Neglected Risk in Financial Innovation:
Evidence from Structured Product Counterparty Exposure

Marc Arnold, Dustin Schuette, and Alexander Wagner*

January 15, 2018

Abstract

We compare prices of structured products paid by retail investors with prices available to institutional investors for identical payout profiles. The price differences reveal that product issuers do not compensate retail investors for counterparty exposure before the Lehman default. Post-Lehman, retail prices no longer neglect this risk. We also measure retail investor attention towards issuer credit risk. For a given level of issuer credit risk, counterparty exposure is compensated more when attention is higher. Furthermore, issuers tend to construct products with larger counterparty exposure. Overall, our results shed light on the conditions under which financial engineering generates neglected risk.

JEL-Code: D8, G21, G33

Keywords: Neglected risk, structured products, counterparty risk, investor attention

*Marc Arnold: University of St. Gallen, Unterer Graben 21, 9000 St. Gallen, phone: +41712247076, marc.arnold@unisg.ch. Dustin Schuette: Accenture Switzerland, dustin.schuette@accenture.com. Alexander Wagner: Swiss Finance Institute, University of Zurich, CEPR, and ECGI, alexander.wagner@bf.uzh.ch. We thank Derivative Partners for providing the term sheets database used in this paper, and we are grateful to Andreas Kropf for kindly answering questions on the data and the Swiss market for structured products. We thank Tobias Berg, Claire Célérier, Nicola Gennaioli, Andreas Ita, Matti Keloharju, Steven Ongena, Per Östberg, Joel Peress, Jean-Charles Rochet, Boris Vallée, Kelsey Wei, and Adam Zawadowski for comments and Chiddi Chidambaran for conversations about the topic of this paper. Seminar and conference participants at Asian Development Bank Institute, Banque de France, the University of St. Gallen, the FIRS conference, the SAFE Conference on Regulating Financial Markets, the SFI Research Days, and the SGF conference have provided excellent comments. We thank the Swiss Finance Institute and the NCCR FINRISK for financial support and Jiri Woschitz for research assistance. The views expressed in this paper fully reflect our own and not the view of Accenture. The authors declare that they have no financial interests that relate to the research described in this paper.

1 Introduction

Financial innovation can benefit the economy because it contributes to completing markets, ameliorate agency conflicts, reduce market frictions, or mitigate counterparty risk (Allen and Gale, 1988; Ross, 1989; McConnell and Schwartz, 1992; Chidambaran, Fernando, and Spindt, 2001). Recently, however, market observers worry that financial innovation harms society (see the Presidential address of Zingales (2015) for an overview). One important dimension of this concern is the "neglected risk hypothesis" (Gennaioli, Shleifer, and Vishny, 2012). Specifically, investors who hold financially engineered securities that entail neglected risk can cause a financial crisis when they suddenly become aware of the true security risk and fly to quality. To curtail this source of market fragility, it is crucial to characterize the conditions under which neglected risk occurs. Identifying neglected risk empirically, however, is challenging. As benchmark values are usually not observable, engineered security prices need to be compared to model value estimates, which are highly sensitive to the underlying assumptions and parameter estimates (Coval, Jurek, and Stafford, 2009).

This paper analyzes the counterparty exposure of simple structured products to investigate when neglected risk occurs. Our products are replicable with components traded by institutional investors. Thus, we can compare observed structured product prices paid by retail investors with replication prices available to institutional investors. Thereby, we overcome the challenge that fair benchmark values are not observable. In addition, analyzing price differences allows us to isolate the neglect of counterparty exposure by less sophisticated retail investors from (unobserved) factors that affect the general market perception of this exposure.

We obtain four main results. First, issuers do not compensate counterparty exposure before the Lehman default. Whereas they earn more from issuing structured products when credit risk increases, retail investors end up acquiring products with neglected risk. Second, the neglect of counterparty exposure disappears after the Lehman default, consistent with the neglected risk hypothesis' idea that investors can suddenly become aware of a previously neglected risk. Third, retail investor attention is important to explain the neglect of counterparty exposure. We show that the neglect occurs when issuer credit risk is large but does not receive sufficient attention and not only when the risk is small. Fourth, issuers design their products towards high counterparty exposure, which underlines the systemic importance of avoiding the neglect of this risk.

In our analysis, we employ a comprehensive data set that encompasses all structured products issued in Switzerland between 2005 to 2010. Switzerland is the global leader in terms of structured products asset volume invested on custody accounts (Swiss Bankers Association, 2011). The data set provides the issue price, time, and detailed terms at which these products are sold by banks to relatively less financially sophisticated retail investors. We select all 501 products of the two Swiss issuers with available CDS spreads that can be replicated with traded financial instruments and for which we have control variables. This sample of simple products provides a unique opportunity to compare structured product issue prices paid by retail investors with replication prices to institutional investors for identical payout profiles at the same time. We label this difference "issue premium" and use it as a proxy of issuers' profit from placing a structured product. Throughout our analysis, we control for standard determinants of the issue premium. Our sample of priced products is considerably larger than existing samples.[1]

We investigate counterparty exposure for two reasons. First, the fact that investors are unsecured creditors upon issuer default can have severe consequences for structured product values. The Lehman liquidation, for example, caused heavy losses to investors of Lehman structured products.[2] Second, the sample time period entails substantial variation with respect to both counterparty exposure levels and salience of counterparty exposure, which helps us to dissect the reasons behind the occurrence of neglected risk.

Counterparty *exposure* of a structured product depends not only on the issuer's credit risk but also on the correlation of the product's promised payments with the issuer's financial health. A high correlation implies that the issuer is less likely to default when contractual repayments to the investor are large and more likely to default when contrac-

[1]For example, Benet, Giannetti, and Pissaris (2006) investigate 31 reverse-exchangeable securities issued by ABN-AMRO between 2001 and 2003. Henderson and Pearson (2011) consider 64 SPARQS launched by Morgan Stanley between 2001 and 2005. Célérier and Vallée (2016) price 141 retail structured products on the Euro Stoxx 50 index, 102 from July 2009 and 39 from October 2010.

[2]http://fortune.com/2011/04/11/finra-fines-ubs-on-safe-lehman-notes/

tual obligations are small. Therefore, with higher correlation investors are less exposed to a given degree of issuer credit risk than if the correlation is small. The insight that correlation mitigates counterparty exposure of engineered securities and, thus, reduces the necessary compensation of security issuers for their credit risk is based on the clinical case study by Chidambaran, Fernando, and Spindt (2001).

Our first result is that banks do not compensate counterparty exposure before the Lehman default. An increase in issuer credit risk reduces a structured product's replication price. If retail investors neglect issuer credit risk and banks refrain from compensating increasing credit risk through lower issue prices, the reduction in replication prices raises banks' issue premiums. This channel is economically important before the Lehman default, increasing the average issue premium by 66% in times of high issuer credit risk (the crisis-pre-Lehman period from the onset of the crisis in July 2007 until the Lehman default) compared to times of low issuer credit risk (the pre-crisis period before July 2007). Whereas not compensating larger counterparty exposure through lower issue prices enhances banks' issue premiums, it also induces that investors acquire structured products that entail neglected risk.

The second result is that issuers compensate counterparty exposure after the Lehman default. Arora, Gandhi, and Longstaff (2012) argue that the Lehman collapse had a tremendous impact on the market awareness of counterparty risk. Intuitively, this salience also sharpened for less sophisticated structured product investors because many retail investors found themselves stuck with Lehman products that became basically worthless over night. The observation that the neglect of counterparty exposure in issue prices disappears with the Lehman default is consistent with the neglected risk hypothesis suggesting that investors can suddenly become aware of previously neglected risk.

For our third result, we discern whether structured product issuers start compensating counterparty exposure due to the elevated attention towards issuer credit risk, or simply due to an increase in the level and variation of this risk. Therefore, we compare issue prices of products between the crisis-pre-Lehman period, a time interval during which issuers' credit spreads were already high and variable, and the post-Lehman period. Strikingly, issuers do not compensate counterparty exposure in the crisis-pre-Lehman period but only in the period after the salient Lehman event.

To additionally support our conjecture that variation in credit risk attention and not simply in credit risk levels drives our results, we construct proxies for retail investors' attention toward issuer credit risk through the Internet search behavior of households in English and German, respectively, employing techniques developed in the text analysis literature (see, e.g., Tetlock, 2007; Da, Engelberg, and Gao, 2011, 2015). The resulting investor attention indices are - both absolutely and relatively to the CDS level of issuing banks - low during the crisis-pre-Lehman period, and high during the post-Lehman period. This finding confirms that (abnormal) investor attention increased with the Lehman default. Moreover, the indices allow us to test whether time-varying investor attention explains variation in credit risk compensation. We find, indeed, that at a given level of credit spreads, counterparty exposure is compensated more when attention is higher.

Fourth, we investigate whether banks are more likely to issue structured products with a higher implied counterparty exposure, that is, with lower correlation between issuers' financial health and products' promised payments. Using a matched sample of not-chosen comparison underlyings, we find evidence that underlyings on which products are issued have substantially lower correlation with the issuer's financial health than the comparison underlyings. This result reinforces the importance of stimulating investors' attention for issuer credit risk to avoid the accumulation of neglected risk in the financial system.

This paper contributes to several veins of the literature. First, we illuminate the conditions under which financial engineering generates neglected risk, a fundamental component in the Gennaioli, Shleifer, and Vishny (2012) model of financial fragility. Thus, our study adds to the literature on the concern that financial engineering leads to market fragility (see, e.g., Rajan, 2006; Gorton and Metrick, 2012; Stein, 2012). Several empirical studies show that unusual events affect the pricing of financial products (Arora, Gandhi, and Longstaff, 2012; Coval, Jurek, Pan, and Stafford, 2013). It is, however, not possible to associate such pricing changes to neglected risk because unusual events can affect important pricing determinants simultaneously such as, for example, "too big to fail" considerations in the Lehman default case. Comparing replication prices paid by institutional investors with issue prices paid by retail investors for identical payout profiles at the same time eliminates the impact of such (unobserved) determinants because they should affect both prices. Thus, our comparison crystallizes when less sophisticated investors *neglect* counterparty exposure relative to more sophisticated investors.

Second, we speak to the literature on information asymmetry between financial engineers and investors. Henderson and Pearson (2011) argue that structured product issuers exploit investors with large issuance premiums because the latter do not fully understand the products.[3] Ammann, Arnold, and Straumann (2017) show that issuers' privileged access to volatility and dividend information is an important determinant of issue premiums. A particular focal point of this literature has been complexity. Célérier and Vallée (2016) document increasing complexity of structured products and show that more complex products have higher markups. Carlin (2009) and Carlin and Manso (2011) study theoretically how the rents to issuers decline with investor sophistication for a given degree of product complexity. Several studies suggest that even institutional investors find it difficult to fully process the information in elaborate securities (Coval, Jurek, and Stafford, 2009; Ghent, Torous, and Valkanov, 2014; Furfine, 2014).

Our study focuses instead on simple single-name products. We find that neglected risk arises for such simple products when risk attention is low. Thus, our results suggest that whereas standardizing engineered securities may help to address issues of excessive product complexity, enhancing investor attention is important to avoid neglected risk.

Third, we contribute to recent studies on the role of investor attention in financial markets showing that attention can affect asset prices, buying behavior, shareholder base, stock liquidity, and trading (Grullon, Kanatas, and Weston, 2004; Barber and Odean, 2007; Griffin, Nardari, and Stulz, 2007; Andrei and Hasler, 2015; Peress and Schmidt, 2016; Sicherman, Loewenstein, Seppi, and Utkus, 2016). We complement this literature by illustrating that neglected risk occurs when investor attention is low.

[3]Due to initial overpricing (and also due to bad trading decisions during the lifetime of a product), investors achieve poor investment performance with structured products (Entrop, McKenzie, Wilkens, and Winkler, 2014; Henderson and Pearson, 2011). Piskorski, Seru, and Witkin (2015) demonstrate that intermediaries even disclose false quality information about mortgage-backed securities.

Finally, we expand the literature that considers credit risk for the pricing of structured securities. Chidambaran, Fernando, and Spindt (2001) show, in the context of a clinical study of a gold-mining company, that investors are willing to pay more for bundled securities that promise high payouts in states when the issuer is doing well.[4] Several studies investigate the pricing of implicit credit risk on the secondary market for structured products (Wilkens, Erner, and Röder, 2003; Baule, Entrop, and Wilkens, 2008; Petry, 2015). They do not, however, address the neglected risk hypothesis.[5]

2 The structured products market and our sample

This section describes the market for structured products and discusses our product sample.

2.1 The market for structured products

Structured products can be described as bundled investment products with a payoff that is linked to the performance of one or several underlyings. This payoff is defined by a pre-specified formula that determines how the product will perform in any possible future scenario. Structured products typically entail embedded derivatives. There is a wide variety of underlings for these derivatives such as equity, commodity, or fixed income securities. Structured products have been successfully marketed to relatively unsophisticated European retail investors (Célérier, Vallée, Calvet, and Sodini, 2016). In Switzerland, more than half of all structured products are estimated to be placed on behalf of private investors (SVSP, 2015). Thus, market participation differs sharply from CDS, EUREX, and OIS swap markets that are populated by professional investors. For example, 98.4% of CDS contracts' and 96% of interest derivatives' notional OTC

[4] Benet, Giannetti, and Pissaris (2006) mention such credit enhancement as a possible explanation of why structured products create value but do not test this hypothesis.

