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### **Structured Products – Caveat Emptor**

The disintegration of the finance industry in the United States has hit home hard of late when investors of structured products linked to Lehman Brothers are faced with the wipeout of their investments following the demise of the venerable bank.

It is not the first time and certainly will not be the last that investments in structured products go awry and make it to the news with reports of multi-million dollar losses.

While hope in an uncertain future outcome and a possibility of non-fulfillment or worse lie at the very core of investing, structured products losses often have their victims cry foul and point out that the underlying risks in the complicated instruments were not adequately explained to them.

As structured products will continue to exist in the market in one form or another, it is good for more to know about them.

#### **What is a Structured Product?**

A structured product is a combination of simpler financial instruments put together by one or several managers (known as structurers) working at a financial institution, supported by a chain of people who are variously involved from the pricing, accounting, legality to the marketing and sales of the product.

The underlying financial instruments alluded to may include assets like stocks and bonds as well as basic derivatives such as vanilla options and credit default swaps to which some have attributed blame for the current financial crisis.

Structured products are concocted to have profiles of risk and return which appeal to investors. The idea is that as investors have different risk appetites, by mixing and matching basic instruments, the right combination can be found to suit. For instance, structured products often come in the form of structured notes, which are like bonds in the sense that they give periodic coupons and a lump redemption at maturity. But unlike bonds, a structured note is sugarcoated with the promise of or the potential for boosted cash flows. In this way, bond investors who are typically careful with their assets and do not have the stomach for the fluctuations of stock or commodity markets but are disenchanted with low interest rates, are enticed into taking bigger risk while the impression of safety is preserved.

Let us illustrate with two simple structures which are abstracts of what one may find in actual products so as to expose some of the basic mechanisms of structuring.

A common structure is an equity-linked note with principal-protection (Fig. 1). Here, the invested principal is divided into two portions, of which one goes into the purchase of a safe bond and the other is put into risky instruments such as stocks or options. The portion of the principal that constitutes the safe bond is carefully balanced with the coupon rate to ensure that it grows back into an amount that is equal to the invested principal at maturity. The portion that gets invested in risky assets provides the potential for higher coupons and bears the brunt of price fluctuations and possible losses.

