

Structured Notes:

Pros, Cons, and Risks



Introduction

Structured notes are unique instruments designed to help investors achieve specific objectives in specific environments. They have gained popularity in the U.S. market in recent years, and technology platforms have made these instruments more accessible to retail investors. Our focus is to present the characteristics of the main types of structured notes and communicate the associated pros and cons. Investing in structured notes can be more nuanced than investing in traditional assets, and the advantages, drawbacks, and costs must be well understood by both advisors and their clients.



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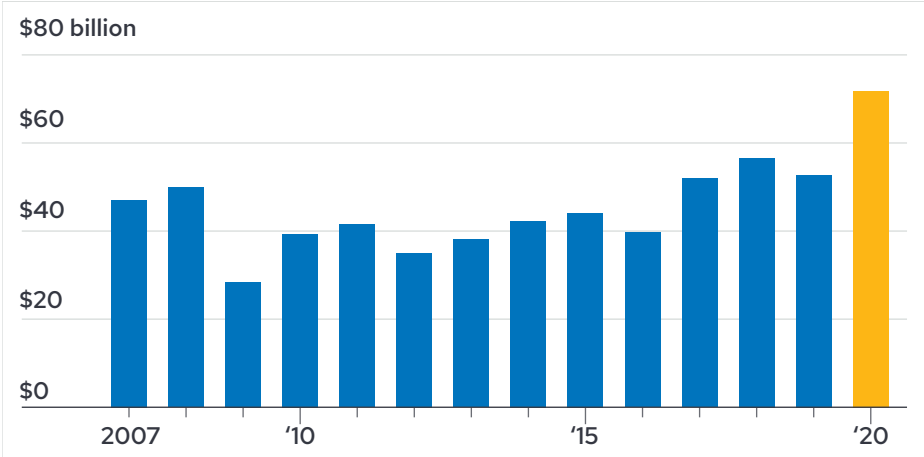
State of the Structured Notes Market

Structured notes are unsecured debt obligations issued by financial institutions, including some of the largest investment banks. These instruments combine a zero-coupon bond with embedded options designed to provide investors with customized and more defined investment outcomes.

Structured notes can offer a wide variety of often complex payoff structures tailored to fit various investment goals and objectives, including market exposure with embedded downside protection features or potential above-market income opportunities. Performance is typically linked to an underlying index, asset, or combination thereof. Structured notes can carry characteristics of both fixed income and equity, and their risk-reward profiles span the spectrum from conservative and income to balanced or aggressive.

The structured notes market represents more than \$3T in assets globally. While structured products have a greater foothold in Europe and Asia than in the U.S. (Ofir and Weiner, 2012), the domestic market for these investments has grown significantly in recent years.

Figure 1: U.S. Structured Note Annual Issuance Volume



Source: Structured Products Weekly of Prospect News

These investments are issued either through custom instruments, or through monthly *off-the-shelf* offerings known as the **calendar**. The calendar is a curated list of structured note offerings listed each month for potential investment. Each structured note has its own CUSIP, so while each individual structured note is unique in this respect, investors are generally presented with similar opportunities from month to month. Domestically, approximately 10-15% of the structured note market is via calendar (i.e., off-the-shelf business). The remaining 85-90% of flows are custom/bespoke CUSIPS created specifically for client needs via traditional communication, such as emails, conversations, and calls with the issuers (Tom McGuire, Director, Halo, personal communication, April 20, 2023). This legacy call-around process done through traditional communication means has several inefficiencies. It is highly manual and resource-intensive, pricing can be opaque, and relationship managers must relay ideas and available products back to clients to determine suitability and necessary documentation. Not surprisingly, such inefficiencies have resulted in high minimums and fees (Wood, 2021).



However, advancements in technology have facilitated the development of platforms such as SIMON and Halo. These platforms present investors with a calendar and act as a centralized hub to price and trade standard products from multiple issuers, making price discovery, document generation, and distribution easier. This technology should drive fees and minimums lower, and it helps standardize the complex and varying terminology across different offerings by issuers. Such platforms have enabled retail investors to more readily access structured notes.

Structured Note Types and Characteristics

There are normally four components of structured notes:

- **Underlier.** The return for a structured note is based on the price return of a designated asset or reference index, interest rates, or designated spread. Examples of underliers would be the S&P 500 Index, an individual stock or basket of stocks, the price of oil, etc. Most of the time, an underlier is a single reference asset. However, investors may occasionally see a *lesser-of* underlier; this type of underlier considers multiple reference assets and uses the worst performing one of them at maturity to determine the note's payoff. For example, a lesser of S&P 500 and NASDAQ underlier would mean that whichever of these two indexes performs worse between the note's purchase and its maturity date would be the index used for performance calculations. Generally, selecting a *lesser-of* underlier grants more favorable terms elsewhere in the note, such as higher upside capture.
- **Maturity.** The term of structured notes is normally between one and ten years, although shorter- and longer-term investments are available. Maturity for most investments falls between one and five years. Structured notes should be purchased with the intent to be held to maturity—though the actual holding period may be shorter—as certain structured notes have embedded call features which allow the issuer to call the investments away prior to maturity if specific conditions are met.
- **Expected payoff at maturity.** Structured note investment returns are determined by formulas customized to fit a particular market outlook or viewpoint ("Introduction to Structured Notes", n.d.). Some investments offer principal protection guarantees while others leave principal exposed to losses at maturity.

