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SPIRE NOTES INNOVATING THE INSTITUTIONAL REPACKAGING MARKET: OPPORTUNITIES AND TRENDS

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Abstract: Repackaging allows customization of Notes' format, currency, and payoff by combining Underlying Assets with Asset Swap Derivatives. After the 2008 crisis, higher regulatory and disclosure burdens jeopardized its attractiveness, until the foundation of SPIRE Multi-Dealer infrastructure in 2016: process standardization, replaceable Swap Counterparties, and other innovative features allow Investors to mitigate credit risk, achieve higher ratings, and lever the Buyback to make Notes more liquid, compared to traditional Repackaging products. Notes can be structured to reflect Investors' needs, strategy, and macroeconomic view, and offer yield enhancement opportunities. Historical demand shows increasing popularity and resilience to market stress, despite seasonality effects.

Keywords: SPIRE, Repackaging Notes, Structured Notes, Institutional Investors, Coupon enhancement

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1. Introduction

The increasing and resilient demand for SPIRE Repackaging Notes proves the attractiveness of its innovations, compared to market alternatives. Repackaging Notes are debt obligations that embed an Underlying Asset component, generating a cash flow, and a Derivative component that adjusts it to Investors' needs. The concept was born in the 1970s to offer customized products with optimized risk/return profiles (Halo Investing 2022). After the crisis, the Dodd-Frank Act and the European Market Infrastructure Regulation ("EMIR") have made investing or issuing Repackaging products more expensive and cumbersome. Single Platform Investment Repackaging Entity S.A. ("SPIRE") was founded in 2016 to overcome these difficulties, by creating a standardized and more transparent program to originate Repackaging Notes for Institutional Investors (entities that make investments on behalf of their clients). During my internship at UniCredit, I followed the set up, approval, and execution of SPIRE deals. The objectives of this Work Project are 1) to discuss the innovations and advantages of SPIRE Notes with respect to market alternatives, from a structural and liquidity perspective, 2) to show how the available cash flow structures can satisfy various Investors' needs and 3) to study demand patterns. SPIRE Notes have innovated the Repackaging market because multiple Counterparties use the same Repackaging structure. Consequently, 1) Investors can easily compare Notes offered by different Banks, 2) Counterparties can be replaced within the program, 3) Investors can ask for a Repurchase Price to multiple Counterparties. These features improve the risk and liquidity profile of the investment, despite a Secondary Market has not been developed and is unlikely to be set up in the future. Demand for SPIRE Notes has been increasing substantially in the first years of the program, stabilizing at a 2% monthly growth rate.

This research will be relevant to SPIRE stakeholders of UniCredit, to understand better its logic, structure, and benefits, and to external audience, because there is very limited available information about the program, and no qualitative or empirical research has been published.

2. SPIRE Repackaging Entity

This chapter describes the structure of SPIRE Notes and the advantages offered compared to Bond investing or to other Notes available in the market. Repackaging Notes are Structured Products whose cash flow is linked to the performance of some reference assets ("Underlying Assets"). Through an Asset Swap, which is a type of Derivative transaction, the cash flows generated by the Underlying Assets are swapped into a different stream of Note Coupons. There are two types of Repackaging Notes: either the same Investment Bank acts as Note Issuer and Swap Counterparty ("Single Arranger Notes"), or the Investment Bank sets up an SPV as Note Issuer and enters a Swap Agreement with it ("SPV Notes"). SPIRE Notes are SPV Notes offered to Institutional Investors, with the innovation that multiple Investment Banks can set up their own SPV within the umbrella of the SPIRE Multi-Purpose-Vehicle ("MPV"). The vehicle issuing the Notes does not interact with a single Arranger, but instead, it is segregated into Compartments that can enter a Swap Agreement with any of the 18 Investment Banks joining the platform: Barclays, BNP Paribas, Crédit Agricole, Citigroup, Credit Suisse, Deutsche Bank, Goldman Sachs, HSBC, J.P. Morgan, Merrill Lynch, Morgan Stanley, Natixis, NatWest, Nomura, Santander, Société Générale, UBS, UniCredit. Compartments are independent: they invest the proceeds of the Note in the Underlying Asset(s) requested by Investors (also "Noteholders"), and Noteholders' claims can be fulfilled only by the cash flow generated by that specific asset: no other assets or source of revenue is available to satisfy the Compartment's obligations. Compartments are considered segregated, as they do not interact with the Balance Sheets of the Arrangers, nor with each other. This feature makes SPIRE Bankruptcy remote: it would default only if all its Compartments are insolvent together, which is very unlikely.

a. SPIRE Notes structure

The SPIRE Compartment is at the center of the SPIRE Repackaging Transaction. It acts as Note Issuer and sells the Notional amount of SPIRE Notes to Noteholders. The Note's Notional

amount is specified at pricing by the Investors, together with the cash flow structure and Underlying Asset(s), according to the desired credit exposure (Graph 1). The proceeds of the Notes will be invested by the Issuer into the desired Underlying Asset(s). Noteholders can choose one of the Banks joining the program as Dealer, which acts as Arranger of the sale of the Notes. The Dealer enters a Swap Agreement with the SPIRE Compartment, according to which the Dealer acts as Swap Counterparty, receiving the cash flow generated by the Underlying Asset(s) and paying to Investors the agreed Note coupon. At maturity, the Swap Counterparty receives the Redemption Amount of the Underlying Asset(s) and Investors receive the Face Value of the Notes, the same amount it paid at inception. For simplicity, the Bank serving the functions of Dealer and Swap Counterparty will be referred to as "Counterparty". Investors choose the Counterparty based on the attractiveness of the Note coupon they can offer. Institutions willing to invest in SPIRE Notes would usually set up a competitive auction between different Counterparties, in which the Bank offering the highest coupon wins the deal. The Issuer can also enter a Repurchase Agreement ("Repo") or a Security Lending Agreement ("SL") with the Counterparty, which involves the exchange of the Underlying Asset(s) between the SPIRE Compartment and the Counterparty at specified periods in time, but they are not common transactions due to their complexity.

Each Counterparty acts as Calculation Agent, namely it defines the stream of payment between the Noteholder and the Issuer and acts as Disposal Agent, in charge of selling or liquidating the collateral in case of redemption before maturity ("Early Redemption"). HSBC Bank plc acts as Custodian for all SPIRE Transactions, by holding the collateral on behalf of the Issuer, and as Issuing and Paying Agent, namely it transfers the payments to the Noteholders. The Counterparty and SPIRE post collateral based on the Present Value ("PV") of the Asset Swap. The exchange is regulated by a 2-ways Credit Support Annex Agreement, which is one of the standard contracts provided by the International Swaps and Derivatives Association (ISDA).

b. SPIRE Notes compared to investing in Bonds

This paragraph discusses why Investors looking for credit exposure might prefer investing in Repackaging Notes with respect to holding solely the Underlying Asset(s): 1) Notes increase the spectrum of accessible investments, 2) the denomination is more flexible, and 3) Notes embed Derivative transactions. First, investing in SPIRE Notes improves portfolio diversification by unlocking investment opportunities difficult to access: 1) Investors restricted from holding Bonds with a certain legal format (Registered Note VS Bearer Note[1]), can repackage them Bonds in a Note format they are allowed to purchase; 2) by Embedding Cross-Currency Swaps in the Notes Investors can consider foreign Bonds with unpopular currencies, 3) old Bonds that present coupon structures not convenient for the current macroeconomic conditions can be repackaged into more suitable cash flow structures. Repackaging increases the range of investments and exposures available to Institutional Investors and improves the liquidity profile of Bonds previously considered illiquid for their format, currency, and outdated payoff structure. If Institutional Investors are willing to purchase these Bonds to repackage them, it becomes easier for Bonds Issuers to place them in the market, and thus the cost of funding for Issuers decreases (Chatri and Townsend 2021).

Secondly, contrary to Bonds, the Notes' requested Notional amount can be issued in smaller denominations, which is an attractive feature for Investors like insurance companies, because they are able to allocate the investment to many smaller sub-portfolios.

Third, some Institutional Investors are facing increasing pressure from EMIR for collateral posting and reporting (Chatri and Townsend 2021), while others are restricted from investing directly in Derivatives transactions (Firoozye 2004), and so they cannot invest in a Bond and separately enter an Asset Swap. Repackaging Notes solve both problems, because they combine

[1] In the Bearer form the sole physical possession of the Note acts as proof of ownership, while in the Registered form the purchase certificate specifies the name of the buyer as evidence of ownership. Bearer Notes can be transferred more easily, so they have raised concerns about tax evasion and money laundering practices, and therefore some Investors might not be able to hold this kind of security.

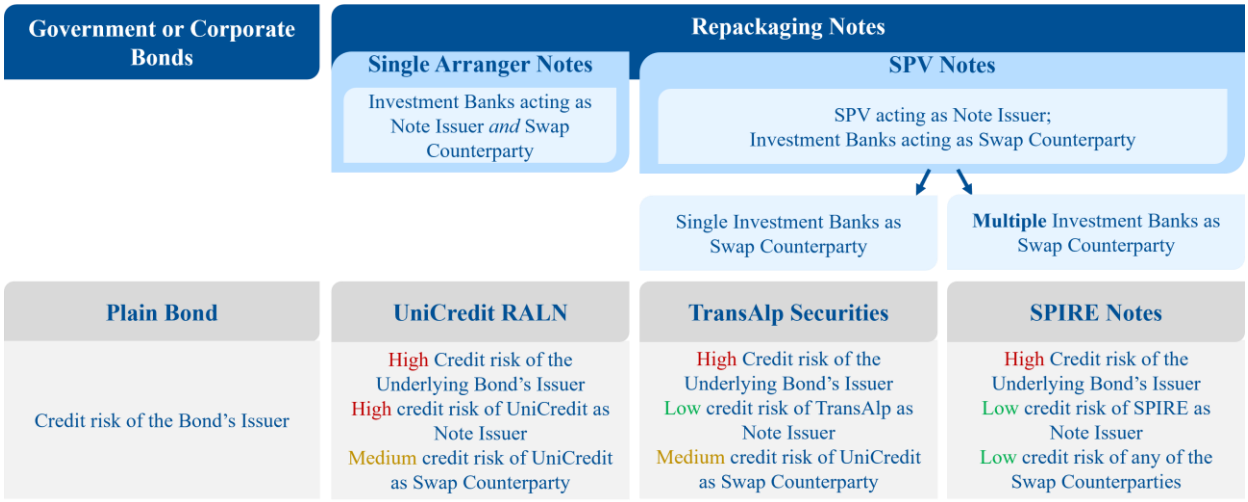
the Underlying Bond and the Asset Swap Derivative in a single instrument: the Derivative contract would be embedded in the Note and not in Investors' book, making reporting easier.

c. SPIRE Notes compared to investing in other Repackaging structures

Repackaging Notes are highly customizable: by holding only one instrument Investors can combine the choice of the desired credit exposure, with preferred cash flow structure, Note format and currency. When investing in Repackaging Notes, Noteholders are subject to the credit risk of the Issuer of the Underlying Asset, of the Issuer of the Note, and to a smaller extent to the credit risk of the Swap Counterparty, because usually the value of the Asset Swap is a small percentage of the Notional amount of the Notes. In case of Default of these entities, the transaction would be terminated early, and Noteholders might experience losses. I compare SPIRE Notes to similar products offered by UniCredit to discuss their attractiveness: UniCredit Referenced-Asset-Linked-Notes (RALN) (Graph 2) and TransAlp Securities (Graph 3).

