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ANDERSON COURT REPORTING
1800 Diagonal Road, Suite 600
Alexandria, VA 22314
Phone (703) 519-7180 Fax (703) 519-7190

PARTICIPANTS:

Opening Remarks:

DAVID WESSEL
Hutchins Center on Fiscal and Monetary Policy
The Brookings Institution

Recent Developments in the Muni Bond Market:

JUSTIN MARLOWE, Session Moderator
University of Chicago

Calling All Issuers: The Market for Debt Monitoring:

Authors:

HUAIZHI CHEN
University of Notre Dame

LAUREN COHEN
Harvard Business School and NBER

WEILING LIU
Northeastern University

Discussant:

DAVE ABEL
Columbia Capital Management

Par Munis - Sub-Par Performance:

Authors:

GUY DAVIDSON
BondMatch

ANDREW KALOTAY
Andrew Kalotay Associates

PARTICIPANTS (CONT'D):

Discussant:

STEVE WINTERSTEIN
MarketAxess

Pay Now, Play Later: Political Connections and Underwriting Relationships in the Muni Market:

Authors:

STEVE LIU
Missouri S&T

Z. JAY WANG
University of Oregon

Discussant:

LARRY FAUVER
University of Tennessee, Knoxville

Direct vs. Indirect Federal Bond Subsidies: New Evidence on Cost of Capital:

Authors:

MARTIN LUBY
University of Texas at Austin

PETER ORR
Intuitive Analytics

RICH RYFFEL
Washington University in St. Louis

Discussant:

SARAH SNYDER
Samuel A. Ramirez & Co.

PARTICIPANTS (CONT'D):

Panel: The Perspective From Muni Bond Issuers:

Moderator:

JUSTIN MARLOWE
University of Chicago

Panelists:

DWIGHT BURNS
Dallas Area Rapid Transit

MANJU GANERIWALA
Virginia Department of Treasury

LAKSHMI KOMMI
City of San Diego

URI MONSON
School District of Philadelphia

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P R O C E E D I N G S

MR. WESSEL: Good morning, I'm David Wessel, Director of the Hutchins Center on Fiscal and Monetary Policy at the Brookings Institution. Welcome to day 2 of the 10th annual municipal finance conference. We're pleased to cosponsor this with colleagues at the Rosenburg Institute of Global Finance at the Brandeis International Business School, the Olin Business School at Washington University in St. Louis and the Harris Public Policy School at the University of Chicago.

Today we have four papers on recent developments in the muni bond market and then we're going to have a panel discussion that begins later this afternoon. As always, all the papers and slides are on our website along with a link to the video of yesterday's sessions. We'll resume our conversation tomorrow, Wednesday at 11:30.

And I want to call your attention, you can see details on our website that in an attempt to at least approximate getting together in person, we're going to have two open discussion groups, one on state and local fiscal issues and one on the municipal bond market

including advanced refunding and other issues. The Zoom links on our website and you can see them there so I hope you'll join.

At this point, I'm going to turn the podium over, the virtual podium over to Justin Marlowe who very kindly agreed to step in for our colleague Rich Ryffel who is suffering from an internet and electricity outage at his house. I guess it's a good thing to have a team or organizers so we have people as competent as Justin to step in.

Justin is a research professor at the Harris School at the University of Chicago. He focuses on issues of public finance. He, among other things, is editor and chief of *Public Budgeting and Finance*. So with that, I turn this over to Justin and again, if you have questions during the day, you can you Slido on the internet #munifinance and we'll be monitoring those. Thank you.

MR. MARLOWE: Thank you, David, much appreciate that and thank you to you and to Stephanie and Howin and to everyone else at Brookings for putting together another really, really terrific conference. I

look forward to all the content today.

A lot of what we have today is from the issuers perspective as was mentioned the theme for today is recent trends in the municipal bond market. And so we'll be getting a lot of really great content, particularly from the perspective of how issuers navigate the capital markets. And that will conclude with a really great discussion with several practitioners, several market participants who are in the market as we speak. So looking forward to all of that.

Just like yesterday, we're going to set up this up kind of segmented into two pairs of papers. Our first two papers this morning, each of them have about 15 minutes to present with 10 minutes for a discussant. We'll talk to both of them first, take a break, come back and then do our next two papers, take a break and come back and have our conversation with your issuer panel.

So without further ado, let me get to introducing our first paper here is from Huaizhi Chen from Notre Dame who goes by H. So welcome H and his co-

author is Lauren Cohen and Weiling Liu. 15 minutes, welcome and look forward to hearing what you have to say about the value of call options in the Muni market.

MR. CHEN: Perfect, thank you very much. Can you see me?

MR. MARLOWE: Sure can.

MR. CHEN: Great. It's really an honor to be here at the Brookings Municipal Finance Conference to present Calling All Issuers: The Market for Debt Monitoring. I'm Huaizhi Chen and this is joined work with Lauren Cohen and Weiling Liu.

So as this audience knows very well, municipalities issue a large number of public debt and these debts finance a large number of long term public infrastructure projects. The interest payments on these debts alone add up to hundreds of billions of dollars per year.

And in environments where interest rates can get exceedingly close to zero lower down such as the one we saw between 2009 and 2015 and the one we saw in the past year managing interest payments and taking advantage of these unprecedented low rates have become

paramount to public finance. And fundamentally in this research, we asked how well did public institutions actually execute these interest rates.

So to be precise, issuers can manage their interest rates through refinancing their existing debts but executing by what's called a call option. Issuers can pay off their bonds at a predetermined price and tap into a lower prevailing market interest rate. And almost 95 percent of long term municipal bonds are callable after an unlock date.

Issuers can obtain value by exercising these call options if the prevailing market interest rates are low enough. So, for example, if the market rates are lower than the standard coupon rate of about 4 to 6 percent, then an issuer can call their bonds and reissue the exact same coupon cash flows to obtain a premium.

Now the average market rates were between 1 to 3 percent in the past 10 years. So during this period, the execution of these features was a first order feature in public finance. Now we're going to examine comprehensively using all municipal bonds available in the past 20 years. How municipal issues executed this

feature after their bonds became callable. And we're going to look at whether issuers pocketed this premium and how much money was left on the gap. Furthermore, we'll link that large gap in refunding efficacies to the IO of the agents who monitored this market.

Now before I step any further, I just want to mention that scholars in this audience have documented incentives and abuses of using treasuries for advanced refunding even prior to the unlocking of these call options. Given that agents can use advance refunding, we were really surprised by the significant amount of callable debt that weren't refinanced by the issuers at all. And we view our work as kind of complimentary to these prior works on advanced refunding's.

So let's move on to our results. We find delays in optional recalling across a vast number of characteristics. So both large and small issuers tend to experience delays. Big cities experience as much delays as small towns. And we see differences across U.S. geographic locations, sample periods, bond structure, bond purpose from hospitals to schools to roads and we observe significant delays across all types

of credit ratings.

So we observed delays in the least safe bonds out there but we also observed significant lag in the execution of calling of AAA bonds which tend to have the lowest prevailing marking interest rates and are the safest bonds out there. These delays add up quantitatively. So we're going to use a simply calibration to estimate the values lost. And we find that the value lost averaged to about $1.74 billion per year after accounting for issuance fees. The average interest rates in the Muni market is about 5 percent. So in other words, we estimate that roughly $1 of $100 of interest payments can be saved through optimal refunding.

In the second part of the paper, we're going to try to make some progress in understanding why issuers have these call delays. And the most obvious answer is that these delays have something to do with the issuers themselves. Some proxies, the sophistication and ability such as issuer size are definitely coordinated with more efficient practices. Larger issuers tend to delay less than smaller issuers.

Now we took our result and went directly to municipalities themselves including the city of San Jose and various different school districts to ask them why do they delay. When we asked them, they snapped back and said well just look at their work load and this is exactly what we did. So we do find that bonds that unlock bring times when these authorities are exceedingly busy tend to delay significantly.

For example, general obligation bonds delay by an average of additional two months if they are unlocked at the fiscal year end. Now we weren't completely satisfied by the issuer explanation. Because this is a market where agents actively monitor these debts to supposedly alleviate inefficiencies. And underwriters in particular are incentivized to provide expertise through their investment banking needs. But we show that the industrial organization of this market may not be perfectly suited to drive out these inefficiencies.

First of all, the relationships in this market is extremely sticky. Individual issuers use the same underwriters the vast majority of the time from 57 to 87 percent. And therefore, even if a competing underwriter

is pestering a municipality to call their existing bonds, this issuer isn't really likely to simply jump ship. In fact, it is exactly the issuers who rely on the same underwrite of mills that are more unlikely to do a calling.

Issuers who rely on the same underwriter are over 8.1 times more likely percent times more likely to delay. We find that bonds that use regional underwriters seem to have better service than other bonds and finally, we'll present some evidence for a causal interpretation of these correlations.

In particular, we show that after the 2009 financial crisis, the municipalities that had used Bear Sterns and Lehman Brothers prior to the crisis had significantly more delays after the crisis than issuers who utilized the other bankers. So if something happens to your banker, it will affect your efficacy.

To make a descriptive statement of how different issuers have behaved, we're going to gather up all the data from every corner of the United States on these steps. Our primary data comes from the merging municipal bond database and this is pretty

comprehensive. Because every values outstanding is very similar to time series calculated by other parties such as the municipal security rulemaking board.

Now we're going to remove all abnormal bonds. So bonds with provisions, that makes them non-standard for calling. Like variable rates, portable defaults or other features. And we're going to remove bonds that were issued by Puerto Rico, Virgin Islands, Guam or Detroit. We're going to compliment this data with historic S&P credit ratings and for comparison, we're going to join this data with corporate bonds data that comes from the merging FISD database.

So at any time a bond is unlocked, an issuer is essentially conducting an optimal exercise problem with an American call option. You can call the bond, obtain it at high premium. These premiums are high relative to the value of the bonds if the rates are low. So if the prevailing market interest rate is 0.5 percent, then you can obtain a very high premium for exercising these options.

If the prevailing market rates are high, then you can't obtain as high of a premium. Now this premium

isn't the whole picture because as other parties and member of the audience will tell you, there is a time value of the option even if the party doesn't exercise. Now this time value or continuation value is the market value of the call option after the delay given that it is an exercise. So an agent should only exercise if they obtain a premium that is greater than the continuation value of this call option.

So we can calculate the value lost per period from not exercising, that is the difference between the exercise value and the continuation value of the bond. And this second picture, right, this value lost is only there when there's a gap between the red line which is the option value, the exercise value and the continuation value of the bond. That is only when the prevailing interest rates are low enough.

