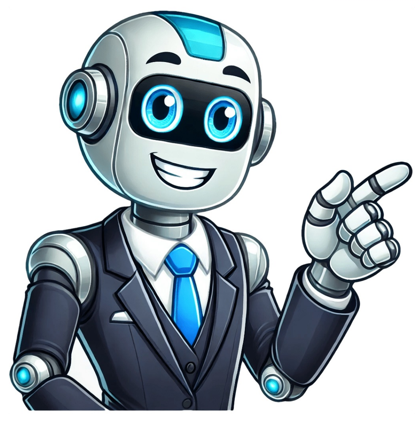

How It WorksLets say a buyer wants to buy a bond but is intimidated by the credit risk of default or bankruptcy of the company. For example, the buyer might want to purchase an oil & gas corporate bond for ten years but is afraid of a possible default around Year 5. Naturally, the buyer would want to hedge against such a credit risk, so they would enter into an asset swap.Lets break the swap down into two steps.There are two main parties involved: 1) the buyer/investor, and 2) the bond seller.Step 1: To start, the bond buyer buys the bond from the bond seller for the dirty price (full price at par plus accrued interest).Step 2: The bond buyer and seller will negotiate a contract that results in the buyer paying fixed coupons to the seller equivalent to the bond coupon rates in exchange for the seller providing the buyer with LIBOR-based floating coupons. The value of the swap would be the spread that the seller pays over or under LIBOR. It is based on two things:The coupon values of the asset compared to the market rate.The accrued interest and the clean price premium or discount compared to par value.The swap shares the same maturity as the original coupon. It means that in the event of the bond defaulting, the buyer will still receive the LIBOR-based floating coupon +/- the spread from the seller.Let us refer to the original oil and gas corporate bond example. Assume, in Year 5, the bond does default. Even though the bond will no longer pay the fixed coupons, the bank will still need to continuously pay the buyer the floating rate until maturity. This is how the buyer hedges against the original risk.Example of an Asset SwapLets look at a specific example with actual numbers. We are looking at a risky bond with the following information.Currency: USDIssue: March 31, 2020Maturity: March 31, 2025Coupon: 7% (annual rate)Price (Dirty)*: 105%Swap Rate: 6%Price Premium: 0.5%Credit Rating: BBB*Dirty Price: The cost of a bond that includes accrued interest based on the coupon rate.Let us break down our example with the steps listed above.Step 1: The buyer will pay 105% of the par value, in addition to 7% fixed coupons. We assume the swap rate is 6%. When the buyer enters into the swap with the seller, the buyer will pay the fixed coupons in return for the LIBOR +/ spread.Step 2: The asset swap price (the spread) is calculated through the fixed coupon rate, the swap rate, and the price premium. Here, the fixed coupon rate is 7%, the swap rate is 6%, and the price premium during the swaps lifetime is 0.5%.Asset Spread = Fixed Coupon Rate Swap Rate Price PremiumAsset Spread = 7% 6% 0.5% = 0.5%Steps 1 and 2 will result in a net spread of 0.5%. The asset swap will be quoted as LIBOR + 0.5% (or LIBOR plus 50 bps).Let us say, for example, that the bond defaults in 2022, even though there are still three years left until maturity in 2025. Remember that the swap shares the same maturity as the coupon. It means that although the bond will no longer pay coupons, the seller will continue paying the buyer with the LIBOR + 0.5% until 2025. It is an example of the buyer successfully hedging against credit risk.More ResourcesCFI is the official provider of the Capital Markets & Securities Analyst (CMSA)certification program, designed to transform anyone into a world-class financial analyst.In order to help you become a world-class financial analyst and advance your career to your fullest potential, these additional resources will be very helpful: Privacy Overview This website uses cookies so that we can provide you with the best user experience possible. Cookie information is stored in your browser and performs functions such as recognising you when you return to our website and helping our team to understand which sections of the website you find most interesting and useful. Strictly Necessary Cookies Strictly Necessary Cookie should be enabled at all times so that we can save your preferences for cookie settings. If you disable this cookie, we will not be able