[5] Indeed, the primary market, on which issuers sell structured products to less sophisticated retail investors, constitutes a more appropriate setting to analyze neglected risk in security prices. On the secondary market, mid prices tend to adjust towards fair values because well-informed issuers need to buy and sell the structured products as market makers (Stoimenov and Wilkens, 2005). Moreover, whereas the structure of products on the secondary market is fixed, our analysis of the primary market allows us to test whether products are designed towards neglected risk.

amount outstanding is with financial institutions, active dealers, or securities houses (BIS, 2016). Similarly, EUREX admits only trading experts with practical experience.[6] Banks' flexibility to create structured products with different terms, maturities, or payoffs makes it difficult for retail investors to understand and compare them with similar products. Thus, issuers earn considerable premiums from placing new structured product with retail investors (Henderson and Pearson, 2011; Célérier and Vallée, 2016).

The outstanding volume of structured products totalled around EUR 770bn in Europe as of December 2012 (Bouveret, Crisóstomo, Gentile, Mendes, Pereira da Silva, and Silva, 2013), accounting for about 4% of household financial wealth or 12% of mutual funds' assets under management. Switzerland is the global leader in terms of structured products' volume invested on custody accounts (Swiss Bankers Association, 2011). In 2012, CHF 168bn were invested in structured products on Swiss bank deposits, which corresponds to 22% of the total amount of structured products in Europe. Most structured products are issued by banks. The market is relatively concentrated. The sales on the Swiss trading platform for structured products (Scoach) of the three largest issuing banks in Switzerland comprise around 70% of all listed products. (See SVSP (2015) for an overview.)

Legally speaking, structured products are obligations for whose fulfilment the issuer is liable with all of its assets. In the case that a structured product issuer becomes insolvent and defaults, investors of the products are considered as unsecured creditors and have no preferential claims to any assets held by the issuer.

2.2 Structured products sample

We draw on a comprehensive database containing all retail structured products issued by Swiss issuers to European investors between January 2005 and December 2010. The database is provided by Derivative Partners. Product denomination is small, usually between CHF 50 and CHF 5000, and there are no requirements regarding investor sophistication. Issuers target households/retail investors. There are no private placements

[6]See http://www.eurexchange.com/exchange-en/trading/trader-admission

in the database.

Of the 8831 equity structured products in the database, we consider those that can be replicated by institutional investors with traded financial instruments such as EUREX options and CDS spreads. Thus, we omit all products on multiple underlyings, with barrier options, and without issuer CDS spreads.[7] This step leaves 512 products issued by the two largest Swiss issuers with traded CDS spreads. After excluding products with missing data, our final sample contains 501 structured products.

We present an overview of our sample in Table 1. The number of products issued per year peaks in 2006 and declines thereafter. 264 products are issued in the *pre-crisis period* from January 2005 until July 8 2007. Following Eichengreen, Mody, Nedeljkovic, and Sarno (2012) and Gennaioli, Shleifer, and Vishny (2012), we set the start date of the crisis to July 9, 2007. 100 products are issued in the *crisis-pre-Lehman period* between July 9, 2007 and the default of Lehman Brothers on September 15, 2008. These two periods together form the *pre-Lehman period*. The period after the default of Lehman Brothers until December 2010 is the *post-Lehman period* with 137 issued products. Products are written on 66 different single stock underlyings. The two most frequent underlyings account for 21% of issued products. Of the 501 products, 491 have their underlying stock in either the SMI (the main index of the Swiss stock exchange), the Eurostoxx 50, or the Eurostoxx 600 index. 360 products have their underlying stock in the SMI index. Our sample comprises 353 Discount Certificates, 94 Reverse Convertibles, and 54 Outperformance Certificates.

Insert Table 1 about here

All three product types are issued throughout the three subperiods by both banks. Although the different product types have a similar payoff structure with a maximum redemption (see Figure 1), they differ in their structure.

Insert Figure 1 about here

[7]Products on a single underlying with a currency different from the underlying's currency also classify as multiple underlyings. In addition, we exclude products on indices because they are only issued by one bank with traded CDS spreads in the first two subsample periods.

Discount Certificates enable the investor to buy the underlying stock at a discount. The initial maturity is usually between one and three years. If the stock quotes above the cap at maturity, the investor obtains the predetermined maximum redemption. Otherwise, he receives the stock.

While *Reverse Convertibles* have the same payout profile as Discount Certificates at maturity, they differ in two aspects. First, Reverse Convertibles pay coupons over their lifetime. Second, they are not written on one unit but on several units of a single stock.

Outperformance Certificates enable the investor to participate disproportionately in the performance of a stock within a certain range. If the stock quotes above a cap at maturity, the investor obtains the maximum redemption. Between a lower threshold and this cap, the investor participates disproportionately in the stock return. Below the threshold, a cash amount equal to the level of the underlying stock is redeemed.

From the structured product term sheets, we hand-collect detailed information. Depending on product characteristics, we collect the product issuer, retail selling price at issuance, product issuance date, payment date, final fixing, maturity, coupons, lower threshold, maximum redemption, conversion ratio, and an identifier for the underlying stock. The product issuance date is the date at which the definite product terms are determined and the product is launched. The implicit options of a structured product run between the product issuance date and the final fixing dates. Investor payment for a product occurs at the payment date and repayment at the maturity date. Additionally, we use the database to extract the number of active products and issuers per month.

Due to the potential concern that our results are driven by the turmoil around the default of Lehman Brothers, in the main analysis we omit products issued during the three months surrounding the default of Lehman Brothers, i.e., August, September, and October 2008. This approach gives retail investors some time to process the new information and form their believes (see e.g., Daske, Hail, Leuz, and Verdi, 2008). As shown in the robustness section, our results remain valid if we include the transition period.

3 Compensation of counterparty exposure

In this section, we investigate whether counterparty exposure is compensated in prices available to retail investors. Section 3.1 introduces the dependent variable "issue premium" and discusses its derivation and intuitive composition. Section 3.2 describes our empirical strategy, variable definitions, and descriptive statistics. Sections 3.3 and 3.4 present the main empirical results. Section 3.5 summarizes robustness checks.

3.1 Issue premium

When banks place a new structured product with retail investors, they hedge this position immediately. At the issuance date, banks thus earn the difference between the issue price to retail investors and the cost of the hedge regardless of the future performance of the product. The issue price already includes issuance fees or commissions. As the simple structured products in our sample can be replicated with traded financial instruments, the direct cost of the hedge is observable. Specifically, the hedging cost corresponds to the market price to institutional investors of the package of individual financial instruments that replicates the payout profile of a structured product.[8] The *Issue Premium* then is the difference between the issue price and this replication price, scaled by the issue price.

We discuss replication prices in Section 3.1.1 in detail. Next, we conceptually describe the role of credit risk in issue premiums and provide a simple exposition of the credit risk component in issue premiums (Section 3.1.2).

3.1.1 Deriving the replication price of structured products

We replicate each structured product at the issuance date by an investment in financial instruments traded by institutional investors that yields the same payout profile (see Figure 1 in Section 2.2 for the payout profiles).

Discount Certificates (DC) are replicated by an investment in a bond and a short put

[8] In our analysis of the variation of issue premiums, we control for additional factors that could influence hedging costs.

option. Hence, their replication price (RP) is

$$RP_{DC} = \frac{M}{exp(rT)} - P(M,T), \tag{1}$$

in which M is the maximum redemption of the product, r the interest rate using the 30/360 day-count convention, T the time to maturity of the product, and $P(M,T)$ the price of a put option on the underlying stock of the product with strike M and time to maturity T.[9]

Reverse Convertibles (RC) are constructed by investing in a coupon bearing bond and short put options, which implies a replication price of

$$RP_{RC} = \frac{N}{exp(rT)} + \sum_{t_i \leq T} \frac{c_{t_i}}{exp(rt_i)} - \alpha P(X,T), \tag{2}$$

in which N is the nominal amount, t_i are coupon payment dates, c_{t_i} are the coupon amounts paid at time t_i, and $P(X,T)$ is the price of a put option on the underlying stock of the product with strike X and time to maturity T. $\alpha = N/X$ denotes the number of put options securitized to the nominal amount of the certificate.

Finally, we replicate Outperformance Certificates (OC) as a bond minus a put plus low strike calls minus high strike calls. Their replication price is

$$RP_{OC} = \frac{M}{exp(rT)} - P(M,T) + (\alpha - 1)C(Y,T) - (\alpha - 1)C(M,T), \tag{3}$$

in which M is the maximum redemption of the product, Y the lower threshold of the underlying stock above which the product pays an outperformance, α the total participation rate between Y and M, $C(Y,T)$ the price of a call option with strike Y, and $C(M,T)$ the price of a call option with strike M.

We obtain the option components in a replication price by transforming traded (American) EUREX option prices to the (European) option prices of the structured product.

[9] The maturity of the bond component can be slightly different than the maturity of the option component. We consider this difference in the replication of products but do not denominate different Ts for ease of notation.

The transformation is described in the Appendix.

3.1.2 The composition of issue premiums: Conceptual background

The *Total Issue Premium*, $Total\ IP$, is the percentage difference between the issue price and the replication price of a structured product:

$$Total\ IP = \frac{Issue\ Price - RP(at\ credit\ risky\ rate)}{Issue\ Price}. \tag{4}$$

In Equation (4), we use the credit-risky interest rate r in the derivation of the replication prices of Section 3.1.1 to account for issuer default risk. This interest rate corresponds approximately to the risk-free rate plus the CDS spread that reflects the (institutional investors') premium to insure against product issuer default (Blanco, Brennan, and Marsh, 2005). All rates and spreads are interpolated to product maturities. Intuitively, replication prices using this rate correspond to the prices of a risk-free bond minus the present value of the issuer's CDS spread plus/minus the option components.[10]

Total IP shows a bank's premium from issuing a structured product. To distinguish between credit risk and non-credit risk components of this premium, we also calculate the non-credit risk related *Issue Premium OIS*, IP^O:

$$IP^O = \frac{Issue\ Price - RP(at\ OIS\ rate)}{Issue\ Price}. \tag{5}$$

IP^O is computed using the risk-free interest rate in the derivation of the replication prices. To proxy for this rate, we follow the literature and apply the (interpolated) OIS swap rate from Bloomberg in the corresponding currency (see, e.g., Gorton and Metrick, 2012).[11] OIS rates bear only negligible counterparty risk (Beirne, 2012; Gorton and Metrick, 2012). Intuitively, replication prices using this rate correspond to the prices of a risk-free bond plus/minus the option components, thereby ignoring the short CDS position. Thus, IP^O corresponds to the premium a bank earns from issuing a structured product if it would only replicate the product's option and risk-free bond components

[10] A bank needs to short its CDS to replicate a structured product.

[11] We also use the OIS rate to calculate the implicit option component of a structured product.

but not replicate the product's credit risk.

Equations 4 and 5 show that the difference between $Total\ IP$ and IP^O is the consideration of the CDS spread in the replication price. Thus, $Total\ IP$ corresponds to IP^O (non-credit risk component) plus the percentage present value of the issuer's CDS spread up to product maturity (credit risk component). This decomposition also shows that the product issuer has an incentive to replicate credit risk by shorting the CDS to earn a larger premium.

In Figure 2, we show the average non-credit risk component, credit risk component, and $Total\ IP$ in the three subsample periods. This simple time series exposition allows us to take a first illustrative look at the composition of issue premiums and to derive the intuition behind our main results.

Insert Figure 2 about here

The first bar shows that the average $Total\ IP$ banks earn is 88 bps in the pre-crisis period. The 88 bps are composed of 80 bps from the average IP^O and 8 bps from issuers' average CDS spread.[12]

The second bar in Figure 2 shows that the credit risk component increases by 56 bps (64-8 bps) in the crisis pre-Lehman period compared with the pre-crisis period. To compensate the higher CDS spread to structured product investors, issuers should either reduce the issue price or offer more attractive option components. Both compensation channels would reduce IP^O. Consistent with the neglected risk hypothesis, however, issuers do not reduce IP^O to compensate the higher counterparty exposure to investors in this period, which allowed them to earn a higher $Total\ IP$. The impact of the higher CDS spread in the crisis-pre-Lehman period on bank earnings is important. Specifically, $Total\ IP$ increases by 64% (56/88 bps) compared with the pre-crisis period due to investors' neglect of counterparty risk.

The post-Lehman period entails a 80 bps (144-64 bps) higher average CDS spread than the crisis-pre-Lehman period. At the same time, however, the average IP^O declines by

[12] The average maturity of products in our sample is around one year. Thus, we can simply add the 8 bps annual CDS spread of issuers to the IP^O.

56 bps (103-47 bps), as shown in Figure 2. This decline suggests that banks compensate investors for the increase in counterparty risk that occurs after the Lehman default.

The simplified time-serial exposition helps to understand that by abstaining from accordingly reducing IP^O when credit risk increases, banks can boost their premiums from issuing products when investors neglect credit risk. Of course, many additional factors affect issuers' price setting decision. In addition, the extent to which issuers need to compensate counterparty risk may also depend on product-specific features. Our analysis in what follows incorporates these factors.

3.2 Empirical implementation

We now discuss our empirical strategy, define the main variables, and present summary statistics.