Graph 4. Comparison between instruments offering credit exposure

Source: Personal Elaboration



UniCredit RALN are Single Arranger Notes, where UniCredit is the Note Issuer and Swap Counterparty, making Investors subject to UniCredit credit risk. Instead in SPV Notes the Issuer of the Note is an SPV segregated from UniCredit's Balance Sheet and considered Bankruptcy remote, thus the credit risk of the Note Issuer is reduced.

TransAlp securities are SPV Notes where UniCredit acts as single Arranger, contrary to SPIRE Notes that can be set up by 18 Counterparties. SPIRE Notes have multiple advantages compared

to TransAlp securities. The first is the high standardization of the SPIRE structure: Investors would compare TransAlp Notes with SPV Notes offered by other Investment Banks, that present different structures, legal documentation and styles, making the comparison difficult (Firoozye 2004). Instead, when Investors ask for a SPIRE Note to multiple Counterparties, the same structure and the same Agents would be adopted by all Counterparties, according to the program. This makes the Notes comparable, and Investors can simply choose the Counterparty offering the highest coupon, all else being equal. Differences in coupon levels depend on the margin applied by the Counterparties, on the buy-in price achieved for the Underlying Asset, and on the Credit Valuation Adjustment ("CVA") charges, which account for credit and counterparty risks, and depend on probabilities of Default, Exposure at Default and Recovery Values. This setting benefits Investors because Counterparties compete to provide the highest possible coupon. Furthermore, Investors holding SPV Notes from different Investment Banks must follow different set up and execution procedures for each of them: instead, the standardization of SPIRE implies that the same process is applied to any of the 18 Counterparties, increasing operational efficiency for Noteholders.

A second innovation is the possibility of replacing a Defaulting Swap Counterparty with another Bank in the program to keep the transaction alive. Despite this being a complex operation with many preconditions, it mitigates further the contribution of the Counterparty's credit risk to the overall risk of the transaction. The implication is that Investors get exposure almost solely to the credit risk of the Underlying Assets' Issuers (Graph 4), with significant positive implications for the overall quality and Rating of SPIRE Notes. SPIRE Noteholders can also exchange the Underlying Asset(s) during the lifetime of the transaction, in which case, the pricing terms of the Swap Counterparty are adjusted to reflect the change in the coupon, Redemption, and credit risk of the new Underlying Asset(s). Investors might be willing to exchange an Underlying Asset(s) if the Probability of Default of its Issuer increases, because

Noteholder would be the residual claimers in case of Early Redemption triggered by a Default. Most Repackaging Notes are eligible for external Rating. The possibility to rate the product is important to Investors for internal risk management, country regulations and auditing: Ratings represent the risk profile of the product and are used to assess the need for capital allocation to satisfy regulatory constraints (Tirupam, Lewrick, and Tarashev 2017). Notes' Rating depends on the Probability of Default of the Underlying Asset's issuer and to a lesser extent of the Swap Counterparty, on the correlation between the two, on the Probability of Default of the Compartment, on the macroeconomic and operational environment of the Underlying Asset(s)' Issuer, on the cash flow structure of the Note (a single bullet repayment at maturity is riskier than an annual coupon), and on whether callable features are included (that would imply risk of Early Termination for Investors) (Scope Ratings 2022). The possibility to replace Counterparty and Underlying Asset(s) and the sound regulatory and legal infrastructure that distinguish SPIRE Notes are described by Rating agencies as positive Rating drivers, that put the product in a position of advantage with respect to other Repackaging vehicles.

3. Analysis of liquidity

This chapter analyses the liquidity profile of SPIRE Notes, outlining the reasons for the absence of a secondary market and discussing the functioning and implications of the Buyback clause. Liquidity is defined as the efficiency with which an investment can be converted into cash. Liquidity is important because it allows to access the wealth and return coming from an investment whenever Investors need ready cash, and allows to free up cash for better opportunities that could arise over the lifetime of an investment. For these reasons, this feature is very attractive and would reduce the risk of holding longer-dated Notes.

a. Advantages and challenges of setting up a Secondary Market

One way to make a financial instrument liquid is to set up a Secondary Market to match sellers and buyers. Despite SPIRE Notes are listed for regulatory purposes, there is currently no

Secondary Market for these securities. For this reason, some Investors might prefer other tradable Structured products despite the attractiveness of SPIRE Notes. Another advantage of a Secondary Market is fairer and more transparent price information. Trading allows to assess the fair value of the product, useful for Noteholders to evaluate their portfolios. A Secondary Market would significantly improve the liquidity feature of the Notes and is likely to increase demand and visibility of the product, benefitting both the Counterparties and SPIRE, that charges new Counterparties with a subscription fee. There are two main reasons why no Secondary Market is in place yet, and that make a future set up unlikely. The first and main reason is the illiquidity cost. Being the Notes highly customized, finding another Investor with the same needs and same view as the previous Noteholder is very unlikely (Liu 2021). The cost for Counterparties to find a buyer might be very high, considering also that the pool of Investors is restricted to Institutional Investors and that buyers might as well contact the Counterparty to set up a brand-new transaction. Furthermore, if the Note position is closed due to unfavorable market conditions, it would be sold at a discount, and the seller would realize a loss. Instead, if the Investor holds the Note until maturity, he would receive at least 100% of the Note's face Value. From the Counterparties' perspective, there is no incentive in wasting resources to scout buyers and set up an exchange, if they can structure a brand-new deal for prospective buyers.

b. Buyback clause

Another way to provide liquidity to Investors is by allowing them to resell the Note to the Counterparty, in part or total, at the "Repurchase Price". A relevant innovation of SPIRE with respect to other Repackaging Notes is that Investors can ask for a Repurchase Price not only to the Counterparty that has set up the Note ("Original Counterparty"), but instead to all Counterparties in the program, upon certain conditions (The SPIRE Note must be a standard transaction, the minimum amount to be unwound is EUR 10mn, conditions for internal credit, compliance and risk approval are obtained and normal market conditions prevail) . This is an

important feature because if the Note is managed by a single Counterparty (the case of RALN and TransAlp for UniCredit), the Counterparty has very high bargaining power on the Repurchase Price, in case of Early Redemption triggered by the Investor. Instead, by opening a Buyback competition, the Original Counterparty's Repurchase Price is challenged. The feature protects Investors and constitutes a liquidity advantage of SPIRE Notes compared to other Repackaging Notes. When the Note is repurchased by a Counterparty, it can either keep the Note and set up a hedge for the new position or unwind the Note. The unwind is almost always preferable and implies the breakdown of the structure in its components: the Underlying Bond would be sold in the market proportionally to the amount to be unwound, and the correspondent proportion of Asset Swap would be terminated with the SPIRE Compartment. Nevertheless, only the Swap Counterparty can terminate the Asset Swap. Therefore, when other Counterparties are asked to present a Repurchase Price, the Original Counterparty quotes a price for the so-called "Unwind Swap", which is substantially identical to the Original Asset Swap, but in the opposite direction, to decrease the outstanding Swap between the Original Counterparty and SPIRE, proportionally to the notional of Notes unwound. After the Unwind Swap is set up, the initial Asset Swap between the Original Counterparty and SPIRE is reduced, and the new Counterparty can now terminate the Unwind Swap with SPIRE. Even if the Unwind Swap valuation is at fair value, the Original Counterparty has the advantage of having reserved CVA charges for the whole lifetime of the transaction. These CVA charges have not been consumed for the years remaining after the Buyback, and the Original Dealer could consider consuming them to show a slightly higher Repurchase Price with respect to other Counterparties, that have no CVA charges in place yet. Therefore, it is very likely that the Original Counterparty ultimately wins the repurchase auction, but the Repurchase Prices presented by other Counterparties represent a lower bound to the one he can offer, protecting Investors from unfair pricing. Despite the advantage of enhanced liquidity, upon Early

Termination Investors become subject to market risk: the Repurchase Price depends on the current market value of the Underlying Bond, subject to interest rate risk, and the value of the Asset Swap depends on interest rate risk, and eventually to inflation risk and exchange rate risk.

4. Main Payoff structures

This chapter describes the five main payoff structures that can be applied to SPIRE Notes, and the objectives of Investors when adopting them: the goal is to show how the same infrastructure can be tailored to Investors with very different needs.

a. Notes with Fixed-to-Floating Coupon

The simplest kind of payoff structure is a standard Fixed-to-Floating Coupon Note, where the fixed coupon of the Underlying Asset is swapped into a floating coupon, usually dependent on benchmark curves. Historically the most common curve has been the EURIBOR index with 3-months tenor, representing the interest rate at which a benchmark group of European Banks lend EUR-denominated funds to each other whereby the loans have a maturity of 3 months. This kind of Notes can be used to hedge, to speculate or to adjust interest rate exposure to limit the interest rate volatility risk.

b. Notes with Fixed Coupon with Callable option

Investors willing to gain a certain credit exposure but unsatisfied with the coupon level of standard Bonds might repack a Fixed Coupon Underlying Asset into a Fixed Coupon Note, with the addition of a callable option for the Counterparty. By embedding the call right, the value of the call option is added to the receive leg of the Swap Counterparty, and therefore the coupon paid to make the two legs match is higher. From a risk perspective, the callable feature increases the risk for Investors, as they might see the investment terminate when it becomes more beneficial (the Note would be called in the scenario of low interest rate environment).