to save your preferences. This means that every time you visit this website you will need to enable or disable cookies again. In Figure 5.1 between the spread to a reference swap rate and the z-spread we see the asset swap spread quoted. In order to appreciate its importance we need to show the basics of an asset swap structure. As represented in Figure 5.2 an asset swap consists of a structure where an investor (the asset swap buyer) holding a bond transfers the bond's coupon onto another party (the asset swap seller), who in returns pays the investor LIBOR plus or minus a spread, the asset swap spread. One could consider an asset swap as a way, on the bond holder's part, to achieve two things: to monetize the bond's credit risk and to do this relative to a standard benchmark such as a LIBOR. The ownership of the bond remains with the bond holder (the asset swap buyer); in case of default the bond holder will bear the brunt of it settling for the recovery rate of the bond. In case of default the swap does not terminate automatically, meaning the bond holder is still liable for the swap coupon payments unless the swap is exited (which usually is done at terms that are suboptimal for the asset swap buyer in these situations[1]). The asset swap spread is meant to offer the bond holder a way to hedge the credit risk of the bond. How is the asset swap spread calculated in practice? FIGURE 6.3 A detailed representation of a par asset swap, where P is the bond price. Before proceeding let us elaborate on our simple picture given by Figure 5.2 where we specify that it shows a par asset swap at inception. This means that the swap was entered into at the same time the bond was issued and both instruments were worth par. While, we shall see in great detail later, a treasury entering into an asset swap structure will always do so at inception and usually at par, let us for the moment maintain a general tone and assume that we are dealing with the situation of an investor who purchases a (fixed rate, for simplicity) bond not at inception and wishes to swap it for a stream of floating payments. The investor has two options, either to enter a par asset swap as shown in Figure 5.3 or a market or proceeds asset swap as shown in Figure 5.4. FIGURE 6.4 A detailed representation of a market (or proceeds) asset swap, where P is the bond price. In Figure 5.3 we have assumed that the bond the investor is swapping is worth less than par. In this situation, one of a par asset swap, the investor needs to pay the asset swap seller up-front the difference between par value and the current bond price. This is because otherwise the investor would begin the swap with a free mark-to-market gain. One could think of this in terms of a fictitious principal exchange: if we were to exchange par principals, the seller would offer the full principal and the buyer would need to do that as well, hence the difference between the bond price and par. During the life of the swap the buyer turns over the coupons C (on a full principal) to the seller and the seller pays a spread over LIBOR to the buyer. At maturity each would pay the full final cash flow and the buyer would also receive the principal from the bond issuer. Now that we have seen the picture in full, how do we calculate the asset swap spread? The situation when the bond is currently worth P, seen from the point of view of the investor, can be expressed mathematically as In the above on the right-hand side we have the purchase of the bond at a price P and an income stream of coupons discounted on a curve adjusted for the credit risk of the issuer. On the left-hand side we have the up-front payment and, for the investor, an income stream of LIBOR payments plus a spread sa and a cost stream of coupons all discounted on a LIBOR-driven (or OIS-driven as shown in Chapter 2) curve. The asset swap spread sa is calculated such that at inception the above structure is fair. In the above we have assumed only one currency for the sake of simplicity and we have assumed that