3.2.1 Empirical strategy and hypotheses

We use the dissection of the $Total\ IP$ in Section 3.1.2 to identify neglected risk. Specifically, we employ the following pooled OLS regression to test the relation between the IP^O of product i issued by issuer j and the counterparty exposure of a product in the main specification:

$$\begin{aligned} IP^O_{ij} \quad = \quad & \beta_0 + \beta_1 CDS\ Spread_{ij} + \beta_2 Correlation_{ij} + \beta_3 CDS\ Spread_{ij} * Correlation_{ij} + \\ & \gamma_0 Post\ Lehman_i + \gamma_1 Post\ Lehman_i * CDS\ Spread_{ij} + \\ & \gamma_2 Post\ Lehman_i * Correlation_{ij} + \\ & \gamma_3 Post\ Lehman_i * CDS\ Spread_{ij} * Correlation_{ij} + Controls_{ij}\delta + \varepsilon_{ij}. \qquad (6) \end{aligned}$$

The key explanatory variables are the bank's credit risk (CDS spread) and the correlation of the issuer with the underlying. For details on the variable definitions, see Section 3.2.2.

If issuers compensate retail investors for counterparty exposure, they would either reduce the issue price or increase the replication price by offering more attractive option or bond components when counterparty risk elevates. Both compensation channels reduce IP^O. Thus, if retail product prices compensate counterparty risk, IP^O declines when issuer credit risk increases. Otherwise, retail prices neglect counterparty risk. Hence, $\beta_1 < 0$ would imply that investors received compensation already before the Lehman default. $\beta_1 = 0$ together with $\gamma_1 < 0$ would suggest that compensation occurred only after the Lehman default.

As discussed in the Introduction, Chidambaran, Fernando, and Spindt (2001) argue that a positive correlation between a security's underlying and the issuer's financial health mitigates investors' counterparty exposure. This logic applies to the case at hand. Structured products are unsecured senior debt and investors obtain a fixed recovery of the par value in case of issuer default. Thus, with high positive correlation an issuer default tends to coincide with a low contractual product payoff. Therefore, the difference between the promised product payoff and the fixed recovery is likely to be small, which results in a low expected counterparty loss to the investor upon issuer bankruptcy. By contrast, structured products bundled such that the correlation between the financial health of the issuing bank and the payoff of a product is low impose relatively high counterparty exposure on investors because such products tend to promise large payoffs to investors when the issuer defaults. β_3 and γ_3 capture this idea. $\beta_3 > 0$ would imply that correlation reduces counterparty exposure compensation already before the Lehman default. By contrast, $\beta_3 = 0$ and $\gamma_3 > 0$ would suggest that this counterparty exposure mitigation occurred only after the Lehman default.

Note that to identify neglected risk, we cannot simply regress $Total\ IPs$ on issuers' CDS spreads. The reason is that using the CDS spread in the calculation of the dependent variable ($Total\ IP$) and as an independent variable would generate a mechanical relation between $Total\ IPs$ and CDS spreads in regressions.

We approach the omitted variable concern in two ways. First, we carefully control for relevant factors that may influence the issue premium. Thus, in $Controls_{ij}$ we include standard controls along the lines of Henderson and Pearson (2011), and we also incorporate additional intuitive controls in the robustness section 3.5. Second, the advantage of analyzing issue premiums as the dependent variable to detect neglected risk is that these premiums represent the difference between the prices paid by retail investors on the one hand and the market prices paid by institutional investors on the other hand for an identical payout profile at the same time. Hence, a change in observed or unobserved credit risk determinants such as, for example, a "too big to fail" aspect should affect both prices but not their difference.

3.2.2 Variable definitions

Our dependent variable IP_{ij}^{O} measures the non-credit risk related issue premium, computed in Equation 5. $CDS\ Spread_{ij}$ is the annual five-year senior unsecured CDS spread of the structured product issuer j for product i. We obtain this proxy for credit risk from Markit. Since products are issued at different points in time, index i also indicates time. Thus, $CDS\ Spread_{ij}$ varies over time for each issuer. The issuance of a structured product is usually preceded by a subscription period, in which investors can opt to buy the product. To take the product subscription period into account, and to mitigate the influence of outliers, we use the average of the daily CDS spreads over the ten-day period preceding the product issuance date. Whereas five-year CDS spreads are traded liquidly throughout our sample period, one- and two-year CDS spreads experience liquidity drops during the market turmoils between end of 2007 and beginning of 2010. Therefore, we follow the literature (Houweling and Vorst, 2005; Jorion and Zhang, 2009) and apply primarily annual five-year CDS spreads to proxy issuers' default risk. We use CDS spreads on senior unsecured debt that are interpolated linearly to structured product maturities in the robustness checks.

Note that we do not separately model counterparty risk reflected in CDS spreads or EUREX option prices. As both CDS trades and EUREX options are fully collateralized, counterparty risk is of negligible importance for these derivatives. Arora, Gandhi, and Longstaff (2012), for example, show that the credit spread of a CDS dealer would have to increase by 645 basis points (bps) to result in a one bp decline in the price of credit protection, and that this reflection of counterparty risk in CDS spreads is only marginally affected by the Lehman default.

$Correlation_{ij}$ is the correlation coefficient between the stock returns of the underlying of the structured product i and the stock returns of the product issuer j over the 100-day period prior to the issuance date of product i. Returns are from Datastream. We choose 100 days in the main analysis because we divide the observation period in different subperiods. With 100 days, we mitigate the impact of returns in subperiods before the relevant subperiod on the measured $Correlation_{ij}$ of a product. We show in the robustness section that our qualitative and quantitative inferences are robust to choosing a 250-days period. To capture counterparty exposure, it is not necessary to calculate the correlation between structured product returns and the stock returns of the product issuer. Specifically, whereas changes in interest rate and underlying volatility also influence structured product returns during a product's lifetime, only the level of the underlying stock at maturity is relevant for the promised payoff of products in our sample. A typical large bank bankruptcy procedure takes much longer than the product maturities in our sample such that, upon final bankruptcy settlement, all products should be expected to have expired already. Thus, the stock price correlation that we consider is an appropriate proxy for the correlation between the promised contractual product payoff at final bankruptcy settlement and the issuer's financial health.

$Post\ Lehman_i$ is a binary indicator variable equal to one for products issued in the post-Lehman period, and zero otherwise.

In the vector of control variables $Controls_{ij}$, we include the excess return of the underlying over the market index during the three and 12 months periods before product issuance from Datastream. As our three primary proxies for hedging costs, we use the logarithm of the market capitalization, the logarithm of the three months trading volume of the underlying stock from Datastream, as well as the underlying option trading volume from the EUREX option database. The latter is the number of traded options on the underlying over all maturities and exercise prices during the month prior to the product issuance normalized by the number of all options traded in that month. We also control for the logarithm of the six months implied at the money call volatility of each underlying stock of a structured product as of one month before the issuance date. To control for CDS liquidity, we include quote quality control dummies of the quote quality classification provided by Markit. In addition, we show how year, product category, and issuer fixed effects affect our results.

All variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the underlying level to account for potential stock-specific errors in the calculation of IP^O. Results for alternative proxies, clustering, and additional controls are presented in the robustness checks.

3.2.3 Descriptive statistics

Table 2 presents summary statistics of the variables used in our analysis. The average IP^O of structured products in our sample is 0.75%. Although we primarily use IP^O in our analysis, it is useful to compare issue premiums in our data when applying a risky interest rate with those obtained in related studies. Therefore, we also calculate the IP^L using LIBOR from Bloomberg as a discount rate. We obtain an average IP^L of 0.90%. This magnitude coincides with the average IP in empirical samples of similar simple short term structured products (Baule, Entrop, and Wilkens, 2008; Célérier and Vallée, 2016). Reverse Convertibles have the highest average IP^L of around 1.35%, followed by Outperformance Certificates with 0.67%, and Discount Certificates with 0.61%. Reverse Convertibles, Discount Certificates, and Outperformance Certificates have average maturities of 1.12, 0.96, and 0.79 years, respectively. Hence, the IP^Ls of the product categories are consistent with the literature reporting a positive relation between product maturity and issue premium (see e.g., Baule, Entrop, and Wilkens, 2008). Another reason for the relatively high IP^L of Reverse Convertibles could be the additional complexity due to their coupon payments (see the replication formulas in Section 3.1.1). Célérier and Vallée (2016) find that the issue premium of structured products is positively associated with product complexity.

Insert Table 2 about here

The mean five-year annual CDS spread is 0.57%; the large difference to its median of

0.13% is mainly driven by the strong increase in spreads during the months surrounding the collapse of Lehman Brothers.

The average correlation coefficient between the equity returns of the issuer and the equity returns of the underlying of structured products is 0.49. 15 products in our sample have a correlation coefficient of one because their issuer simultaneously corresponds to their underlying stock. Two products have a negative correlation (very close to zero).

The average market capitalization of the underlying equities is USD 64.07 bn. Most structured products in our sample have a maturity below one year. Discount Certificates and Outperformance Certificates with a maturity below one year obtain a privileged tax treatment in Switzerland. Thus, products seem to be structured towards the tax advantage.

Insert Table 3 about here

Table 3 presents separate summary statistics in the pre-crisis, crisis pre-Lehman, and post-Lehman subperiods. IP^O and Correlation are largest in the crisis-pre-Lehman period. As expected, the underlyings' market caps and option trading volumes are lowest in the post-Lehman period.

3.3 Main results

In this section, we present our main results on the neglect of counterparty exposure. Table 4 shows outcomes of our pooled OLS regression of the IP^O on counterparty exposure from January 2005 to December 2010. We begin by analyzing compensation for product-specific counterparty exposure over the entire sample period in Column (1). Columns (2) to (6) then investigate how the Lehman default affects this compensation.

Insert Table 4 about here

If issuers compensate retail investors for the risk of product issuer default, we expect CDS spreads to be negatively related to IP^O. In addition, we test the central idea that retail investors' counterparty exposure depends on product characteristics. Specifically, compensation for issuer credit risk of products with higher Correlation should be lower.

Regression (1) shows that the coefficient on CDS Spread Issuer is significantly negative and that of the interaction CDS spread * Correlation is significantly positive. Thus, issuers on average compensate product-specific counterparty exposure. Consistent with Chidambaran, Fernando, and Spindt (2001), higher Correlation reduces the counterparty risk which issuers must compensate because Correlation hedges investors' exposure.

Column (2) shows that counterparty exposure compensation is driven by the Post-Lehman period. Specifically, the coefficient on CDS Spread * Post-Lehman is significantly negative and that on CDS Spread * Correlation * Post-Lehman significantly positive. Before the Lehman default, by contrast, there is no compensation for counterparty exposure. This result suggests that the Lehman Default affected counterparty risk compensation.

The finding on CDS Spread * Correlation is important also because the CDS spread itself could conceivably proxy for, or could be correlated with, a tendency of riskier banks to issue more products. Thus, the reduced issue premium for a bank with a high CDS spread in the post-Lehman period could indicate that prices fall more for banks who previously issued a larger number of products. In addition, it is possible that the CDS spread itself picks up retail investors' tendency to be scared away from financial innovations in general. These alternative stories cannot explain the central role of product-specific exposure, that is, the interaction CDS spread * Correlation.

In Column (3), we include the underlying-specific controls. Our results on counterparty exposure compensation are unaffected. The coefficients on the control variables are insignificant, similar to most coefficients in the study of Henderson and Pearson (2011).[13]

In Column (4), we include year fixed effects to account for time trends in the IP^Os and credit spread, thus also controlling for potential time variation in structured product demand. Column (5) instead considers product issuer and product category fixed effects, thus taking out unobserved heterogeneity on the issuer or product category level. Finally, Column (6) includes all fixed effects. The results in Columns (4) to (6) are similar to Column (2), implying that the effect in the post-Lehman period is identified both from the cross-section and the time series of credit spreads.

[13] The only difference to Henderson and Pearson (2011) is that the positive coefficient on ATM Call 180 is significant in their product sample.

To understand the quantitative implications of this analysis, note that the CDS Spread Issuer is the annualized CDS spread on senior bank debt, structured products in our sample have an average maturity of around one year, and the products are classified as senior in case of default. Thus, investors should approximately be compensated by a one percentage point decrease in IP^O for a one percentage point increase in the CDS spread for products with underlyings that are not correlated to the issuer's financial health.[14] As products in our sample have a positive Correlation, the counterparty compensation should, therefore, be below one percentage point. Indeed, the point estimates in Column (2) imply that for a structured product with an underlying stock at the first quartile of correlation (0.37), a one percentage point increase in the CDS spread is associated with a 0.49-2.73+0.24*0.37+4.49*0.37 = -0.49 percentage point decline in the IP^O after the Lehman default. This point estimate is significant at the 1% level. Similarly, the regressions in Columns (3) to (6) imply that a one percentage point increase in the CDS spread is associated with a 0.25–0.52 percentage point decline in the IP^O after the Lehman default for a product in the first quartile of correlation.

In addition, we find the coefficient on Correlation Issuer with Underlying itself to be negative in the post-Lehman period, which supports the argument in Allen, Bali, and Tang (2012). The authors suggest that investors demand a premium for equity portfolios of nonfinancial firms that are correlated with systemic risk from the financial sector relative to portfolios that are uncorrelated with this risk. Consistent with this view, we find that banks offer lower IP^Os after the Lehman default when issuing structured products that entail a higher correlation of their payoff to the issuing bank's equity return and, hence, to the banking sector.[15]

In sum, Table 4 establishes remarkable variation in the extent to which issuers compensate counterparty exposure before and after the Lehman default. Importantly, our analysis does not merely show that financial product prices change due to the Lehman default. Rather, the comparison of replication prices paid by institutional investors with

[14]The notional of a CDS spread is fixed and, hence, has no correlation to equity.