To make up for this additional risk, the Note offers a higher coupon than the Underlying Asset, and Investors can thus achieve the target of coupon and yield enhancement.

c. Notes with CMS-linked Coupon

CMS-linked Coupons embed a Constant-Maturity-Swap ("CMS"), where the receiving leg is the fixed or floating coupon of the Underlying Asset, and the paying leg is the Asset Swap rate relative to a tenor specified by the Investor (Nera Economic Consulting). The Asset Swap rate is the value of the fixed coupon currently set by the market for a vanilla Asset Swap (usually against 6M Euribor), for each maturity. For example, the 10-year Asset Swap rate as of November 24th 2023 was 3.10%, meaning that a vanilla Asset Swap maturing in 10 years was paying a fixed coupon of 3.10%, while the fixed rate in November 2022 for the same maturity would have been 2.70%, due to a lower Yield Curve ("YC") (Graph 5). To price a CMS-linked Coupon, Counterparties need to forecast the same tenor of the Asset Swap curve, for each year until maturity. For example, for a 10-Years Note linked to the CMS 20 Years, issued in 2023, the Asset Swap rate with tenor of 20 years must be forecasted between 2023 and 2033, implying that the last coupon will depend on the Asset Swap forward between 2033 and 2053.

The consequence is that CMS Coupons are highly dependent on forward rates, which are expectations about future rates extrapolated mathematically from the spot rates of the YC. Considering that Swap rate curves have a similar shape to the equivalent sovereign YC, CMS-linked Coupons are used to reflect Investors' views about a specific tenor of the YC in the future. The CMS coupon has 2 parameters: $Participation\ x\ CMS(tenor) + Spread$; Solving by the spread makes the coupon less dependent on the oscillations of the CMS rate because the spread would be fixed regardless of the extent of the Swap rate change. Instead, participation higher than one increases the exposure to Swap rate movements (Graph 6). Investors can also ask to price a floor or a cap by embedding options. The YC configuration at the time of CMS pricing has relevant consequences on the CMS-linked coupon parameters. Assuming a fixed receiving leg: If the YC is upward-sloping, the forwards will be upward-sloping as well, implying a high Swap rate for the future compared to the current one. In this case, low parameters are priced in

the CMS Coupon. If the YC is flat, forward rates and Asset Swap rates would be flat, and therefore high parameters are priced in the coupon to match the fixed receiving leg. If the realized Asset Swap rates are higher than the ones expected at pricing, then the Investor has locked high coupon parameters and the Present Value ("PV") of the CMS is positive for the Investor. Investors require this type of coupon in periods of flat market expectation about the YC, if they expect a steepening, or more generally if Investors believe that the market is underestimating the future Swap rates. The Constant Maturity rate is usually chosen with a longer tenor (usually 10,20 or 30 years) than the tenor of the index period of the floating leg, in a way to gain exposure to changes in the long-term rates (Risk Institute 2004).

Investors can also embed expectations about the timing of the steepening in the coupon formula, through a structure that pays a fixed coupon for the initial years and a CMS coupon afterwards. CMS-linked Notes are indicated for Institutional Investors with a very clear macroeconomic view and investment strategy.

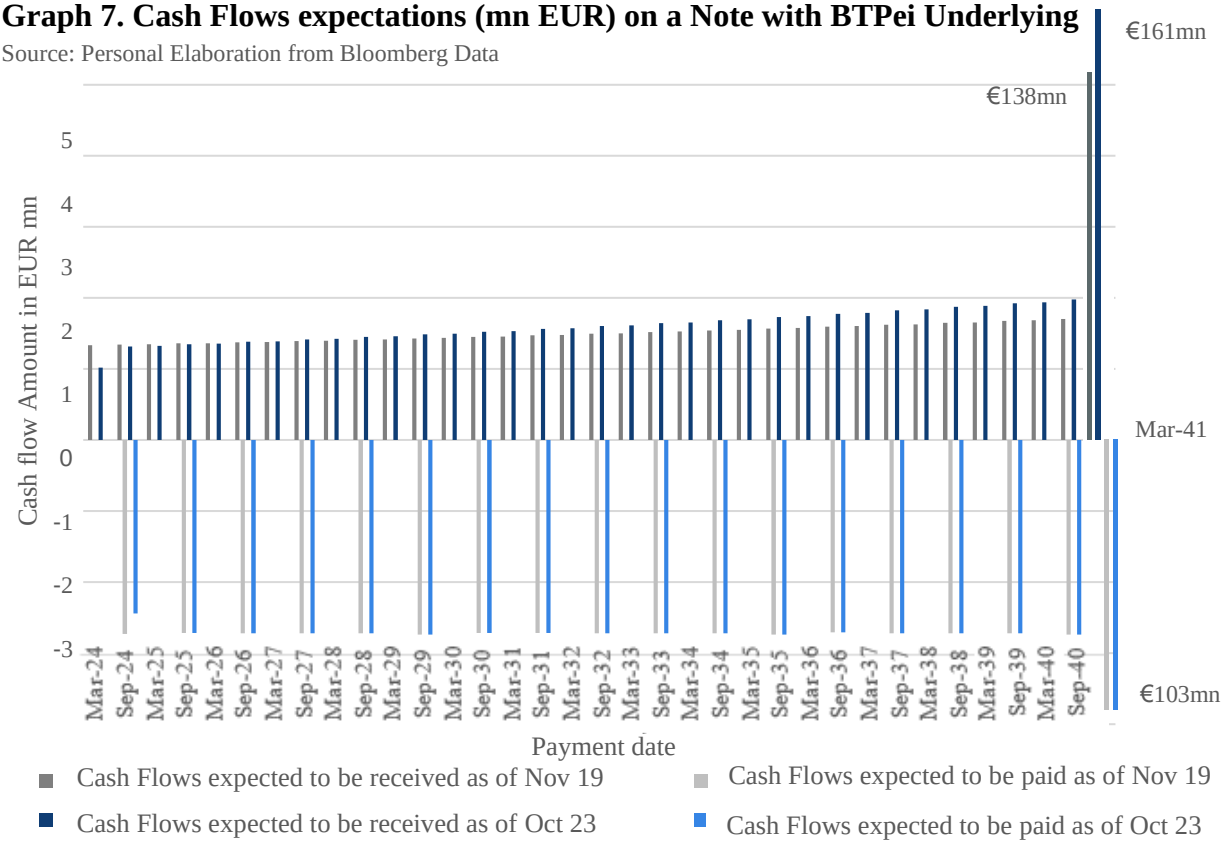
d. Notes with Inflation-linked Underlying Asset

Investors interested in Inflation-linked investments might consider repackaging Inflation-linked Bonds ("ILBs") into Fixed Coupon Notes. ILBs have a percentage coupon applied to an increasing Nominal amount, which depends on an inflation index. If inflation increases, the Nominal amount increases, and thus the coupon is calculated on a higher value. At maturity, the Redemption amount will be higher than 100 if inflation has increased during the lifetime of the transaction (inflation lift-up). If Investors are unwilling to wait until maturity to receive the inflation lift-up, they can repackage an ILB into a Fixed Coupon Note, where the Counterparty receives the variable coupons of the Underlying, plus the inflation lift-up at maturity and pays to the Noteholders a fixed coupon (always calculated on a 100% nominal amount). To make up for the inflation lift-up and make the two legs of the Asset Swap match, the Swap Counterparty must offer a higher annual fixed coupon to the Investor: this Note structure allows to distribute

the lift-up during the lifetime of the transaction, by embedding it in the coupons. The risk for the Counterparty is backloaded: it offers a higher coupon than the one received for the whole length of the contract, until the final inflation lift-up. Therefore, if the Underlying's Issuer defaults right before maturity, the Counterparty would realize a loss. For this reason, these transactions imply a very high counterparty risk for the Counterparty compared to other cash flow structures. I provide an example to clarify the payoff development with inflation: on 12.11.2019, a 100mn Fixed Coupon Note of 2.72225% (annual) was issued, likely to repack an Italian ILB ("BTPei"), with a 2.55% semiannual coupon. I retrieved from Bloomberg the cash flows expected as of issue date and roughly four years after (23.10.2023). The expected Note's cash flows to be paid by the Swap Counterparty are independent from inflation and unchanged between observation dates, while the expected cash flows to be received have increased as of October 2023. The pandemic-driven inflation was forecasted in November 2019, but was not expected to be so persistent: following the macroeconomic developments, inflation expectations have been revised up by October 2023. The change in expectations has an impact

Graph 7. Cash Flows expectations (mn EUR) on a Note with BTPei Underlying

Source: Personal Elaboration from Bloomberg Data



on the PV of the Asset Swap, benefiting the Counterparty that pays a fixed coupon priced with 2019 expectations, but receives a variable coupon depending on current higher expectations: the coupon offered in 2019 was based on too low inflation projections. The negative PV for the Noteholder implies opportunity cost, because repricing the Note with October 2023 expectations would result in a higher coupon. Yet, the loss for the Investor is not realized.

On the opposite scenario, Counterparties offer a too high coupon if the inflation expectations at pricing date are overestimating future inflation: when inflation is realized lower than the estimates, the Asset Swap PV would become positive for the Noteholder.

In a sense, this structure protects Investors from inflation fluctuations, because they receive the fixed cash flow agreed at pricing regardless from expected and realized inflation levels: they would be subject to market parameters only in case of Early Redemption, as the Noteholder is the residual claimer of a waterfall procedure, after the Swap Counterparty and all the other Agents involved in the transaction. The value to be distributed would depend on the market value of the Note components: the proceeds of the sale of the Underlying security (Recovery Value in case of Default) and the PV of the Asset Swap, both dependent on inflation.

Investors would consider this product: 1) if they want to distribute the inflation lift-up of ILBs across the lifetime of the investment; 2) if they look for an investment that takes inflation increase into account, but is shielded from Inflation fluctuations; 3) if they seek an investment with enhanced coupon with respect to Bonds independent from inflation available in the market 4) if they believe the market is overestimating inflation and try to lock in a high coupon.

e. Notes with Inflation-linked Coupon

Notes with Inflation-linked Coupon allow to monetize from inflation, by setting the Note coupon as a percentage of an inflation index. At pricing, the index multiplier is set according to future inflation expectations. Investors would invest in Notes with Inflation-linked Coupon if they believe the market is underestimating inflation, because a high coupon would be locked

in at pricing. If the future realized inflation is higher than the one projected at pricing, then the coupon factor is multiplied by higher-than-expected levels, benefiting Noteholders. Notes can be structured to reflect Investors' views about market's over- or under-estimation of inflation.

f. Notes with Cross-Currency Coupon

All the previous structures can be further customized by embedding a Cross-Currency Coupon to generate the coupon in the desired currency. Investors would rather use a SPIRE Note instead of a plain Cross-Currency swap, because it allows for operational efficiency: in one instrument Investors can achieve the credit exposure desired coupled with the currency preferred, instead of buying the Underlying and setting up the Cross-Currency Swap in distinct deals. Furthermore, SPIRE Notes and Swaps are treated differently from a reporting point of view: Swaps are Derivatives kept in the trading book and they would must be evaluated and justified for accounting purposes at the end of each financial year. There are two main Investor types for Notes with Cross-Currency Coupons: 1) Investors willing to take exposure to the European market but having their cash flows in another currency (the common case is Financial Institutions using Kronen); 2) European Institutions seeking investments in foreign currency for diversification purposes but restricted from investing directly in Derivative transactions.

