

TRANSCRIPT

What you need to know about bond pricing

Richard Carter: Good afternoon, everybody. For those of you in the East Coast, and good morning still on the West Coast. My name is Richard Carter, and as Jonathan was saying, I'm joined here today by my colleague Steven Traugott for this seminar on understanding bond pricing. For those of you who may be less familiar with our webinar series, you know, this is one of these presentations where we're looking from the perspective of holders of individual bonds. You know, obviously fixed income investing can take various forms, and different types of instruments. But we're really focusing today on individual bonds, and any of you who have invested in individual bonds, and know about that can understand how sometimes challenging that can be. You know, holding a portfolio with multiple positions, or bonds, and perhaps even experienced how the pricing of those bonds may be a little bit more challenging than with say, stock investing, where there's pretty much constant pricing on any U.S. traded stock.

We're also going to cover a little bit about how the bond market varies when it comes to pricing, in terms of the cost of making those transactions, and why

we think it's important also to consider that. Because it ultimately all feeds into the yield that you are capturing as a bond investor.

So as we look at the presentation today, we're going to cover three main blocks. First of all, we're going to take a spin through the bond market at a pretty high level, but we're going to use that to set the context. And I think from there, it'll be helpful to understand some of the structures, structural influences on bond pricing. And then, for the meat of the presentation, we're going to look here at the different types of pricing that exist for individual bonds. In broad strokes, this goes to the topic of valuation pricing, historical pricing, and then live pricing. So we'll cover those three main components. And then as I was just saying, we'll end on the aspect of trading costs, and how those influence bond pricing as well.

So let's now look at the bond market from the point of view of this context setting. We'll look at the makeup of the markets, the major bond types, the size of the markets, and the volumes traded, and outstanding. So, when you look at the bond market compared to the stock market. First of all, it's important to think about how, you know, many of us who may be familiar with the stock market think of the stock market as essentially a fairly homogenous market of shares. They are shares of corporations, publicly traded companies.

And yet, over in the bond market, we actually have a diversity of different types of instruments. Everything from corporations, of course, but also governments. Government agencies and municipalities in the U.S., these are the main constituents of the bond market. When you look at the comparison against size as well, really in the stock market, you're thinking of shares that are varied by large corporations, multinational corporations, multibillion valuations, all the way down to the small startup companies, trading in as far as penny stocks, ultimately. But again, that is, those are denominated in different levels, but ultimately could be, each of them could be fairly liquid when it comes to the trading.

Whereas when you think about the bond market, we have here multiple issues from the same issuers, sometimes those issues can be very large, multibillion issuance from say the Treasury or some of the large municipalities, and yet those same issuers could also issue small increments. So again, a wide variety, and that influences the amount of pricing you get to see on those issues themselves. And actually where you think of the trading marketplace venues, in the stock market, more familiar I'm sure with the NYSE, the NASDAQ, these places where visibility or transparency is fairly easily attained by anyone accessing those pricing venues, over in the bond market, it's largely what we

call an over the counter market. A market where bonds are traded between dealers, or between broker and their clients, and this leads to a fairly inherent amount of fragmentation. And we'll show you in this presentation how various steps from both regulators and also from participants such as Fidelity have worked over the years recently to improve the amount of data visibility. And it's still quite a fragmented context here.

And finally, when we look at pricing transparency, that centralization that you see in the stock market I think helps basically everyone to see, at a given point in time, what a price is for a given security. Over in the bond markets, it is again, influenced by the size of the issue, size of the issuer, and that can lead to, you know, easily visible prices on a daily basis, versus when you look at some of the smaller issues, and we'll show you in this presentation, a lot less liquidity, and therefore, in a way, you can understand a lot less easy to determine what is the current price at any one point in time if you seek to mock the market.

So Steve, maybe I could just turn it over to you now to show us in quantitative terms some of the central influences at work to the two markets here.