[15]Even if this premium is already reflected in the initial price of the option component of a structured product, the bond component is also correlated with the banking sector, which justifies a compensation to investors via a lower IP^O.

prices paid by retail investors for the identical payout profile reveals variation in the neglect of counterparty exposure of less sophisticated relative to more sophisticated investors over time. Specifically, the neglect of counterparty exposure disappears after the Lehman default, and issuers then compensate product-specific counterparty exposure.

3.4 A closer look at the occurrence of neglected risk

In this section, we develop our counterparty exposure compensation results further. Section 3.4.1 provides one perspective on whether structured product issuers start compensating counterparty exposure due to the elevated attention towards issuer credit risk, or simply due to an increase in the level and variation of this risk. Section 3.4.2 provides an alternative perspective by constructing proxies for retail investors' attention toward issuer credit risk through the Internet search behavior of households in English and German, respectively.

3.4.1 Sample splits

One critique to the results presented so far could be that the absence of compensation for counterparty exposure before the Lehman default occurred because credit risk was negligible in this period. If investors do not get compensated for small risks, the policy implications of this analysis may be limited. Moreover, the significant results in the post-Lehman period could be driven by a higher variability of the independent variable. From the fact that compensation does occur in the post-Lehman period, we cannot infer whether this happens because counterparty exposure was high or because credit risk was salient. Clearly, the two factors are hard to separate. Yet, we can make progress by considering the period subsample splits presented in Table 5.

Insert Table 5 about here

Column (1) confirms that, after the Lehman default, the coefficient on the CDS spread is negative and significant and the interaction term of the CDS spread and Correlation is significantly positive. For example, the point estimate of the total effect of CDS spreads on the IP^O in the post-Lehman period is -0.48 and significant at the 1% level for products with a correlation at the first quartile, similar to the conclusion from Table 4. This result confirms that after the default of Lehman, issuers compensate investors for counterparty exposure.

In the pre-Lehman period, by contrast, the CDS spread and the interaction of the CDS spread and Correlation are both insignificant; see Column (2).

Of particular interest is a subperiod of the pre-Lehman period, namely the crisis-pre-Lehman period shown in Column (3) that runs between July 9, 2007 and the Lehman default. This subperiod has a substantially larger average credit spread of 64 bps and credit spread standard deviation of 0.40 than the pre-crisis period with 8 bps and 0.03, respectively. Despite considerable issuer credit risk, however, counterparty exposure is not compensated in the crisis-pre-Lehman subperiod. Our subperiod results maintain if we add the controls and the fixed effects, as shown in Columns (4) to (9).

The results in Table 5 suggest that counterparty exposure of structured products is not compensated simply when credit risk is large, but only when investors are actually aware of this risk after obtaining new information. Thus, our results cannot be explained by the idea that individuals make financial mistakes solely when the consequences of mistakes are negligible (see, e.g., Agarwal, Chomsisengphet, and Souleles, 2015). The finding that issuers did not need to compensate counterparty exposure in the crisis-pre-Lehman period is consistent with the view that some agents exhibit local thinking (Gennaioli and Shleifer, 2010; Gennaioli, Shleifer, and Vishny, 2012) or have different access to information or abilities to process information than others (see, e.g., King and Wadhwani, 1990; Barlevy and Veronesi, 2003; Hong and Stein, 2003). In particular, a typical retail investor on the structured products market may have more difficulties in assessing counterparty exposure than the sophisticated investors that participate in the over-the-counter credit derivatives market. The default of Lehman revealed substantial news to the former agents and induced them to reassess previously neglected risk.

3.4.2 Attention toward issuer default risk

We interpret our results so far as suggesting that time variation in retail investors' attention toward issuer credit risk plays a crucial role for the compensation of counterparty exposure. We now construct a proxy of this attention to support this interpretation.

To proxy for retail investor attention, we investigate Internet search behavior in Google Trends. This approach is inspired by Da, Engelberg, and Gao (2011) who argue that the aggregate search frequency for ticker symbols in Google can be used to measure the attention of less sophisticated retail investors. These investors are typical clients targeted by structured product issuers. Thus, we explore the idea that internet search frequency for credit-risk related terms can serve as a useful basis for computing a proxy of retail investor attention toward issuer credit risk.

We start by building a list of search terms that reveal attention toward credit risk. We conduct and present our analysis for both English and German search terms separately. For English, our starting points are the Harvard IV-4 and the Lasswell Value Dictionaries that place English words into various categories. From these dictionaries, we select the words that are tagged "economic" as well as "negative," and that are associated with credit risk. This step leaves us with a set of eleven words such as "bankrupt" or "liquidate." We then need to understand how these words are searched in Google. Following Da, Engelberg, and Gao (2015), we, therefore, input the words into Google Trends to obtain the ten top searches associated with each word during our sample period from January 2005 to December 2010. This step generates 109 search terms after removing duplicates, such as "going bankrupt."

Next, we remove search terms that are not clearly related to finance such as, for example, "default password". This step leaves 50 final terms. For each of the final terms, we download the worldwide weekly search volume over our sample period. We record only the search volume of final terms for which the volume is available with a weekly frequency.[16] 30 individual time series $I_{i,t}$ of weekly worldwide search volumes remain in our data set.

[16] The data frequency is decided by Google Trends based on search popularity. Low popularity search terms only have monthly data available.

To address concerns about outliers, seasonality, trends, and heteroscedasticity in the search volume data, we proceed as follows (see, Da, Engelberg, and Gao, 2015). First, we winsorize each individual time series at the 1% level (similar results hold with winsorizing at, for example, the 2.5% level). Second, we regress $I_{i,t}$ on weekly dummies and keep the residuals. Third, we standardize each time series by scaling them with their time series standard deviation. We label the resulting time series "adjusted" series.

Finally, we run regressions of the adjusted series on a CDS index. To build the relevant CDS index, we collect average weekly CDS levels for all issuers of structured products in Switzerland with traded CDS quotes and calculate the weekly average of these levels. The regressions allow us to identify the importance of the search terms behind the adjusted series for issuer credit risk attention. Following Da, Engelberg, and Gao (2015), using historical regressions for selecting the most relevant search terms is a way to make sure that terms are not only ex ante obvious, but also objectively relevant from the data. As expected, the contemporaneous relationship between the adjusted series and the CDS index is almost always positive. Only five out of the 30 series have a negative regression coefficient. We use the adjusted series that have a positive regression coefficient to focus on the search terms that are most important for retail investors' attention toward credit risk.[17] From these adjusted series, we construct our weekly attention index as

$$Attention_t = \sum_{1}^{25} I_{i,t}. \tag{7}$$

A potential concern with this attention proxy is that the worldwide English search behavior could be driven by the attention of US retail investors and not of European retail investors to which our products were sold. Search frequencies, however, are too low during our sample period to collect country-specific search volumes from Google Trends. To address this concern, we construct also an attention index out of German search frequencies. The worldwide search volumes in German should mainly be driven by German speaking countries in Europe such as Austria, Germany, and Switzerland.[18]

[17]Our results are robust to alternative series selection methods, such as using the ten adjusted series with the highest positive t-value.

[18]We construct the German index by translating our set of eleven English words into German. Specifically, for

The attention indices in English and German have a correlation of 0.83. Hence, issuer credit risk attention does not seem to be a local phenomenon.

We first plot our English attention index against the CDS index in Figure 3. The figure provides a graphical indication that attention can diverge from the level typically warranted by the magnitude of issuer credit risk.

Insert Figure 3 about here

Next, we show how this proxy of retail investor attention toward issuer default risk varies during our three subperiods. As can be seen in Panel A1 (for English search) and B1 (for German search) of the summary statistics in Table 6, average $Attention_t$ is low in the pre-crisis and crisis-pre-Lehman periods, and high in the post-Lehman period. In Panels A2 and B2, we investigate Abnormal Attention, that is, the attention above or below that expected for a given level of issuer credit risk. Specifically, we regress $Attention_t$ on the contemporaneous CDS index level and report summary statistics for weekly residuals during the subperiods. The results are consistent with our conjecture in Section 3.3 regarding retail investors' credit risk attention in that they imply that abnormal investor attention was low in the crisis-pre-Lehman period, but high after the Lehman default.[19] For example, the means of -0.29 (English search) and -0.21 (German search) in the crisis-pre-Lehman period imply that $Attention_t$ was on average 0.29 and 0.21, respectively, lower than the level of $Attention_t$ that is typically expected (predicted) for the corresponding CDS index level in each week. Thus, whereas it is obvious that investor attention generally rises with issuer default risk, we show that this increase was atypically low in the crisis-pre-Lehman period and atypically high post Lehman.

Insert Table 6 about here

Finally, we use our data-driven attention index to conduct a more refined test of the hypothesis that issuers compensate credit exposure when retail attention towards

each English word we take the first German translation in the "Online Duden translator" that has an economic tag, and is neither an equally spelled English expression nor a duplicate from another translated word. We then obtain the German top ten searches for each translated word and proceed in exactly the same steps as for the English attention index. Whereas Switzerland has four official languages, German is the primary language for two thirds of the population.

[19]To test for significance, we regress the weekly residuals on subperiod dummies. The crisis-pre-Lehman dummy is significantly negative and the post-Lehman dummy significantly positive, both below 1% levels.

issuer credit risk is high. Table 7 shows regressions in different subperiods, in which we use the attention index to determine the subsamples. When attention is below the median[20] for the English search, the coefficient on CDS Spread is insignificant and that on the interaction between CDS Spread and Correlation is negative; see Column (1). By contrast, the coefficient on the CDS Spread is significantly negative and the coefficient on the interaction between CDS Spread and Correlation is significantly positive when attention is above the median (Column 2). In addition, Columns (3) shows the intuitive result that when attention is even higher, the role of credit risk and product-specific counterparty exposure are even more pronounced. The point estimate of the total effect of CDS Spread on the IP^O in Column (3) provides a good exposition of the impact of attention. Specifically, during periods in the top quartile of attention, the total impact of CDS Spread on IP^O is -0.58 and significant at the 1% level for a product with a correlation of 0.37 (the first quartile of Correlation). The results for German search are similar, although the coefficient on the CDS Spread in Column (5) is not significant.

Overall, the results confirm that the neglect of counterparty exposure in issue prices of structured products occurs when there is no attention toward issuer credit risk.

Insert Table 7 about here

3.5 Additional results and robustness

In this section, we provide additional results and several robustness tests regarding the compensation of counterparty exposure in structured products.

First, it is common in the literature to use London Interbank Offered Rates (LIBOR) in the currency of a structured product as the discount rate r in the calculation of IPs (Henderson and Pearson, 2011). The IP^O calculated with the OIS rate and the IP^L obtained with the LIBOR rate have a correlation of 0.93. The results in Column (1) of Table 8 show that our conjectures are robust to using the LIBOR rate. The point estimates indicate that in the post-Lehman period, the total effect of the CDS spread on

[20] We use the one week lag, $Attention_{t-1}$, to determine cutoff dates in the regressions because it usually takes some days to launch a structured product. Our results are quantitatively similar without lagging or with a two week lag of $Attention_t$.

IP^L at the first quartile of Correlation is 0.44 (and statistically significant at the 10% level). Thus, our results are similar when using the LIBOR instead of the OIS rate.[21]

Insert Table 8 about here.

Second, we use the interpolated CDS instead of the five-year CDS. Our results are robust to this alternative CDS spread, as shown in Column (2).

Third, we apply the average of the daily CDS spreads over a five-day period preceding the product issuance date (instead of over a ten-day period) to assure that our conjectures do not depend on the assumed product subscription period. The results remain unchanged, as shown in Column (3).

Fourth, we consider the concern that banks may price structured products that have their own equity as underlying differently from those issued on other companies' equity. As Correlation is, by definition, one for the former products, such a pricing behavior could drive our correlation results. Column (4) of Table 8, however, shows that including only products with a correlation below one does not change the quantitative results.

Fifth, Column (5) implies that using a 250-days time window to calculate the Correlation Issuer with Underlying does not affect our conclusions.

Sixth, we cluster standard errors at the underlying level in the main analysis. Column (6) of Table 8 shows that not clustering standard errors does not affect the results. Additional regressions (not tabulated) show that standard errors do not change noticeably when we cluster on each of the around 60 issue months or when we cluster two-way (both on the underlying and the issue-month level).

Seventh, in the main analysis we exclude August, September, and October 2008 to avoid that our results are driven by the market turmoil around the Lehman default. Column (7) shows that our results are robust to including these months.

Finally, we examine the robustness of our results with respect to several additional controls: (a) We control for product maturity.[22] (b) We additionally consider the issuer's

[21]We use the OIS rate in the main regressions because the LIBOR also reflects credit risk. Thus, our main conjectures could be driven by the correlation between CDS spreads and LIBOR found in (Abrantes-Metz, Kraten, Metz, and Seow, 2012). This positive correlation could also explain the positive coefficient on CDS Spread Issuer that we find in the pre-Lehman period when using LIBOR.