5. Historical SPIRE issuances

This chapter delves into the main demand pattern for SPIRE Notes, first at an aggregate level, and then focusing on some payoff structures: despite Investors are driven mainly by their needs when purchasing a Note, the macroeconomic setting makes some payoff structures more attractive in certain periods. To analyze the trend of demand I used Bloomberg data about published Notes. 814 SPIRE Notes have been published on Bloomberg for 2022 (out of 944 declared). By adding the 2023 issuances, a dataset of 932 Notes has been set up. Bloomberg does not disclose whether the Notes have a single Underlying Asset, or whether they are a linear basket, namely the Compartments invest in multiple Underlying Assets (with risk given *pro*

rata parte, contrary to securitization). Therefore, I set up a methodology to match the Notes to a single Underlying Asset (thus excluding linear basket structures), to gain more insights about the rationale behind the Repacks and categorize them. For Notes with maturity longer than 2028, I retrieved all Bonds with the same maturity date (SPV expires with Underlying) and issued before the Notes, and then I ordered them by EUR amount issued (to track the biggest issuances, likely to be more liquid in the market, and thus easier to repackage). In case of multiple matches, I used the Swap Manager function to reverse engineer the trade by inputting the known cash flows of the two legs and analyzing whether the resulting spread might have been appropriate to represent costs and dealer profit. Last, I set up a graph, displaying the evaluation (when available) of each SPIRE Note and the suspected Underlying Asset. Since the value of the Note is equal to the value of the Underlying Asset plus the PV of the Asset Swap, I expected that the Note and the Underlying values follow the same trend, adjusted upward or downward depending on the value of the Asset Swap (Graph 8). In the case of Notes with Cross-Currency Swaps embedded, the valuations should be less correlated due to the fluctuations in the exchange rate, which can be substantial. If the Note was a linear basket, then the valuation of the Note would be the aggregate result of the valuation of the Underlying Assets plus the PV of the Asset Swap, and therefore when comparing the Note valuation to just one Underlying, they would not follow the same trend, and the pair would be excluded by the analysis.

The methodology led to 442 pairs being recognized, out of the total 932 SPIRE Note dataset.

a. Cumulative SPIRE Notes demand

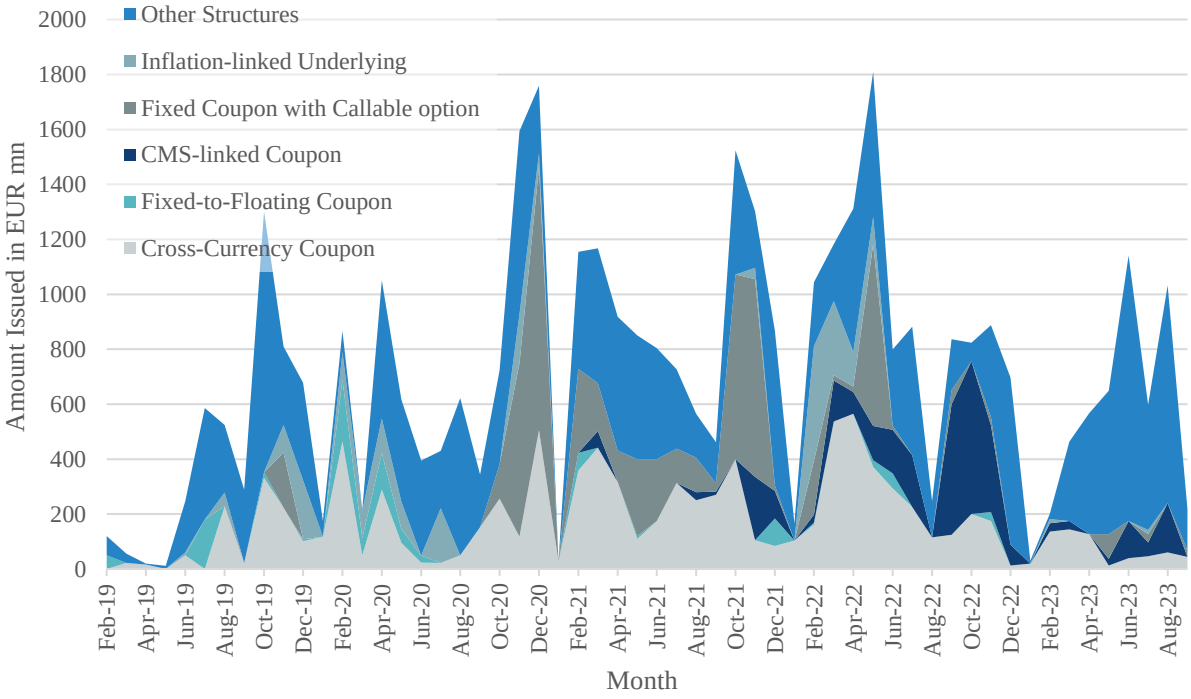
Before the introduction of SPIRE, there were two different movements across Investment Banks, to standardize Repackaging transactions. The group represented by Deutsche Bank wanted to keep different SPV structures for each Bank but providing a common framework to standardize procedures and regulation (Bartholomew 2016). Instead, the SPIRE founder Banks called for a higher degree of standardization, by allowing all Banks to use the same

MPV. This was the solution adopted. As expected, the annual growth rate of the total amount issued was higher in the initial years after SPIRE foundation in 2016, with a 1581% increase in EUR amount outstanding between 2018 and 2019, due to the addition of 6 new Counterparties in the program (Table 1), that significantly increased the customer base with access to the product, as well as its recognition in the industry. At the same time, existing Counterparties saw their market share decrease due to higher competition and might have tried to increase their marketing effort to involve more clients. The SPIRE program was released in an environment of low fixed income yield, when Investors were seeking yield-enhancement products, and Repackaging Notes were undergoing a revival period (Chatri and Townsend 2021): many Investors were willing to invest in relatively illiquid products to achieve their yield targets (Liu 2021). I studied the EUR cumulative amount issued starting in February 2019 (Graph 9), divided into 5 of the main cash flow structures previously described: Cross-Currency Coupon (24% of the total, graph 10), Fixed-to-Floating Coupon (3%), CMS-linked Coupon (8%), Fixed Coupon with Callable option (15%), Inflation-linked Underlying (6%), and the rest are transactions whose structure is not recognized. The monthly growth rate in EUR nominal amount has double digits in 2019, and gradually decreases until a stable average of 2% as of September 2023, when the total amount outstanding of SPIRE Repackaging Notes reached EUR 40bn. Demand follows a clear upward-sloping trend, with jumps in December 2020, November 2021 and June 2022. The demand for SPIRE Notes did not decrease during the financial market's turmoil generated by the Covid-19 pandemic, when demand slowed down for other types of financial products (Lundin & Ewans 2021), and Investors looking for quick opportunities turned to Repackaging Notes (Mann 2020). According to the Maples Group's proprietary transaction data, the demand for Repackaging Notes was particularly high in the second quarter of 2019, resembling the pattern seen during the 2008 financial crisis downturn, and confirming the appeal of Repacks during times of stress. The same

research in 2022 (Lundin and Bodden 2022) points out that Repackaging activity weakened in the first half of 2021, as improving economic conditions made Investors feel safe to turn back to other products. Nevertheless, demand for SPIRE Repacks does not seem to follow the industry slowdown (Graph 9). This sign of resilience demonstrates Investors' confidence in the structure: adopters might have decided to keep investing in SPIRE for its efficiency and yield enhancement properties instead of returning to more traditional instruments. Demand for SPIRE Notes follows a seasonal pattern, with peaks in October and November and downs in January, representing each respective year's low.

Graph 11. Monthly Amount issued of SPIRE Notes (mn EUR) by payoff structure

Source: Personal Elaboration from Bloomberg Data



Institutional Investors ultimate their annual economic outlooks at the beginning of the year: the limited demand in January might be explained by the need to define a clear strategy before investing. Between 2019 and 2022, the EUR amount issued was below average also in August, likely to be due to holiday effect, but the trend normalized in August 2023, a period of extra-ordinary inflation and interest rates levels, that provided good entry points for CMS-linked Coupon and investments linked to Inflation. The average deal size has been oscillating between EUR 20 mn and EUR 60 mn (Graph 12). Periods characterized by above-average

deal size signal activity from big Institutional Investors, that demand large transactions. An example is the peak of August 2020, when despite the number of series issued was only 5, a Note of Goldman Sachs of EUR 450mn biased the analysis. On the other side, below-average deal size might represent demand from smaller Institutional Investors or market uncertainty, when Investors might prefer to demand multiple notes with the same structure instead of a big transaction, to eventually facilitate a gradual winddown.

b. Demand for Notes with Fixed Coupon with Callable option

Fixed Coupon Notes with Callable option repack almost exclusively French Government Bonds ("OAT") with extremely long maturities, which carry relatively low credit risk and therefore offer low coupon and yield. By embedding a call option exercisable by the Counterparty, the coupon for the Investor is enhanced, because the option premium is distributed across the investment's lifetime. The demand peak between November and December 2020 is justified by a high request for the Repack of OAT with maturity in 2052 (FRTR 0 ¾ 05/25/52), that were issued at the beginning of February 2020. A second peak is between October and November 2021, with 5 repacks from different Banks each of EUR 200 mn of OAT with maturity in 2040 (FRTR 0 ½ 05/25/40). By investing in callable Notes Financial Institutions could achieve the desired exposure to the French credit risk while benefitting from enhanced coupon in a period of historical minimum OAT yield (World Government Bond 2023). Arrangers surveyed by Maples about Repackaging activity in 2021 (Lundin and Bodden 2022), cited the attractiveness of Bond Repacks with callable Asset Swaps, considered interesting by Investors in a low interest rate environment. From the perspective of the Counterparties, the possibility of calling the Swap increases flexibility amid volatile economic conditions.