So using this method, we can calculate the value lost per period for all the outstanding bonds in our panel. We're going to group all the outstanding callable bonds that don't get called into bins and for each bin, we're going to calculate the immediate exercise value, the exercise premium of these bonds.

And we're going to calculate them model implied continuation value of these options.

And we can calculate the difference which is the difference between the exercise value and the continuation value which is the cost of delayed exercise every year for bonds with investments grades from the S&P. And this is what we have. We find that the value lost by Muni issuers generally range between $1 to $3 billion per year in the municipal market. And this is after assuming a 2 percent reissuance cost. We plot these values out in blue and we see that it is the highest between 2009 and 2013, before the Muni rates started rising.

To kind of compare these values, we could do the same exercise for the corporate bond market and we plot this in orange. And even thought the corporate bonds have much higher values outstanding, roughly $10 trillion outstanding, the estimated value lost per year is much lower.

Now the types of bonds that drive these delays come from all over the spectrum. We can separate bond types using emerging filing codes and we see that delays

are not only driven by any single type of Muni bonds. General obligation bonds that are bonds backed by the full taking authority of municipal governments are almost as likely to delay as revenue bonds. And about 10 percent of these bonds well never end up exercising their call options even in the past 10 years when the market rates are the most advantageous.

We see that this variation exists across different states and within states as well. So Texas, for example, has a high efficacy in terms of calling their existing bonds and we less bonds being called in the state of California. This variation exists across credit ratings and as we expect, lower credit rated bonds tend to delay much more than higher rated bonds. And yet we see that there is a certain cross section of AAA bonds that delay their callings by a year or never call their existing bonds even after the unlock date.

And next, we're going to just examine the correlations of the ability to delay with various different characteristics. After adding in characteristics including state, year, capital purpose and credit rating fix effects, we can only explain as

much as 14 percent of the variation in the delays experienced by various different bond issues. Overall, there seems to be some idiosyncratic effect in this market that makes some issuers exercise much more than others.

Next, we tried to look at issuer effects such as workloads and sophistication. And we do see that issuers are particularly worse at calling their debt that are unlocked near the fiscal year end. Bonds that are unlocked during this these times experience hard delays. Similarly, if we interact this workload variable with the size of the issuer, we find that smaller issuers that face high workload tend to delay the most. And we interpret this as that issuer sophistication and capacity as a factor in driving these refunding delays.

And the last part of the paper studies why market participants don't alleviate this gap from issuers. In a perfect world, underwriters and other market participants such as lawyers, financial advisors and the voting public are incentivized to decrease the money left on the table by sharing this premium with the

issuer. So we examined individual municipal issuer and underwriter relationships. And what we find is that these relationships are extremely persistent. Issuers utilizing one lead underwriters for the vast majority of their bonds issued and this is true for all issues. Over 87 percent of all issues are issued by one lead underwriter and for issuers who issue much more frequently.

So for issuers that issue at least 60 bonds in the sample, the vast majority of these bonds are underwritten by the same party. And we find that this is actually and these issuers that utilize just one single underwriter are exactly the same parties that delay their calling. So we can use underwriter persistence as an X variable and try to regress that on whether an issuer delays or not.

So we find that issuers who use a single underwriter for the vast majority of their bonds are the exact ones who need the calling of their bonds, the refinancing of their bonds the most. Now these are all correlations and we can try to provide a bit more causal evidence in terms of interpreting our results. So we

can examine municipalities that depended on investment banks that have severe issues during the 2009 financial crisis. So we can exactly examine municipality that depended on Bear Sterns or Lehman Brothers prior to 2007.

After the crisis, these are the exact same issuers who delayed the most and we don't see any effect of any other large investment bank such as Goldman Sachs. So we interpret this as underwriters being kind of important in alleviating these inefficiencies.

So in conclusion, we find that roughly $1.7 billion are lost annually by public issuers through calling delays. These delays come from different dimensions including bond issues, issuer size, geographic location, time periods and various different bond structures, bond purposes and credit ratings. Furthermore, we find that these delays are consistent with gaps in monitoring. Inattentive issuers tend to delay the most and that bond that it uses, the largest underwriters are much more likely to delay. So that's all I have, thank you very much.

MR. MARLOWE: Thank you, H, great presentation

and right on time which is much appreciated. So with that, we'll go right into our discussant comments from Dave Abel from Columbia Capital Management. Welcome, David.

MR. ABEL: Okay am I live here? Okay great.

MR. MARLOWE: Sure are.

MR. ABEL: Okay great. Good morning, Dave Abel with Columbia Capital Management. We're financial advisors pairing off with this paper, Calling all Issuers. I want to compliment H and his team for an extensive and robust work product. It's been really a joy to work on this thing from a technical perspective.

Municipal call options are a very, very well-traveled subject as we know. Refund the just appealed, when to advance refund and how to coupon when you do. And a time honored favorite of competitive versus negotiated sales they're all very well-traveled topics but they all orbit around the municipal call option, that's what drives them.

But within that peer group, this is the first paper to explore why bonds don't get called and how much that might cost. Knowing the sector as I do, refunding

monitors are in pitch books are a big part of what we do and I would think that (inaudible) would go on and spec it. So this is my chance to give you a practitioner's perspective.

Okay next slide. Okay the intuitive findings were demonstrated empirically quite well but I do want to kind of bookmark here for a little bit later in my comments that the corporate culture differs from the municipal culture in some significant ways. It was little surprising to me that revenue credits outperformed GO in terms of efficient call timing.

And I would surmise that might be because of the enterprise is more specialized, they're monitoring coverage tests, they're involved in rate settings. So the debt structure might be a more central part of the mission statement and therefore, you know, top of mind month after month.

The very sticky underwriter relationships is not something I would have thought of but as has been explained it makes sense. If we have a very low competition or no competition environment, workflow bottlenecks can prevail and we have a slightly lower

sense of urgency.

Another issue that I didn't expect would be the case but they report so, airport, water and GO would be three different types of credit under the same issuer umbrella that would be three times the workflow of just three different GO sales. So that's how I would think about multiple callable issues being a delay factor.

In terms of underwriter dominance, general practitioners might have bulk workflow bottlenecks whereas and going to Bear and Lehman being a sticky relationship with a lot of post, you know post-exit delay, I think the market climate itself had a big impact on that, market liquidity. So that was a headwind that resulted in additional call delay. That would just be my perspective.

Business focus could be a factor as well. The paper talks about Dougherty, for example, owning the Dakota's. All things Dakota, they're very regionally focused and fully up to speed and monitoring what's going on in those two states. National dominant (inaudible) firms probably have workflow optimization within the system where they can move flow around and be

more responsive. That would make sense from a business model perspective.

But the one I thought was most interesting was that competitive sale issuers or issuers that are known for issuing competitive sales tend to be more covered by FA's and underwriters. So the FA community is probably the dominant source of monitoring there.

External factors driving call delays, I could see from a past life building a narrative around a structural imbalance or waiting for an audit could add several months to otherwise originally calling bonds. Bundling from an administrative economy perspective I could see holding two or three call dates in a row if they're closely together to do a single transaction.

And one of the things I see a lot or at least in my practice is we'll consolidate tax facts. We'll take a long asset life, new money transaction and couple it with a current refunding in a way that we can do a restructure in a better outcome then a current refunding all by itself.

Okay, next slide. I wanted to if I could get at this $1.74 billion number and this was a big pre-

conference discussion, most of our focus and I had two major concerns. The first was where we double counting and the option value or the refunding PV is how they measure it. But I was fearful if they do that at every test period we could be adding duplicative values. But I understand the way the test actually works is that they only impact PV incrementally so that not all of -- so you don't have multiple refunding's counting as a big loss bucket. So double counting is probably avoided.

The second concern I had was are we reflecting yield curve and credit slope accurately and they do, in fact, use actual data by rating group and by maturity. So this keeps longer maturities from being overstated in value. So again, to marry up to $1.74 billion annual loss number, I wanted to see if I could back into some really simply market relationship method to reflect $1.74 billion under different coupon scenarios.

So with the par underneath the gross coupon in overtime, I take $1.74 billion and I divide by the coupon, .05 $34.8 billion. Now the refunding bond has to take the place of the refunded bond so let's imagine that we have annual debt service savings of about 20

percent. $34.8 billion divided by .2 is $1.74 billion.

So then I compare, I do this for a three coupon, a four coupon and a five coupon market, culture if you will, versus $3.8 trillion outstanding and I get 5.76 or 4.6 percent of the market involved for a five coupon, 5.7 percent of the market not called for a four coupon and much higher, 7.6 percent not called for a three coupon. Again, this is extremely crude but the results aren't crazy. So we have some complexities here.

Replacement optionality, for example, refunding adjusted yield is a topic that Peter Oars developed quite well. Premium coupons are expensive if not called. Taxable corporates tend to issue at par so they're going to be more lost resistance if not called. And importantly, these annual test dates may or may not co-align with bull markets. So we could miss, we could have annual January test dates but the bull market occurred in April.

Next slide. Ways to mitigate this loss could start with just issuing the lower coupons. There's a tradeoff here. So if the bond is called in this

example, 20 year maturity, yield to call is lower with a 5 percent coupon 1.31 versus 1.66. If the bond is not called, the yield to maturity is lower with a 3 percent coupon. 3.31 for the five coupon versus 2.44 but there's no free lunch here. Higher coupons can reduce borrowing costs over time but the bonds have to be called to get there. Lower coupons can be safer if not called but there's a higher floor cost that comes with that.

Next slide. Okay my effort number two to get at this from a series of current refunding's, actual refunding's using actual yield curves one each year for a 30 year level debt structure. So I created something issued in 1990 who's call starts in 2000 and goes out to 2020. Obviously, a very narrow example of how debt might be issued but it does give me a call date every year during the test year.

So this is a AAA credit plus 20 basis points but the refunding rules are all or none and if none I get level savings. I'm looking for a 3 percent minimum PV and if I reach that 3 percent PV and I don't refund, I start the loss clock. So later PV tests are reduced

by successive accumulations prior foregone annual savings.

So what happened here. We had three silent years because the market didn't deliver value on these five coupons. 2003 we got there, we met the test and we start the last clock. 2004, a year in call delay was at our best year even though we had a loss year behind us. Post 2008 started delivering us fantastic PV as you can see later in the list there but by that time, our refunding had reduced in size considerably and we had accumulated considerable loss.

So at the lower right hand corner, I wanted to see what this example series would cost over time for a five coupons, four coupons and three coupons. 5 percent coupon, we left $9.4 million on the table. For a 4 percent coupon culture we left $4.7 on the table. For a 3 coupon culture we left $2.4 million on the table, all as expected.