[22]Structured products with a maturity below one year obtain a privileged tax treatment in Switzerland. There-

stock return over the six months before product issuance. The idea is that a better reputation of the issuer, proxied by the past 6-months stock return, could positively affect the IP^O of structured products. (Of course, this variable is highly correlated with the issuer's CDS.) (c) The degree of competition in the structured products market may discipline issuers as they wish to avoid the revelation of high issue premiums to retail investors through comparable products. Thus, we control for Number of Issuers, which is the number of foreign and local issuers in Switzerland that have outstanding structured products of any sort in the week of the issuance date. We collect this variable from the structured products database. As expected, Number of Issuers has a negative coefficient throughout our observation period, suggesting that more competition reduces IP^O. (d) Next, we include Implied Market Volatility, i.e., the level of the volatility index VSMI of the SMI index from Bloomberg at the product issuance date, to control for aggregate market risk or risk aversion (see, e.g., Bekaert and Hoerova, 2014). Implied Market Volatility enters significantly in the Pre-Lehman period. Thus, issuers earn a higher IP^O when there is more market uncertainty, which could be driven by issuers demanding compensation for larger expected hedging costs in uncertain times. (e) In addition, structured products could serve banks as a medium-term funding source. Hence, issuers' funding needs may influence their IP^O. We control for funding needs with the issuers' quarterly Tier 1 Ratio from Datastream and find that when banks are less capitalized they demand higher premiums. For space reasons, we present one regression in Column (8) by adding all of these control variables. The key results on counterparty exposure compensation are unchanged, and they are also robust to adding each of these controls one at a time.

4 Product design and counterparty exposure

Neglected risk in engineered securities is of peculiar concern in the financial fragility hypothesis of (Gennaioli, Shleifer, and Vishny, 2012) if issuers have a propensity to design

fore, we define also a binary indicator variable equal to one for maturities at or beyond one year. Using this alternative control variable does not affect our results.

securities towards this risk. The issuer's first order product design decision that affects counterparty exposure is the underlying choice that determines a product's correlation with the issuer's financial health.[23] There are several potential reasons why banks could design structured products with particularly high counterparty exposure. For example, issuers may try to avoid the premium discovered by (Allen, Bali, and Tang, 2012) that investors require for investments that are highly correlated with systemic risk from the financial sector. Thus, they possibly offer structured products with underlyings that have a low correlation to the issuing bank (and, therefore, to the financial system) to increase the issue premium. An alternative reason is that the value of options raises with the correlation between the equity underlying and the interest rate (see e.g., Merton, 1973). Banks' internal interest rate (funding cost) is negatively associated with their financial performance (Babihuga and Spaltro, 2014). Additionally, structured products in our sample are characterized by a long option position for the bank.[24] Hence, issuers may simply attempt to increase the value of their option position by designing products with a low correlation between the underlying and their own stock. In this section, we analyze whether banks effectively tend to design structured products that entail high implied counterparty exposure.

4.1 Empirical approach

We first present our empirical approach to measuring the tendency of banks to issue low correlation products. To test this preference-for-low-correlation hypothesis, we need to compare the correlation of stock underlyings that are chosen by the issuer with the correlation of otherwise similar underlyings that could reasonably be chosen, but are not. We use a standard matched sample approach as described in Roberts and Whited (2012) and as employed, for example, in Kahl, Shivdasani, and Wang (2015). Thus, we construct a matched sample of underlyings and then test for the significance of the difference in

[23] Strikes and underlying are the design variables for a given product category. The strike price does not directly affect counterparty exposure.

[24] The Outperformance Certificates also entail a short position in a call option for the bank (see Equation 3) The long positions in the put and the call, however, have a much larger combined absolute value than the short call for reasonable parameter choices.

correlations of actually chosen and non-chosen matched underlyings. This approach has the advantage that we do not compare the (relatively) small number of actually chosen stock underlyings with the potentially extremely large set of possible equity underlyings.

To construct the matched sample, we proceed as follows. We define, for each actually chosen stock underlying of a structured product, the choice set as the set of underlyings in the same index on the same date. We concentrate on the 492 products with an underlying in the SMI, Eurostoxx 50, or Eurostoxx 600 index and consider as an in principle eligible set of underlyings the shares traded in one of the three indices. For the 17 remaining products, it is not clear what the comparable set would be. (A separate analysis for the 360 underlyings in the SMI index is available on request. It yields very similar results.)

Among the set of underlyings in the same index on the same date, we select the five underlyings that are the closest neighbors with respect to the Mahalanobis distance from the implied volatility, market capitalization, and turnover of the actually chosen underlying. Moreover, in an additional analysis, we match on the industry of the underlying (using SIC divisions). The market capitalization, and the turnover of each underlying in the choice set are collected from Datastream. The implied volatilities are extracted from 180 days at-the-money call options from EUREX according to the procedure described in the Appendix. EUREX option prices are available for all SMI underlyings over the complete sample period, for most Eurostoxx 50 underlyings, and for some of the Eurostoxx 600 underlyings. As recommended by Roberts and Whited (2012) we check that qualitatively and quantitatively similar results maintain if we additionally match on other criteria (such as on historical volatility), and/or if we choose three, four, or more than five matched underlyings, and/or if we discard, for example, the 1% of the worst matches.[25] For each resulting observation, we then compute the standardized rank difference

$$DIFF{-}RANK = (Rank\ Issued{-}Rank\ Matched)/number\ of\ underlyings\ in\ the\ index. \tag{8}$$

Rank Issued is the rank, in terms of the correlation coefficient of the actually chosen underlying with the issuing bank over the past 100 days, within the relevant index.

[25]For a few products, we do not find a matching underlying within the same index.

Higher numbers correspond to higher correlation. $Rank\ Matched$ is the average rank of the matched non-issued underlyings in terms of that correlation. We compute the ranks based on the correlation coefficients ten days before the relevant issuance date because the implementation of structured products typically starts one to two weeks before this date. The results are not sensitive to this assumption. We scale the difference in ranks by the number of underlyings in the respective index because an absolute rank difference of, for example, two has a different interpretation in the SMI with 20 stocks than in the Eurostoxx 50 with 50 stocks. Thus, our dependent variable is a standardized rank difference that is between minus one and one. In our main analysis, we focus on ranks instead of absolute correlations. The reason is that absolute correlations depend on business cycles. As business cycles may also influence the decision of banks to issue structured products, we are concerned that an apparent preference for low absolute correlation products could, in fact, be driven by this dependence.

We also use

$$DIFF - CORR = (Correlation\ Issued - Correlation\ Matched). \tag{9}$$

$Correlation\ Issued$ is the correlation coefficient of the actually chosen underlying with the issuing bank and $Correlation\ Matched$ is the correlation coefficient of the matched non-issued underlyings with the issuer returns. We apply the same timing conventions as for $DIFF - RANK$.

4.2 Results

Table 9 presents the results of OLS regressions in which the dependent variable is $DIFF-RANK$, that is, a measure of the difference in the correlation of the actually chosen underlying minus the average correlation of the non-chosen matched underlyings.[26] Our focus in these regressions is on the constant term that shows the average difference in the correlations. We cluster standard errors on the issuance day level to account for the fact

[26] The results for $DIFF - CORR$ are similar, and available upon request.

that for each issued product we have multiple control underlyings.

Insert Table 9 about here.

Column (1) shows that the chosen equity underlyings have a significantly smaller correlation with the issuer than the matched underlyings that are not chosen. Economically, the coefficient -0.064 in Column (1) means that on average, chosen underlyings have a 6.4 points lower standardized correlation rank than matched underlyings. This magnitude is about one fifth of a standard deviation of DIFF-RANK. We add year fixed effects in Column (2) and issuer fixed effects in Column (3). Our results remain robust.

In Column (4), we add the issuer's CDS spread. The negative coefficient on CDS spread implies that banks have a stronger propensity to issue low correlation products if their credit risk is larger, though this coefficient is not statistically significant. In Column (5), we repeat the analysis and additionally match on the industry of the underlying. In this case, the CDS spread also becomes significantly negative.

Overall, our results show that issuers of structured products have a tendency to design structured products so as to entail large counterparty exposure. There is also some evidence that this tendency is stronger when issuers' credit risk is high.

5 Conclusion

This paper provides novel empirical evidence on the occurrence of neglected risk. We show that issuers do not compensate the counterparty exposure of simple structured products before the Lehman default. Thus, investors acquire products that entail neglected risk. After this event, issuers compensate counterparty exposure. By investigating the Internet search behavior of households, we show that retail investor attention towards issuer credit risk was atypically low before, and atypically high after the Lehman default. Moreover, attention is a crucial determinant of counterparty exposure compensation.

Besides the price setting behavior of issuers, we also investigate how banks design their structured products. Our analysis implies that issuers tend to structure their products towards more counterparty exposure. The interplay of product design toward high counterparty exposure and compensation that does not attend to this risk causes a systemic concern regarding the accumulation of neglected counterparty exposure in the economy.

Our results have important policy implications. Motivated by the dramatic consequences of the subprime mortgage crisis, some market observers propose to severely curtail financial innovation. Others argue that there could be benefits from standardizing securitized products (Ghent, Torous, and Valkanov, 2014). Our evidence suggests that issuers compensate counterparty exposure of structured products. This compensation, however, depends critically on the level of retail investors' attention toward issuer credit risk. Compensation does not happen when this risk is, in fact, important but not salient to investors. Without sufficient attention, banks do not compensate issuer credit risk although the product structures that we analyze are quite simple. Hence, standardization and reduction in complexity alone may not avoid the accumulation of neglected risk that leads to financial fragility. Our results also imply that as an alternative to prohibiting the issuance of financially engineered securities to unsophisticated investors, desirable policies should help investors to form realistic expectations by stimulating their attention toward the inherent risks of these securities. Existing work shows that, for example, experience sampling is a powerful mechanism for improving investors' risk choices (see, e.g., Kaufmann, Weber, and Haisley (2013), Bradbury, Hens, and Zeisberger (2015)). One needs to keep in mind, though, that unbiased advice is likely to be a necessary, not a sufficient condition for avoiding investment mistakes (Bhattacharya, Hackethal, Kaesler, Loos, and Meyer, 2012), and that issuers may respond to educational initiatives by obfuscatory actions (Carlin and Manso, 2011).

Our insights on the importance of retail investor attention to avoid neglected risk in financially engineered securities stimulate additional research questions. Does market competition, regulatory pressure, or bank reputation drive the relation between attention and neglected risk? Does insufficient attention determine the occurrence of additional neglected risks? We look forward to studies addressing these questions.

Appendix: Transformation of option prices

For an accurate transformation of American EUREX options to European option prices, we need the expected dividend and volatility of the underlying, as well as the product parameters from the term sheet of each product at the issuance date.

We estimate dividend amounts and dates expected between the issuance date and the maturity of structured products by projecting ex-dividend dates of the year prior to the issuance date reported in Datastream into the future. Instead of calculating a dividend yield, we account for each projected discrete dividend in our calculations. If we were using a dividend yield instead, we might underestimate or overestimate the expected dividend payments over the lifetime of a structured product if the product just expires before or after an expected discrete ex-dividend date.

The volatility of the underlying stock of a structured product is extracted from implied volatilities of traded EUREX Options. In particular, for each option used to replicate a structured product, we search four EUREX Options. One EUREX option with the closest lower strike price and the closest longer maturity, one option with the closest lower strike price and the closest shorter maturity, one option with the closest higher strike price and the closest longer maturity, and one option with the closest higher strike price and the closest shorter maturity. To extract the implied volatilities from these four EUREX Options, we proceed as follows. As EUREX options are of American type, we develop a binomial tree model in the spirit of Cox, Ross, and Rubinstein (1979) for each underlying stock. We use a daily discretization for the tree with $p = (exp(r(1/360)) - d)/(u - d)$, $q = 1 - p$, $u = e^{\sigma\sqrt{(1/360)}}$, and $d = 1/u$, where p (q) is the probability of an increase (decrease), and u (d) is the discrete factor for an increase (decrease) in the stock price. This approach also allows us to incorporate our discrete dividend projections, which is important because a EUREX option may just expire before or after a projected dividend payment. Each day, an option can be prematurely exercised optimally in the tree. The implied volatility of an EUREX option then corresponds to the σ that equates the American option price in the tree with the observed EUREX option price.[27] To estimate the implied volatility for an option used in the replication of a structured product with a certain maturity and strike, we linearly interpolate the implied volatilities from the corresponding four EUREX options in the two-dimensional space formed by maturity and strike. In case we do not

[27] Observed option prices are EUREX settlement option quotes based on mid prices.

find four EUREX options for a certain option used in the replication, we follow the approach suggested by Henderson and Pearson (2011) and extract the implied volatility of the option contract in the EUREX database that (i) has a time to expiration that most closely matches the final fixing date of the structured product, and (ii) has a strike price closest to the strike price of the option in the structured product replication.

As the structured products we analyze are of European type, we finally price the options used in the structured product replication via the Black-Scholes formula for puts and calls, applying the estimated dividends, and implied volatility.

References

Abrantes-Metz, Rosa M., Michael Kraten, Albert D. Metz, and Gim S. Seow, 2012, Libor manipulation?, *Journal of Banking & Finance* 36, 136–150.

Agarwal, Sumit, Chunlin Liu Chomsisengphet, and Nicholas S. Souleles, 2015, Do consumers choose the right credit contracts?, *Review of Corporate Finance Studies* 4, 239–257.

Allen, Franklin, and Douglas Gale, 1988, Optimal Security Design, *Review of Financial Studies* 1, 229–263.

Allen, Linda, Turan Bali, and Yi Tang, 2012, Does systemic risk in the financial sector predict future economic downturns?, *Review of Financial Studies* 25, 3000–3036.

Ammann, Manuel, Marc Arnold, and Simon Straumann, 2017, Illuminating the dark side of financial innovation: The role of investor information, *Working Paper*.

Andrei, Daniel, and Michael Hasler, 2015, Investor attention and stock market volatility, *Review of Financial Studies* 28, 33–72.

Arora, Navneet, Priyank Gandhi, and Francis A. Longstaff, 2012, Counterparty credit risk and the credit default swap market, *Journal of Financial Economics* 103, 280–293.