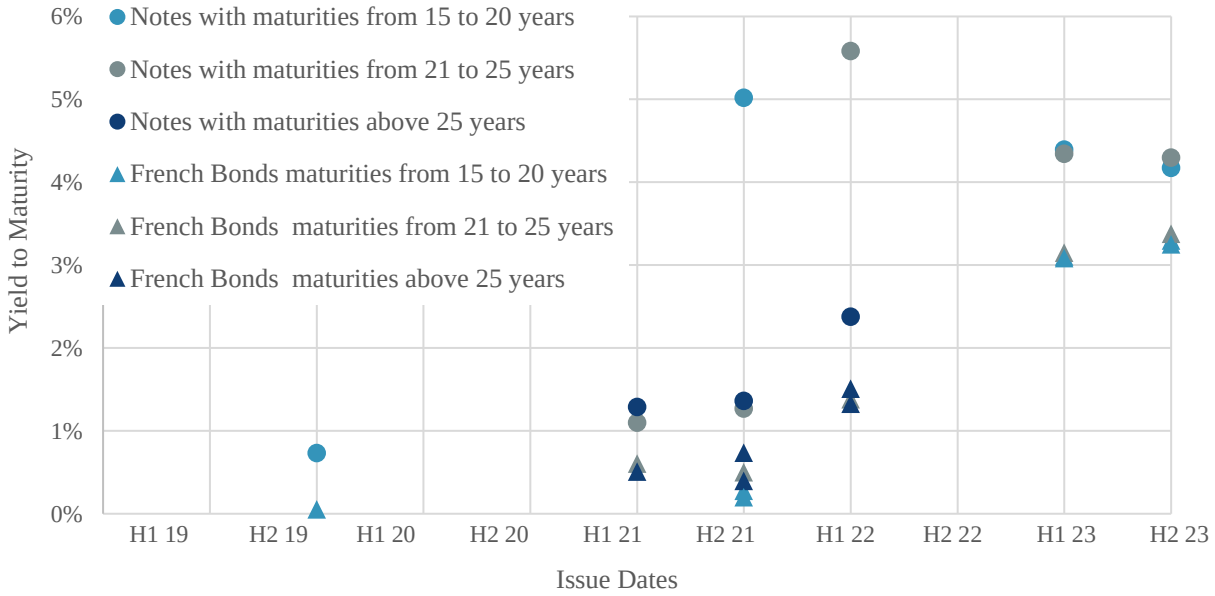
This kind of Note presents the highest average lifetime (Table 2), as it is usually applied to long-dated securities. It also has the highest average deal size, sign of the presence of big Institutional Investors (likely French Insurance companies).

The Yield to Maturity ("YTM") is a standalone figure that allows to evaluate the return on an investment held until maturity, regardless of its credit exposure. It is calculated as the unique rate that generates a PV of 0 when used to discount all the investment's cash flows.

I set up a graph to prove that Fixed Coupon Notes with Callable option are an attractive investment compared to market alternatives. I selected the Fixed Coupon Notes with Callable option on OAT Underlying of my dataset, I divided them by issue date (X-axis) and maturity (color coding in the graph) and downloaded from Bloomberg the YTM as of issue date. The comparable investment must have the same credit exposure and maturity, thus I picked some Fixed-Coupon OAT, matched them to the Notes by maturity, and retrieved their YTM in the same period as the issue dates of the Notes. For all issue dates and maturities, the YTM of the Notes is higher than the market alternative, proving the yield enhancement property.

Graph 13. Historic comparison between YTM of Fixed Notes with Callable option on French Government Bonds and French Government Bonds, by maturity intervals

Source: Personal Elaboration from Bloomberg Data



c. Demand for Notes with CMS-linked Coupon

CMS-linked Coupon Notes were adopted starting in March 2021, probably because they are more complex to be priced. These structures present the lowest average lifetime (Table 2) because forecasting very long-term forwards for CMS pricing requires many assumptions and might be unreliable. Since these instruments are used to monetize from a YC steepening, a high

increase in the demand was observed in September 2022, a period when the European YC was flattening and markets were pointing to an inversion (Bahceli, Westbrook, and Ranasingheb 2022), while the US YC was already inverted since June 2022 (Barbuscia and Randall 2022). Over November the spread between the 2 years and 10 years rates tenors sharpened and kept increasing (Graph 14). The expected inversion was due to hikes in the federal funds rate from the European Central Bank and the Federal Reserve, in an attempt to maintain price stability after a wave of inflation generated by excessive aggregate demand in the aftermath of the Covid-19 pandemic, which had caused tightening of the labor market, increase in demand for price-inelastic supply (still partially disrupted by the pandemic), and higher commodity prices, further exacerbated by the start of the Russia-Ukraine conflict in February 2022 (Bernanke and Blanchard 2023). In periods of flat and inverted YC, forward levels of Swap rates were flat, implying low expectations for long tenors, and therefore high parameters were priced. Investors believing the YC would normalize in the future saw an attractive entry point. The same rationale applies for the period between June 2023 and August 2023, when multiple Notes were issued with a steepener coupon, namely dependent on the difference between a longer CMS tenor and a shorter one, which boosts the coupon in case of steepening starting from an inverted YC.

d. Demand for Notes with inflation-linked Underlying Asset

Notes with Inflation-linked Underlying are used to swap the Underlying's inflation lift-up at maturity for a higher Note coupon. In February 2020 the high amount outstanding is driven by three Repacks by Bank of America of the Government US Bond linked to the US CPI Urban Consumers Index (TII 2 ⅛ 02/15/41) into Fixed Notes. Considering the lag between the pricing of the note and the issue date, and the lag in calculating inflation, I consider the information available at issuance was that inflation increased from 1,0% in November 2019 to 1,3% in December 2019 in the Euro Area (Eurostat 2019) and increased by 0,2% also in the US (U.S. department of Labour 2019). A significant issue of Repacks of the French ILBs with maturity

2053 (FRTR 0.10% 07/25/53) was registered in February 2022. The timing is justified by the first auction of the security in late January 2022 (Agence France Trésor 2023): Investors saw an opportunity to enhance the yield of normal OATs by distributing the inflation lift-up. JPM Morgan has been the main Counterparty, issuing EUR 333mn worth of Notes with this Underlying Asset. In this period, ILBs became more attractive thanks to increasing inflation levels and inflation expectations, as the ECB Survey of Professional Forecasters (2022) published inflation expectations for the first quarter of 2022, revising up 2022's expectations from 1,9% (as of December 2021) to 3%, and 2023's expectations from 1,7% to 1,8%. Longer-term inflation expectations for 2026 went from 1.9% to 2.0%, implying an increase between 0.2 and 0.3 percentage points of longer-term expectations over the previous three rounds. Investors believing that the market was overestimating long-term inflation expectations saw a good entry point to lock in a high fixed coupon.

To prove the yield enhancement property of Notes repackaging ILBs, I repeated the same exercise of retrieving the YTM of the Notes and of investments comparable for maturity, credit exposure, and coupon structure: I compared the YTM at issue date of Notes with BTPei Underlying Asset with the YTM of Fixed Coupon Italian Government Bonds ("BTP") as alternative investment (Graph 15). Results show that the Notes provide higher YTM, by maturity bins, using the same calculation date. Notes provide a yield pick-up because they have the inflation lift-up to be redistributed, not considered in BTP investments.

6. Conclusion

SPIRE Repackaging Notes are attractive investments for Institutional Investors with respect to market alternatives. Like other Repackaging instruments, SPIRE allows to tailor the product to Investors' wishes, by customizing Underlying Asset(s), Note format, and payoff structure, but with the innovation of being able to enter Swap Agreements with different Counterparties. The main features are 1) high structural standardization, benefitting Investors that can use the same

framework for different investments, making it easier to compare Counterparties and improving operational efficiency; 2) sound legal infrastructure of the Notes; 3) possibility to substitute Counterparties or Underlying Asset(s), reducing the impact of the credit risk of the Counterparty and of the Underlying Asset's Issuer; 4) Buyback clause that allows Investor to ask for a Repurchase Price to all other Counterparties in the program, reducing the Original Counterparty bargaining power. Despite the unlikelihood of a Secondary Market to be established, due to high customization and difficulty in the matching mechanism, the Buyback clause with multiple Counterparties allows to achieve some degree of liquidity.

These innovations are positive risk mitigants and allow SPIRE Notes to achieve better Ratings than other Notes, all parameters being equal. Using the same platform, Investors can access a wide range of opportunities using different payoff structures: 1) through CMS Coupon they can embed strategic views about future shapes of the YC, especially attractive in periods of flat curve for Investors expecting a steepening; 2) Notes with Inflation-linked Underlying or Coupon can be used to monetize respectively from the market overestimation or underestimation of future inflation; 3) despite the margin made by Counterparties, yield enhancement can be achieved by repackaging ILBs into Fixed Coupon Notes or by applying callable structures to low-yielding Underlying Asset(s); 4) Cross-Currency Notes are used to avoid carrying separate Swaps in the books and to access easily foreign investments. Historical analysis shows a continuous increase in interest, with total EUR amount issued of 40bn as of September 2023 (according to Bloomberg data). The growth rate in EUR notional is slowing down with respect to the initial years but has stabilized around 2% monthly growth rate of issuances in 2023, with seasonal effects of peaks in October and November and downs in January and August. Demand has been resilient also in challenging economic and financial periods like the Covid-19 pandemic. In conclusion, SPIRE Notes are an attractive product compared to market alternatives, and their popularity is deemed to increase.