Keep in mind that structured notes do not normally represent ownership of a portfolio of assets or the underlier; rather, they are promises to pay made by the issuers of the notes. While an investor's statement value will vary in the interim based upon the behavior of the underlier¹, the relevant value for the payoff of the note is based on what the performance of the underlier, or underliers, is at the maturity date². And while structured notes can be thought of as a promise to pay by the issuer, investors generally have the right to receive payment to which they are entitled only from the structured product itself, and investors do not have direct rights against the issuer.

- **Protection** from price declines in the underlier through different types of buffers.

We will discuss characteristics of three common types of structured products: market-linked growth notes, market-linked income notes, and market-linked CDs.

¹The statement of a structured note will reflect the fair market value estimate at a given point in time and could show an unrealized loss prior to maturity if the underlier's performance falls below the protection threshold, but the final payout is based upon the underlier's value at maturity.

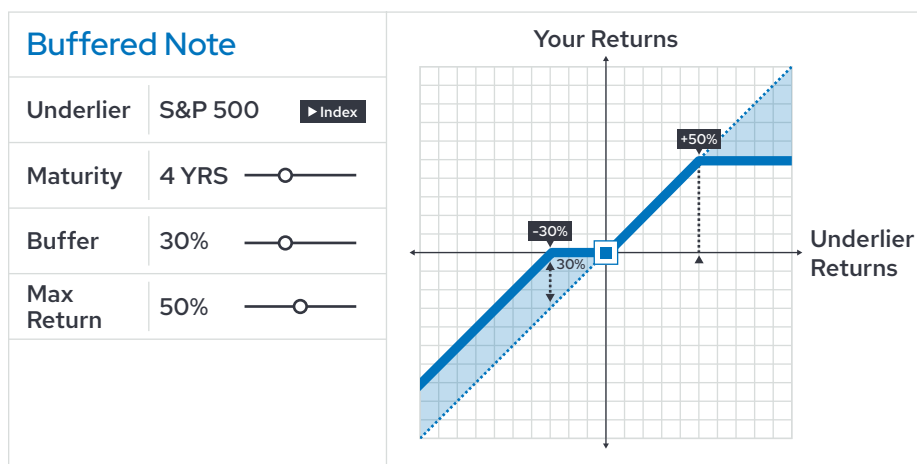
²An exception to payoff based on the underlier's value at maturity would be a lookback feature in which an average of the underlier's values over the course of the note's term is used for the payoff computation.

Market-Linked Growth Notes

A market-linked growth note gives investors market exposure based on an underlier, such as the S&P 500 Index, and usually contains some combination of downside protection and an upside cap on return, and pays out at maturity. Market-linked growth notes with an equity underlier can be considered for the equity sleeve in an investor's portfolio. The majority of market-linked notes range from one year to five years in maturity, though some can be longer. Market-linked growth notes may be appropriate for investors who want market exposure with some degree of downside protection.

The protection threshold is called a buffer. The two most common types of buffers are hard buffers and barriers. A **hard buffer** absorbs a fixed stated percentage of the underlier's loss, and then the holder is exposed to a 1:1 loss ratio with the underlier thereafter.

Figure 2: Market-Linked Growth Structured Note with Hard Buffer Payout Structure Example



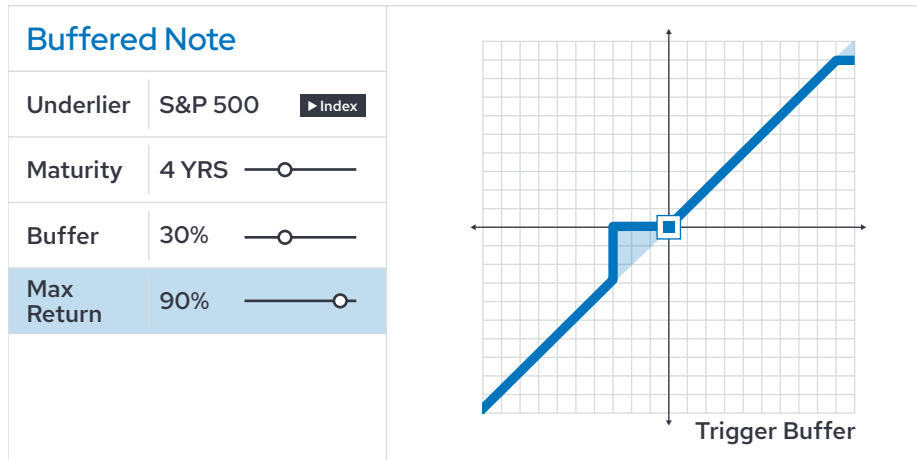
Source: SIMON

This example illustrates the four components of a structured note with a hard buffer: the underlier is the S&P 500 Index, the maturity is four years, the downside protection level is 30%, and the investor's expected payoff at maturity given the graphed market outcome is designated by the solid blue line on these diagrams. The dotted line represents the underlier (S&P 500) return. On the downside, if the buffer (protection level) is not breached, the investor remains fully protected.