Next slide. I wanted to take this very same structure and try it on lower coupons and lower credits to see if these results made sense. So for our AAA five coupons, the earlier markets worked best even though we

had absolute higher yields and longer duration. For our lower coupons and lower ratings, we had better value in later markets at that time post 2008. We also had much steeper curve slope and shorter remaining refunding duration.

But there's a major flaw in my approach here that is a weakness that is not -- that the paper overcomes. I'm doing an all or none refund every maturity, refund none of the maturities. Their method is far more accurate granularly. They go bond by bond rather than series by series. But nevertheless, we have kind of a simplistic anecdote, lower rated credits and lower coupons reached the goal. That might be the best value to be had.

Okay, my wrap up slide, one more. So this research can inform policy and best practices but I did say I was going to comment on the corporate culture. There are three key differences that I see. Municipalities are disciplined, disparate and multitasked. We have maybe 80,000 municipal credits versus 8,000 much larger corporate credits in the public markets. Municipalities tend to issue serialized

structures amortizations over time that are supported by taxes and user fees.

Corporations don't tend to pledge specific revenues, rather they use large bullets and they roll along sweet spots in the yield curve probably on average a shorter tenor than 30 years. Make-whole calls are common in the corporate market so a par-call delay is probably far more muted even considering the size of the corporate market. Municipal markets also have unique features on tax preferences. Being a tax exempt market, premium couponing forced all capital delaines should bonds trade in the secondary market at a discount.

So the market preference for premium couponing is very present. We also have remediation for change of use and change of control. Taxable at market rather than tax exempt above market, non-exercised loss is probably going to be inherently lower just on those cultures.

A quick comment on competitive sales. In order to win the bid, we have to reach the lowest TIC to maturity and that's a measure that cannot assume that the bonds will be called. That inherently drives the

offering to lower coupons and therefore, competitive sales may be more delay loss resistance.

So some ideas that are sort of near and dear to how I think about call dates. These are structuring implications and I think they're supported by this work. I would try to position a call date to occur when the yield is most likely to actually be lower. So take a 15 year bond with a 10 year call. When you get to that call, it's now a 5 year bond. So the odds that slope was a big part of driving lower yields is considerably higher.

Let's go to the opposite extreme. Let's take a 30 year bond which becomes a 25 year bond if we put an aggressive 5 year call on it. So in that instance, we're far more dependent on absolute rates actually falling than yield curve slope. So there's a good chance that a very, very long maturity with a super short call will have, you know, incomplete development and value and so that call is probably the target of languishing.

Credit enhancement tend to prefer to use on par coupons where the yield benefit goes more likely to

the whole life of the bond. If I use credit enhancement on a very high coupon, the odds are that that's only the call date and the pricing reflects that. Non-call is also an option but we have price resistance and outward pressure on yields. We also have a situation that's very costly to restructure and very costly to remediate.

On monitoring and advocacy, I think technology and transparency is a tailwind in drafting. And otherwise, try to synchronize away from the high traffic periods of the year from budget and audit cycles. So that's a well written paper, I enjoyed working on this and Justin, I'll turn it back over to you.

MR. MARLOWE: Thank you very much, Dave, appreciate those comments. Certainly very, very insightful from the standpoint of a market practitioner so thank you for that. We have a couple questions from the audience which we can definitely get to. Before we do that, I wanted to just real quick see if H or any of his co-authors had any kind of immediate reactions to any of Dave's comments.

MR. CHEN: These are extremely helpful. Thank you so much. And there's a lot of comments to get

through so we really appreciate all these -- this roadmap that you gave us. Thank you so much.

MR. MARLOWE: Great. Okay well let's get to some audience questions then. So we do have one that came in right away. The question is, has there been any drift over time in the market's covenant stringency that might have led to a non-interest rationale for calling versus not calling. So a question about the rule of covenant stringency in the market.

MR. CHEN: So most of the bonds have option lockups that are five, seven years ahead of times. So to the extent that stringencies drives our value, it probably doesn't but it's definitely worth checking. So we do know that coupon payments have come down over time as their interest rates came down but in terms of common stringencies, I'm not sure so we can definitely check on this.

MR. ABEL: You know, if you have a footprint test required and it's coverage credit and you're not quite there, you know, you could be sort of locked out of being able to execute inside a footprint and you have to wait for a performance to come back in order to

capture savings.

MR. CHEN: It's something definitely worth checking a bit more on.

MR. MARLOWE: Great. Another question was the advent of the SEC municipal advisor rule taken into account? That certainly might have limited the ability of underwriters to pitch refunding's to issuers to some extent. So any thoughts on that 2014 SEC rule?

MR. CHEN: So in terms of the time series difference, we do see that the value loss peaked around 2012, 2013 and then decreased ever since. So in terms of the time series difference, in terms of value lost, we don't see a dramatic increase after 2014. Whether that causes anything in the cross section, we could check a bit further. But definitely not in terms of just the raw time series difference.

MR. MARLOWE: Okay. Dave, anything to add to that?

MR. ABEL: Yeah, I think we're very careful to provide market general comment and try to be non-particular and non-specialized in a refunding recommendation. So I think for the most part, we've

been able to inform and advise and say hey, you've got, you know, callable bonds in the market but to, you know, turn that and restructure it this way or do something else would result in advice being given. And so, I think those are -- we're far more careful about what we say and how we observe than we used to be. But I think that from a monitoring perspective, we're still doing our best to get in front of as many people as we can.

MR. MARLOWE: Perfect. Another question from the audience and that question is did you consider that issuers might be waiting to call to see if interest rates might go down even further?

MR. CHEN: I mean that is definitely one of the cases for a lot of issuers. If I see that the interest rates is 3 percent and I think that might go down to 1 percent or 2 percent, I might want to wait. And this is exactly why we incorporate continuation values and our analysis.

So the value that we calculate as loss is with the idea that these issuers can exercise their co-options and also keep the co-options for their future issues. So if they delay, if they call their options

now, they can ideally have their premium now and also reissue the exact same bonds with another co-option just in case the interest rates go down even further. So that's how we incorporate that twist into the analysis.

MR. MARLOWE: Makes sense. David, anything to add to that too?

MR. ABEL: Yeah, I think we get -- that's not on the door of the refunded adjusted yield analysis. You know, long term borrowing costs as a result of several subsequent refunding's chained together. I think one way that this delay on anticipation of a better result happens is simply that the 3 percent policy goal is a very old goal, a long, long, time ago. That goal probably as a practical matter at least doubled if not tripled.

You know, there was a time when an 8 percent PV was just a home run and now, you know, a 25 percent PV is a home run. So I think standards performance have raised and that may very well result in waiting to see what happens.

MR. MARLOWE: Makes sense. Okay before we go on to our next paper, anything else, any of the author

team or Dave wants to add here. Last chance to chime in before we move on.

MR. CHEN: I just want to thank Dave again for all the insightful comments. This has been incredibly helpful.

MS. COHEN: I just wanted to add that thank you very much for this opportunity and I think H answered most of the questions exactly the way I was thinking as well. But I just wanted to add that there are significant time trends that we see in our data and that's why we have that plot over time.

But we don’t see any breaks, those are really suggestions to the break changes. We don't see any sharp breaks at least from this first cut but we will dig in deeper. And we do have the year fix effects so we can look at some of those year by year changes as well. But thank you very much.

MR. ABEL: Now this paper was a lot of fun to work on, I appreciate the opportunity. As these guys know, I really put them through the paces. I didn't believe the $1.74 billion and I really arm wrestled about that. I think won me over for the most part,

especially when we're able to kind of develop some kind of the back of the envelop proxies to say all right, the result isn't crazy.

You know, probably some granularity is deserved in how we approach this and there are some external factors that we can't account for. But nevertheless, you know, protecting for non-call outs results in, you know, loss of value at the outset. That's the coupon discussion. So, you know, monitoring and advocacy is probably central to the discussion.

MR. MARLOWE: Well that makes great sense. Well thank you to our presenters and to Dave for your excellent discussant comments. So moving right along then staying with some of these same themes around pricing and the role of coupons and the role of option value in pricing. Our next paper is from Guy Davidson and Andy Kalotay and it's titled Par Munis-Sub-Par Performance. So we'll have Guy present that paper and then we'll have discussant comments from Steve Winterstein. So welcome to all of you and we look forward to hearing what you have to say.

MR. DAVIDSON: Okay can I be heard?

MR. MARLOWE: We can hear you for sure.

MR. DAVIDSON: Let's get started because I'm going to take up my full first 15 minutes. So good afternoon, I'm Guy Davidson and Andy and I wrote Par Munis Sub-Par Performance early this year. Today, it's my pleasure to present the ideas and Andy will join us for the Q&A. But I'm going to present the ideas from the perspective of an institutional money manager.

In fact, for the last 28 years, could you move to the next slide please, I ran municipal portfolio management at Alliance Bernstein. And that's a business where we had $50 billion in AUM in portfolios that were managed both for individuals and institutions.

Now to have a successful business or money management business, we needed to offer strong after tax returns, particularly over the short to intermediate terms, say three to five years. So we were measured and compensated both on our market to market performance and, of course, we had to be tax smart in our realization of gains and losses.

But that's all kind of what you would expect me to say, right, as a portfolio manager. But what may

be less obvious to you is how tax liabilities in the future can impact municipal bond prices today and accordingly can impact short and intermediate term mark to market performance which is exactly what we're focused on for our clients.

So today's story is about the impact of tax liabilities on par-munis bonds and why institutional investors like myself at least until the end of last year we had a very strong preference for premium coupon Muni. Next slide please.

Let's start our story today by looking at what municipal investors use as their benchmark yield curve. Now on the left side of this slide is the benchmark AAA Muni yield curve from a week ago. It looks like what you would expect a yield curve to look like, right? Yields rise as the years to maturity increase which you can see on the X axis. Now look at the right side of this slide and here are the corresponding bond prices. And what you see is prices begin maybe a little above par but they quickly rise to 130 percent of par value by 10 year maturity.

What's going on? Well, the benchmark curve

for municipals is for 5 percent coupon bonds and once you get to the 10 year maturity, there are also callable bonds. And this is in a world today they're using 5 percent premium bonds in a world where yields are 1 to 2 percent. So there's a (audio skip) Muni investors use premium bonds as their reference curve.

You can see also investors preference for premiums in market indices. If you compare ices Muni and corporate bond indices, you'll see that the yield of the municipal index is about 1 percent lower than the corporate yield. At the same time, the coupon on the Muni index is more than 1 percent higher than the average coupon of the corporate index. In fact, the Muni coupon is almost 5 percent, not a surprise, right.

So let's take a step back here and ask ourselves why would an investor prefer to pay an issuer 130 percent of face value today to get back 100 percent at maturity. I know I have lots of clients who ask that question but it's a conundrum, right, unless you know about taxes. And that's the next slide, please.