Steven Traugott: Absolutely, thanks Richard. As you pointed out, compared to the equity market, the bond market is definitely much bigger and more complex. And we have some statistics to kind of show that here on the next slide. So, when we look at the markets, you can see that the relative market size between the two is fairly similar. However, when we look at the daily trading volumes, the bond market is over double the size of what you see in the stock market on a given day. You know, in addition to that, I think one of the even more interesting things to note is the number of securities that are traded in each of these markets on a given day.

So in the stock market, we had about 5,300 or just over 5,300 companies that are going to be traded. However, on the bond side, you'll see over 1.1 million different CUSIPs that are potentially traded, or outstanding issues available at any given time. So, a CUSIP is just an industry-wide identifier that's used for securities. So we'll go into a little detail on those later, but obviously, a major difference between the two markets is just a number of available issues out there.

So if we look at a specific example we have here for you, is Ford. So on the stock side, their market cap is about \$34 billion, where on the bond side, they have just around \$79 billion in outstanding bonds currently in the market. And

then the big difference, when you go and look at the stock market, there's one ticker for Ford. You know, and when you look up, whereas on the bond side, we have about 311 different CUSIPs and unique CUSIPs that Ford has out there at this time.

So as we dig a little bit deeper into the volume of the bond market, we can see this next chart, the green bars here represent the trading volumes on a given day, and for each of the different types of fixed income securities that we have, and that's represented on the left axis. And then we have in the blue diamonds the number of unique CUSIPs that are available in each of those markets. And that's represented on the right axis. So if we take a quick look at that, we can compare and contrast some of the different products that we have. So for example, Treasuries, the most liquid market in the world, we will see about 589 billion in daily trading volume. And that's only with about 1,000 unique CUSIPs that are available. Whereas when we contrast that to the municipal market, for example, we see only 12 billion in daily trading volume, yet there's almost 990,000 different unique CUSIPs available in that marketplace. So quite a difference there, you can see between those two.

So as we dive into the rest of this presentation, you know, we will see that the bond market is complex, and can be difficult to navigate. But we do hope that

we can shed some light on how you can use the tools available here at Fidelity to help you evaluate both historical and live pricing on bonds.

Richard Carter: Thank you, Steve. Yeah, so I mean with that last shot particularly in mind, we're going to now look at pricing. And as I said earlier, we're going to divide it into three areas. Valuation pricing, historical, and then live pricing.

So let's first of all consider, in the context of valuation pricing, the statements. Here's a statement many of you may be familiar with. We've highlighted in the green column the most recent price that's relevant for this statement, which was taken on December 31st, 2018. So, you know, it's a monthly snapshot, if you like, of one's holdings with the price there. And you can see the imperative for the statement that we need a price in order to obviously add up for the client the entire portfolio. And as you'll see later on, it may well be that some of these bonds may not actually trade day to day. So unlike the stock market, where your stock prices will be the last traded price of a given day, again in this case, the end of the month, that may not be the case, there may not even be trading for a particular bond. But nevertheless, we need to come up with a price, for the purposes of reckoning.

And to that end, we have captured here in this statement data derived from third parties, Fidelity contracted several third parties, companies like IDC Data, and also S&P, to provide us with an objective third party evaluation. And if there were no trading of a particular issue on a given day, these companies are expert at looking at comparable securities to see where they've been priced, and what kind of influences they've been subject to from the market, and distinguish that from specific issuer situations. And evaluate what a price might be accurate for a particular bond, but may not have actually traded on that particular day.

So that same approach carries through to this screenshot here, which is on slide, sorry, slide 13. It shows here a snapshot of the positions page on Fidelity.com. So again, you're looking at this column which is highlighted here, the last price, it is the price from the prior night. So, unlike in equities, where you'd see a price that was literally intraday, if the security has just rated, you'll see that most recent price. In the fixed income case, with individual bonds, all these prices are derived from the prior day's valuation price, so you can see here the same price, we highlight one here, 102.406 for this New York General Obligation bond.