Babihuga, Rita, and Marco Spaltro, 2014, Bank funding costs for international banks, *IMF Working Paper*.

Barber, Brad M., and Terrance Odean, 2007, All that glitters: The effect of attention and news on the buying behavior of individual and institutional investors, *Review of Financial Studies* 21, 785–818.

Barlevy, Gadi, and Pietro Veronesi, 2003, Rational panics and stock market crashes, *Journal of Economic Theory* 110, 234–263.

Baule, Rainer, Oliver Entrop, and Marco Wilkens, 2008, Credit risk and bank margins in structured financial products: Evidence from the german secondary market for discount certificates, *Journal of Futures Markets* 28, 376–397.

Beirne, John, 2012, The EONIA spread before and dring the crisis of 2007-2009: The role of liquidity and credit risk, *Journal of International Money and Finance* 31, 534–551.

Bekaert, Geert, and Marie Hoerova, 2014, The VIX, the variance premium and stock market volatility, *Journal of Econometrics* 183, 181–192.

Benet, Bruce A., Antoine Giannetti, and Seema Pissaris, 2006, Gains from structured product markets: The case of reverse-exchangeable securities (RES), *Journal of Banking & Finance* 30, 111–132.

Bhattacharya, Utpal, Andreas Hackethal, Simon Kaesler, Benjamin Loos, and Steffen Meyer, 2012, Is unbiased financial advice to retail investors sufficient? Answers from a large field study, *Review of Financial Studies* 25, 975–1032.

BIS, 2016, BIS statistical bulletin, *Bank for International Settlements.*

Blanco, Roberto, Simon Brennan, and Ian W. Marsh, 2005, An empirical analysis of the dynamic relation between investment-grade bonds and credit default swaps, *Journal of Finance* 60, 2255–2281.

Bouveret, Antoine, Ricardo Crisóstomo, Monica Gentile, Victor Mendes, Paulo Pereira da Silva, and Fernando Silva, 2013, Economic report: Retailisation in the EU, *European Securities and Markets Authority.*

Bradbury, Meike, Thorsten Hens, and Stefan Zeisberger, 2015, Improving Investment Decisions with Simulated Experience, *Review of Finance* 19, 1019–1052.

Carlin, Bruce, 2009, Strategic price complexity in retail financial markets, *Journal of Financial Economics* 91, 278–287.

——— , and Gustavo Manso, 2011, Obfuscation, learning, and the evolution of investor sophistication, *The Review of Financial Studies* 24, 755–785.

Célérier, Claire, and Boris Vallée, 2016, Catering to Investors through Product Complexity, *Quarterly Journal of Economics* forthcoming.

——— , Laurent Calvet, and Paolo Sodini, 2016, Financial innovation and stock market participation, *Working Paper.*

Chidambaran, N.K., Chitru S. Fernando, and Paul A. Spindt, 2001, Credit enhancement through financial engineering: Freeport McMoRan's gold-denominated depositary shares, *Journal of Financial Economics* 60, 487–528.

Coval, Joshua, Jakub Jurek, Kevin Pan, and Erik Stafford, 2013, How markets learn, *Working paper.*

Coval, Joshua, Jakub Jurek, and Erik Stafford, 2009, The economics of structured finance, *Journal of Economic Perspectives* 23, 3–25.

Cox, John, Stephen Ross, and Mark Rubinstein, 1979, Option pricing: A simplified approach, *Journal of Financial Economics* 7, 229–263.

Da, Zhi, Joseph Engelberg, and Pengjie Gao, 2011, In search of attention, *Journal of Finance* 66, 1461–1499.

——— , 2015, The sum of all fears investor sentiment and asset prices, *Review of Financial Studies* 28, 1–32.

Daske, Holger, Luzi Hail, Christian Leuz, and Rodrigo Verdi, 2008, Mandatory IFRS reporting around the world: Early evidence on the economic consequences, *Journal of Accounting Research* 46, 1085–1142.

Eichengreen, Barry, Ashoka Mody, Milan Nedeljkovic, and Lucio Sarno, 2012, How the subprime crisis went global: Evidence from bank credit default swaps, *Journal of International Money and Finance* 31, 1299–1318.

Entrop, Oliver, Michael McKenzie, Marco Wilkens, and Christoph Winkler, 2014, The performance of individual investors in structured financial products, *Review of Quantitative Finance and Accounting* September, 1–36.

Furfine, Craig, 2014, Complexity and loan performance: Evidence from the securitization of commercial mortgages, *Review of Corporate Finance Studies* 2, 154–187.

Gennaioli, Nicola, and Andrei Shleifer, 2010, What comes to mind, *Quarterly Journal of Economics* 125, 1399–1433.

——— , and Robert Vishny, 2012, Neglected risks, financial innovation, and financial fragility, *Journal of Financial Economics* 104, 452–468.

Ghent, Andra C., Walter N. Torous, and Rossen Valkanov, 2014, Complexity in structured finance: Financial wizardry or smoke and mirrors?, *Working Paper.*

Gorton, Gary, and Andrew Metrick, 2012, Securitized banking and the run on repo, *Journal of Financial Economics* 104, 425–451.

Griffin, John M., Federico Nardari, and René M. Stulz, 2007, Do investors trade more when stocks have performed well? Evidence from 46 countries, *Review of Financial Studies* 20, 905–951.

Grullon, Gustavo, George Kanatas, and James P. Weston, 2004, Advertising, breadth of ownership, and liquidity, *Review of Financial Studies* 17, 439–461.

Henderson, Brian J., and Neil D. Pearson, 2011, The dark side of financial innovation: A case study of the pricing of a retail financial product, *Journal of Financial Economics* 100, 227–247.

Hong, Harrison, and Jeremy C. Stein, 2003, Differences of opinion, short-sales constraints, and market crashes, *Review of Financial Studies* 16, 487–525.

Houweling, Patrick, and Ton Vorst, 2005, Pricing default swaps: Empirical evidence, *Journal of Internation Money and Finance* 24, 1200–1225.

Jorion, Philippe, and Gaiyan Zhang, 2009, Credit contagion from counterparty risk, *Journal of Finance* 64, 2053–2087.

Kahl, Matthias, Anil Shivdasani, and Yihui Wang, 2015, Short-term debt as bridge financing: Evidence from the commercial paper market, *Journal of Finance* 70, 211–255.

Kaufmann, Christine, Martin Weber, and Emily Celia Haisley, 2013, The role of experience sampling and graphical displays on one's investment risk appetite, *Management Science* 59, 323–340.

King, Mervyn A., and Sushil Wadhwani, 1990, Transmission of volatility between stock markets, *Review of Financial Studies* 3, 5–33.

McConnell, John J., and Eduardo S. Schwartz, 1992, The origin of LYONs: A case study in financial innovation, *Journal of Applied Corporate Finance* 4, 40–47.

Merton, Robert, 1973, Theory of rational option pricing, *Bell Journal of Economics and Managmeent Science* 4, 141–183.

Peress, Joel, and Daniel Schmidt, 2016, Glued to the TV: Distracted retail investors and stock market liquidity, *Working Paper*.

Petry, Stefan, 2015, Determinants of secondary market prices for structured products during the 2007-2009 financial crisis, *Working Paper*.

Piskorski, Tomasz, Amit Seru, and James Witkin, 2015, Asset quality misrepresentation by financial intermediaries: Evidence from the RMBS market, *Journal of Finance* 70, 2635–2678.

Rajan, Raghuram G., 2006, Has finance made the world riskier?, *European Financial Management* 12, 499–533.

Roberts, Michael, and Toni Whited, 2012, *Endogeneity in Empirical Corporate Finance* . vol. 2 of *Handbook of the Economics of Finance* (Elsevier: Amsterdam).

Ross, Steven A., 1989, Institutional market, financial marketing, and financial innovation, *Journal of Finance* 44, 541–556.

Sicherman, Nachum, George Loewenstein, Duane J. Seppi, and Stephen P. Utkus, 2016, Financial attention, *Review of Financial Studies* 29, 863–897.

Stein, Jeremy, 2012, Monetary policy as financial-stability regulation, *Quarterly Journal of Economics* 127, 57–95.

Stoimenov, Pavel A., and Sascha Wilkens, 2005, Are structured products 'fairly' priced? An analysis of the German market for equity-linked instruments, *Journal of Banking and Finance* 29, 2971–2993.

SVSP, Schweizerischer Verband für Strukturierte Produkte, 2015, Market report struktured products, *Quarterly report*.

Swiss Bankers Association, 2011, Wealth management in Switzerland: Status report and trends, *Basel*.

Tetlock, Paul C., 2007, Giving content to investor sentiment: The role of media in the stock market, *Journal of Finance* 62, 1139–1168.

Wilkens, Sascha, Carsten Erner, and Klaus Röder, 2003, The pricing of structured products in Germany, *Journal of Derivatives* 11, 55–69.

Zingales, Luigi, 2015, Presidential address: Does finance benefit society?, *Journal of Finance* 70, 1327–1363.

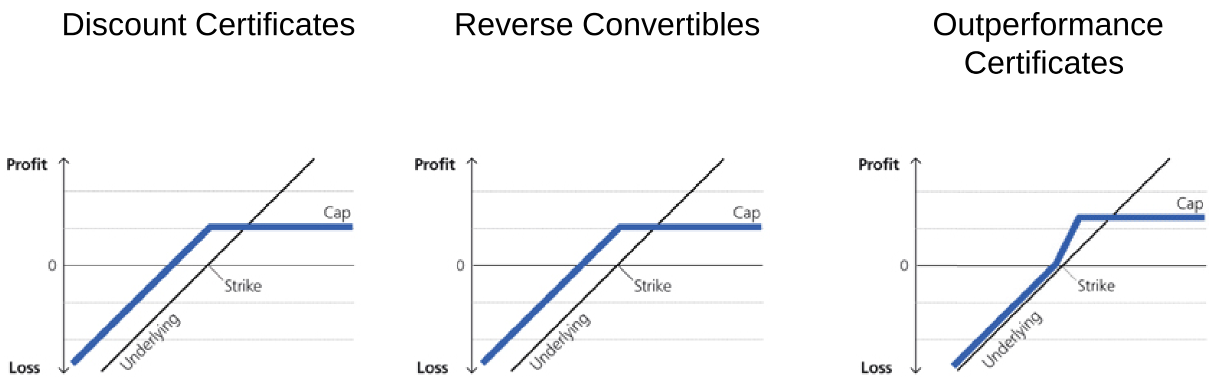

Figure 1
Payout Profiles

The blue, bold line illustrates the payout profile of structured products at maturity. The black, thinner line depicts the payoff at maturity of the underlying equity share.

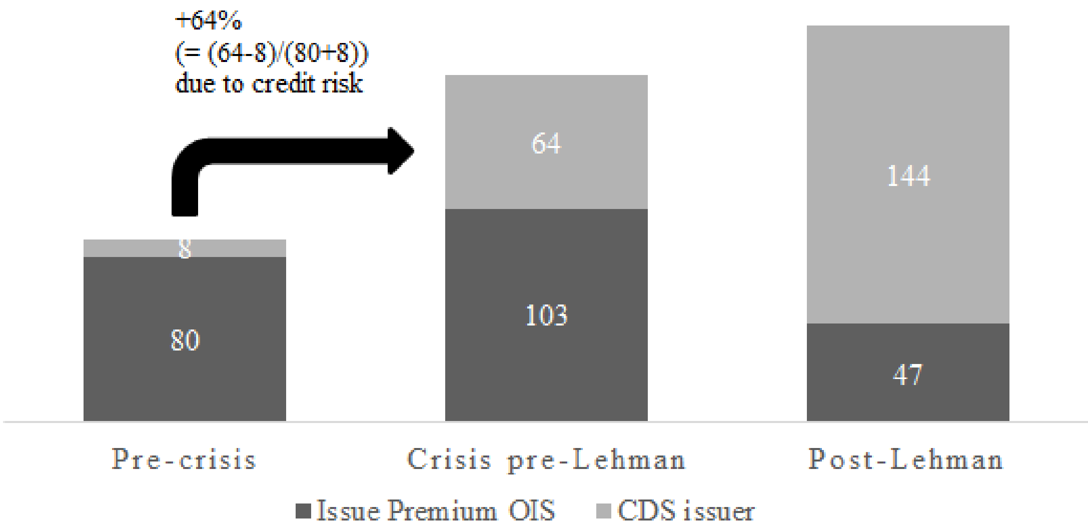

Figure 2
Total Premiums Earned by Issuers

This figure shows the composition of banks' average total premium of issuing structured products in the pre-crisis, crisis pre-Lehman, and post-Lehman subperiods. The dark grey part is the non-credit risk related portion of the total premium. The light grey part corresponds to the credit risk related portion of the total premium.