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8. Appendix

a. Tables

1. Annual Amount issued of SPIRE Notes (EUR mn)

Year	Amount Issued	Growth rate	Number dealers
2017	360		4
2018	276	-23%	8
2019	4,641	1581%	14
2020	8,792	89%	15
2021	10,367	18%	17
2022	10,684	3%	17

2. Average lifetime and average size of SPIRE Notes, by payoff type

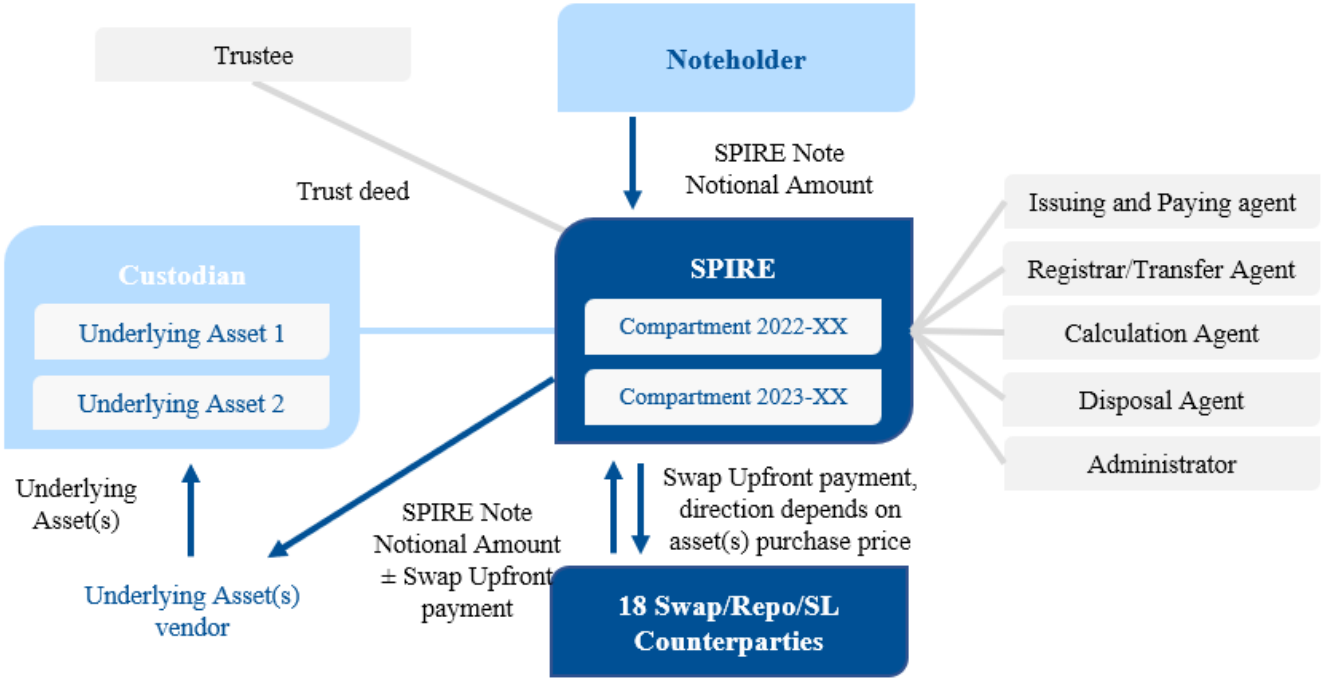
Payoff Structure	Average lifetime	Average deal size
Fixed Coupon with Callable option	28	66
Fixed-to-Floating Coupon	26	45
Cross-Currency Coupon	20	46
CMS-linked Coupon	14	35
Inflation-linked Underlying	21	47

b. Graphs

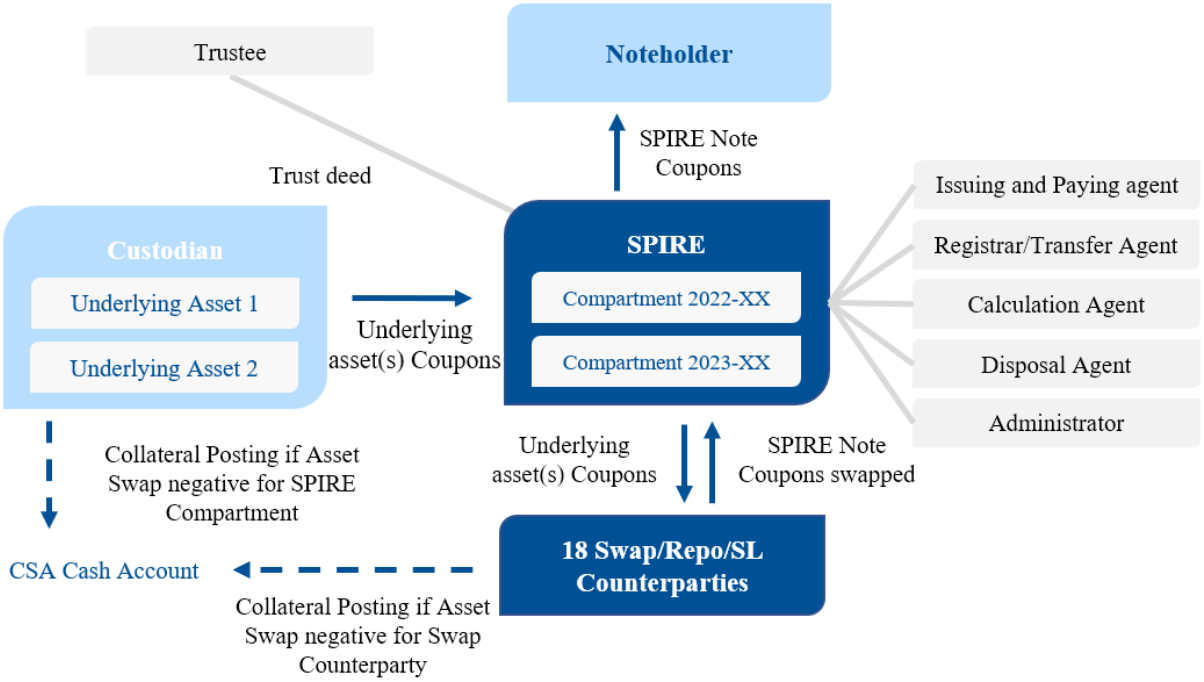
1. Structure of the SPIRE SPV Note, at inception, during the lifetime of the transaction and at maturity