And then carrying it through, this is what we call our bond details page. If you open up a bond, diving into a bond, you'll see two tabs. The first tab here, shown on the left, highlights in the overview, items to do the bond structure, such as the coupon, the maturity date, etc. But over to the right, we have a snapshot when you highlight the tab for price and performance. And it covers several risk metrics, and several prices. And you can see here, when we took the screenshot, this New York bond did not have a live price, or on the bid or the ask side, you can see here the letters N/A. Because this particular bond wasn't trading. But if you look further down where we highlight what we call here the third-party price, there's the same number we saw before on the positions page, 102.406. So in the context of the bond details page, we actually call it the third-party price. Again, think of it as an evaluated price, updated daily, usually around sort of 2:00, 3:00 a.m., if you're up at that time. But it then will persist for the rest of the day. So if this bond were to trade, you could compare live prices with this third-party evaluated price from the night before.

Steven Traugott: Excellent. So when we look at some of the tools that are available that utilize this third party price, one of them that we do have is our fixed income analytics tool. And so, this tool uses that third-party pricing, the overnight evaluation price, to put together a number of summary calculations

that you can utilize as a customer on your current holdings. You can use hypothetical holdings, outside holdings. Any of those holdings that are in your, listed in your analytics page, in the positions page, we will then put a third-party price on that, and then can run these summary calculations. So without an overnight evaluation price, we wouldn't be able to provide, or run the analytics that really make this tool work for you as a customer. As well, when we look at this tool, you can look at different types of cashflow summaries, both monthly and yearly, on principal and interest. And you can look at things, more detailed analytics such as duration, credit ratings, and a number of other tools that we show, and analytics that we show as part of this tool.

Richard Carter: Great Steve, thank you. So I think you've really illustrated again why we need this valuation price for our, all the bonds that we make available, and customers own. Let's now shift to historical pricing, and maybe you could just take us through why we need to distinguish valuation pricing from historical pricing, why can't we just use historical pricing, you know, and not have this thing called valuation pricing?

Steven Traugott: Absolutely. So as we flip to the next slide, we start to point out the need for that kind of important historical pricing, which we can find through

recent trades. So, when we look at both corporates, municipals, agencies, they all are reported trades from the entire market, not just Fidelity's customers, or Fidelity trades, but the entire market, that we allow customers to look at through our recent trades tab. So, what we have here is a municipal bond, and we'll find that for municipal bonds, the -- a number of times that they are going to trade in a given day, or a given month, is going to be fairly small.

So in this case, we see another New York municipal bond that traded back on August 20th. Prior to that, there wasn't a trade before that until July 30th. So in cases like this, when the trading isn't as current, that's when you might want to look and say OK, well let me look at that third-party evaluation and see what they have, as far as a price on the bond. Now when we go to the corporate side, there may be a little bit more information and more intraday trading, or daily trading, in which case the recent trades is going to give us a very good indication of where that historical trading has been.

Richard Carter: Well you're saying that Steve, right, it's -- for this example with the muni, that the, there may not be enough historical trading going on for a day or week at a time, but the valuation price could change nevertheless, right, day to day?

Steven Traugott: Yes, so exactly. So even though there's not the daily trading we'll see in the recent trade, that evaluation price gets updated every night to give you a little bit of an idea of where the market movement may have occurred on a given day, and how that's reflected in the price of that bond.

Richard Carter: Excellent, all right. So good, thank you Steve. So that hopefully has covered those two topics. Now let's look at live pricing in the bond market, and to begin this topic, we're going to look at the slide here, which is a map, if you like, of our inventory, and how at Fidelity, clients who visit our website typically see, as you can see on the left, something in the order of 50,000 unique bonds offered at a given point in time during the day. And that equates to over 75,000 different offerings. So we'll go into the difference between these two numbers in a second, but think of it as again, the 50,000 unique bonds, and the offerings are offerings from various dealers, sometimes several dealers offering the same bond, hence the number 75 is bigger than the 50.

So now going to the diagram, over to the far right, you see where, what I'm talking about here when I'm referencing multiple dealers. You can see here many large companies, names you may be familiar with, Citigroup, UBS,

Goldman Sachs, etc. In fact, Fidelity has its bond inventory derived or aggregated from over 100 different dealers. So when we show our bond inventory, our bond offering, it's not just our own in-house offerings. In fact, our Fidelity offerings constitute only about 2% of our total availability that we make available for our clients. The vast majority comes from dealers across the street. And you can see in this diagram, if you move slightly to the left, the light blue column, one of those sources, as I said, is Fidelity Capital Markets, our own in-house bond inventory.