A note with a **barrier** (sometimes called a **trigger buffer** or **knock-in**) absorbs an initial percentage of the underlier's loss, but if that initial level is exceeded, the investor realizes the full market downside as if investing in the underlier itself.



Figure 3: Market-Linked Growth Note with Barrier (Trigger Buffer) Payout Structure Example



Source: SIMON

Compared to the hard buffer note in Figure 2 above, notice that for a barrier (trigger buffer) note in Figure 3, the investor’s maximum return is increased to 90% in exchange for greater potential downside loss. Like a hard buffer, if the barrier is not breached, the investor remains fully protected. However, if the barrier is breached and the S&P 500 declines to any level worse than the allotted protection level of 30%, the barrier note holder would see the same downside as the underlier. Notes with barriers are appropriate for investors who are confident that the protection level will not be breached at maturity.

Table 1: Downside Protection Comparison between Hard Buffer and Barrier Notes

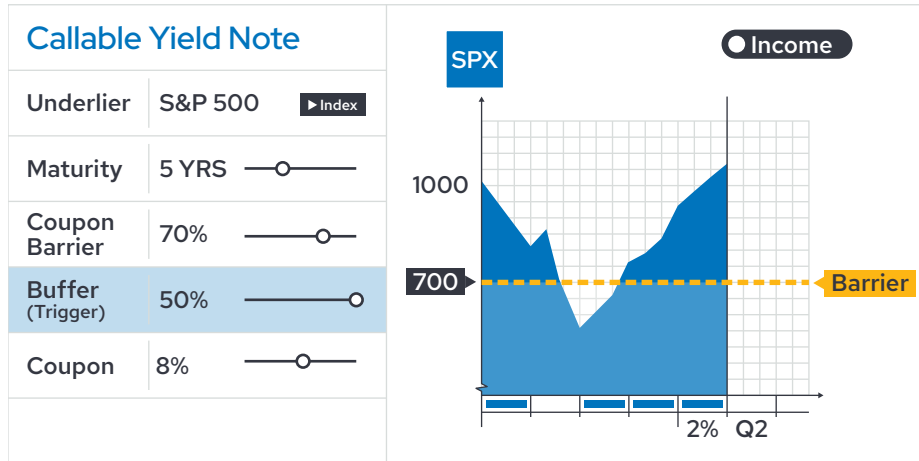
| Buffer Type | Hard | Barrier |
|-----------------------------|-------------|-------------|
| Underlier | S&P 500 | S&P 500 |
| Protection Level | 30% | 30% |
| % Decline in Underlier | -30% | -30% |
| Structured Note Performance | 0% | 0% |
| % Decline in Underlier | -50% | -50% |
| Structured Note Performance | -20% | -50% |

Market-Linked Income Notes

A market-linked income note pays coupons, like some annuities or bonds. While the coupon rate is generally fixed, their payment is contingent upon the performance of the equity underlier, such as the S&P 500 Index or a single stock. Maturity for these notes is typically between two and ten years. In the majority of these notes, investors only receive coupons with market-linked income notes – there is no upside potential for the principal amount, but investors may face downside risk to the principal if the underlier declines beyond a buffer protection level. The benefit to these notes is that investors may receive higher coupons than traditional fixed income; these notes became particularly attractive in the yield-starved environment with near-zero interest rates investors have seen over much of the past decade. Drawbacks are that the investor’s principal can be at risk, coupons may be reduced or zero depending on the underlier’s performance, and many of these notes are callable.

Callable notes can be called back by the issuer before the note matures. This is likely to be on terms favoring the issuer, and it is unlikely the investor would be able to reinvest their money at the same rate of return afterward.

Figure 4: Callable Market-Linked Income Structured Note Coupon Payout Example



Source: SIMON

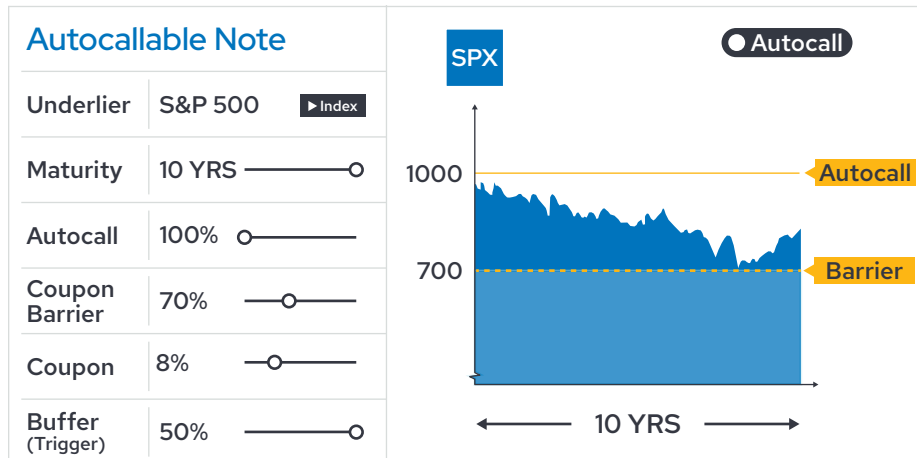
This example illustrates the terms and payout structure of a callable market-linked income note. The underlier is the S&P 500 Index, the maturity is five years, the annual coupon rate is 8% (2% quarterly), and the dotted line represents this note’s 70% coupon barrier. The coupon barrier refers to the performance threshold for the underlier that determines if the investor receives a coupon, whereas the buffer refers to the performance threshold for the underlier up to which principal protection is provided. In this example, at each quarterly settlement date throughout the life of the note, if the S&P 500 Index value is at least 70% of its value at the time the note was issued, the investor will receive a 2% coupon. At any quarterly settlement date in which the S&P 500 value is below 70% from the value at issuance, no coupon is paid. If at any time the note is called away by the issuer, the issuer will return the principal value, and the trade ends.