Source: Personal Elaboration from SPIRE S.A Base Prospectus

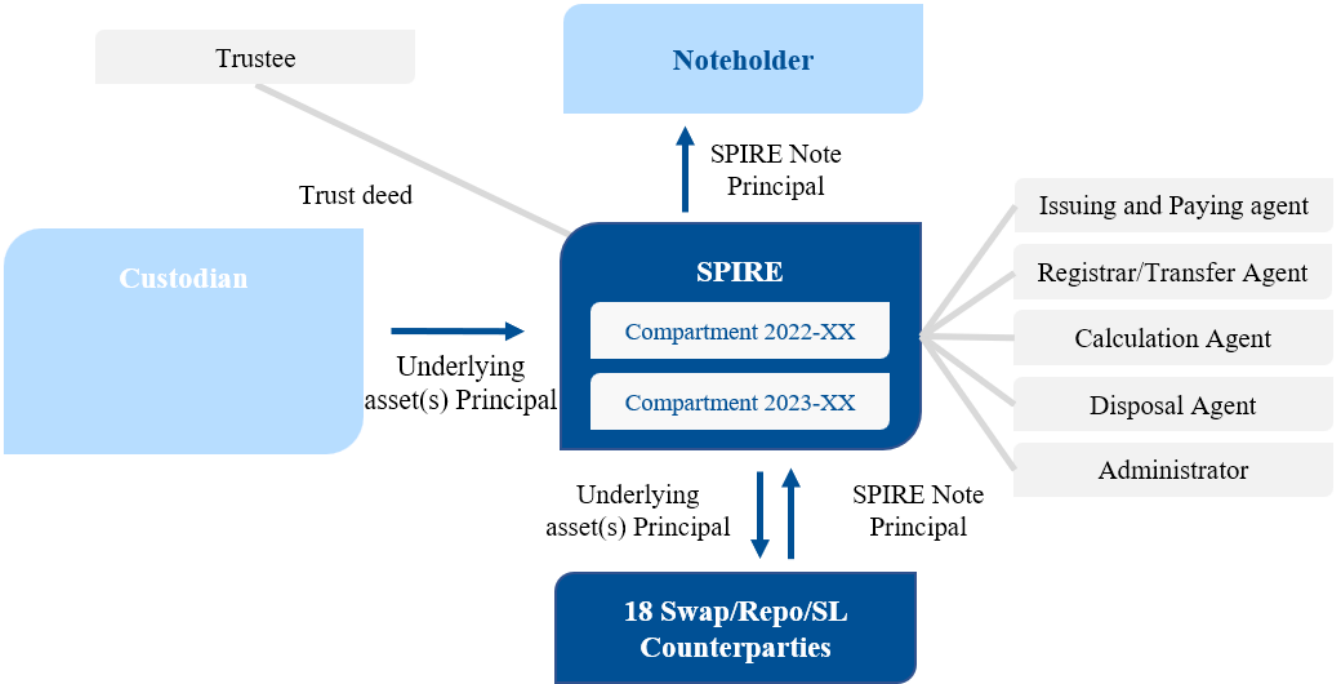
a. At inception



b. During the lifetime of the trade

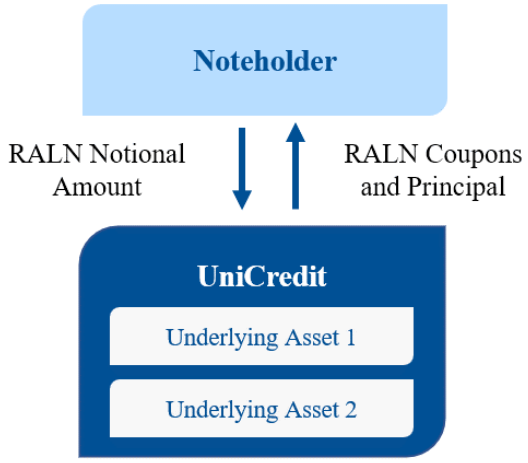


c. At maturity



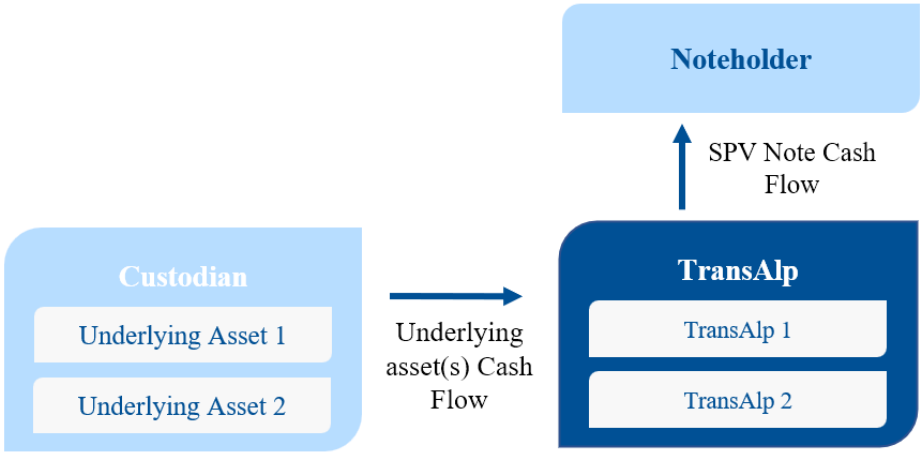
2. Structure of UniCredit RALN

Source: Personal Elaboration



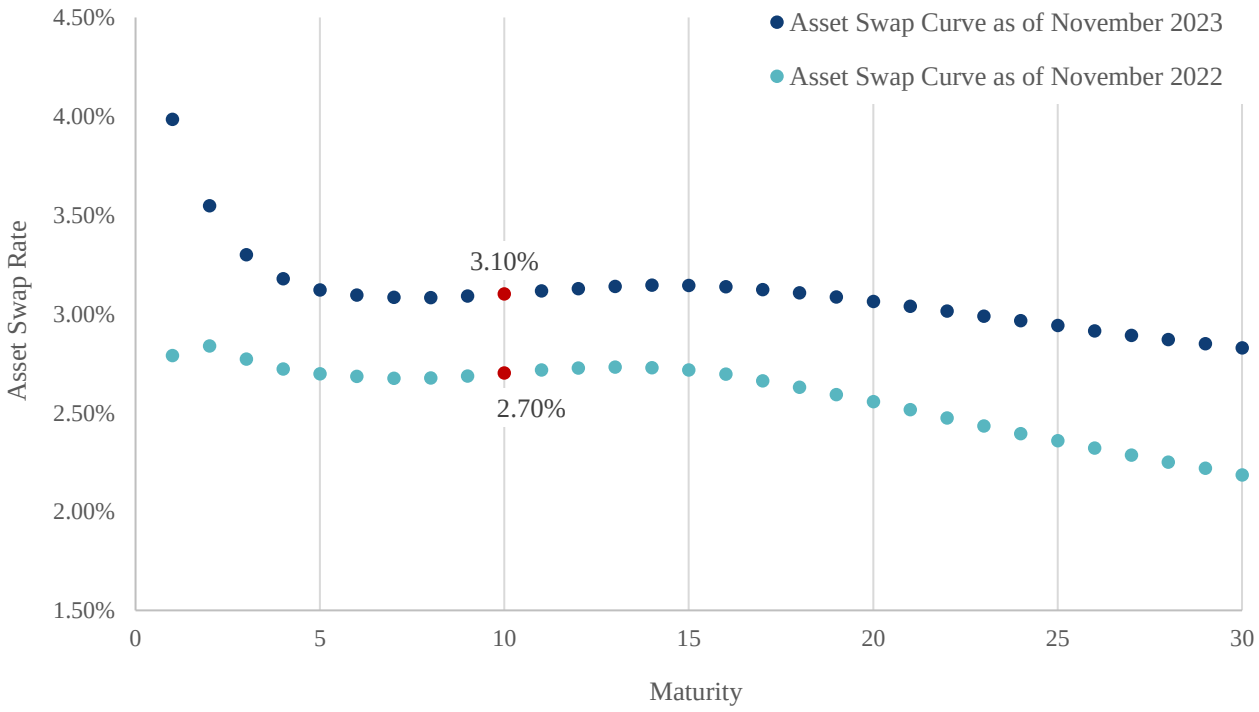
3. Structure of the TransAlp SPV Note

Source: Personal Elaboration



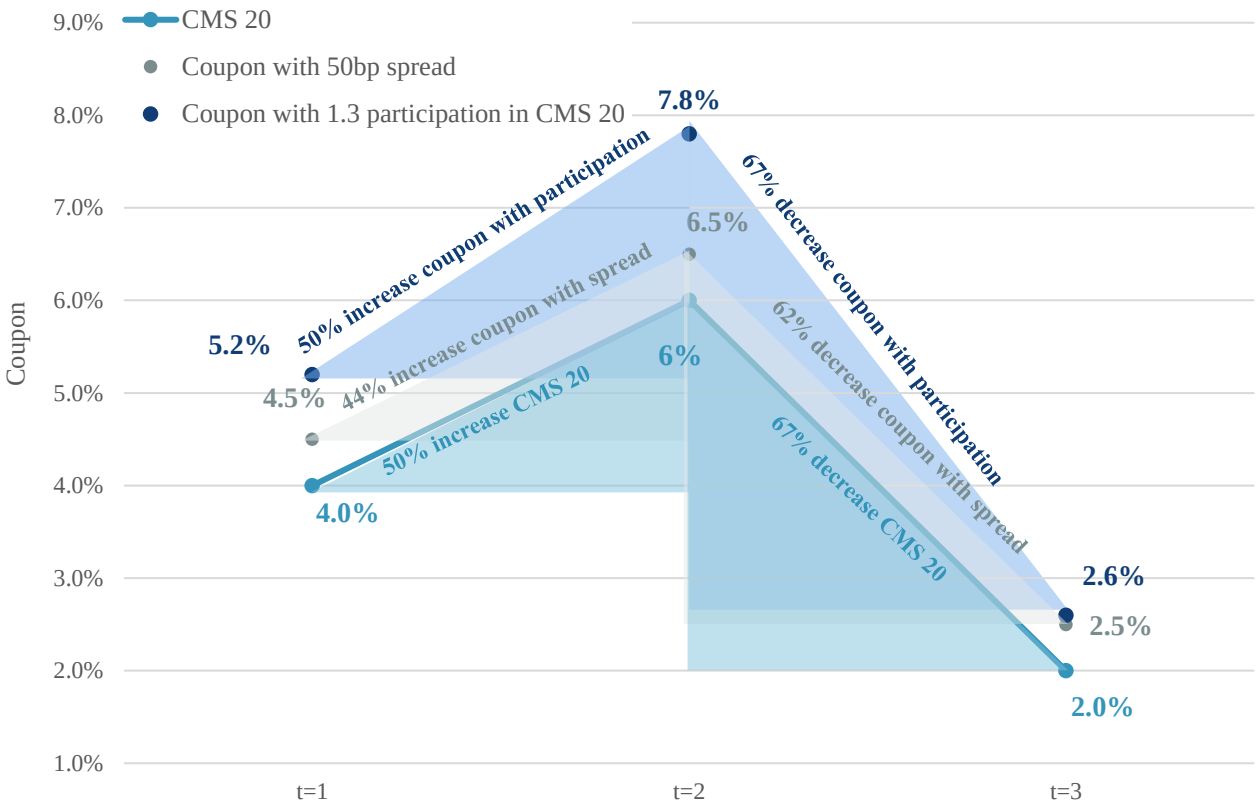
5. Asset Swap curves as of 24th November 2022 and 24th November 2023

Source: Personal Elaboration from Bloomberg Data



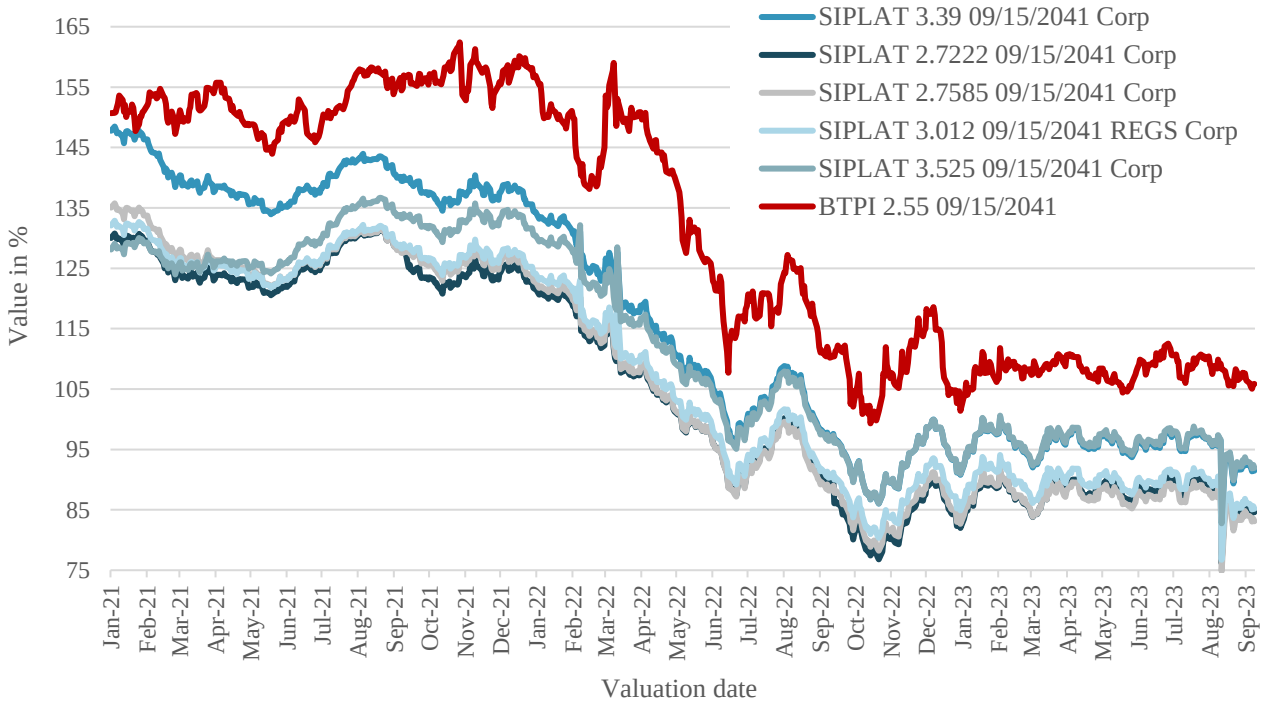
6. CMS coupons sensitivity to CMS rate increase