The answer really is about taxes. And specifically an obscure part of the federal tax code

called by Muni investors the De minimis tax. So to think about why, let's talk about first, let's thinking about a 10 year bond that is issued with a 2 percent coupon and priced at PAR. Now if yields rise, the mark to market value of the bond falls because the yields are higher. That's bond math, right.

The present value of the bonds cashflows are worth less when discounted by a higher yield. But that's not the end of the story for Muni bonds. With Muni's, investors are focused on after tax returns. So tax liabilities at maturity also must be accounted for. If the bond is bought at 98, the investor will have a long term capital gain when the bond matures at 100. If the bond is bought at 97, the 3 point appreciation will be taxed as ordinary income.

Now I'm not going to spend much time going over this at the moment and you can see it in the paper. But here the de minimis thresholds are shown and you can refer to this later. But the real point to focus on is that Muni returns aren't necessarily tax free and investors should and will compare investment alternatives on an after tax basis. Next slide please.

This accounting for tax liabilities at maturity depresses municipal bond prices when they fall below par. Here along the Y axis are prices for a 10 year bond, non-callable at different interest rate levels. Now the X axis shows the difference between coupon and the yield at 0. The bonds coupon and yield equal and if you look to the Y axis, the price equals 100.

Now as you move to your left, they're lower than the coupon and the price is higher and above par. Now look to the right. Prices are lower and the blue and red lines diverge. The red line shows the conventional price yield relationship where future taxes aren't considered. Now future tax liabilities are (audio skip) in the prices along the blue line.

As you can see, the blue line falls more quickly because the next buyer wants to be compensated for future tax liabilities. If they aren't, they'll simply buy a different municipal bond without those tax liabilities. In short, tax costs increase the interest rate sensitivity of par and discount Muni's.

In fact in the next slide, this chart shows

the price sensitivity of a par bond changes both drastically and quickly. To bond measures duration is the measure price sensitivity to a change in interest rates. If a bond has a duration of 10 years and interest rates jump from say 2 percent to 3 percent, a bond manager would expect prices to fall by about 10 percent which is the product of duration and the change in yields.

Looking at the red line here, the conventional measure of duration it's pretty stable. That's not the case when comparing or when tax liabilities become part of the picture and you can see that in the blue line. When I Muni bonds price falls below par, its price is declining both because yields are rising and because a future tax liability is being created. A double whammy so to speak.

So par and discount Muni's have longer durations then conventional analytics indicate and the impact of taxes are handled by a tax neutral approach. So that's all nice theory, right. Let's take a look at some trades and see how much better accounting for taxes in a tax neutral approach does in estimating the price

movements of Munis. So next chart please.

Here we went to the MSRB's trade database. And we looked for par and premium coupon bonds with similar maturities and call features issued by the same issue that were large enough to have a history of trades and issued long enough ago so that they traded over a wide range of interest rate levels. The two bonds I'm showing you here were sold in 2016 by Los Angeles Unified School District, a high grade issuer.

The par bond has a 2 percent coupon and matures in 2029 and is callable at par in 2026. The premium coupon bond had a coupon of 5 percent and matured one year shorter in 2028 and had the same call features. Furthermore, they both had almost $80 million in outstanding bonds and so they had significant trades over time. Now we're going to focus on the institutional trades which were $ 1 million and above.

And when we looked at those since issuance, the fives have remained premium bonds while the twos have covered the spectrum of discount to par to premium due to the changing levels of interest rates since 2016. Now one more comment. Since simple yields to a

benchmark curve are not a good comparison for bonds that have such different call structures, one with values of the calls are so different. One is a 5 percent coupon bond priced at a premium and callable par and the other one is a 2 percent callable bond priced near par.

We used OAS Options Adjusted Spreads to measure their relative value. And you can see at the very bottom here that the OAS of the par bonds started off a little bit higher at 16 versus the premium bond at 10. Now let's take a look at trades. The next chart please. Thank you.

This chart shows the conventional OAS of trades from both bonds from 2016 through last year. In the case of the 5 percent coupon bonds, centitions, they have remained priced well above par and their OAS's have ranged from - 7 to 60 basis points. Now take a look at the orange dots. The movements in both price and OAS for the 2 percent coupon bonds were far more volatile. The conventional OASs of the 2's rose consistently with lower prices to as much as 150 basis points.

As the premium bonds did not display the same spread widening, we can infer that the widening with

regard to the 2's is not a credit event but due to the rising future tax liability of the bond as its price falls. In fact, when tax costs are accounted for in the tax neutral framework, the resulting OAS is more stable and more similar in range to the 5 percent coupon bonds as you can see here in this slide. So next slide please. Thank you.

So here we've added the OAS calculations using a tax neutral framework. And you can see looking at the green diamonds that the OAS of the 2 percent coupon bond now peaks at around 80 basis points, not 150 basis points. And is more similar to that of the premium coupon bonds that are to the right.

So what does this suggest? First, that investors do care about taxes which makes sense. So it's imperative to include tax costs into the price sensitivity of municipal bonds which conventional analytics fail to do. Second, taxes can impact mark to market returns.

Taking a step back and thinking about it, a bond with more downside than upside is likely to have a depressed expected return over the both the short to

intermediate term horizons and by in this case, I'm going to show you a pretty large margin. So let's take a look at that and let's start by calculating a one-year expected return for par bond. Next chart please.

In this example, we're going to take a look at a 10 year bond priced at par at 2 percent and I apologize, I just caught today that in this version of the deck, I have on the left the price and yield column headings mislabeled. They should be opposite. So 2 percent yield par price.

Okay now, we care about looking forward. As a portfolio manager if we're worried about mark to market, we need to think about things going forward. And to calculate a one-year expected return for this bond, we're going to in our assumptions today, we're just going re-price the bond off of a forward curve using the AAA curve one year from now. And we're going to reprice it as a 9 year bond.

Now on the forward curve, the 10 year yield rise is 30 basis points and this bond rolls down the curve, becomes a 9 year bond and its price actually will have only fallen by about a 1 percent. Its price falls

to 99 as you can see in the middle of this page on the right. When you combine the price decline with the coupon income and a small amount of reinvestment of that coupon, the annual mark to market return is 1.17 percent, certainly lower than the coupon.

This is the mark to market return that an institutional portfolio manager has to worry about and what we'll be reporting. Now at the same time, none of us on this screen believes that our point forecasts are particularly accurate. So we're not exactly sure what yields are going to do so we're going to create a range of possible returns and we're going to use, in this case, a 30 percent volatility assumption and we're going to assert that yields are logged normally distributed. And we're going to come up with a range of return and their probabilities.

Now with that, I'm going to just draw your attention to the tails. In this environment, you know, a positive return, when you buy a 2 percent bond, there's a chance, small, but there's a chance you're going to get a 7.5 percent return over the next 12 months. At the same time, take a look at the bottom or

it's actually at the top of the chart but at the other tail. There's a chance you could also get a return of -18.7 percent.

Now focus that asymmetry, that asymmetry really is going to hammer the expected return of a par bond. Because the way I'm going to calculate the expected return now is I'm going to take the probability weighted average of these returns and when I do that, suddenly now that negative convex, that big downside of these bonds compared to a much more limited upside really limits the expected return on a par bond and it comes out to only 0.14 percent. Okay so that's a pretty low number. Let's compare that to premium and discount Muni's. Next slide please.

Now here what I'm showing you is the returns from a par bond in the red and let's focus on that first, different implied volatilities. These were doing the expected returns and the 0.14 percent for the par bond that I was just going through is in the red bar in the center of the chart using the 30 percent volatility.

Now focusing on the red bars, the expected volatility is lower, the expected return of the par bond

is higher. This is because if you dampen how much yields can move, you also dampen that downside. And so, then suddenly that's not part or the likelihood is much lower that you're going to have much of a tax hit to the par bond and it's relative or expected return rises. Okay but the opposite is true if volatility is expected to be much higher.

So a par bond's expected value is inversely correlated with the expected market volatility. So now let's turn our attention to the expected returns of the premium and discount bonds. And as you can see, the premium bonds really by comparison shine. Not in absolute terms, their returns are close to 1 percent but compared to par and discount bonds they do pretty well. And this is because the prices of the premium bonds are well above par in all scenarios so tax liabilities don’t play a role in their expected returns really.

In the case of the discount bond, it does better than the par bond and in part, that's because the tax liabilities are a more constant part of valuation so it's more symmetrical. The reason the discount bonds underperform the premium bonds, however is because on

average here because we use the forward curve, we're expecting rates to rise and the discount bonds have a longer duration than the premium bond. Actually 14.9 years is the tax neutral duration for the discount bond while it's 8.3 for the premium bond.

So next slide please. So what have we shown? First, municipal investors focus on after tax returns. Second, tax costs make par and discount Muni's more sensitive to interest rate changes than conventional analytics suggests. We've also shown that institutional investors strong preference for premium bonds makes sense as they don't want to incur the mark to market performance or hit to their portfolios that a par bond might incur. So they basically just try to avoid that tax split and move more towards premium bonds.

And we've also shown that the relative value of par bonds is really correlated or inversely correlated with the expected level of interest rate volatility. So that's what I've covered. I want to give a couple takeaways as well to leave you with and then if we could move to the next one.

The first idea is that look, this is to

issuers. Institutional investors have a preference for premium coupon bonds. So to attract institutional demand, issue the premiums and I think what you'll see is that you're lower financing costs.

Now the second part to that is something that Andy has been starting to work on a lot recently and we can go into this into the Q&A more. But considering issuing on these premium bonds with higher call prices. And right now, the standard is to have a par call in 10 years. But consider having not like 102, 105 but more like 140 or 150. This really has two benefits.

The first is that it will ensure that when you call the bond, interest rates will have actually dropped. And second, because the bond is more likely to be outstanding for longer and it will effectively have a longer duration, investors are going to be willing to pay more for it. And, in fact, you could receive another 20 points when you sell the bonds in price. So that's a good thing from your perspective, you can raise more money.

For academics, I think the point here is just know the impact of taxes. Don’t just look at yields and

prices, understand also that tax effects are impacting both of them as well as call options. We saw a little bit of that in the presentation earlier but call options, the vast majority of municipal bonds are callable too. So just make sure you're keeping track of that.

Investors, I think for most cases, institutional investors are avoiding par bonds. But, you know, we've also set up a framework here that if you know your preferences, you can also begin to play around and ask yourself, if that yield for a par bond high enough versus the premium bond that I should be interested. But let's just start with the idea, don't buy that par bond unless you're offered a lot more in yield. With that, I'm going to hand it over to Steve and thank you all for putting up with me and my technical shortcomings.