Autocallable notes work much the same way as callable notes, except there is an additional term in the structure, the **autocall** level. In Figure 5 below, the autocall level is 100%. On any quarterly settlement date throughout the term of the note, if the underlier—the S&P 500 Index in this case—closes above 100% of the value at the note’s initial trade date, it automatically gets called away. Any settlement date in which the S&P 500 is between 70-100% of its value at the initial trade date, the investor receives a coupon. At any settlement date in which the S&P 500 is less than 70% of its trade date value, no coupon is paid.

The example in Figure 5 shows a hypothetical note in which the underlier remains between the autocall level and the coupon barrier for the duration of the note’s term, which would result in a coupon payment every period. This result is unlikely, however. With most autocall products, the most likely outcome using option pricing models is that the note will call on the first date, pay the investor the relevant coupon, and return the investor’s principal (Hampson, 2021). This would achieve the goal of providing the investor with an above-market income stream, albeit for a short period of time.



Figure 4: Autocallable Market-Linked Income Structured Note Coupon Payout Example



Source: SIMON

Please note that Figures 4 and 5 illustrate the coupon payout structure only; the downside risk for the investor’s principal for market-linked income notes would look similar to the structured note in Figure 3. Market-linked income notes are most appropriate for investors who are confident that a) the underlier will remain within the prescribed range throughout the term of the note to receive coupons, and b) the underlier will not breach the buffer at maturity, which would result in some loss of principal. Market-linked income notes with an equity underlier should be considered for the equity sleeve in an investor’s portfolio, given that the principal is at risk.

Market-Linked CDs and Issuer-Protected Notes

Market-linked CDs tie coupon payments to the underlier’s performance. They are FDIC-insured up to the applicable limits, and principal is guaranteed. These are suitable for investors who are bullish on markets and want variable coupons based on market performance vs. fixed payments from traditional CDs. Other versions of market-linked CDs allow the investor to participate in market upside but without any income (sometimes called Point-to-Point CDs). Additionally, most market-linked CDs have a feature which allows an estate beneficiary to redeem it prior to maturity for 100% of face value (Learning Center, www.simonmarkets.com). The drawback is that neither coupons nor growth are guaranteed, given they are based on performance of the underlier. These CDs are a much safer investment than the aforementioned market-linked growth and market-linked income notes. Investors should evaluate the fixed or contingent coupon rate offered by market-linked CDs against a direct CD purchase through other financial institutions. Additionally, compare this rate to the dividend yield of the underlier and weigh this assessment against the value of the downside protection offered.

Issuer-protected, market-linked growth notes are similar to market-linked CDs in that the full principal will be returned to the investor at maturity (i.e., no market risk if the underlier declines in value). Unlike market-linked CDs, issuer protected notes are not FDIC-insured and are subject to the credit risk of the issuer. In exchange for forfeiting FDIC insurance, investors receive better payout terms and a shorter maturity vs. CDs.

Pros of Structured Notes

Structured notes seek to offer several advantages to investors, primarily falling into three categories:

- Constructing better-defined outcomes
- Use cases for different environments
- Improved investment accessibility

We will discuss each of these in turn.

Constructing Better-Defined Outcomes

Structured notes can enable advisors to target a narrower range of expected outcomes for their clients. For example, an investor in retirement, or a defined benefit plan, may have a specified return target. Structured notes could be used to help reach this objective, provided that the client can accept capped upside in exchange for downside protection (Greg Phelps, Red Rock Wealth Management, personal communication, February 16, 2023).

A simple solution could be using a market-linked growth note; using the example in Figure 2 above, an investor would be fully protected from any downturn in the underlier as long as it does not exceed 30%. In exchange for this level of protection, upside gains from the underlier during the term of the note would be capped at 50%. While the upside would not be as high as continuing to hold that portion of their portfolio in equities, the market-linked growth note would afford them some level of downside protection in case of a pullback in the equity market.