But in the middle, Tradeweb Direct, ICE BondPoint and TMC, are three, what we call ATs, or alternative trading systems. Think of them as aggregators working behind the scenes with electronic connections to the right, to the dealers on the right, and then in turn, electronic connections back up to Fidelity, and to Fidelity.com. So essentially, what we do is to work with these ATs, and our internal capital markets partner, and we gather the sort of aggregation of aggregations in order to feed the fullest pictures we can to Fidelity.com. And we'll show in a second that our philosophy here is not to in any way bias our own inventory, we really have the principle of the best price showing forward on all of these bond offerings.

So, when you -- as a client, when you visit the website, this is how that translates to what you see. Here's an example, a corporate bond search. And at any one day, we may well be shown something in the order of 7,000, 8,000 different corporate bonds. This is how you'll see it after performing. You may fall back a more narrow subset of that, of course. But you know, here's a couple of bonds, and you can see we've highlighted the two columns to focus on. One is the bid side, and one is the ask side. So the bid side being what a dealer is willing to pay to buy this bond from you if you have it. Alternatively, most of our clients will be looking at the ask column here, where there's an ask price, and an ask yield, and these are the best prices available for this particular offering at this particular point in time. Again, aggregated and derived from the multiple dealers that we've just shown you on the previous slide.

So the intent, coming back to the very beginning of this presentation, where we showed you how there isn't a central point, like in NYSE or in NASDAQ, for bonds, our intent here is in this over the counter, fairly fragmented market, to aggregate offerings and prices, in order to show through the most accurate and hopefully the most aggressive, in many clients' benefit, the price available.

Steven Traugott: So, if we dig a little bit deeper into some of the specific product types, and what you might see, here we have, on the next slide, a look at live pricings for both Treasuries and corporate bonds. And so we look at these two first, mostly because they're the more liquid markets that you're going to find. And by that, I mean for the majority of the time on Treasuries, pretty much always we're going to see both a bid and an ask price available when you look up the bonds. For corporates, which would be the second line, we have an example there of a corporate, a Wells Fargo bond, generally between 90 and 95% of the corporate bonds, you'll see also both a bid and an ask price available online.

So the nice thing about seeing liquid markets such as these is you can see that the spread, or the difference between where you can buy a bond, or purchase a bond, and where you could sell that bond, is very narrow. Meaning you as a customer are not losing a lot of your value on the trade to the dealer who is making a market between this bid and ask price. So looking at the Treasury, for example, our example on the top, we can see that the yield spread is only 0.005%, so a very narrow market. Whereas if we look at the corporates, also a very narrow yield spread of 0.011%.

So now when we contrast that to, and look at our next slide, we get to municipal bond offerings. So as we discussed a little bit earlier, differences between these types of markets, the number of CUSIPs, the trading volume that you'll see a difference between these markets. On the municipal bond side, the majority of the time, we're only going to have a one-sided market per year. So it's mostly going to be dealers offering bonds to customers, so where customers have the ability to purchase those bonds, there may not be an active bid side on the market.

So in this case, investors can make comparisons between bonds with similar structures, and similar timeframes, call dates, things like that, to enable them to compare bonds at the same time. It also might make sense to use that third-party price, or evaluation price that we mentioned earlier, as a way to help evaluate the bond and the price, and whether you as an investor think this is a good price for the bond that you might want to consider purchasing or not.