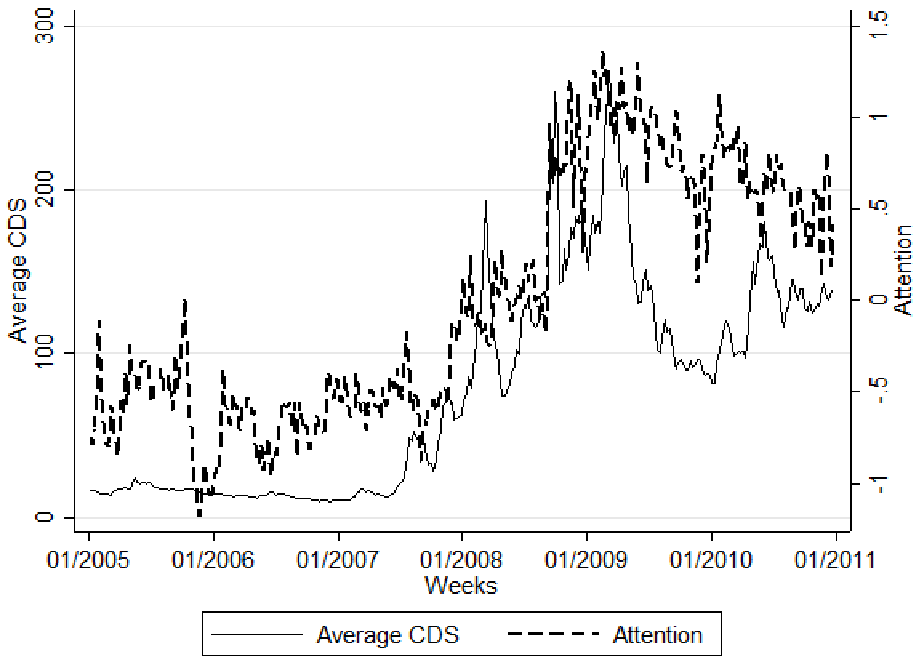

Figure 3
Attention Index and CDS Levels

The solid line depicts the average 5-year CDS level of structured product issuers in Switzerland over time. The dashed line shows the retail investor attention index that is constructed based on English internet search volumes.

Table 1

Composition of the Structured Products Sample

This table presents information on the composition of our structured products sample. Panel A groups the sample by issue year, Panel B by time period, Panel C by underlyings, Panel D by index to which the underlying belongs, and Panel E by product category.

	Number of Issued Products
Panel A: By Year	
2005	69
2006	144
2007	102
2008	79
2009	71
2010	36
Panel B: By Period	
Pre-Crisis	264
Crisis-Pre-Lehman	100
Post-Lehman	137
Panel C: By Underlying Stock	
Nestlé	63
Novartis	41
Roche	27
Other	370
Panel D: By Underlying Index	
SMI	360
Eurostoxx 50 or 600 (non-SMI)	131
Other	10
Panel E: By Product Category	
Discount Certificate	353
Reverse Convertible	94
Outperformance Certificate	54

Table 2
Descriptive Statistics: Full Sample

This table presents descriptive statistics for the full sample. Our starting point is a term sheets database containing all structured products issued in Switzerland between January 2005 and December 2010. We collect data on products issued by the two largest participants in the structured products market in Switzerland with traded CDSs, and we include three types of structured products that can be replicated with bonds and traded EUREX options: Discount Certificates, Reverse Convertibles, and Outperformance Certificates. See Section 2 for details. Issue Premium OIS (IP^O) is the issue price of a structured product minus its replication price, scaled by the issue price, expressed in percentage points. It is calculated using OIS rates as the risk-free rate. CDS Spread is the CDS spread of the issuing bank in percentage points, calculated as an average of CDS spreads in the ten-day period prior to the product issuance date. Correlation is the correlation coefficient between the equity returns of the underlying of the structured product and the issuer over the 100-day period prior to the issuance date. 3m and 12m Excess Return Underlying are the 3 and 12 months continuous annual returns of the underlying in excess of the 3 and 12 months continuous annual returns of the Swiss Market Index (SMI), respectively. Ln (Market Cap Underlying) is the natural logarithm of the market value of equity of the underlying (in USDbn). Ln (Turnover Underlying) is the natural logarithm of the dollar value (in USDm) of the trading volume of the underlying during 60 days starting 3 months prior to the issuance. Option Trading Volume Underlying is the number of traded options on the underlying over all maturities and exercise prices during the month prior to the product issuance normalized by the number of all EUREX options traded in that month. Ln (ATM Call 180) is the implied volatility of an at the money call option on the underlying of a structured product with a maturity of 180 days one month prior to the issuance date. Issue Premium LIBOR is the Issue Premium in percentage points, calculated using LIBOR rates as the discount rate. CDS Spread Issuer (Interpolated) is the issuer's CDS spread interpolated linearly to the product maturity. Maturity is the maturity of the structured product in years. 6m Return Issuer denotes the stock return of the issuer over the past six months. Number of Issuers is the number of issuers in Switzerland that have outstanding structured products of any sort in the week of the issuance date. Implied Market Volatility is the level of the VSMI index. Tier 1 Ratio is the quarterly tier 1 ratio of the issuer.

	N	Mean	Std. Dev.	Q25	Median	Q75
Issue Premium OIS	501	0.75	1.26	0.19	0.94	1.49
CDS Spread Issuer	501	0.57	0.70	0.07	0.13	0.91
Correlation Issuer with Underlying	501	0.49	0.19	0.37	0.49	0.61
3m Excess Return Underlying	501	1.32	11.09	-4.94	1.45	7.29
12m Excess Return Underlying	501	1.40	19.41	-10.08	0.56	11.89
Ln (Market Cap Underlying)	501	3.59	1.25	2.69	3.80	4.77
Ln (Turnover Underlying)	501	8.50	1.74	7.44	9.06	9.93
Option Trading Volume Underlying	501	1.71	2.20	0.22	1.12	2.39
Ln (ATM Call 180)	501	3.16	0.49	2.93	3.11	3.36
Issue Premium LIBOR	501	0.90	1.32	0.41	1.02	1.56
CDS Spread Issuer (Interpolated)	500	0.43	0.72	0.02	0.04	0.53
Maturity	501	0.97	0.17	0.97	1.00	1.01
6m Return Issuer	501	-0.04	0.29	-0.26	0.03	0.14
Number of Issuers	501	19.97	6.04	15.00	21.00	26.00
Implied Market Volatility	501	18.90	8.41	12.95	16.10	21.46
Tier 1 Ratio	501	12.38	2.17	11.30	12.00	13.20

Table 3
Descriptive Statistics: Subsamples

This table presents descriptive statistics for three subsample periods for the main variables. Panel A shows descriptive statistics for structured products issued from January 2005 until July 9, 2007, the *pre-crisis period*. Panel B shows descriptive statistics for structured products issued in the *crisis-pre-Lehman period*, i.e., after July 9, 2007 and before the default of Lehman Brothers. Panel C shows descriptive statistics for structured products issued after the date of the Lehman Brothers default (September 15, 2008) until December 2010, i.e., in the *post-Lehman period*. The variables are defined in Table 2.

Panel A: Pre Crisis Period	N	Mean	Std. Dev.	Q25	Median	Q75
Issue Premium OIS (IP^O)	264	0.80	1.17	0.31	1.03	1.52
CDS Spread Issuer	264	0.08	0.03	0.05	0.08	0.10
Correlation Issuer with Underlying	264	0.47	0.18	0.36	0.47	0.57
3m Excess Return Underlying	264	1.47	8.32	-4.25	1.28	5.44
12m Excess Return Underlying	264	1.51	15.83	-9.98	-0.23	7.81
Ln (Market Cap Underlying)	264	3.61	1.18	2.77	3.75	4.75
Ln (Turnover Underlying)	264	8.31	1.82	7.34	8.99	9.85
Option Trading Volume Underlying	264	1.73	2.21	0.26	1.12	2.40
Ln (ATM Call 180)	264	2.96	0.35	2.82	3.02	3.14
Panel B: Crisis Period before Lehman Default	**N**	**Mean**	**Std. Dev.**	**Q25**	**Median**	**Q75**
Issue Premium OIS (IP^O)	100	1.03	0.98	0.53	0.99	1.54
CDS Spread Issuer	100	0.64	0.40	0.32	0.52	0.76
Correlation Issuer with Underlying	100	0.56	0.19	0.42	0.54	0.69
3m Excess Return Underlying	100	-0.31	12.15	-7.91	-1.44	8.73
12m Excess Return Underlying	100	2.07	20.56	-11.95	0.64	14.32
Ln (Market Cap Underlying)	100	4.00	1.17	3.32	4.38	4.93
Ln (Turnover Underlying)	100	8.98	1.84	7.85	10.05	10.44
Option Trading Volume Underlying	100	1.80	2.33	0.27	1.37	2.43
Ln (ATM Call 180)	100	3.15	0.51	3.00	3.18	3.40
Panel C: Period after Lehman Default	**N**	**Mean**	**Std. Dev.**	**Q25**	**Median**	**Q75**
Issue Premium OIS (IP^O)	137	0.47	1.52	-0.37	0.55	1.31
CDS Spread Issuer	137	1.44	0.68	0.96	1.16	1.96
Correlation Issuer with Underlying	137	0.48	0.22	0.37	0.52	0.62
3m Excess Return Underlying	137	2.22	14.41	-4.78	3.10	9.65
12m Excess Return Underlying	137	0.69	24.32	-11.08	2.54	15.02
Ln (Market Cap Underlying)	137	3.26	1.36	2.44	3.49	4.57
Ln (Turnover Underlying)	137	8.52	1.43	7.49	8.77	9.83
Option Trading Volume Underlying	137	1.63	2.11	0.17	0.82	2.34
Ln (ATM Call 180)	137	3.56	0.46	3.24	3.52	3.84

Table 4
OLS Regressions of the Issue Premium OIS

This table presents results of OLS regressions. The sample contains structured products issued between January 2005 and December 2010 in the structured products market in Switzerland. It contains three types of structured products that can be replicated with bonds and traded EUREX options. The dependent variable is the Issue Premium OIS (IP^O), which is the issue price of a structured product minus its replication price, scaled by the issue price, expressed in percentage points. It is calculated using OIS rates as the risk-free rate. CDS Spread is the CDS spread of the issuing bank in percentage points, calculated as an average of CDS spreads in the ten-day period prior to the product issuance date. Correlation is the correlation coefficient between the equity returns of the underlying of the structured product and the issuer over the 100-day period prior to the issuance date. Post-Lehman is a binary indicator that is equal to one after the default of Lehman Brothers, and zero otherwise. The control variables are defined in Table 2. t-statistics, reported in parentheses, are calculated with robust standard errors clustered at the underlying level. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	Issue Premium OIS (IP^O)					
CDS Spread Issuer	-1.303***	0.486	0.321	1.238	0.094	1.252
	(-5.40)	(0.55)	(0.36)	(1.28)	(0.12)	(1.39)
Correlation Issuer with Underlying	-0.806	-0.377	-0.362	-0.258	-0.543	-0.435
	(-1.61)	(-0.59)	(-0.59)	(-0.38)	(-1.03)	(-0.74)
CDS Spread * Correlation	2.320***	0.243	0.466	-0.233	0.817	0.002
	(5.84)	(0.18)	(0.35)	(-0.17)	(0.70)	(0.00)
Post-Lehman		1.381	1.410	1.950	1.453	2.240*
		(1.51)	(1.46)	(1.62)	(1.53)	(1.84)
CDS Spread * Post-Lehman		-2.725***	-2.647**	-3.564***	-2.330**	-3.444***
		(-2.78)	(-2.64)	(-3.19)	(-2.48)	(-3.08)
Correlation * Post-Lehman		-3.875*	-3.943	-4.932*	-4.125*	-5.052*
		(-1.72)	(-1.64)	(-1.90)	(-1.73)	(-1.99)
CDS Spread * Correlation * Post-Lehman		4.493**	4.410**	5.494**	4.177**	5.256**
		(2.21)	(2.08)	(2.46)	(2.01)	(2.42)
3m Excess Return Underlying			-0.004	-0.001	-0.009	-0.006
			(-0.44)	(-0.08)	(-1.07)	(-0.68)
12m Excess Return Underlying			0.004	0.003	0.004	0.003
			(0.81)	(0.58)	(0.94)	(0.68)
Ln (Market Cap Underlying)			-0.018	-0.006	-0.042	-0.029
			(-0.24)	(-0.08)	(-0.65)	(-0.43)
Ln (Turnover Underlying)			0.019	0.031	0.040	0.055
			(0.45)	(0.73)	(1.15)	(1.45)
Option Trading Volume Underlying			-0.031	-0.033	-0.026	-0.027
			(-0.92)	(-0.91)	(-0.85)	(-0.81)
Ln (ATM Call 180)			0.047	0.233	0.006	0.204
			(0.31)	(1.20)	(0.05)	(1.33)
Constant	0.685**	0.385	0.249	-0.192	1.007*	0.459
	(2.03)	(0.99)	(0.40)	(-0.24)	(1.94)	(0.72)
Observations	501	501	501	501	501	501
R-squared	0.076	0.121	0.128	0.157	0.194	0.227
Year fixed effects	No	No	No	Yes	No	Yes
Product issuer fixed effect	No	No	No	No	Yes	Yes
Product category fixed effects	No	No	No	No	Yes	Yes
CDS liquidity control	Yes	Yes	Yes	Yes	Yes	Yes

