bonus certificates with a cap. *SCENARIOS* is the number of scenarios in a document. The reference value for the issuer dummies is DZ Bank. (Dummy variables differ due to product availability.) Standard errors are provided in parentheses. Significance at the 5% level is denoted by *, at the 1% level by **, and at the 0.1% level by ***.

The standardization of the market makes it possible for us to perform a more detailed analysis for German documents and enables us to identify drivers of the suggested returns. We regress the average scenario return per product on the product's characteristics, which include the time to maturity, the cap in the case of discount certificates, the barrier, the bonus level, and an indicator variable for the existence of a cap in the case of bonus certificates, as well as the number of scenarios in the document, and a series of issuer dummies. The results are presented in *Table 4*.

As expected, an increase of the remaining time to maturity increases suggested returns by about 4.5% per year for bonus certificates and 2.8% per year for discount certificates. For discount certificates, the cap level lowers suggested returns by 0.7% per 1,000 index points, which is in line with the actual expected return. For bonus certificates, the bonus level has little impact (+0.5% per 1,000 index points), whereas the barrier level increases the suggested return by 5.0% per 1,000 points. This finding is interesting, since, *ceteris paribus*, an increase of the barrier leads to a reduced expected return and the researcher would, at first sight, expect a negative impact. However, this effect is apparently offset by higher selling prices of products with lower barriers. Also in line with actual expected returns, prospectuses for capped bonus certificates suggest 3.2% lower returns than those for bonus certificates without a cap.

As to the issuers, our statistical findings for the issuer dummies are consistent with our descriptive results in *Table 2*. HSBC suggests relatively high returns, and DZ Bank, being the reference value in the regressions, suggests relatively low returns. Therefore, issuers with a higher overpricing have a higher coefficient and vice versa.

In addition to suggested returns, we study the suggested risk. For the U.S. market a closer appraisal is difficult, as there is a wider variety of products and the actual risk of the certificates takes very different shapes. For the German market, a comparison of issuers is easier, due to the selection of standardized products. Although the majority of issuers choose an average standard deviation of scenario returns between 30% and 50%, this value is only 13% for Citigroup and 14% for HSBC. This difference depends primarily on the existence of a total loss scenario. Citigroup and HSBC (and also Deutsche Bank) have no total loss scenarios in their documents, while the other issuers do (for most, but not all, of their products). Differentiating between the two product groups discount and bonus certificates reveals no larger differences with the exception of HSBC (discount certificates: 7%, bonus certificates: 20%).

As with the additional adjusted return measures discussed above, *Tables 2* and *3* also display the share of prospectuses in which the scenarios are in descending order, and where the worst case scenario is a total loss. These shares take different values on the heterogeneous U.S. market (with several product types), but the choice of German banks is binary. Either all of their scenarios are in descending order, or none is, and German banks present total loss scenarios in all of their documents, or in none.

Hence, we find that there is no market-wide upward bias of suggested returns, in either the U.S. or the German markets. While average scenario returns are negative, median returns are close to zero or somewhat positive. In Germany, scenarios are still more conservative than in the U.S. Among banks operating in the U.S. market, there are some with quite optimistic scenarios; these are Bank of America and Morgan Stanley in terms of average returns, as well as Bank of Montreal and Credit Suisse in terms of median returns.

4 CONCLUSION AND OUTLOOK

By analyzing about 20,000 information documents, we provide evidence that most banks use reasonable, or even negatively biased, scenarios to illustrate their structured retail products. This finding holds true for both the U.S. and the German market, with the exception of a few U.S. banks. These results contradict the frequent criticism that to induce investors to buy their products, banks are inclined to upward-bias returns systematically in scenarios.

Concerning potential changes in regulation, our results suggest that stricter regulation regarding information documents today is neither necessary nor helpful to protect individual investors, at least for the German market. However, we note that banks are under greater scrutiny than they were before the financial crisis of 2008, which means that stricter regulation might still be necessary in the future. Particularly in the U.S., regulation for scenarios in financial product sales brochures could control the proportion of positive scenarios to negative scenarios.

The results of our study provide considerable possibilities for future research, particularly from a regulatory perspective. For example, it would be very interesting to determine how to design a prospectus in such a way as to maximize product comprehension while keeping the complexity of the brochure low. Since providing scenarios increases the length of the brochure, it remains to be determined if the assumed resulting increase in comprehensibility is worth the cost, or if it just risks information overload. (For example, Wallmeier (2011) questions the use of simple payoff diagrams and proposes a risk and return survey in order to provide investors with relevant and comprehensive information.) In this context, Döbeli and Vanini (2010) find that simpler product descriptions, rather than more extensive ones, motivate people to make an initial investment in structured products. Furthermore, investigating the relation between investor comprehension and their subsequent investment decisions would allow for a determination as to how similar banks' and regulators' interests actually are.

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