Richard Carter: Thank you Steve. And so if I can just take us back now to, as you mentioned earlier, a more liquid market in the corporate context. I want to show people this screenshot of what we call depth of book. And you know, remember when I was saying that we aggregate all these different offerings

and prices from different dealers, here's a case where you have one CUSIP, this is a Wells Fargo bond, and you have many dealers both on the bid side and the ask side. And although we show, at the first row here, the best price in terms of the lowest price that a customer can buy, and the best bid, the highest price for the customer to sell their bonds, too, this, the book display illustrates that, you know, you can also see those other prices from other dealers, that lie behind that leading price. So our attempt here is to show that liquidity, as well as if a customer were to want to buy a large amount, you can see here on the ask side, depth of book, the leading price, you can see the second column is quantity, in brackets, the minimum. So in this case, there's actually only two bonds available from this dealer, and two minimum at this price. So if anyone were to want to buy, you know, \$10,000, 10 bonds, or \$100,000, 100 bonds, you can see that the need to work down the book and place several others here at slightly different prices. But all along, the intent is to create this dynamic, so that dealers are competing, the dealers would ultimately, I think, like to be the ones seeing the most trades, therefore, they would need to be the best price in order to be the logical choice for clients to choose. So this illustrates here, in the corporate context.

We also, as you were just mentioning Steve, the ability to compare prices with the valuation price, you know, in this display you can see here with corporate

bonds, the ability to compare the depth of book with the recent trade. So, the depth of book is what we have available at the Fidelity for clients to buy. And yet, the recent trade, as you mentioned earlier Steve, is from the entire market. It's national data, if you like. So again, this dualism, or the comparison ability, is helpful, I think. Both traders know it's there, and now obviously the power to the consumer, our clients are able to see this, and see if the prices that they're seeing are somewhat in line, or reasonable compared to where this bond has recently been trading.

Now, compare that to this case. Again, the muni, here's a muni bond where the depth of book display is available, it's a lot smaller, you can see just two dealers offering the bond, no dealers bidding the bond. If we did have a dealer bidding the bond, it would certainly show through, but it's just illustrative again of a less liquid market. And as you showed earlier Steve, you can see in the historical cases this particular bond traded twice on one day, and then it went for about five months before it was traded the prior time. So this is just the reality of the muni market, and you can see how different it is compared to the corporate market.

So Steve, yeah, I think you wanted to now show us a little bit about what one can do. If you own muni bonds, there is no live bid, typically. What is it that you can do as an investor if you do want to sell bonds in the muni area?

Steven Traugott: Absolutely. So we do have a process available for customers, for when we do not have a live bid online. So typically, you'll see this as we talked about in the municipal market, occasionally for some corporate bonds, and sometimes for CDs, for example, is where you might have to initiate this request. So what you would do as a customer is if you have a position you're looking to sell, there's no live market online, you would go to your position's page, you're able to click on the sell button, and it would bring you to this ticket that we show you here in the top left corner. So for example, let's say we were trying to sell this municipal bond here, there's no live market online. Once you click the sell button, it populates all this information for you, so it looks very similar to what our current trade ticket does. You would input the quantity that you were interested in selling, and then you would hit that submit request for bid quote button at the bottom.

Now, if you are not signed up for the bid wanted alerts, the system would then take you to sign up for the alerts. The alerts allow us to communicate the bid price is in the information, back to you as a customer, through the email

system, in a timely manner, so that you're able to act on the price that comes back, and try and get the best possible execution done for that trade. So now if you are signed up for alerts, or after you sign up for alerts, it will bring you back to this confirmation page. Once again, it just kind of reiterates all the information, lets you know that the bid request has been received by Fidelity. And then what we really want to point out is in the next steps. We have our access to the new bid wanted dashboard.

So that dashboard, coming up here on the next slide, is what it looks like here, it's a fairly new screening tool that we made available to customers, so it may be a little bit unfamiliar to many of you at this point. But the intent here was to be able to provide a single place where you as a customer can status your bid request, take action on those requests if you decide to, as well as look at some of the historical requests that you've made. So once you enter your account, you would be able to see all your requests.

So for example, one of the nice things that we now have, once you enter the request, so for an example, the first bond here, the California State GO, we now provide you with a time that the response is expected to come back. So therefore, as a customer, you would then know the best time to log back into the account to wait for that bid to come back, to take action on it. And then

once a bid does come back, so the second line there, we see we got a bid back on our CD there at 98.012. It tells you the time that that bid is out until. So obviously, there's no guarantee, we can have market movement or something between that time, but this is the time that you as a customer can reasonably expect that if you place that order, you should get a fill from the dealer who's placed, who's responded with that bid. And then once you do have that bid, you can hit that green place order button that we now have, and that'll bring you right to the trade ticket to sell the bond, and hopefully give you an execution on the sell order. And then as well, we have the information on some historical pricing, and bids that you may have requested before that at least will give you some interest, and understanding of where pricing has been on some of the positions in your portfolio when you have requested them before.