And though downside protection is one of the primary uses of structured notes, these instruments can also be geared toward upside capture. If an investor has an extremely bullish viewpoint on the market, structured notes can offer leveraged upside to magnify returns to outperform vs. holding the underlier directly. Furthermore, features like leveraged upside and downside protection can be combined into a single structured note to create a unique payoff profile.

Whether serving as a hedge and offering a form of insurance, used as an opportunistic return vehicle, or anywhere on the spectrum between, structured notes are designed to create a narrower and more defined range of client-specific outcomes, increase the investor's degree of certainty, and facilitate more accurate holistic financial planning. With structured notes, financial institutions and advisors can better serve customers in offering a wider menu of portfolio solutions and tailoring investments to best fit client objectives (Ofir and Weiner, 2012).



Use Cases for Different Environments

Following the Great Financial Crisis (GFC), ultra-accommodative monetary policy helped boost equity markets to all-time highs, with the S&P 500 Index posting a positive return in 12 out of the 14 calendar years since 2008. This abundant liquidity also fueled both innovation and the growth of speculative assets. As noted by the Strategas Technical and Macro Research Team in a November 2022 report regarding the number of crypto and blockchain companies represented in the *Forbes annual 30 Under 30 list* for the year 2022, “It’s remarkable to think that the founders of these companies were roughly 15 years old when QE was first introduced in 2008...for many, ample liquidity is all that’s known.” However, the Federal Reserve pulling liquidity out of markets to combat inflation beginning in 2022 helped fuel the S&P 500 Index’s tailspin into a return of -18.11%. Investors would be wise to recognize the cyclical nature of markets, and, given the relatively low volatility experience in the QE cycle, it’s not unreasonable to expect greater volatility over the next decade than the last as global economies face tighter monetary conditions.

Fortunately, structured notes can be designed to work in more environments than just bull markets. For volatile markets in particular, structured notes can provide a clear path to risk reduction in order to accommodate nervous or increasingly risk-averse clients (“An Introduction to Structured Investments,” 2021). For instance, suppose an investor nearing retirement had seen a significant increase in the value of his or her portfolio over the decade-long period of quantitative easing initiated after the GFC and continuing through the year 2021. If this investor wanted the potential to participate in equity market gains but had become less concerned about appreciation and more cognizant of capital preservation amidst growing market uncertainty, they could reallocate a portion of their equity sleeve to a market-linked growth note with a downside protection threshold set in accordance with their comfort level.

Downside protection and investor peace of mind is a straightforward use case, as structured notes generally have a low probability of generating a loss when markets are going up or are behaving in a normal fashion (Maringer, Pohl, and Vanini, 2016). However, market-linked income notes could also be utilized to potentially improve or smooth the total return profile in a sideways or volatile marketplace when investors cannot assume a constant up-and-to-the-right trajectory of their equity holdings. Assuming the underlier remains within the prescribed range of values per the selected note, investors could remain protected from downside losses and collect attractive coupon payments. Or, take the example of a long-term investor who is looking to lock in gains from a recent market rally—he or she could purchase a growth-oriented CD offering, which would capture all of the future appreciation upside of the underlier with none of the downside and the CD being FDIC-insured (in exchange, the investor would need to hold to the 5-10-year maturity and forfeit dividends paid by the underlier).

Structured notes are customizable portfolio solutions created to fill needs demanded by investors. Just as market-linked income notes filled a need for income in a low-rate environment of the 2010s, or how market-linked CDs with FDIC insurance grew in popularity and issuance in the U.S. to mitigate credit risk following the Lehman Brothers bankruptcy in 2008, the structured note marketplace is adaptable and can likely help fill whatever uncertainties for which clients demand solutions as they assess the coming market environment.

Improved Investment Accessibility

All structured notes are linked to an underlying reference asset. When an investor purchases a structured note, he or she does not actually own the underlier, but rather, the performance of the note is based on the price movements of this underlier. In certain instances, this aspect of not owning the underlier can be to the investor's advantage. Structured notes can be created with a wide variety of underliers as reference assets, including individual stocks, indexes, commodities, interest rates, and others.

Suppose an investor had a bullish outlook on the price of oil over a specified time frame but perhaps did not want to purchase stock in a particular firm due to ESG restrictions, preferred more direct exposure to the commodity rather than a given company, or had no experience trading in futures markets. This investor could purchase a structured note with the price of oil serving as the underlier. Or, take an investor interested in Bitcoin but is justifiably concerned about owning it directly through cryptocurrency platforms, given recent headlines; this investor could purchase a structured note with Bitcoin as the underlier and have exposure to the price movements without the firsthand risks of platform solvency that may come with ownership of the asset directly.

2020 saw record issuance of structured notes in the United States. Most of them were linked to equity underliers, with about two-thirds of new products linked to stock indexes, and about one-quarter linked to individual stocks. The strong demand was due in large part to retail investors wanting to access the derivatives market through structured notes (Liu, 2021).

Investment accessibility does not pertain solely to exotic assets either. Structured notes may appeal to conservative investors hesitant to invest in such underliers directly ("An Introduction to Structured Notes", n.d.). For example, in Europe and Asia, structured investments have long served as a stepping stone into getting exposure to equities for risk-averse investors accustomed to holding their wealth in fixed income securities and bank account savings (Morningstar Manager Research Services, 2020).