MR. WINTERSTEIN: Thanks Guy.

MR. MARLOWE: No problem at all. Technical challenges are something I'm sure we've all experienced. Steve Winterstein, welcome, look forward to your discussant comments.

MR. WINTERSTEIN: Thanks, good to see you, Justin. And, you know, I called Guy earlier this morning and I said to him, you know, we've known each other for 30 years and I asked him I said, have we ever been on a panel together before? And we both agreed that when the other one was speaking, we were in the audience being the primary heckler. So but actually I get to heckle you now, Guy.

No look, everyone I think is familiar with Andy Kalotay's work. He just published interest rate risk management of municipal bonds. Guy actually contributed to that text and I had a small part in reading it and giving some observations. But Andy's work is widely published in academic journals, in research and so forth.

You know, I think we have a real advantage in having these two fellows combine this effort because Guy, I've had a front row seat to his entire career and I can tell you that we have a boots on the ground money manager and this is not a solution in search of a problem. This is actually things that and I had a very similar role to Guy's. We wrestle with these issues

every day. Premiums, coupons, tax treatments but all in the context of liquidity and how we're going to deal with taxes relative to the liquidity of the bond when we need to sell it and so on and so forth.

So I asked myself one question. I asked myself why is this paper important. And that's really what I'm here to talk about is not to recount the great highlights of the paper. We had the advantage of discussing these things for quite some time together throughout our careers but why is it important?

And the first reason that I came up with, I didn't have to work very hard at thinking of three good reasons why this paper is important. Number one, remember that 40 percent of the entire municipal market is held by individual investors. 40 percent of the market is held by individual investors. And those individual investors either lack the knowledge base or the interest to understand the complications of evaluating optionality as it relates to taxes.

And so, it's very important in the sense that, you know, we would look at individual investors and they would say things like and I think, Guy, you would agree

with this. They would say I don't want to buy a bond at par. So you can buy $100,000 par at a price of $105 and the refrain was always this. If I hold it to maturity, I lose my $5,000 in principle.

And so, individual investors have a strong preference for exactly the kind of securities that Andy and Guy have studied here. Par bonds or discount bonds not taking into account tax considerations. So from that perspective, I think it's extremely important for advisors, at least advisors if not the individual investors to understand the importance of this paper.

But I'd be doing the institutional market an injustice if I didn't mention also that the institutional investor understands some of the very basic mechanics of this. An institutional investor, a fund manager understands the market discount cut off price, the de minimis role and that the price will fade eventually as it gets to that point. The problem is, there has never been this kind of rigor put around it.

And so, what do they do? They know that these discount bonds can have a problem with liquidity for all the reasons that Guy and Andy point out in their paper

because of the acceleration to the downside in price right around that market discount price. Because of the negative convexity there and because of the duration extension.

And so, there are a multiplicity of issues that an institutional investor has to wrestle with. So what do they do, they largely avoid the problem. They ignore and avoid it and so they simply buy the premium coupon bonds which leads me to my second point.

Institutional investors buy premium bonds because we understand that there are tax implications for discount bonds but the issuer doesn't understand that their audience is bifurcated. Now we looked at that LAUSD bond where we had a 2 percent coupon at par, a five handled coupon at a premium. Issuers will issue those two kinds of bonds in order to appeal to those two different audiences without really understanding who they're selling it to and understanding the whys and wherefores and the mechanics of the underlying securities. Some do, most don't. I think that's very important.

And finally, and I mentioned this in passing,

the third point is that Guy and Andy do something that is new to this kind of work. And it's a fresh look at things. People have done papers on the price performance of bonds in and around the market discount cutoff price.

No one, to my knowledge, has applied an option adjusted framework to it. That discipline is absolutely necessary if you're not applying an option adjusted framework to this analysis, then you're falling short of the market. I think that's extremely important for what they do.

Remember that every bond, practically every issue comes in a no call ten structure in the marketplace and once that new issue seasons we start to see optionality ripe in the market. Practically everything and we've seen call options actually shorten up after the elimination of the advanced refunding. So that's extremely important, the option adjusted analysis.

Finally, two takeaways. Areas that they could explore I think and take this a little bit further. I look at and I had this discussion with Andy and Guy and

I think, you know, it's an interesting discussion. I look at a tax payment on a market discount bond as a negative interest payment. It's a negative cash flow at the end of the period, right, at the end of the holding period and sometimes it might be to maturity.

If I look at that as a negative interest payment, the tax payment is a negative interest payment on that security but I don't know what that interest rate will be. In other words, I don't know what that payment will be because I don't know what the prevailing tax rate will be 10, 15, 30 years from now.

When I got into the business back in 1984, I think the maximum marginal income tax rate was 70 percent. Today it's in and around 40 percent. So why not treat that tax payment in the same kind of discipline that we would treat an option and understand the volatility of interest rates relative to this problem. It's been studied before but I don’t think in the context of an option adjusted analysis looking at the future path of tax rates and I think that will matter.

And one final thing, Justin, and I'll wrap up.

We noted in the paper that once a bond goes deeply into discount away from the de minimis farther into a discount, it passes that market discount cutoff price and then heads deeper into a discount. Convexity actually turns positive and it not only turns positive it becomes very positive. Because and I'm going to infer that it's because now taxes are fully absorbed into the price of the bond and now it can be convexed because there is no more downside to it than is already experienced.

Perhaps in a higher interest rate environment where prices seem to have more symmetry in the market, now everything is at a premium or most of the market is at a premium. As interest rates move up and maybe there is more symmetry in prices, I think Andy and Guy would do well to start to investigate and put a little more rigor around the causality of that convexity and again, I made that inference but there's no rigor around that. But I think that would be a very interesting thing to look at. And with that, I'll conclude my remarks. Good job Guy, good job Andy and I enjoy working with you guys and looking at these kinds of issues.

MR. MARLOWE: Thank you, Steve, very much for all of your thoughts on that. We have maybe a minute or two before we go to break. I just wanted to invite Guy and/or Andy to respond to anything Steve said if they would like.

MR. DAVIDSON: I don't know if Andy is on but that idea of uncertainty around taxes is one you could put a distribution around the taxes. I think that at the moment, what most people do is just figure the current tax rates. I'd want paid at least that and maybe even a little more if I think tax rates are going to be higher. But you could certainly make that more rigorous and put a range around tax rates and probability weight it.

MR. MARLOWE: Makes good sense. Okay well with that, thank you, Guy, for the presentation. Thanks, Steve, for all of your thoughts.

MR. DAVIDSON: Thanks for having us.

MR. MARLOWE: You bet. So we're ready to break now. Let's reconvene at 12:55 Eastern with our next pair of papers. Thanks everyone, we'll see you then.

(Recess)

MR. MARLOWE: Okay, well, welcome back, everyone. Thanks for coming. I hope you had a nice brief break there. We'll get right back to our proceedings here, with the next pair of papers. Again, consistent with the first couple of papers this morning, our next couple of papers are also from the standpoint of the issuer and will bring a kind of a different perspective to these next couple sets of questions, and particularly dealing with question of the way that the underwriting process works, the way the pricing works through the underwriting process.

And so, with that, we'll jump right into our next paper, from Steve Liu and Jay Wang. It's titled "Pay Now, Play Later: Political Contributions and Underwriting Relationships in the Muni Market". Steve, welcome. We look forward to hearing what you have to say.

MR. LIU: Thank you, Justin. Can you hear me fine?

MR. MARLOWE: Sure can, thanks.

MR. LIU: Thanks. I want to first thank

Brookings Institute for inviting us. It is a great honor to present our work for both academic colleagues and market practitioners. Today, I'm presenting a joint project with Professor Jay Wang, from University of Oregon, that's a paper about political contributions and underwriting market share in the Muni market.

Regarding the research question, there are three aspects I would like to briefly discuss at the front, and the first one is we are basing everything on this regulation called Rule G-37. It was a rule approved by the SEC in 1994. Starting from the second quarter of that year, brokers and dealers are required to disclose all the donation information through the Form G-37, and that is also where we collect our donation data. And so, since the rule came out in the design to curb the pay-to-play practice in the industry and we just find it pretty interesting, we want to take a look at this rule, and we're more interested in during this post G-37 period and how different companies react differently to this regulation and how different contribution strategies have been developed, after the Rule G-37, and how they have different impact on their

market, especially the negotiating market deals. And at last, we also take a look at the determinants of different strategy, contribution strategies, and we want to see what determined a different choice, in terms of deciding what strategy will be a proper way to establish political connections.

Why is this a good setting for us to look at this question? So, so, on one hand, it's interesting that we know official issuers are running campaigns in this -- in the public office, and they're trying to secure the election by collecting fundings. And so, on the other hand, underwriters obviously want to, you know, obtain government contract. In this context, we were talking about negotiated market deals from local government. So, there are two layers of relationship. One is the political relationship. The other one is the business relationship. So, we just want to see how these two interact with each other in this specific setting. And I think I don't need to address how important the Muni market is to the economy.

And, next, let's just take a quick review for this Rule G-37. As I mentioned, in April 1994, this

rule was implemented, and the goal for this Rule G-37 is to better regulate the market political activities and somehow to prevent the pay-to-play practice, to make market more transparent, and improve the, you know, the industry equality. So, there are two parts of this rule I want to point out. One is the disclosure requirement. So, as I said, dealers and brokers will start reporting all the details to the four. And also, there's a business prohibition term in this regulation, which is -- I will show you on this form.

So, there's two parts of this form. On the top part, we have these contributions made to issuer officials, with names, office, amount of money. And this bottom part is -- this one is called payment made to political parties of states or political subdivisions. And this one, we don't have any specific names or office or campaign information, and this is called -- we define this type of donation party donation, and this one is the candidate donation.

And there's also something more interesting regarding this role -- this rule. The second part, as I said, is a prohibition rule about this type of political

donation for a campaign candidate. And the specific rule states that whenever you make a donation to a specific campaign candidate, you are subject to the two-year business plan, during the following two years. In other words, you can't do business with them, especially the candidate, the officials who may have influence over the lead underwriter selection process.

So, there are exceptions. These are more interesting, okay? So, as I said, the party donations are not subject to any restrictions. You can donate to parties. You can continue doing business with the local government. And there's one exception that is making this very interesting, and that is called the de minimis limit of $250. There are two conditions. If you meet these two conditions, you are immune from the two-year business prohibition term. And the first one is if the donor is an eligible voter for the campaign candidate, and also the total amount of donation is not exceeding $250. It is not a big amount. It is pretty strict, right? So, and that is how we think it's necessary to classify, you know, different types of donations in our work.