Richard Carter: So Steve, just to maybe ask you a question on this one. You know, if you're selling a corporate or a Treasury, right, where there's a live bid, the execution's going to be pretty instantaneous. What type of timeframe are you talking about here when you submit this request for a muni?

Steven Traugott: Sure. So for municipal bonds, we have a collection window of about 90 minutes that we're going to allow. So what happens in that

timeframe is we, at Fidelity, get your request, and then as you pointed out earlier, Richard, we basically send that request backwards through our little chart that we had done before, where it goes to the ATs, and then to those dealers, and gives them time to respond to that bid. So all these different dealers competitively bid on your bond, it's an anonymous system, so each dealer doesn't know what the other dealer has bid, so they need to put an aggressive bid on the bond, which is helpful for you as a customer. And then once that collection window is done, we then send back to you, as a customer, the best price that we were able to get on that bond. So for corporate bonds and for CDs, other type of taxable products, non -- both taxable and tax-exempt munis, that window we have is about 30 minutes, because the markets move a little bit quicker. So we give a little bit less time to make sure we can get a good execution on them.

Richard Carter: Excellent, all right Steve, thank you. OK, so really interesting to see that sort of price discovery at work there. So I think now I'll just turn it around, and come back to the topic of more common, perhaps, for our listeners, is to buy a bond. You know, how do you start buying a bond? From all the choices we have, 50,000, it can often seem overwhelming. Where to begin? So going to pause at this screenshot here, also taken from our website, but many of you may be familiar with the yield curve, there's a lot written about it right now, it's

in the news, because it's going flatter, and sometimes even inverted. But we're showing here this screenshot from our website, showing two yield curves actually, the orange one being the Treasury curve, and above it is the corporate AAA curves. And the idea being here is to say well yeah, you know, how to decide, right? There's a yield curve, of course, is a benchmark of yields, stretching out into the future. You can see here the X axis, going from three months or six months, all the way out to 30 years. And it traces the line of best yields, as you can see here, typically the less risky instruments here, the Treasury, are yielding slightly less than the more risky corporate bonds.

So with that in mind, you know, an investor can choose which instrument, which part of the curve, which time commitment, suits their yield and risk tradeoff. And if you think of this yield curve shown in this fairly common depiction. Transitioning now to what we show on our webpage, as you come to fixed income at Fidelity. So if you go across the top of our green bars here, news and research, and then drop down to fixed income bonds and CDs. You come to this yield table, and the yield table really is a way of essentially showing, you know, 120 different yield data points, several different yield curves simultaneously, each for the purpose of comparison where an investor can find the best yield available for a given time commitment with different bond maturity timespan across the top, the different column headers, all the

way out again to 20-plus, 30-plus years, sorry. And down the rows are different types of bonds. So everything from Treasuries, to CDs, to AAA-rated high-quality corporates, down to single A, and the same for munis, and ending with taxable munis.

So, when our clients are looking for a good yield, you know, at a very high level, so much does depend on where to actually position oneself, both in the product type, and also the maturity commitments. So if we have a closer look at this yield table, I'll just do this quickly on the next slide, you can see here how there's a number of features built into it. As I said, there were 120 different data points here, as you can see. And any one of them will, if you have it set to the default setting, which is to show the highest yield, any one will show the bond underneath it that represents the highest yield available for a given instrument, and a maturity. So in this case, you can see for example in the Treasury 10-year, at the time that this screenshot was taken, which is, as I say, quite a while ago, the best yield was 2.75. I think today it's getting down to about 1.45. I just looked. So quite a big change.