Thus, structured notes can enable retail investors to access investment strategies which may otherwise be unavailable to them (SEC.gov, 2015) and facilitate wider participation in financial markets (Ofir and Weiner, 2012).

Cons of Structured Notes

Structured notes are unique and require a better working knowledge from all parties involved than most types of traditional investments. Both advisors and end clients should have a clear understanding of these aspects before purchasing structured notes:

- Credit risk
- Market risk
- Illiquid
- Difficult to analyze and classify
- Call/prepayment risk
- Costs
- Taxes
- Due diligence burden



Credit Risk

Structured notes are unsecured debt obligations of the issuing bank. While the investor's payout is determined by the performance of the underlier and the terms of the specific note, in a broader sense, the investor is effectively purchasing a bond from the issuer. It is a promise on which the issuer is expected to pay at maturity. Like any corporate bond, if the issuer is unable to pay in full, that loss will be born by the bondholder.

Investors who held structured notes issued by Lehman Brothers lost nearly all of their principal after the bank collapsed in 2008 (Morningstar Manager Research, 2020). Though the largest banks are now subject to stricter stress testing and capital requirements than they were before the GFC, advisors and investors should be aware of the financial health of structured note issuers. Diversifying among different issuers could help mitigate some risk should another financial crisis emerge.

Market Risk

Structured notes are often described as hybrid vehicles with characteristics of both bonds and equities. We would caution investors that this description, while accurate with respect to how these notes are constructed, may not always be accurate with respect to how structured notes behave in practice. Historically, in normal or up-markets, structured notes normally behave as expected, but during a market crisis event, the notes tend to behave like the equity underlier. Investors purchasing structured notes to insure against a market crash should be mindful that a crash is precisely the time at which the downside protection is most likely to fail.

At maturity, the issuer is required to pay the investor according to the terms of the note. The payout will be determined by the performance of the underlier. And while protection features like barriers and buffers can limit some degree of downside, as shown in Table 1 above, many notes face the possibility of a loss of principal. For a market-linked growth or income note, if the underlier's value at the maturity date is lower than the level of protection designated, the investor will realize a loss. A hard buffer will absorb some percentage of the loss, but with a barrier note, investors are exposed to the full downside loss of the underlier if it has breached the barrier at maturity.

In a 2016 research study titled *Structured Products Performance, Costs, and Investments*, Maringer, Pohl, and Vanini analyzed more than 20,000 individual structured notes in the Swiss marketplace from the years 2008–2014 and found that almost all the products had limits on the positive side of returns (capped upside), but not on the negative side; such would be the case with a barrier note. In a normal market environment, the structured notes were very likely to generate a positive return, and while a significant negative return was possible, it was unlikely. The authors found that in 2012–2014, 80% of structured notes generated positive returns. However, in the year 2008, which was the onset of the global financial crisis, and in the year 2011 which was the year of the European debt crisis, the products in this sample showed negative performance medians. Furthermore, a study analyzing U.S. structured notes found that structured note returns covary positively, though not perfectly, with broad market indices (Henderson and Pearson, 2011). This makes intuitive sense, as most structured notes are tied to equity underliers.

In a risk mapping analysis performed on 1,662 barrier notes issued between 2011-2021, Envestnet | PMC determined the following:

Table 2: Structured Notes with S&P 500 Index Underlier

| | |
|------------------------------|---------------|
| Potential Max Loss | -55.81% |
| Average Barrier Protection % | 26.43% |
| Count | 1,662 |
| # Didn't Breach | 246 |
| % Didn't Breach | 14.80% |
| # Breached | 1,416 |
| % Breached | 85.20% |

Source: SIMON, author's calculations

The table shows that with this sample of notes, 85% of the 1,662 products would have breached the barrier at some point during the term of the contract.³ The majority of these breaches would have occurred between 2007-2009. That is not to say that these breaches would have occurred exactly at maturity, but rather, it shows that during a market panic, 85% of these barrier notes hypothetically *could* have experienced a loss of principal had they matured near that point in time. This potential for the full downside capture of the underlier is why barrier notes with equity underliers should be considered as part of the equity sleeve in a portfolio allocation.

Liquidity Risk

In the United States, there is no secondary market for reselling structured notes. If an investor needs to sell their note before maturity, they may be able to sell it back to the issuer; the issuer, however, is under no obligation to make a market, and while they usually will repurchase them, it will likely be at a discount. The relative lack of liquidity for structured notes is a result of their customizable nature. These vehicles are designed to do a certain thing at a certain point in time to help the original purchaser achieve his or her goals. They aren't necessarily broadly appealing to other investors. Investors who purchase structured notes should be prepared to hold until maturity.

Forfeited Dividends

Remember that a structured note is a promise by the issuer to make a payment based on the price return of the underlier rather than owning the underlier itself. This means that the holder of the structured note forfeits any dividends which the underlier pays during the term of the contract vs. holding the underlier directly. Research from S&P Dow Jones Indices⁴ shows that since 1926, dividends have contributed over 30% of the total return for the S&P 500 index. Income investors should weigh the missed dividend payments, which represent real income and a meaningful portion of total return within a diversified asset allocation, against the income payments described in the offering document for the structured note.