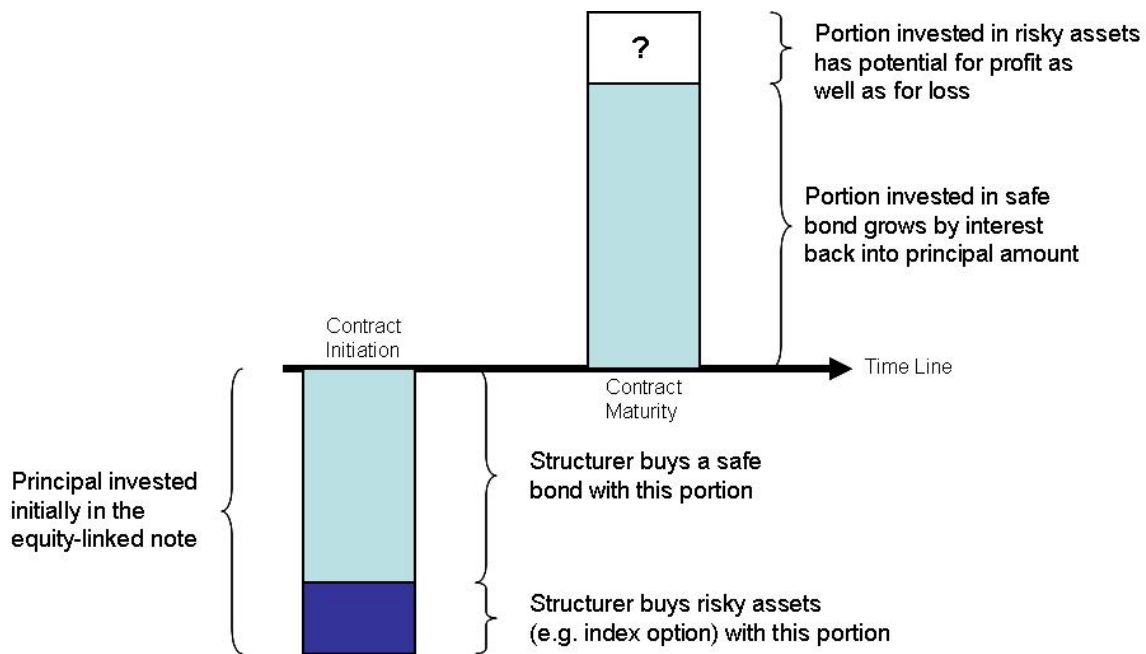


Figure 1. Structure of a basic principal-protected equity-linked note, simplified to have no interim coupon.

While higher coupons in equity-linked notes may or may not be realized, yield-enhancement structured notes (Fig. 2) claim upfront to give higher coupons. This is done through the sale of derivatives. To understand this, think of derivatives as insurance policies. When you purchase a policy, you pay a premium periodically until either the policy expires or an event that the policy is supposed to insure against occurs. If the policy expires without event, the premiums collected become full profit for the insurer. If an insurance event occurs, the insurer will have to pay a predetermined sum to the policyholder. In a similar way, when you purchase a structured note whose boosted coupons are funded by the sale of derivatives, your position is equivalent to that of the insurer who sells away an insurance policy. The periodic premiums add to the otherwise low coupons and you really do end up with a good deal if the product matures without event. However, if the analogue of an insurance event occurs, then your invested principal is drawn upon to cover the loss faced by the counterparty who bought the

derivative from you. A note structured in this manner gives up protection of the principal in exchange for statedly higher coupons.

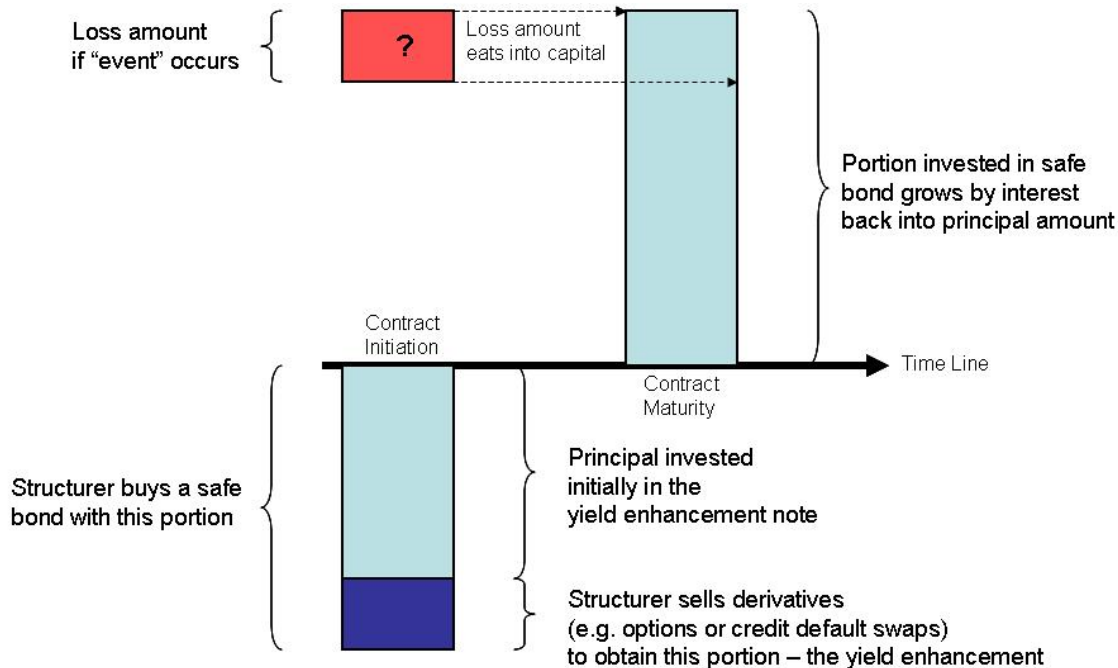


Figure 2. Structure of a simple yield-enhancement note, simplified to have no interim coupon.