the frequency of the bond is the same as the floating leg payments. We now see how useful it is to use the terminology introduced in Section 5.2.2 in which we use a credit correction to the discount factor. This means that on the right-hand side of Equation 5.11 we do not need to concern ourselves for the moment with how we discount the bond, how we get to the correct yield, and so on. What is crucial is that the same fixed coupon Cj is discounted in two different ways on two sides of Equation 5.11. In Figure 5.4 we describe the situation of a market (or proceeds) asset swap. The investor (or asset swap buyer) has bought a bond at a price P, which is less than the full par value, and instead of entering into a swap with principal 1 he enters into a swap with principal P. During the life of the swap the investor pays the coupons from the bond and receives a set of floating payments on a P principal. However, the coupons and, crucially, the final payment, since they need to match the bond, refer to a full principal which means that the asset swap buyer will pay 1 at maturity to the asset swap seller who will need to increase the natural final payment of the swap, which would have been P, by an amount (1 P). Mathematically we can express this, again from the point of view of the investor, as (5.11) (5.12) The asset swap spread is again the spread that renders the whole structure above fair at inception. For other types of asset swaps and an interesting discussion on the sensitivities of asset swaps, one should see O'Kane [66]. In Equation 5.11 we have highlighted the initial up-front payment that corrects for the fact that the bond price is not par. Previously, in Equation 5.12 we have highlighted the last additional payment, and in order to do so we have included the last principal exchange cash flows in the swap on the left-hand side. As odd as it might seem, this is to show that, whereas in the par asset swap the principal is the same on both swap legs (the principal exchanges are nonexistent since it is a single currency swap), in the market asset swap it isn't and this is because the coupon leg of the swap always has to mirror the bond. Perhaps it is useful to stress it again to avoid confusion. There isn't a real principal exchange at the end, only the additional payment on the asset swap seller side. We have written it in this form in Equation 5.12 for didactic purposes only. Of the spreads that can be used to characterize the credit risk of a bond, benchmarks, swap spreads, and z-spreads are useful indicators to compare different issuers, even across different types of maturities. They are, however, not useful calculation tools and certainly they are not trading tools. No trader would trade a bond using the reference spreads to swap rates, benchmark bonds, or z-spreads (we shall see later, however, how they can be useful to arrive to tradable values for illiquid bonds). Asset swap spreads, on the other hand, are not useful credit indicators because they are driven by the bond price, which in itself is driven by many factors, credit or noncredit related. The spread can be useful to compare two issuers only if we compare two bonds trading roughly at the same price and with similar issue and maturity dates. (For this precise purpose, on the other hand, an asset swap is an extremely useful tool and probably the only one rigorous enough.) However, asset swap spreads are real calculation tools and are tradable values, that is, it is a number a trader would quote. They are particularly important for our discussion because, as we shall see later, asset swap structures constitute the essence of funding and treasury operations. The funding level of an institution is in essence the asset swap at inception of a recently issued bond. We shall conclude our analysis of bond credit with a look at the relationship between bonds and credit default swaps. Welcome back. In this post, a new notebook on a class that I havent seen used a lotin the wild. Enjoy! Subscribe to my Substackto receive