So, obviously, we have this large donation defined as a donation exceeding the de minimis limit of $250 to a campaign candidate. Right here, we call this large donations in our work. And also, we have the bottom one. It's called party donations, you know, as we saw it, it's the bottom part of that, and they are not going to specify who is going to receive the fund, who's -- how they're going to spend the fund, right, who are they going to support?

So, the four beliefs, this kind of a not directly effective relationship, later on. And your -- all other small amount of donations made to campaign candidates, and there are two other types that we define, right here. Let me show you the second sample very quickly, and then we go back -- I will come back to this page. This is the first one, and now we see the amount of donations, right here, that shows $1,200 and $5,000, right here, and made towards the State Treasurer and the Governor candidate, and this one is to the Republican Party of Illinois.

And this is the second one. If you can't see this very clearly, I just want to explain this for you.

I circled six $250 donations by the registered representative. They are are exactly $250, and they're all made to the State Treasurer Candidate. If you look closer at this form, this is from the Single Quarter, by the Single Firm, right? They're -- also, we've had a pattern for $250 donations made to the Lieutenant Governor and the State Attorney General. And that just made us think maybe it's necessary to single out some of the smaller amounts of donations. So, we've classified that type as multiple small donations made to the same candidate. And it made us think it might be -- it's possible that just, at the same time, multiple employees just want to support one candidate, that it's also possible this is the way to circumvent, you know, the two-year business prohibition term. So, that is why we want to just take a further look at this type of donations. We call this multi-small donations. And all the other single small amount of donations are classified as small donations, right here. So, overall, we have large, multi-small, small, and party donations, and we're going to look at how these different type of donation strategies will play different roles in the

underwriting market relationship.

How do we fit into the literature? This is the first paper using this term, political contribution strategy, a lot, in the script. So, there's three different streams of hypotheses I want to point out very quickly. The first one is an investment-based hypothesis. The argument is companies and those sales representatives are making donations and they're looking for a payback. In this context, they're looking for a government contract, right? They're mainly contract. And the second one is consumption-based hypothesis. The argument is it doesn't have to have any intention. You know, a political relationship and business relationship can be two separate sets of relationship, and they may -- they just want to, you know, donate to someone they like, and that's it. And the third one that we think is also quite relevant to our is called long-term relationship hypothesis. Snyder, 1992, argued that sometimes donors may not look for immediate payback. So, sometimes, they just want to establish a relationship and also maintain long-term relations with the local officials. It is also possible.

Next, we're going to show how we test these different strategies, under the framework differently, and how we observe some different outcomes. The first set of findings that I'm going to show -- because of the time limit, I'm going to show you more -- I'm going to focus more on the qualitative part of the findings, instead of showing you table after table. So, the first set of findings, right here, is we find both multi-small and large contributions are associated with higher negotiated market share in the following year's, but they are having a different impact. And this is how they are different. First of all, one standard deviation increase in multi-small donations are associated with 2.34 increase in negotiated market share in the next year. Large donations, they also have a similar impact on their following year's market share, but now they -- there's a two-year delay. So, that is the difference. We attribute this pattern to the business prohibition term of Rule G-37. And to double check the baseline finding, we find it's necessary to confirm it is the political influence that is playing the role in the market relationship, instead of other

observed factors.

So, we used two subsamples. One was donations to elected candidates, and the other one is donations with unelected candidates. And we're just looking at the different, you know, outcome with different type of donations. So, the first subsample shows strong impact on the market share and also the coefficients are showing a large magnitude. However, the other subsample with losing candidates don't have any strong impact on the following year's market share. So, this has made us believe it is more likely the political influence that is playing the important role, driving our baseline result, instead of some nonpolitical factors, causing this relationship. And we also did similar tests on the small and party donations, but we couldn't find anything significant on those donating underwriters' future in the writing market share.

And this is our Figure 1 in the paper. It basically summarized how, you know, different strategies play out, during the pre-donation period, and during the after-donation period. I want to point out one thing that's right here. You're looking at party donation,

multi-small donation, and small donation, and then large donation. During the pre-donation period, and this one is on the top, meaning they're, relatively speaking, doing quite well in the local market. But five percent, six percent is not very dominant, but still relatively better than the other type of target states. For large donations, on the other hand, their targeting states, they're not doing so well, okay, and they're just barely having some market share in those states. And for the donation year 1, year 2, there's no impact, and 3 and 4, we start seeing some impact. For multi-small donations, we see the impact is kind of earlier than this one, and also the increases are more strong, compared with other donations during the post-donation period.

And the second main part of our finding is we just take a look at how different strategies are determined. So, we find, except for large donations, of those within a pair of states and the underwriter, all those donations are pretty persistent over time. And the large donations and multi-small donations appear to be substituting each other, meaning they're not being used at the same time. We think it's because of the

two-year business prohibition rule for the large donations. And also, we find national underwriters are more likely to choose large donations in states with high growth rate in negotiated deals. And we find regional underwriters who would prefer multi-small donations that mainly focus on their, you know, regional markets. And also, underwriters who like to make party donations would like to target states where they already have good business relations. And that is the second part of our main finding.

And overall, I think I'm running out of time to go over this. It's pretty standard for data, the data source, except for the Form G-37. We use all those donation information from the MSRB's website. And besides the election result, we also used the competitive market share as our dependent variable to run a placebo test. But we don't find any significant result out of the placebo test, meaning it's unlikely there is some competitive advantage of those donating underwriters, that, you know, having the market share change, during the post-donation period. It's more likely the political factor that is playing a role.

So, overall, we think it is interesting to find that these political connections do play an important role in the market, even after the Rule G-37, and different strategies have been developed, and, you know, underwriters try to advance their underwriting relationship with the local issuer officials. And that is all I have for this paper. Thanks for your attention and time.

MR. MARLOWE: Thank you very much, Steve, much appreciated. And thanks again for staying right on time, appreciate that. Our discussant for this paper is Larry Fauver, from the University of Tennessee. Larry, welcome, and look forward to hearing what you have to say.

MR. FAUVER: Thanks, Justin. I appreciate that. All right. Justin, is that -- you can hear me and everything's viewable, it looks good?

MR. MARLOWE: Yep, you're good to go.

MR. FAUVER: Great, thank you so much. So, I appreciate it. Let me echo thank you for inviting me to discuss this paper. I appreciate the opportunity, so. I -- let's get into it, I guess. And so, let me just

summarize. Steve did a great job, and so I just want to make it, just kind of in one slide, just what's going on in the paper, so that kind of an idea.

So, the authors examined if the political contributions made by Muni Bond Underwriters, in these negotiated bids, leads to future underwriting business. And the sample is from 1999 to 2013, and they conclude that multiple small donations and large donations lead to an increase in future business. The caveat here is the large donations because of Rule G-37 with the two-year gap. They see this not happening right away, but it happens after that two-year gap is up. And so, most of this evidence is attributed to winning candidates in elections.

And then further, Steve mentioned this toward the end of his presentation, that regional underwriters choose to donate through multiple small donations, and national underwriters make large donations in high growth states, right? And it's probably not surprising that underwriters contribute in areas where they have a strong presence.

So, let me get into what I liked about the

paper. And so, I always like to kind of say what I liked. I think that's important. So, I think it's an interesting topic. I've done some research on it in the past. I think the authors do a great job in looking at the topic. They tried to tackle -- they address causality, right? This is a big issue in empirical work. And so, and I think the questions and answers are important to investors, the market, municipalities, and so on. So, so, I think that's really -- bodes well for the paper, and, you know, having those four things is great.

So, let me get into some thoughts, questions I have, and I don't know that I have answers. There are more questions and things that Steve and Jay Wang could look at, hopefully, and, you know, see what's going on. So, basically, I think these three are related, and I think, as I mentioned, it's important and relevant, but what additional benefit do we gain here, in the sense of, okay, so, they gain market share. Does this actually have an impact on the municipality? So, do investors pay for this? You know, what's happening, say, to the price of the bonds? Do we see this actually

-- you know, because of this, is the evaluation or the price of these bonds being impacted?

And so, maybe this is some type of efficient arrangement. I'm not sure that I would argue that. But is there some expertise gained. And so, are some deals more complicated than others? And so, bringing in certain types of underwriters may be more beneficial. And I think just a little more on, you know, the contribution of the paper, I think it's there. I think some of this just needs to be teased out.

So, the results on the, you know, large donations, I know, inherently, there are some issues with long-term studies. And so, are there issues here? You know, are there some other things that can be controlled for or maybe looked at differently? There's a lot going on, right, over those two years. Maybe, maybe, pin down the channel a little bit more, in the sense of, you know, the economic magnitudes are huge, in terms of, you know, what goes on and in terms of the, you know, market share that they gain, and so on. But the dollar contributions seem a little bit low, low than I -- you know, given what the increase is.

You know, the discussion on political ideologies mentioned in the paper, can they explore that a bit more? Is this why we see these results? I kind of like that avenue. Maybe also discussing the sample a bit more, how many instances do underwriters contribute to different candidates? I think, you know, it was discussed that it doesn't happen often. But do they stick with the same party? Are they hedging their bets? And who has authority over these deals? So, can they decide which deals are negotiated or not, meaning, you know, the municipalities? Is this theory based on contributions? Why exclude underwriters that never contribute? I was trying to think it through, and I really couldn't decide one way or the other, and this is in Footnote 19.

And, you know, just a little more, and then I've got one more slide to wrap up, but maybe how the election outcome analysis hands endogeneity concerns. I was trying to connect the dots and, again, maybe I was missing something. It wasn't quite clear to me. Do the underwriters gain even more market share after their candidates are elected? So, in other words, do they

gain when they're not, but then even more, so?

Also, some of the observations throughout the paper, either what's lost, you know, example in the multinomial, sometimes the authors mention about some obs are lost. It would be interesting to just kind of maybe detail a little bit. I know the authors say they're not quite sure why these negative coefficients exist in the table. I forgot to put the table there. I think it's Table 4, maybe, Specification 3 there.

But a couple more, Figure 1, and Steve put that up, it shows a huge jump in market share for underwriters. It's just concentrated only on a few. I know there were -- two of the contributions, they dropped a little bit, after a year or two. But is this only a small handful that really gain, or is this kind of consistent across the -- all the underwriters?

Something I didn't quite understand in Table 2, Panel A, all the donation, compared to the rest of the nation, I would have thought that would have added up, but, again, maybe, maybe I missed something. I got 595 versus 701. And then, this is related to 15, why the differences in the sample size? Sometimes it

appears that maybe we're comparing different samples, and so, it would've been nice to see where, you know, say, in Table 4, those almost 6,000 observations, where do they come from? And I didn't see that mentioned.