The derivatives that are sold to boost coupons can be options or credit default swaps. If they were options, they may be sold at successive intervals of time to collect periodic option premiums. The analogue of an insurance event is the option expiring in the money and the counterparty who bought the option has to be paid. In the case of credit default swaps, periodic payments are collected from the counterparty who purchased the swap to insure against a predefined credit event. If no credit event occurs, the owner of the structured note goes away happily with an investment well made. On the other hand, if a credit event does occur, the periodic collections are halted and part or whole of the principal invested in the structured note is used to reimburse the counterparty. Just as an insurance event may be defined by many complex clauses, the definition of a credit event can be complicated.

Structured products are complex. The complexity stems from the fact that not one but several basic financial instruments are required to put a structure together, with the concerted effort of many parties. Each component adds risk and a layer of non-transparency to the finished product. Much of this complexity though is hidden from the investor.

The complexity also makes it difficult for the general investor to gauge whether he is getting his money's worth in the investment. In assembling a structured product, the structurer needs to purchase the constituent contracts which make up the structure and

pay off the service providers who are involved in the assembly process. On top of that, he imposes a fee for his remuneration. All of this is done in an opaque manner so that only those closely associated with the structuring industry are able to reliably estimate the breakdown of costs and fees. The investor may also find it difficult to sell off the product before expiry either because he is contractually obligated to hold on or doing so would lose further value to the bid-ask spread. This ought to be familiar to anyone who has ever tried to exchange for foreign currencies and gotten stumbled by two quoted rates. The buy (bid) price and the sell (ask) price quoted by the money-changer naturally differ since he earns his keep through transactions and the difference (spread) between the two prices is the source of his profit. This, however, translates into a loss when one needs to change the foreign currencies back into the local one. The money-changer is inclined to quote as wide a spread as he can but is constrained by competition from other money-changers. Since a structured product is a tailor-made contract, the investor does not have much choice but to accept the bid-ask spread of the issuer even if it may be large.

### The Role of Financial Engineering

Financial engineering is a discipline that arose in the 1980s and has become rather widespread over the past decade as it is being taught in a growing number of universities around the world. It has its roots in the work of the academics Fisher Black, Myron Scholes and Robert Merton who explained how financial derivatives ought to be priced in the early 1970s. For their endeavour, the Nobel Prize in Economics was awarded to the two living pioneers in 1997.

What financial engineering has achieved is the quantification of risk and the possibility of putting prices to a myriad of financial contracts. Even though the details of how the pricing is done is often obscured by mathematical technicalities, the underlying principle is actually very simple. Take an everyday object, say an apple, for a concrete example. If there were just a single apple in the whole world, then pricing the apple at a million dollars would be just as reasonable as pricing it at a dollar. However, if there were already a market that is selling apples at a dollar each, then it seems unreasonable to price an apple at a level much higher than that. Financial contracts are priced in much the same way. If there were an open market for an instrument, the price of the instrument will be determined by market supply and demand forces. If the instrument is not traded freely in an open market, then it is compared to other instruments which are and the price is derived thereof. The comparison on the basis of similar cash flows and risk profiles is usually imperfect and financial engineers are enlisted to make the necessary computations in order to obtain a price.

A whole vista of financial products have been invented and made available for sale following the spread of the necessary expertise in the finance industry. The basic products are assembled into ever more complex ones in an unrelenting competition for the funds of investors. At the core of this beehive of activity is the fundamental belief that we know how to price risk. This is roughly true in the life insurance industry as human demographics vary only gradually over time and insurance premiums can be adjusted

accordingly. But when applied to the highly interconnected and unpredictable finance industry, such a belief can only be as firm as it is foolhardy. Professional traders, investors and speculators who grasp the financial intricacies keep their eyes closely on the market and have to constantly adjust their estimates of prices and risk as the market evolves. Sometimes they may fail to anticipate a sudden turn of events such as the recent restriction on the short selling of financial stocks and thereby lose a lot of money. But they know what they are in for and it is fair game for them. The same cannot be justifiably said for amateur investors who have the virtues of structured products extolled to them and the intrinsic risk downplayed.