Losing out on dividends also decreases the value of the buffer (Whitby, 2021). To illustrate, for the calendar year 2022, the S&P 500 Total Return Index which includes dividends was -18.11%, and the S&P 500 Price Return Index which does not include dividends was -19.44%; the performance on a structured note with a 10% hard buffer, therefore, was -9.44%. When accounting for dividends, for the year 2022, the 10% buffer was only worth 8.67% (18.11% - 9.44%) compared to just investing directly in the index.



³Backtested returns, provided by SIMON to determine potential maximum loss, were generated by simulating the parameters of each contract over the past 15 years of daily underlier price observations.

⁴See S&P 500 Dividend Aristocrats: The Importance of Stable Dividend Income. <https://www.spglobal.com/spdji/en/documents/research/research-sp500-dividend-aristocrats.pdf>

Difficult to Analyze and Classify

The customizable nature of structured notes can be a benefit with respect to forming a return profile that fits a given investor's specific goals, but the heterogenous aspect of these contracts make them challenging to analyze. Maringer, Pohl, and Vanini, who conducted the study of the Swiss structured product marketplace, argued that the major reason for difficulty analyzing performance was a lack of structured product comparability even within the same category. For example, some market-linked growth notes have an upside performance cap, while others offer leverage; some have a high protection threshold, while others offer minimal protection. Structured notes differ substantially from each other in terms of payment structure and risk profiles because they cater to different investors' views, expectations, and goals. And with respect to comparing different categories of structured notes, the authors stated that "Expectations about volatility, the direction of price movements, and – in particular – the potential of prices falling below certain thresholds are the main criteria for preferring one type of structured product over another. This implies that direct comparison across categories is difficult if not impossible." They concluded that a direct comparison of annualized returns would be misleading because short periods can result in extreme and unrealistic annual returns due to the outsized impact of outliers. Structured notes with caps limit one side of the payoffs, which biases averages toward outliers, and because large deviations usually occur only on one side, risk metrics like standard deviation and volatility, which assume a normal distribution, are less useful for structured products vs. traditional investments.

Ergo, investors should think critically and view bold or definitive claims regarding structured note performance or classification with some level of skepticism. For example, proclamations that some minimum fixed percentage allocation to structured notes will automatically improve a portfolio's Sharpe ratio or create a superior efficient frontier should invite questions. What kind of structured notes were used or considered for such a study? What were the underliers these notes were linked to? Did they all have the same maturity? Did they provide coupons or rely on price appreciation? What were the protection levels of the notes? Was principal at risk? How did markets behave during the time period analyzed, and would it have been different if markets had been under stress? Furthermore, how was performance and risk calculated?

For example, consider the illiquidity premium. Lack of liquidity, or the ability to efficiently buy and sell an asset, is a risk for which investors expect to be compensated. Traditional illiquid alternatives such as private equity and hedge funds often lack a highly active secondary market and tend to earn an excess return, known as the illiquidity premium. Although they lack liquidity, structured notes eliminate the potential to earn the illiquidity premium. Structured notes have a known non-trading window, with no uncertainty as to the parameters of the outcome. The purchaser buys the note up front and is repaid according to the price-based performance of the underlier, which precludes earning an additional premium. While the exact outcome is not certain given the uncertain path of the underlier, any illiquidity premium that structured note investors may have earned is essentially engineered away. Structured note investors take on the illiquidity risk born of their operational features without compensation, while investors in traditional illiquid alternatives are expected to earn a premium for bearing that same risk.

Additionally, traditional illiquid alternatives give investors consistent exposure to other factors, such as the equity market, interest rates and inflation. While structured notes' performance is tied to an underlier that may offer exposure to some or all of these factors as well, the exposure may be inconsistent and less than perfect given payout structures and terms of the note. Though structured notes are an alternative choice when building a portfolio, their portfolio usage is not synonymous with more traditional illiquid alternatives.

Advisors and investors may see claims of improved diversification being one of the benefits of structured notes utilized in a multi-asset allocation to smooth out a portfolio's volatility. This can be a problematic assumption with structured products. Recall the formula for the risk of a two-asset portfolio, as measured by standard deviation and that ρ represents the correlation coefficient:

As the correlation between the two assets falls, standard deviation (simply the square root of variance) also declines, improving diversification benefits. Conversely, when the correlation term rises, standard deviation increases and the diversification benefit decreases. During high periods of volatility such as market panics, correlations between financial assets tend to rise. Table 2 above shows that in periods of market stress, a market-linked structured note will tend to behave like its equity underlier. Further, depending on the downside protection level of the

$$\sigma_p = \sqrt{w_1^2 \sigma_1^2 + w_2^2 \sigma_2^2 + 2 w_1 w_2 \rho_{1,2} \sigma_1 \sigma_2}$$

structured note, its correlation with its equity underlier may approach 1 more quickly than other cross asset class correlations, such as stocks and bonds.