So, finally, again, just some minor quibbles and, you know, just to be thorough, you know, their placebo test doesn't necessarily handle causality. I mean, it's close. I mean, it just really highlights that things wouldn't change for the treated firms, without the treatment, and maybe that's semantics, but just kind of keep that in mind. And I know that, you know, the authors need two years post to look at that because of the Rule, but why stop in 2013? Could they go a couple more years? Again, these are somewhat petty. How many observations are lost in Footnote 23? And so, maybe I focused on the sample too much, but -- and then, lastly, just a few minor typos, but, otherwise, just Table 6 was a bit confusion and confusing, I should say, to me, and so, maybe the -- they could look at some other things. This kind of ties back to my earlier point about the election, whether they were an incumbent or not, or maybe they can --

Steve and Jay Wang can look at that a little bit different or slice that up a little bit different to maybe get at that a little bit, perhaps better, but. But thanks so much. I enjoyed the paper, and thank you, again.

MR. MARLOWE: Thank you. I appreciate a really thorough review of that paper. Before we get to questions from the audience, maybe give the authors a chance to respond to anything that Larry said in his discussant remarks, anything that struck you, just as you were listening, that you might want to respond to, first and foremost?

MR. LIU: Sure. Thanks, Larry, for the thorough review on the paper. And also, thanks for pointing out those important, you know, part of the paper, and especially thanks for pointing out the weakness of the paper and also how we can additionally bring to the contribution for the work.

First, I want to -- I think the cause of the bond and how the welfare impact is very important, and I strongly agree with you on that. We're currently working on that. So far, we don't have very -- we don't

find anything significant yet, in terms of the, you know, cost of capital and underwriting fees, but we're going to see because that will require us to break down to the easy level. And so, so far, we just actually get everything up on a State Year Level. So, and that will require a little bit of work and time to sort out.

And hedging, I think, yes, a lot of times, those donors are pretty consistent, and they're donating to the same party, over years. But we do observe some hedging donation strategies, over time. But, so, overall, we just find if a connection is established with the right party in office, I think that is a political connection. So, that is how we define such connections. But I think it's interesting to look at that, as well. We will think about that.

And also, the authority and what specific office, that is a quite challenging question because we really don't know where to find, you know, connections between, say, what kind of issuers is under control of the Governor's Office or Treasurer's Office, what type of issuers are not influenced by those offices. So, we will keep thinking about that because it is important to

establish a more clear link between the two parties.

And why do we exclude the never donating underwriters? We just think, you know, fundamentally, they're quite different from the treatment group of the donating underwriters, just in terms of market sharing, in terms of market condition and competitiveness. They are not quite comparable to them. But, you know, adding them won't change our result. And in Table 2, where I think Larry pointed out one part about the donations, because there are overlaps, so, if you see 595, including some overlap, but overlap, it is not quite often. And so, if you add up separate strategies, they will probably go over 700, but, you know, taking out overlap, just counting the donations in your state, that is the total number of donations that we used in a sample. Overall, we really appreciate the comments, and all those advice were -- we'll continue working on this project, and, yeah, thanks for the advice. Thank you.

MR. FAUVER: You're welcome.

MR. MARLOWE: Terrific. All right. Jay, anything to add there?

MR. WANG: Sure. Larry, thanks again for all

the wonderful comments. Clearly, this paper is still in a sort of a preliminary stage. This is only our second draft. So, we'll definitely do our best to incorporate your comments and make it more polished.

Just one quick comment about the donation amount. I agree with you, the dollar amount seems to be small, compared to the noneconomic magnitude, in terms of the market share they gain afterwards. Our interpretations actually look at quite a few papers in the political contribution literature. It seems many papers suffer from the same issue. The dollar amount donation seems to be small, relative to the economic impact documented from this post-donation impact.

My sort of the take on this is this political donation is only one part of activities these people do to connect with politicians. There may be other, behind the scenes, that we do not, as economists, we do not observe. But as long as the dollar donation amount is kind of positively correlated with those unobserved connection activities, then I think we can still push through our same interpretations. This is only sort of the best explanation I can give to you, but I agree.

The dollar amount is kind of small, relative to the economic benefit we documented. Yeah, thank you.

MR. MARLOWE: Very good. We have a question from the audience, actually, from Marc Joffe, who presented yesterday. And I think you speak to this a little bit in the paper, but just for the benefit of the audience, the question is, did you download the Political Contribution Disclosure Forms from EMMA, and could you speak a little bit to how you went about parsing those data and built the data set that you used in the paper?

MR. LIU: Oh, we're doing the old-fashioned way. We just collect them manually, and we just sort them out, and transform them into spreadsheet tables, and that's how we do it. We didn't really rely on any programming language to manage the text because a lot of old files from the '90s, late '90s, they're scanned on PDF. So, it's kind of hard to, you know, visually recognize that by program. So, yeah, we just want to anchor -- want to ensure the quality of the numbers and information that we collect from the website. We just manually enter those numbers.

MR. MARLOWE: Although my apologies to your research assistant, or you, or whoever it was in charge of doing that because that sounds like quite, quite an undertaking. All right. Jay, any response to that?

MR. WANG: No, yeah, that's exactly what he did. Steve did most of the work there, so.

MR. MARLOWE: Terrific. Okay, well, any other -- I want to give our panelists and -- or I should say our authors and Larry a chance. Anything else that anyone would like to comment on here, that's come up in the course of the discussion, before we wrap up and move onto our next paper here. Any other -- anything else for the audience to take away from the discussion today?

MR. FAUVER: Justin, let me -- I would like to just -- I think, Jay, you know, you raised a good point about the unobservables, right, that inherently, in all these papers, that's what's missing, right, is why such a apparently small, you know, donation or political contribution leads to such a huge economic magnitude, and I just -- when you mentioned that, I just thought maybe -- and, you know, I don't know how difficult this is because I would assume it would have been done, but

maybe there's some other intangibles that can be picked up or that you can kind of examine, since you've downloaded this by hand or, you know, you kind of involved -- you know, when you're really involved with the data. Maybe there's something there that can pick that up, like the complexity of the deals or, you know, whatever it may be to proxy for something else. But I agree with you, with your comments. But it would be nice if you really had a nicer, not nicer, but a channel or some other intangibles to correspond with it. But, overall, it's not an easy proposition, so. That's all I wanted to add, so.

MR. MARLOWE: Terrific. Well, thank you all for a great paper, a great discussion, and lots of great conversation. It's definitely a salient topic and touches on a lot of things that we've talked about, throughout the course of the conference, and will continue to talk about, throughout the course of the conference.

So, with that, we're running a little -- a minute ahead, but that's all right because that just means we'll have a little more time, then, for our next

paper, which will be presented by Peter Orr. And this paper deals with, again, a topic that's come up at a couple different times already, but that's the rule of the Federal Subsidy in the Muni Market. And along with Rich Ryffel and Marty Luby, Peter's come up with a paper titled "Direct versus Indirect Federal Bond Subsidies: New Evidence on Cost of Capital", so keeping with our theme of the issuer's perspective in the market, and then this paper will be discussed by Sarah Snyder, from Ramirez. Welcome to both of you. Peter, 15 minutes, and I look forward to hearing what you have to say.

MR. ORR: Great, thank you. Can you guys hear me all right?

MR. MARLOWE: Sure can.

MR. ORR: Okay, excellent. And you can see the screen? Not yet. Hit share on that. All right, how about now?

MR. MARLOWE: It looks great.

MR. ORR: Excellent, great. Well, thanks for the opportunity, happy to be here. As Justin said, we're looking at the Direct and Indirect Federal Bond Subsidies, and, in particular, a comparison of cost of

capital of the two. Ultimately, getting to the question of what is the right subsidy, if there is going to be a direct version of support for public purpose projects, what is the neutral subsidy rate for a direct subsidy program the Federal Government should employ to achieve some level of neutrality between tax-exempt and taxable programs?

I'm letting you read about our backgrounds online. We had that introduction already. But from a research perspective, there has been, historically, both indirect and direct subsidies of, again, projects deemed to serve a public purpose. The Direct Subsidy Program was embodied in the Build America Bond Program, which came into being after the financial crisis. What has been much more common, historically, is a Indirect Federal Support, and that is via the exemption of Federal Income Taxes on Municipal Bond Interest. So, that has provided a lower cost of capital, all else equal to municipalities, for many decades now.

And, you know, when we look at the criticism that's been in play for quite some time, when you're evaluating, as an investor, and has been discussed in

prior panels, as well, when you're evaluating, as an investor, what sort of yield to accept on a municipal bond, there's uncertainty there in not knowing what the benefit of that tax exemption will mean because we don't know what income tax rates are, in the future. There have been changes to the tax code. There will be continue -- continue to be expected changes in the tax code. But there's uncertainty there, and that uncertainty has led to the criticism that the indirect approach is inefficient, in terms of the U.S. taxpayer getting a certain bang, bang for the buck.

The BAB Program was designed to correct those deficiencies because it's a direct payment, one that ultimately the investor doesn't really have to worry about because they're getting their taxable payment, regardless, and they have to deal with their own tax consequences of taxable income. The original BABs Program offered a 35 percent subsidy. It was in place from early 2009 to the end of 2010. There were a little less than $200 billion in BABs issued, and the thing that occurred, subsequent to those issuances, was due to the Federal Budget Sequester, there has been a reduction

in the amount of BABs subsidy paid to issuers.

And one way, you know, I think issuers need to think about this is that the Municipal Bond Program gives them a nominal guaranteed payment stream, when they issue municipal bonds. They have shifted, that risk that I mentioned earlier, of the change in tax rates. That's really borne by the investor because, again, the investor doesn't really know the benefit of that tax-exempt income in the future, due to the uncertainty of marginal income tax rates, going forward. However, BABs have essentially and then effectively given that risk to issuers, in a certain sense, in that, and this actually happened, I wrote an article about this, as soon as the BAB Program was introduced, back in the late 2000s. But it is a direct payment, which, as a flying duck overhead, is a real target for cutbacks, when the Federal Government can't get things going in a balanced sort of way. So, there's been a haircut, due to Federal Budget Sequester, which has actually resulted in, effectively, an increase in net payments by issuers, due to that haircut that's occurred to the Sequester.

There have been a number of proposals related

to extending the Direct Subsidy Bond Program, the America Fast Forward Bonds. There was some discussion, under the last administration, about also having another Direct Subsidy Program, but it was ultimately not included the 2018 discussions of the Tax Program, then. There is something floating around, now, or last year, rather, anyway. And this was even a bit more complicated. They were talking about a direct subsidy rate that was high, over 40 percent, and that it would ramp down over time. And so, again, the question being what is the direct subsidy rate that will induce issuers and investors to use the program, relative to the traditional and more common Municipal Bond Program that's out there?