Table 5

OLS Regressions of the Issue Premium OIS: Sample Splits

This table presents results of OLS regressions. Column headers indicate the subsample periods: Post-Lehman, Pre-Lehman, and Crisis-Pre-Lehman. The dependent variable is the Issue Premium OIS (IP^O), which is the issue price of a structured product minus its replication price, scaled by the issue price, expressed in percentage points. It is calculated using OIS rates as the risk-free rate. CDS Spread denotes the CDS spread of the issuing bank in percentage points, calculated as an average of CDS spreads in the ten-day period prior to the product issuance date. Correlation is the correlation coefficient between the equity returns of the underlying of the structured product and the issuer over the 100-day period prior to the issuance date. The control variables are defined in Table 2. *t*-statistics, reported in parentheses, are calculated with robust standard errors clustered at the underlying level. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Sample period:	Post	Pre	Crisis-Pre	Post	Pre	Crisis-Pre	Post	Pre	Crisis-Pre
Dependent variable:					Issue Premium OIS (IP^O)				
CDS Spread Issuer	-2.240***	0.481	0.376	-2.067**	0.170	0.628	-1.937**	1.306	1.115
	(-3.34)	(0.54)	(0.31)	(-2.44)	(0.19)	(0.60)	(-2.67)	(1.26)	(1.27)
Correlation Issuer with Underlying	-4.254**	-0.391	-0.797	-4.127*	-0.303	-0.656	-5.318**	-0.294	-0.804
	(-2.26)	(-0.60)	(-0.89)	(-1.82)	(-0.48)	(-0.61)	(-2.52)	(-0.50)	(-0.82)
CDS Spread * Correlation	4.747***	0.257	0.914	4.431**	0.755	0.392	4.218**	-0.167	0.366
	(3.06)	(0.20)	(0.49)	(2.20)	(0.56)	(0.23)	(2.53)	(-0.11)	(0.29)
3m Excess Return Underlying				-0.007	-0.008	0.007	-0.001	-0.012	0.005
				(-0.58)	(-0.76)	(0.41)	(-0.11)	(-1.24)	(0.31)
12m Excess Return Underlying				-0.003	0.009	-0.006	-0.002	0.009	-0.005
				(-0.55)	(1.31)	(-0.76)	(-0.40)	(1.39)	(-0.72)
Ln (Market Cap Underlying)				0.299*	-0.102	-0.071	0.271	-0.112	-0.047
				(1.71)	(-1.16)	(-0.48)	(1.52)	(-1.53)	(-0.29)
Ln (Turnover Underlying)				-0.188	0.035	-0.021	-0.114	0.061*	-0.007
				(-1.24)	(0.86)	(-0.38)	(-0.78)	(1.73)	(-0.10)
Option Trading Volume Underlying				0.039	-0.049	-0.022	0.041	-0.048	-0.023
				(0.78)	(-1.25)	(-0.65)	(0.62)	(-1.39)	(-0.63)
Ln (ATM Call 180)				0.236	-0.061	0.231*	1.130**	0.015	0.267
				(0.56)	(-0.39)	(1.83)	(2.19)	(0.12)	(1.68)
Constant	2.373***	2.260***	1.541**	2.032	2.362**	1.197	0.044	1.956**	1.128
	(2.97)	(3.65)	(2.65)	(1.06)	(2.44)	(1.11)	(0.02)	(2.51)	(0.98)
Observations	137	364	100	137	364	100	137	364	100
R-squared	0.133	0.082	0.150	0.169	0.119	0.189	0.275	0.266	0.217
Year fixed effects	No	No	No	No	No	No	Yes	Yes	Yes
Product issuer fixed effect	No	No	No	No	No	No	Yes	Yes	Yes
Product category fixed effects	No	No	No	No	No	No	Yes	Yes	Yes
CDS liquidity control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 6

Attention of Investors toward Issuer Default Risk during Different Subperiods

This table presents descriptive statistics of our index of investor attention toward issuer default risk. Panel A presents data based on English search, Panel B presents data based on German search (see Section 3.4.2 for details). Attention in Panels A1 and B1 is our weekly index of the aggregate volume of Internet search queries that are associated with issuer credit risk. Abnormal Attention in Panels A2 and B2 denotes the weekly residuals from regressions of Attention on a product issuer CDS index.

Panel A: Attention (based on English search)					
Panel A1: Attention	No. weeks	Mean	Std. Dev.	Min	Max
Pre crisis	132	-0.56	-0.97	0.13	0.20
Crisis pre Lehman	62	-0.20	-0.89	1.01	0.32
Post Lehman	119	0.72	0.17	1.46	0.24
Overall	313	0.00	-0.97	1.46	0.63
Panel A2: Abnormal Attention	No. weeks	Mean	Std. Dev.	Min	Max
Pre crisis	132	-0.04	-0.46	0.62	0.19
Crisis pre Lehman	62	-0.29	-1.15	0.27	0.26
Post Lehman	119	0.20	-0.78	1.04	0.35
Overall	313	0.00	-1.15	1.04	0.33
Panel B: Attention (based on German search)					
Panel B1: Attention	No. weeks	Mean	Std. Dev.	Min	Max
Pre crisis	132	-0.34	0.26	-0.87	0.37
Crisis pre Lehman	62	-0.16	0.20	-0.61	0.54
Post Lehman	119	0.46	0.30	-0.16	1.42
Overall	313	0.00	0.45	-0.87	1.42
Panel B2: Abnormal Attention	No. weeks	Mean	Std. Dev.	Min	Max
Pre crisis	132	-0.03	0.26	-0.56	0.69
Crisis pre Lehman	62	-0.21	0.24	-0.65	0.37
Post Lehman	119	0.14	0.34	-0.59	1.15
Overall	313	0.00	0.32	-0.65	1.15

Table 7

OLS Regressions of the Issue Premium: The Role of Investor Attention

This table presents results of OLS regressions. The table is a variation of Table 5. The difference is that in this table, we use Attention instead of the Post Lehman indicator to capture time variation in investor attention to issuer default risk. Attention is our weekly index of the aggregate volume of Internet search queries (either in English, Columns (1) to (3), or in German, Columns (4) to (6)) that are associated with issuer credit risk (see Section 3.4.2 for details). The dependent variable is the Issue Premium OIS (IP^O), which is the issue price of a structured product minus its replication price, scaled by the issue price, expressed in percentage points. It is calculated using OIS rates as the risk-free rate. CDS Spread denotes the CDS spread of the issuing bank in percentage points, calculated as an average of CDS spreads in the ten-day period prior to the product issuance date. Correlation is the correlation coefficient between the equity returns of the underlying of the structured product and the issuer over the 100-day period prior to the issuance date. All regressions include the same controls and fixed effects as Table 5. The control variables are defined in Table 2. t-statistics, reported in parentheses, are calculated with robust standard errors clustered at the underlying level. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Internet search language:		English			German	
Attention level:	Below median	Above median	Top quartile	Below median	Above median	Top quartile
Dependent variable:	Issue Premium OIS (IP^O)					
CDS Spread Issuer	1.958	-1.107**	-2.238**	1.975	-0.453	-2.103**
	(1.47)	(-2.39)	(-2.65)	(1.49)	(-1.23)	(-2.69)
Correlation Issuer with Underlying	0.325	-1.853**	-5.342**	-0.698	-0.315	-6.403***
	(0.53)	(-2.13)	(-2.20)	(-0.90)	(-0.57)	(-2.76)
CDS Spread * Correlation	-4.334**	2.469***	4.490**	-0.835	1.171*	4.724***
	(-2.01)	(2.74)	(2.37)	(-0.45)	(1.94)	(2.76)
Observations	249	252	126	246	255	128
R-squared	0.326	0.199	0.278	0.279	0.219	0.324
Standard controls	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Product issuer fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Product category fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
CDS liquidity control	Yes	Yes	Yes	Yes	Yes	Yes

Table 8
OLS Regressions of the Issue Premium: Additional Results

This table presents results of OLS regressions. Panel A presents results for the Post-Lehman period and Panel B for the Pre-Lehman period. The dependent variable is the Issue Premium (IP), the issue price of a structured product minus its replication price, scaled by the issue price, expressed in percentage points. For IP^O, the OIS rate is used as the discount rate. For IP^L, the LIBOR is used as the discount rate. CDS Spread denotes the CDS spread of the issuing bank in percentage points, calculated as an average of CDS spreads in the ten-day period prior to the product issuance date. CDS spread is usually the five-year senior unsecured CDS spread of the issuer. In regression (2), we use the CDS spread linearly intepolated to product maturities, and in regression (3) we use the average in the five-day period prior to the product issuance. Correlation is the correlation coefficient between the equity returns of the underlying of the structured product and the issuer over the 100-day period prior to the issuance date. Regression (4) considers only products not issued on the issuing bank. In regression (5), we use a 250-days period prior to the issuance date for the calculation of Correlation. Maturity is the maturity of the structured product in years. 6m Return Issuer denotes the stock return of the issuer over the past six months. Number of Issuers is the number of issuers in Switzerland that have outstanding structured products of any sort in the week of the issuance date. Implied Market Volatility is the level of the VSMI index. Tier 1 Ratio is the quarterly tier 1 ratio of the issuer. All regressions also include the same control variables and fixed effects as Table 5. Column (7) includes also August, September, and October 2008. t-statistics, reported in parentheses, are calculated with robust standard errors clustered at the underlying level, except in regression (6), where standard errors are not clustered. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable:	IP^L	IP^O	IP^O	IP^O	IP^O	IP^O	IP^O	IP^O
CDS type:	5y	Interpolated	5y, 5-day avg.	5y	5y	5y	5y	5y
Correlation type:	Eq	Eq	Eq	Eq<1	Eq250	Eq	Eq	Eq
Clustering:	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Excluding 3 months around Lehman	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Panel A. Period:				**Post-Lehman**				
CDS Spread Issuer	-2.270***	-1.302**	-1.775**	-2.298***	-1.951**	-1.937***	-1.709**	-2.978***
	(-2.88)	(-2.55)	(-2.66)	(-3.71)	(-2.26)	(-2.67)	(-2.24)	(-3.99)
Correlation Issuer with Underlying	-6.518***	-3.149**	-4.899**	-6.138***	-4.479*	-5.318**	-4.083*	-4.433**
	(-2.74)	(-2.42)	(-2.51)	(-3.38)	(-2.00)	(-2.60)	(-1.70)	(-2.49)
CDS Spread * Correlation	4.936***	2.967**	3.858**	5.043***	4.196**	4.218**	3.747**	3.786**
	(2.73)	(2.50)	(2.50)	(3.50)	(2.19)	(2.55)	(2.05)	(2.65)
Maturity								-0.717
								(-0.44)
6m Return Issuer								-0.829
								(-1.03)
Number of Issuers								-0.762***
								(-3.50)
Implied Market Volatility								0.014
								(0.34)
Tier 1 Ratio								-0.290
								(-1.24)
Panel B. Period:				**Pre-Lehman**				
CDS Spread Issuer	2.059*	2.510	1.406	1.475	1.395	1.306	0.073	1.136
	(1.81)	(1.24)	(1.32)	(1.35)	(1.21)	(1.48)	(0.12)	(1.34)
Correlation Issuer with Underlying	-0.208	-0.338	-0.278	0.230	-0.333	-0.294	-0.551	-0.249
	(-0.34)	(-0.58)	(-0.48)	(0.41)	(-0.51)	(-0.63)	(-1.03)	(-0.42)
CDS Spread * Correlation	-0.501	0.045	-0.237	-0.408	-0.353	-0.167	1.663**	-0.115
	(-0.30)	(0.02)	(-0.16)	(-0.25)	(-0.21)	(-0.14)	(2.09)	(-0.10)
Maturity								0.896***
								(3.94)
6m Return Issuer								0.386
								(0.87)
Number of Issuers								-0.180***
								(-4.17)
Implied Market Volatility								0.051***
								(2.95)
Tier 1 Ratio								-0.083**
								(-2.05)

Table 9
Issuance Choice Patterns

This table presents OLS regressions. The sample contains stock underlyings of structured products issued between January 2005 and December 2010 in the structured products market in Switzerland, as well as matched equity underlyings. The sample contains three types of structured products that can be replicated with bonds and traded EUREX options, and that have an underlying that is either in the SMI, the Eurostoxx 50, or the Eurostoxx 600 index. The dependent variable is the standardized rank difference $DIFF-RANK$ = (Rank Issued minus Rank Matched) / number of underlyings in the index, in which Rank Issued is the rank, in terms of the correlation coefficient of the underlying with the bank over 100 days, within in the relevant index (higher numbers correspond to higher correlation). Rank Matched is the average rank of the matched non-issued underlying in terms of that correlation. We compute the rank based on the correlation coefficients 10 days before the relevant issuance date. We scale the difference in ranks by the number of underlyings in the respective index. Thus, this dependent variable is a standardized rank difference that is between -1 and +1. A negative constant term means that on average the underlying-bank equity correlation of underlyings that are chosen for an issued structured product is lower than the underlying-bank equity correlation of similar (matched) underlyings that are not chosen. For each underlying on which a structured product is issued, we search for 5 underlyings on the same day that are (a) in the same stock market index (SMI, Euro50, or Eurostoxx 600), (b) have a similar implied volatility of at-the-money 180 days call options, (c) have a similar market capitalization, and (d) have a similar trading volume of the underlying during 60 days starting 3 months prior to the issuance. The matching variables, too, are measured 10 days before the relevant issuance date. In column CDS Spread denotes the CDS spread of the issuing bank in percentage points, calculated ten days prior to the product issuance. Bank's Prior 250 Day Return is the equity return of the issuing bank over the 250 days before the product issuance. SMI's Prior 250 Day Return is the return of the SMI over the 250 days before the product issuance. t-statistics, reported in parentheses, are calculated with robust standard errors clustered at the issuance date level. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)
Dependent variable:			DIFF-RANK		
Average DIFF-RANK (= regression constant)	-0.064***	-0.087***	-0.095***	-0.090***	-0.062**
	(-3.45)	(-2.79)	(-3.03)	(-2.87)	(-2.16)
CDS spread				-0.043	-0.042***
				(-1.36)	(-3.14)
Observations	2,052	2,052	2,052	2,052	1,989
R-squared	0.018	0.022	0.025	0.029	0.045
Index fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	No	Yes	Yes	Yes	Yes
Issuer fixed effects	No	No	Yes	Yes	Yes