### No Risk No Return, More Return More Risk

People are generally enamoured by the phrase 'no venture no gain' which translates into finance as 'no risk no return'. The counter-phrase 'more return more risk' is entirely equivalent and should serve as a stark reminder to all investors.

In an open market, the expected yields of investment products of a similar quality should be about the same. When the expected yields of two products differ significantly, there can be two reasons. One, a product has not been correctly priced. This occurs when there is an error in the computation of the price or the market prices of the underlying instruments have changed. Issuers of structured products commonly protect themselves from the latter source of mispricing by incorporating a call feature which allows them to cancel the contracts with the appropriate reimbursement of funds. Two, the risk levels of the two products are different. A structured note that has enhanced yield from the sale of derivatives does not guarantee its principal and may suffer a capital loss when a credit event occurs. An ordinary bond may have comparatively lower coupons but the investor does not have to worry about credit events. An equity-linked note may have the possibility of giving higher-than-average coupons, but that is counterbalanced by the possibility of lower-than-average coupons.

Despite the uncertainty in prices and yields, this risk is nevertheless explicit in a structured product. The complicated nature of how a structure is put together means that the failure of any party that is involved in the setup may have detrimental consequences to the continued effectiveness of the contract, even if the structure is proclaimed to be principal-protected. This issue of counterparty risk, much less explicitly mentioned even though the relevant clauses exist in the contract or are implicit in contractual obligations, is commonly glossed over by investors.

The tradeoff between risk and return is fundamental to finance just as the law of conservation of mass is to physics. From school, one learns that mass can never be destroyed. In a similar vein, a hope for a higher return will always be accompanied by the necessity to face a greater degree of uncertainty and this is cast in cold hard stone.

### Conclusion

Financial instruments, apart from the very simplest ones, are hard for the general population to understand and not readily accessible to most. By packaging basic instruments into structured products with specific investment goals and risk profiles, investment opportunities ordinarily available only to the professionals or wealthy individuals are opened up to the public. This in itself is a good cause.

However, structured products are typically complex financial instruments with embedded risks. The ins and outs of a structured product are documented in its prospectus which is written with a legal tone that is not an easy read for the layman. Some of the descriptions of risk and return may require an appreciation of how the relevant financial markets work to understand. Though risk and yield are equally pertinent to a structured product, the latter is usually highlighted more than the former for marketing reasons.

Education and good representation and dissemination of information should be integral to the sale of structured products, especially when the targeted audience comprises the retail investors. Proper product understanding for investors allows them to make wise investment choices and stay away from risks which they cannot fathom. What that means is that the investor will have to know whether capital losses can be incurred, the maximum loss that can be incurred and the circumstances under which that will happen. As retail investors do not normally take excessive risk, the issue of capital protection should be the priority in consideration. Only when that is sorted out should one proceed to think about the yield potential of the instrument. A well-educated salesperson can steer the investor to the right product and have it explained to him. An appropriate set of incentives can be devised by the management so that the personal goals of the salesperson are aligned with the advisory task. Granted that a prospectus is a legal document which necessitates the technical thoroughness, a shorter but still concise summary of the salient points will greatly improve readability. Pictures, graphs and tables are immensely helpful aids for illustrating the product mechanics.

Proper understanding, monitoring and management of risk is important in finance. This realization precipitated an entire risk management movement in the banking industry. The underlying message is clear. Do not leave any chance to be overly surprised when risk turns into reality. To the investors of structured products, packages of risk as these are - caveat emptor.

*(2480 words)*