Investors should be mindful that—whether a structured product is originally added to a portfolio as an alternative investment, a bond, or a diversifying instrument—during a sell-off in which many holdings within an investor's portfolio may become more highly correlated and lose their diversification benefit anyway, this impact could be magnified as the allocation to structured notes will likely perform less like a volatility reducing asset and more like an additional equity allocation.

Call/Prepayment Risk

For callable notes, issuers can redeem them at their sole discretion. This will be when it is advantageous to the issuer. When a note is called away, investors most likely will not be able to reinvest their capital at the same rate as they did originally. Replacement issues with similar characteristics may or may not be available and would require their own due diligence. A note being called away also has an indirect impact on the cost of a structured note, as the effective annual expense rises in percentage terms when the holding period has shortened (Arnott, 2020).

Costs

If purchased through a brokerage, structured notes can have substantial commissions. Some of these charges can be waived if purchasing a structured note through a fee-based program. Even so, these securities can carry relatively high costs.

The costs of structured notes are implicit and can be estimated by comparing the value shown on the investor's statement vs. the price paid for the note. For example, if an investor pays \$1,000 for a one-year note and their initial statement shows a value of \$980, this represents a 2% implicit fee. This covers the creation, distribution, and hedging costs for the issuer, as well as some profit margin.



Practically, this discounted initial statement value only matters if an investor wants to sell their note before maturity, as the payoff and return of principal would be based on the \$1,000 purchase value. The value of the note will fluctuate throughout the holding period. Many factors contribute to these movements, such as interest rates, spreads, time to maturity, volatility, and movements of the underlier assets. It is important to note that although the security will have price fluctuation, at maturity, if the principal protection hasn't been breached and the issuer is solvent, investors will get the principal back (Tom McGuire, Director, Halo, personal communication, April 20, 2023). The implicit cost is best thought of as the price paid to access the vehicle wrapper; an investor could theoretically avoid the fee by constructing the same note themselves by purchasing a zero-coupon bond and buying/selling options to replicate the payout structure. Obviously, constructing such a note on one's own would be impractical in requiring substantial capital, knowledge, experience, and time. Ultimately, investors pay a premium for the convenience and availability of this wrapper. In the 2012 research paper *Investment in Financial Structured Products from Rational and Behavioral Choice Perspectives*, authors Ofir and Weiner present findings concluding that issuers price structured notes above these theoretical values in part to capitalize on behavioral biases common to retail investors.

Taxes

The tax treatment of structured notes is complicated, and, in some cases, uncertain. Before purchasing any structured note, investors may wish to consult with a tax advisor to understand the consequences of any particular note, including imputed interest and any foreign tax consequences.

Due Diligence Burden

Investors must do their homework and wade through complex and complicated disclosures to understand what they are getting with any structured note. This is no simple task and requires a concerted due diligence effort that is likely to consume more resources than due diligence on more liquid and transparent investment vehicles. Moreover, because structured note payouts and protection contingencies depend upon the performance of the underlier at maturity, the purchaser of a structured note needs to have an informed opinion on the range of outcomes for the market over that time frame. Investors should be prepared to spend considerable time and resources on structured note due diligence as part of their overall due diligence framework.

As the structured note market continues to expand domestically, the library of resources and tools for evaluating them continues to expand. Platforms such as Simon and Halo are rapidly evolving to not only make a more efficient marketplace for structured notes, but to introduce education around the vehicle themselves. Volumes of digestible materials from writeups to short videos help advisors grasp the concepts surrounding these investments. These platforms also offer summaries of the various notes on their platforms. While these resources serve to gain comfortability with structured notes and a high level overview of individual notes themselves, they do not replace a thorough due diligence program. Investors should read and understand all offering documents to make an informed investment decision.

In examining a sample of 1,258 barrier notes with the S&P 500 Index as the underlier using data provided by SIMON, the average embedded fee, annualized, was 1.17% for market-linked growth notes and 1.35% for market-linked income notes. By comparison, in 2021, the average actively managed equity mutual fund was 0.68%, and the average index equity fund charged 0.06% ("Trends in the Expenses and Fees of Funds", 2021).

Conclusion

The uniqueness of structured notes brings both benefits and challenges. Advantages include specific use cases, access to different asset class exposures, better-defined outcomes, and investor peace of mind. Drawbacks include cost, illiquidity, tax complexities, market and credit risk, and difficulties assigning a set allocation within a diversified portfolio. For all our attempts here to offer general best practices when considering the usage of structured notes, they are by definition a highly customizable vehicle, and their usage can likewise be tailored. However, the average investor is well-advised to approach structured notes thoughtfully and consider the topics covered here, as well as their impact on the total portfolio and not simply one slice of the pie. Above all, it is imperative that advisors and clients discuss and identify specific objectives, understand all of the scenarios which could ensue with a particular structured note, and then decide if the structured note could help achieve that goal. Because of their heterogeneity and differentiation from each other, structured notes should be viewed on a case-by-case basis as tools to help an investor reach a defined goal rather than viewed as a homogenous asset class to be assigned a blanket allocation.



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