my posts in your inbox, or follow me onTwitter orLinkedInif you want to be notified of new posts, or subscribe via RSS ifyoure the tech type: the buttons for all that are in thefooter. Also, Im available for training, both online and (whenpossible) on-site: visit my Training page for more information. Asset swaps import QuantLib as qlimport pandas as pd today = ql.Date(20, ql.May, 2021)ql.Settings.instance().evaluationDate = today The AssetSwap class builds a swap that exchanges the coupons from agiven bond for floating-rate coupons. Lets take a fixed-rate bond as an example: schedule = ql.Schedule(ql.Date(8, ql.February, 2020), ql.Date(8, ql.February, 2025), ql.Period(6, ql.Months), ql.TARGET(), ql.Following, ql.Following, ql.DateGeneration.Backward, False,)settlementDays = 3faceAmount = 100coupons = [0.03]paymentDayCounter = ql.Thirty360(ql.Thirty360.BondBasis) bond = ql.FixedRateBond(settlementDays, faceAmount, schedule, coupons, paymentDayCounter) Besides the bond, the AssetSwap constructor takes the floating-rateindex used to fix the exchanged coupons forecast_curve = ql.RelinkableYieldTermStructureHandle(ql.FlatForward(today, 0.01, ql.Actual360()))index = ql.Euribor6M(forecast_curve) and other parameters: a spread over the floating rate, the bond price,the schedule for the floating-rate coupons (which is optional: if wepass an empty one, the swap will use the same as the bond), theday-count convention for the floating-rate coupons, and a couple offlags specifying the kind of swap were creating. spread = 0.0050bond_price = 103.0 pay_fixed = Truepar_asset_swap = False swap = ql.AssetSwap(pay_fixed, bond, bond_price, index, spread, ql.Schedule(), index.dayCounter(), par_asset_swap,) When par_asset_swap = False, the swap creates floating-rate couponspaid on a notional equal to the bond price. As for bonds, its possibleto extract the coupons and retrieve information on each one: def print_coupon_info(cashflows): data = [] for cf in cashflows: c = ql.as_coupon(cf) if c is not None: data.append((c.date(), c.rate(), c.nominal(), c.amount())) else: data.append((cf.date(), None, None, cf.amount())) return pd.DataFrame(data, columns=["date", "rate", "notional", "amount"]).style.format({"amount": "{:.2f}", "notional": "{:.2f}", "rate": "{:.2%}"}) print_coupon_info(bond.cashflows()) date rate notional amount 0 August 10th, 2020 3.00% 100.00 1.50 1 February 8th, 2021 3.00% 100.00 1.48 2 August 9th, 2021 3.00% 100.00 1.51 3 February 8th, 2022 3.00% 100.00 1.49 4 August 8th, 2022 3.00% 100.00 1.50 5 February 8th, 2023 3.00% 100.00 1.50 6 August 8th, 2023 3.00% 100.00 1.50 7 February 8th, 2024 3.00% 100.00 1.50 8 August 8th, 2024 3.00% 100.00 1.50 9 February 10th, 2025 3.00% 100.00 1.52 10 February 10th, 2025 nan% nan 100.00 print_coupon_info(swap.leg(0)) date rate notional amount 0 August 9th, 2021 3.00% 100.00 1.51 1 February 8th, 2022 3.00% 100.00 1.49 2 August 8th, 2022 3.00% 100.00 1.50 3 February 8th, 2023 3.00% 100.00 1.50 4 August 8th, 2023 3.00% 100.00 1.50 5 February 8th, 2024 3.00% 100.00 1.50 6 August 8th, 2024 3.00% 100.00 1.50 7 February 10th, 2025 3.00% 100.00 1.52 8 February 10th, 2025 nan% nan 100.00 print_coupon_info(swap.leg(1)) date rate notional amount 0 August 10th, 2021 1.50% 103.89 0.33 1 February 10th, 2022 1.50% 103.89 0.80 2 August 10th, 2022 1.50% 103.89 0.78 3 February 10th, 2023 1.50% 103.89 0.80 4 August 10th, 2023 1.50% 103.89 0.78 5 February 12th, 2024 1.50% 103.89 0.81 6 August 12th, 2024 1.50% 103.89 0.79 7 February 10th, 2025 1.50% 103.89 0.79 8 February 10th, 2025 nan% nan 103.89 Par asset swaps When par_asset_swap = True, the floating-rate coupons are paid on anotional equal to 100 and the swap includes an upfront payment: par_asset_swap = True swap = ql.AssetSwap(pay_fixed, bond, bond_price, index, spread, ql.Schedule(), index.dayCounter(), par_asset_swap,) print_coupon_info(swap.leg(0)) date rate notional amount 0 August 9th, 2021 3.00% 100.00 1.51 1 February 8th, 2022 3.00% 100.00 1.49 2 August 8th, 2022 3.00% 100.00 1.50 3 February 8th, 2023 3.00% 