But the important thing is that investing in the bond market is so much about relative value, and relative prices, and relative yields. So the Treasury 10-year is, at this point, yielding 2.75. And we can see that the best yielding agency at

this time was 3.58. And the corporate single A was 4.32. So, you know, a lot of choice available, and yet it's distilled in these 120 yield points that are, every 15 minutes, culling the best prices and best yields from our inventory.

Another way you can use this table is to click here at the top left on the median yield. Here, you will see, as it says, the -- in the category you're interested in, the yield of the median bond. So if you order the bonds from the highest to the lowest yield, this would be the medium. So try to depict something that was less aggressive maybe in a given category, more typical for the bonds in that particular time and type of bond.

Now, the final pointing, thing to point out as you click on one of these yields, you actually do get to the displays we were just showing earlier, essentially a list of bonds that fit this time and product type criteria. And from there, you can look down at, if you're looking at median, you can look at higher yields, lower yields. If you're looking by the highest yield, you can look down this table to seek slightly lower yielding, maybe less risky bonds. But really, to see the whole variety. So in a way, we produced here a one-click way to dive into our inventory. And all along, the takeaway here really is that although we talk about bond prices, you may see a price of 99, and you may see a price of 102, 105, etc. The yields are the great leveler. The yields are the way to enable one

to evaluate bond A versus bond B. They may be very differently priced, because of the different structures, different coupons, different maturity dates. But when you use the map to calculate the yield, that gives you the ability to compare these two bonds almost on an apples to apples basis.

So now for our final section, we're going to look at understanding trading costs. And we're going to start off by looking at the notion of transparency, how that's calculated, and this topic of markup, which is bond parlance for commission. And how it impacts yield. So let me just start this section with this diagram. You can see here, slide 30, it is sort of a simplified approach to compare two philosophies when it comes to pricing, as far as charging for the bond transaction are concerned. Row A here is how we approach this at Fidelity. Row B is how bonds have conventionally been priced, and several of our competitors still use this approach. So follow along if you would with me as I go through these steps, one, two, and three across the top.

Step one is, as we've been saying, this is a little bit of counter market, the bond market. Bonds are seen by different traders across the market, and whether it's a Fidelity inventory, or -- but they are showing the same prices to each other, and trading across firms, across internet connections now at these prices. Now you have this dotted line, the dotted line represents the gap

between the dealers and the price, the investors. And you can see at Fidelity, we take the same prices that the dealers are seeing, and when we aggregate and show the prices on Fidelity.com, our bond prices are the same prices that you see, and that the dealers are seeing, just simply fed through to Fidelity.com, and the same prices that you see as investors.

On the other hand, row B, the traditional approach with bond investing is that the dealers would add what's called this undisclosed markup, and bundle that to the combined price, and show that to the clients. So you can see here, this is why we've added this lighter green box to the dark green for row B, which is that the client may not know what is the underlying price of the bond. They've just seen the one combined price. And as they go then to step three, this is the price they'll see on their, the confirmation page, or the broker will be talking to them about. And they'll execute at that price. Whereas at Fidelity, coming back up to row A, as an investor, you'll see again the same prices that the traders are seeing in step two, then during the trade ticket experience, we'll add our pricing, which is a very clear dollar per bond, and then combine it, and show you the yield impact of that transaction cost, that markup. So it's very disclosed here, again, a dollar per bond is what we charge at all times, apart from Treasuries online, which are actually no charge, but corporate bonds, muni bonds, agency bonds, we charge \$1 per bond.

Steve, did you want to just show us a little bit of this, and how you can actually, as an investor, see this in the historical trade view of recent trades?

Steven Traugott: Absolutely. So one of the easiest ways for a customer to research this is through the recent trades. Now I worked for a while as a representative, talking to customers on the phone, and one of the questions they always had is, you know, how much do I pay for bond here? How else can I tell how much I'm paying for a bond at my other dealer where I may have had bonds as well. And so, one of the easiest ways, like I said, is to do that via the recent trade. So if you know the time that the trade was done, you're able to go back into recent trades as we discussed earlier, because the recent trades shows all trades in the market, and not just trades at Fidelity, we have that information available to you.