Source: Personal Elaboration



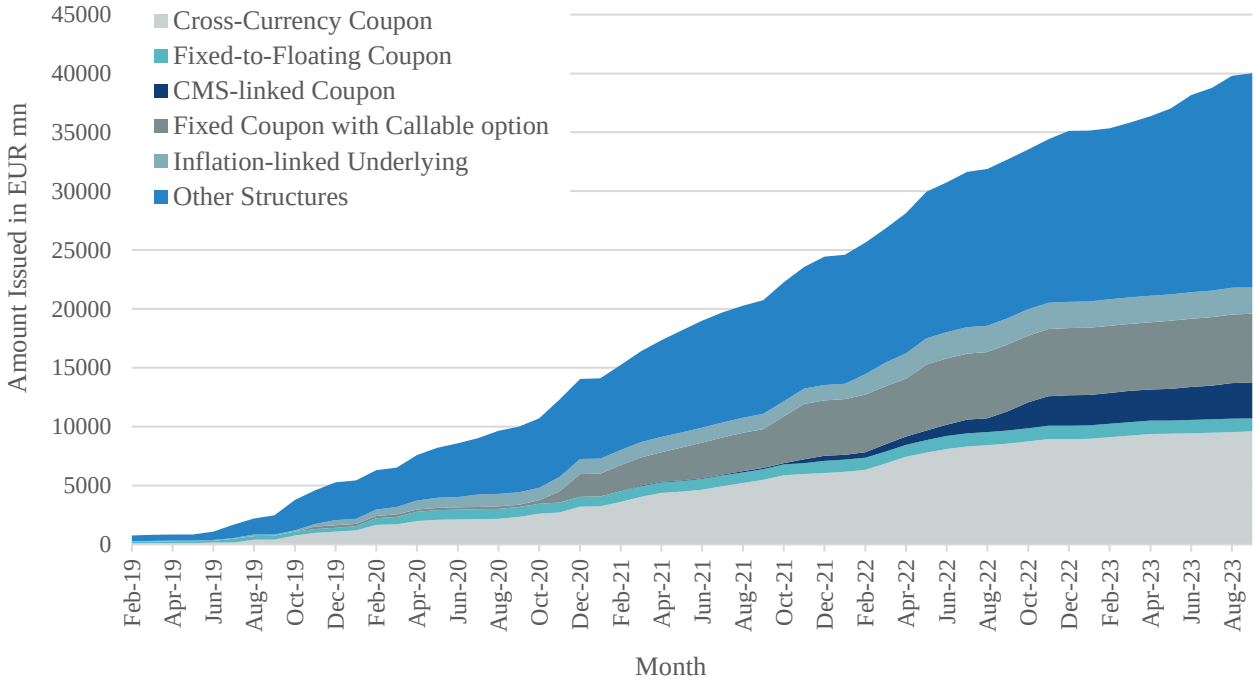
8. Comparison between SPIRE Note and Underlying valuation

Source: Personal Elaboration from Bloomberg Data



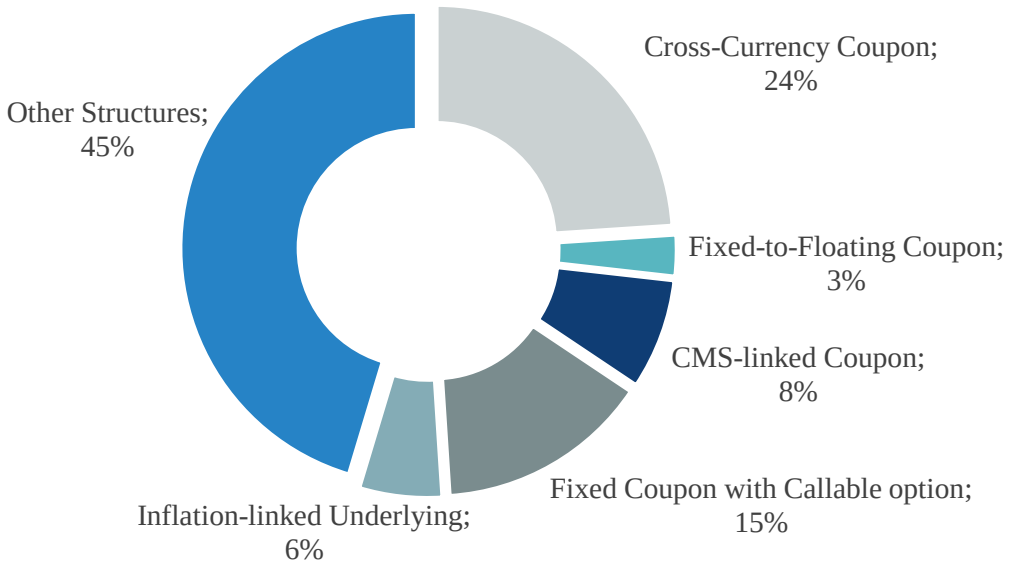
9. Cumulative Amount issued of SPIRE Notes (mn EUR) by payoff structure (Apr 2019 – Oct 2023)

Source: Personal Elaboration from Bloomberg Data



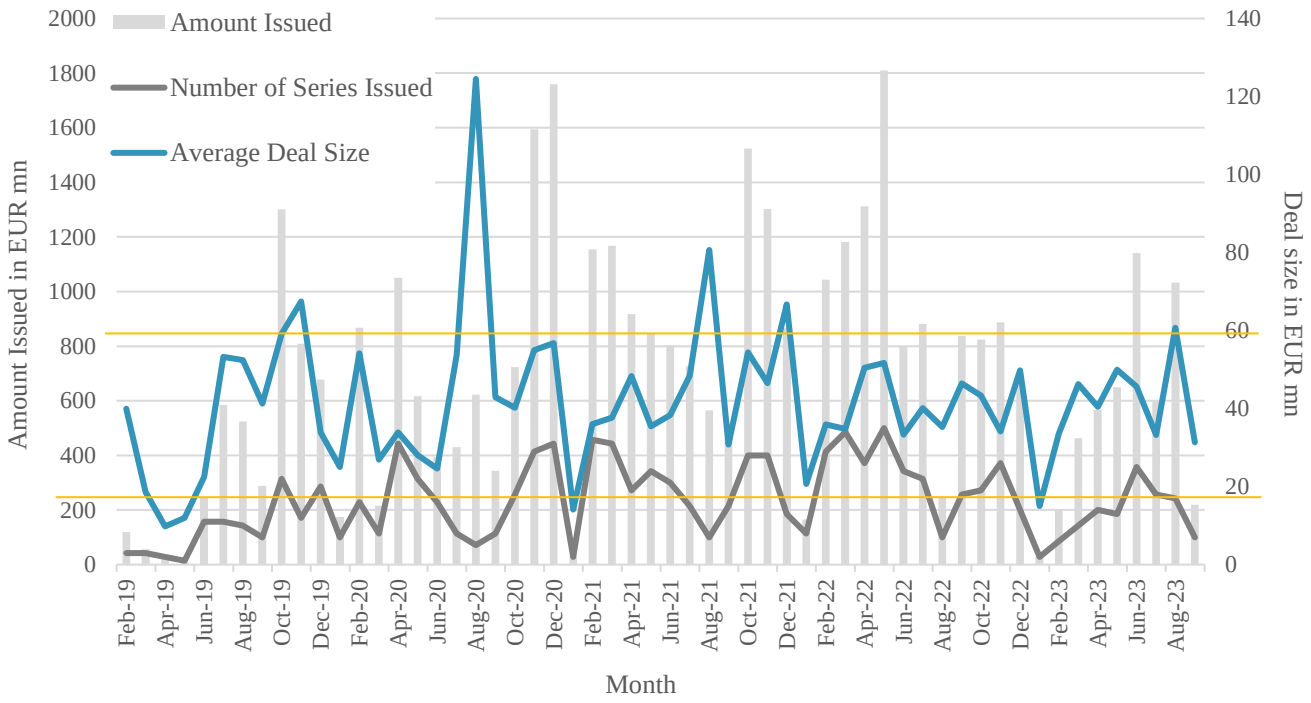
10. Total Amount issued of SPIRE Notes (mn EUR) by payoff structure

Source: Personal Elaboration from Bloomberg Data



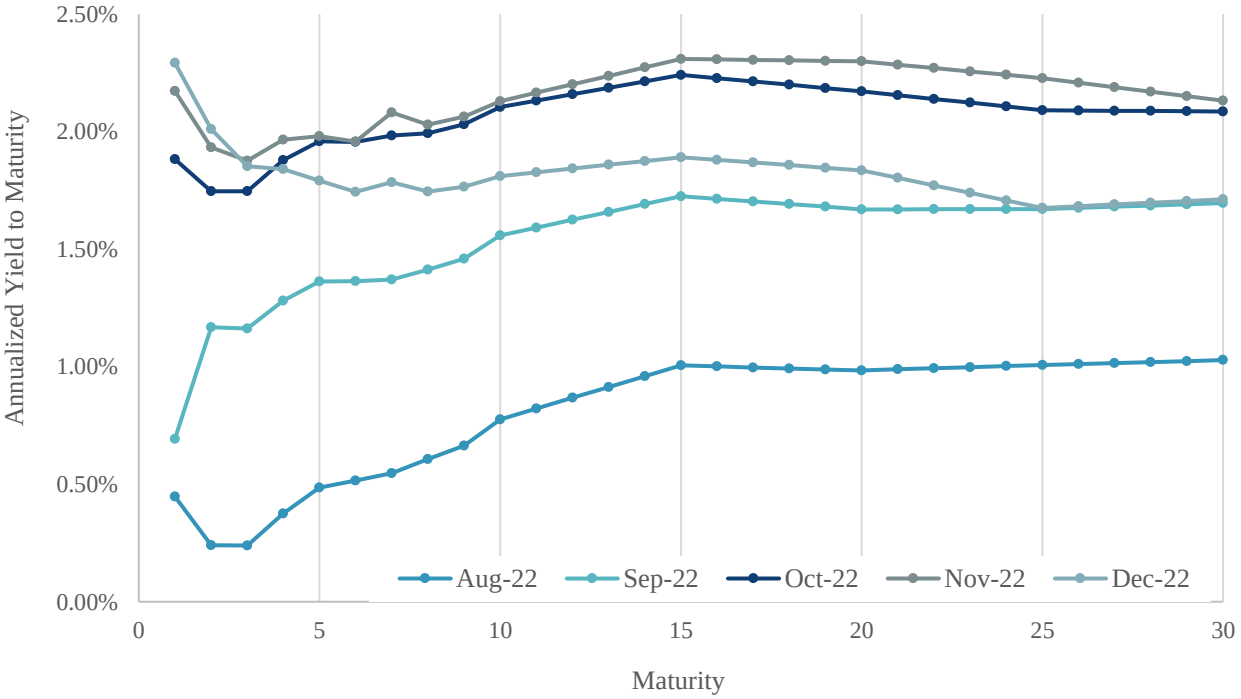
12. Average Deal Size of SPIRE Notes (mn EUR)

Source: Personal Elaboration from Bloomberg Data



14. EURO Benchmark Curves shape between August and December 2022

Source: Personal Elaboration from Bloomberg Data



15. Historic comparison between YTM of Fixed Notes with Italian ILBs as Underlying and Italian Fixed-Coupon Bonds, by maturity intervals

Source: Personal Elaboration from Bloomberg Data