100.00 1.50 4 August 8th, 2023 3.00% 100.00 1.50 5 February 8th, 2024 3.00% 100.00 1.50 6 August 8th, 2024 3.00% 100.00 1.50 7 February 10th, 2025 3.00% 100.00 1.52 8 February 10th, 2025 nan% nan 100.00 print_coupon_info(swap.leg(1)) date rate notional amount 0 May 25th, 2021 nan% nan 3.89 1 August 10th, 2021 1.50% 100.00 0.32 2 February 10th, 2022 1.50% 100.00 0.77 3 August 10th, 2022 1.50% 100.00 0.76 4 February 10th, 2023 1.50% 100.00 0.77 5 August 10th, 2023 1.50% 100.00 0.76 6 February 12th, 2024 1.50% 100.00 0.78 7 August 12th, 2024 1.50% 100.00 0.76 8 February 10th, 2025 1.50% 100.00 0.76 9 February 10th, 2025 nan% nan 100.00 In both cases, once we give it an discounting engine, the swap canreturn more information. discount_curve = ql.YieldTermStructureHandle(ql.FlatForward(today, 0.02, ql.Actual360()))swap.setPricingEngine(ql.DiscountingSwapEngine(discount_curve)) The NPV and legNPV methods return the value of the swap or of eitherleg. In this case were paying the bond coupons, therefore thecorresponding leg has a negative value. print(swap.NPV())print(swap.legNPV(0))print(swap.legNPV(1)) -2.230481904331157-104.26057030905751102.03008840472636 Its also possible to retrieve the spread over the floating index thatwould make the swap fair: fair_spread = swap.fairSpread()print(fair_spread) We can test it by re-building the swap with this spread and asking forthe NPV again: swap = ql.AssetSwap(pay_fixed, bond, bond_price, index, fair_spread, ql.Schedule(), index.dayCounter(), par_asset_swap,)swap.setPricingEngine(ql.DiscountingSwapEngine(discount_curve)) print(swap.NPV())print(swap.legNPV(0))print(swap.legNPV(1)) 0.0-104.26057030905751104.26057030905751 print_coupon_info(swap.leg(0)) date rate notional amount 0 August 9th, 2021 3.00% 100.00 1.51 1 February 8th, 2022 3.00% 100.00 1.49 2 August 8th, 2022 3.00% 100.00 1.50 3 February 8th, 2023 3.00% 100.00 1.50 4 August 8th, 2023 3.00% 100.00 1.50 5 February 8th, 2024 3.00% 100.00 1.50 6 August 8th, 2024 3.00% 100.00 1.50 7 February 10th, 2025 3.00% 100.00 1.52 8 February 10th, 2025 nan% nan 100.00 print_coupon_info(swap.leg(1)) date rate notional amount 0 May 25th, 2021 nan% nan 3.89 1 August 10th, 2021 2.12% 100.00 0.45 2 February 10th, 2022 2.12% 100.00 1.08 3 August 10th, 2022 2.12% 100.00 1.07 4 February 10th, 2023 2.12% 100.00 1.08 5 August 10th, 2023 2.12% 100.00 1.07 6 February 12th, 2024 2.12% 100.00 1.10 7 August 12th, 2024 2.12% 100.00 1.07 8 February 10th, 2025 2.12% 100.00 1.07 9 February 10th, 2025 nan% nan 100.00 Asset swaps can be built based on other kinds of bonds besidesfixed-rate ones; the resulting instances work the same way. Asset swaps provide a form of asset financing, where investors borrow funds to purchase an asset, typically a bond. Asset swaps are also a good bond rich-cheap analysis tool. Such swaps can of course be used for speculative purposes. In this paper we provide a brief overview of asset swaps and derive a par-par asset swap spread formula incorporating bond accrued interest. Finally we illustrate how to calculate both the yield-yield and par-par asset swap spread using the liquid 10 year German Bund Extent: 1 Online-Ressource (10 p) Type of publication: Book / Working Paper Language: English Notes: Nach Informationen von SSRN wurde die ursprngliche Fassung des Dokuments December 3, 2016 erstellt Other identifiers: 10.2139/ssrn.2809111 [DOI] Classification: C00 - Mathematical and Quantitative Methods. General ; C02 - Mathematical Methods ; D46 - Value Theory ; E40 - Money and Interest Rates. General ; E44 - Financial Markets and the Macroeconomy ; E50 - Monetary Policy, Central Banking and the Supply of Money and Credit. General ; F00 - International Economics. General ; F30 - International Finance. General ; G10 - General Financial Markets. General ; G12 - Asset Pricing Source: ECONIS - Online Catalogue of the ZBW Persistent link:

Par par vs proceeds asset swap. Par par asset swap example. What is a par par asset swap. Asset swap par par yield yield. Asset swap example. What is an asset swap.