So here, we have an example of an Apple bond that we took, one of these bonds was purchased by a Fidelity customer back on July 23rd of 2018. The other was done through another broker in August of the same year. And you can see the difference in the top, which is the one done with the other broker, the customer was able to purchase 50 bonds at 107.5036. Now the dealer to dealer trade, or where the dealer from the other side was able to source that

bond was 105.3966, which equates to a markup of \$21.07 on that bond.

Whereas if we compare that to the Fidelity trade on the bottom, we see that the customer was able to purchase 100 bonds at 104.109, and the dealer, or the ATS that we were able to provide that to the customer, that was showing that at 104.009. So that equates to the \$1 per bond that Richard mentioned earlier. So quite a significant difference, and any time you start adding cost or price to the bond, ultimately what you're doing is affecting that yield that you're getting as a customer. So the higher the markup, the less yield you're going to get on that potential purchase.

Richard Carter: You can see that Steve, right, in the yield column, right? They can make --

Steven Traugott: Yes.

Richard Carter: --an impact on the yields.

Steven Traugott: Yes, you can see the difference, obviously the difference in pricing just in general, between 104 and 107, it costs, you know, close to 20 basis points on this trade difference in what that customer was able to get. So quite a significant difference.

Now as part of the new markup rules that went into effect in 2018, dealers, and not just Fidelity, all dealers, are now forced to provide the markup, required to provide that markup, on the confirmation for the customer to see. So as we see, we provided a couple examples here in slide 32 of trade confirmations that you might receive here at Fidelity. In the top left, we have a customer who is purchasing bonds that bought 100 of the Toyota Motor Credit Corporation bond. And in the highlighted red, you can see they paid the markup of \$100, which is a dollar per bond. And that equated to 0.1016%. So a very low percentage of your trade, or your yield is being taken away due to that markup.

And to contrast that, to look at the other side, a sell order, we had a customer that sold 105 of an Indiana Finance Authority bond, a municipal. The markdown on that was \$105, once again, dollar per bond. And that equated to 0.0874%, so once again, very small percentage of your trade is going towards that trading cost, going towards that markup or markdown on the trade.

So now, in order to really look at the difference in these, we at Fidelity decided to sponsor a comparison study, and we had Corporate Insights do that for us.

And what they found is when looking at a comparison of the markup that customers paid for similar positions here at Fidelity, compared to what they did at some of our competitors, in this case we've looked at Morgan Stanley, Wells Fargo, and Merrill Lynch, the ones that we're highlighting on the page here, you can see that the difference was astronomical, really, when you look at the difference between what you would pay and dollar per bond here at Fidelity.

So for example, corporate bonds here at Morgan Stanley, the average difference on a trade that you would pay there is \$21.08 markup, as compared to the dollar per bond. Fairly similar story at Wells Fargo and Merrill Lynch, as well as the same when you look at municipal bonds. A little less of a markup, but still quite a significant difference between what you're paying at these firms, compared to what you would pay here at Fidelity.

So what does that equate to in real dollars, when we look at an example trade of 22 bonds? Really, anywhere between \$140 and \$460 difference that you might pay more just looking at the markup on a trade, when looking at some of these brokers in the markup capacity, compared to what you might have at Fidelity with the dollar per bonds.

Richard Carter: Excellent Steve, thank you very much. OK, so a pretty big difference there, especially when you multiply it by the number of bonds per trade, right?

Steven Traugott: Exactly.

Richard Carter: OK, so thanks for that. So I think this pretty much takes us to the end of our formal presentation. Just to recap quickly, we covered the context, remember the context of the bond market, and how it differs from the stock market. We looked at the different types of bond prices that exist, the valuation price, the historical pricing, and the live pricing. And then we just wrapped it up now with a deep dive into the trading cost aspect. So, you know, we appreciate people listening this far -- oh, well I'll just point out here, of course, if you're interested in anything else from today's presentation, certainly please visit our website, Fidelity.com, and News and Research, Fixed Income. Also, feel free to call our fixed income specialists, the number is clearly highlighted there. They're available from 8:00 a.m. to 8:00 p.m. Eastern. And they'll be also very happy to help you with any further questions.

END OF AUDIO FILE