So, in prior research, one of the things that was missing was an acknowledgement and an analysis of the fact that when the taxable BAB Programs were issued, they tended to include a make-whole call, which, at the end of the day, created a calculation that, to the issuer, meant that, even though they could refinance the bonds, the make-whole component of that effectively left them with an uneconomic call. It wasn't like a

traditional call, where you're taking the bonds out at par or some modest premium. You were effectively making a payment to the investor that made them whole, hence make-whole call, whereas traditional long-term tax-exempt bonds would usually carry a 10-year par call, so that all the bonds, after 10 years and maturity, in a given series of bonds, would provide for an economic refinancing of those tax-exempt bonds. And so, if you're going to compare the Taxable BAB Program to a traditional Tax-Exempt Bond Program, you need to account for this call feature.

And that's what prior research lacked and what our research attempted to go ahead and include. So, based upon some other research that I had done with Mary Luby, we used a Refunding Adjusted Yield, which took into account the refinancing ability of those tax-exempt bonds, and based upon simulating the behavior of municipalities, and how they actually make refinancing decisions, and the use and monetization of those tax-exempt call features, we include a Refunding Adjusted Yield to account for, you know, that refinancing flexibility, which tended to make the calculation of

expected yield for the tax-exempt bonds more realistic, once you include the monetization of that call feature.

The Refunding Adjusted Yield essentially recovers the market price of the bonds, based upon the simulated debt service of the issuer accounting for that future refinancing activity or refunding activity, as it's called in the marketplace. And we used 5,000 simulations of refundings, using an Opportunity Cost Index, which is one that is used by tax-exempt borrowers in the marketplace. So, how do the calculations actually work?

Just going through a quick example, if we have BABs that were issued at a nominal cost of capital of 10 percent, if we include that 35 percent subsidy, that brings us down to six and a half. If you compare that to a hypothetical tax-exempt bond at eight percent, that would be the True Interest Cost. The True Interest Cost is a calculation that assumes debt service just goes to maturity, and there is no refinancing involved. If we assume that the Refunding Adjusted Yield brings that eight percent down 50 basis points to seven and a half, then we're looking at a comparison of a BAB benefit of

one and a half percent, when looking at the BAB TIC versus Tax-Exempt TIC, compared to a one percent benefit, using the BAB TIC versus the Refunding Adjusted Yield on a tax-exempt bond basis.

This leads to a 33 percent overstatement of the BAB benefit, relative to a more realistic Refunding Adjusted Yield cost, which, when you're comparing subsidy rates, means that you've understated your neutral subsidy rate by 25 percent, namely a neutral subsidy TIC of 20 percent versus the more realistic 25 percent for Refunding Adjusted Yield. So, that's ultimately the risk of not including the benefit of the call feature embedded in the tax-exempt bonds, when it really belongs there.

Here's an example using the University of California Regents. The actual BAB all-in TIC with the subsidy was about 3.90. The tax-exempt all-in TIC, issued at the same time, was right around 4.70. But after reflecting, in the far-right bar, for the refunding activities, Refunding Adjusted Yield, that brings us down to more like a 4.21. When we look at the actual benefit, then, calculated using TIC at 64 basis

points, but using a more realistic Refunding Adjusted Yield cost of capital for the tax-exempt bond, that brings it down 19 basis points to 35. And if we bring that to its natural conclusion, in terms of a neutral subsidy rate, the implied neutral subsidy rate using a traditional TIC was about 25 percent, and using a Refunding Adjusted Yield, it gets us closer to 29. So, you can see the error there, we would argue, in not including the refundability of the tax-exempt bond.

And looking at this, across the -- our analysis, the stated taxable BAB subsidy rate was 35 percent. The actual BAB subsidy rate was something a bit less than that, based upon the Sequester that actually occurred, which, again, meant that municipalities were losing out on a portion of that sort of promised subsidy rate and then taking that risk on, effectively, versus a neutral tax-exempt subsidy rate, based upon TIC, which is a little bit less than 25 percent. That, we would argue, is, again, in error because it doesn't include the refinance ability of the underlying tax-exempt bonds. If we adjust that back to the neutral subsidy rate, it gets much closer to 30

percent. So, that's sort of cutting to the chase of the analysis.

I see I've got a couple minutes left here. So, BABs did provide some interest cost benefit versus tax-exempt bonds, but smaller than estimated in previous research. This benefit is even smaller when accounting for the Sequester, and even smaller still when accounting for the call feature that's inherent in tax-exempt longer dated bonds. Again, our conclusion is that something closer to 30 percent would get you to sort of a neutral subsidy rate in the Direct versus Indirect Programs, and ultimately this should inform any future programs that Congress may enact. I think that's the bulk of what I wanted to address here, with a couple minutes to spare. I yield my time to Sarah.

MR. MARLOWE: Thank you, Peter.

MR. ORR: Thank you.

MR. MARLOWE: Much appreciate that.

MR. ORR: You bet.

MR. MARLOWE: So, with that, as mentioned, welcome to Sarah Snyder, from Ramirez, to offer some discussant comments. Welcome, Sarah.

MS. SNYDER: Good afternoon, everybody. Thank you, Peter, for sharing your findings with all of us. I agree with the main points given throughout the report and do my best to provide some key points on the historical aspects of the Building America Bond Program, Direct Subsidy Program, but then also bring forward to current day because we have seen a shift in the taxable market, as we -- and then as we start to discuss bringing back direct pay bonds and as part of this, you know, bipartisan infrastructure plan. So, I'm going to share some slides. Hopefully, they come up. Can you guys see the slides? Hopefully.

MR. MARLOWE: Sure can, thanks.

MS. SNYDER: Okay, great. So, again, thank you to everyone for being here and, you know, kind of moving forward, I, you know, I put some points on the next two pages, but kind of just going to talk through. So, obviously, as Peter mentioned, it's important to recognize the major structural differences in both the tax-exempt and taxable markets, with respect to optionality. I'm not going to necessarily go through the differences between the two, as Peter did that, but,

you know, make-whole calls are still the preferred structure for most taxable investors, who seek to match long-term assets and liabilities, and do not, you know, necessarily want to have bond cashflows disrupted by the -- having the bonds called.

However, we have seen a shift in this, and I'll talk about that, going forward. But one thing that we would say wasn't necessarily discussed too much in the paper was that we would say probably in 2009, when BABs were first introduced, they were predominantly issued with the make-whole call, and then as we -- as investors and issuers got more comfortable with the program 10-year par calls were, you know, did receive more acceptance on the deals, as we moved into 2010. The numbers I'm kind of roughly coming up, as we found about 35 percent of the larger deals in excess of $50 million had a par call. And, you know, as I said, there was greater acceptance for that and even more so, as we move forward to today in the taxable market.

One of the important points highlighted by Peter, and in the paper, by Marty and Rich, was this life cycle of a bond and using RAY. Obviously, you

know, municipal issuers are used to selling bonds that they plan to refinance in the future. Most tax-exempt are sold with a 10-year par call, and about nearly half of all issuance to date, you know, for the last 10 years has been refunded. So, this is a common practice for our municipal issuers. So, I agree with the point, when you're comparing a make-whole or a non-call bond to a tax-exempt par, you need to take into account, as well, that refinancing flexibility. You know, and as you look at, you know, direct pay bonds in the future, as well as other variables in the Federal Sequestration.

One other nuance that I'm just going to mention here, that's actually on the next page, but was that one of the challenges, as well, with issuing direct pay bonds is the ability to tax --

MR. ORR: Okay, Sarah, your slides --

MS. SNYDER: Oh.

MR. ORR: -- your slides aren't advancing.

MS. SNYDER: Oh, no, no, I'm still on this slide. Sorry.

MR. ORR: Oh, okay, fine, thanks.

MS. SNYDER: It's okay. Oh, I was just saying

that it's on the next slide but I'm going to talk about it here was that, over the years, one of the challenges with direct paid bonds was the ability to capture the subsidy and the revenue pledged to the bond. So, you know, over the years, as bankers, we've worked with issuers to incorporate this into the documents and just something that we want to point out, as it relates to direct paid bonds in the future, is, you know, the ability to have that in every -- this program may come back. Well, you obviously suggest to issuers incorporating that.

So, you know, let's kind of move forward to today and look at, you know, obviously the paper was written more so looking back at BABs and how they were issued and that the market is obviously, you know, significantly different than we -- what we experienced in 2009 and '10, and as we start to discuss, you know, the infrastructure package and it potentially coming back. So, as I mentioned, the -- you know, I want to point out kind of the changes, and so, you know, the question's really going to be, will municipal issuers seek to take advantage of this type of program, and who

will it really help?

And the factors that come into play really are the relationship between tax-exempt and taxable bonds today. We're in a very low interest rate environment, historically low, as many would say, and both markets are extremely healthy for municipal issuers. We've also seen a tightening of credit spreads. So, I say all this to mean that the level of subsidy that, you know, Peter talked about, you know, we also agree that something as low as 28 or even lower really probably will not work for most high-grade issuers, at this point, and so, you know, an issuer's initial question is really going to be, is it going to save me money?

And, you know, the overall Direct Payment Bond Program, while it would give governments another option to finance needed projects, you know, as we bankers like to say, it's another tool in the toolbox. We understand that, you know, the argued benefit is an expanded investor base and potentially lower cost of borrowing, but, again, there are several considerations for our issuers and whether or not it's a viable program for them to use.

So, when I talk, just quickly, about the taxable market and how it's changed, we've actually seen a significant increase in taxable issuance, as I show here on the slide. As we saw tax-exempt advance of fundings go away, we saw taxable issuance, in 2021 and 2020, really pick up to similar levels we saw in 2009 and '10. So, you're looking at anywhere from 20 to 30 percent of the market, now, compared to the average, which is eight percent. And so, this increase in taxable issuance has really increased the buyer base for taxable debt, as well. So, to the point of, yes, a Direct Pay Taxable Program does, you know, have a strong, not going to say stronger, but it has a large buyer base, as well. But we are also seeing a very healthy tax-exempt market.

The other thing I'll point out as being a difference between, you know, 2009 and now is that we've seen an increase in acceptance for par call options. So, that's where, you know, we're now going to maybe comparing a 10-year par call and tax-exempt to a 10-year par call and the taxable direct subsidy, so, you know, being able to apply that kind of RAY component to both

of those, being able to refinance. But we are seeing a greater acceptance of the 10-year par call. In fact, this past week, we saw California State University issue two index-eligible term bonds, one was make-whole and one was par call, and the spread between those has really compressed significantly, as compared to back in 2009 and ’10.

MR. MARLOWE: Sarah, I just -- I don’t mean to interrupt, but we’re still on your first slide here. Have you been advancing?

MS. SNYDER: I did. It didn’t go?

MR. MARLOWE: No.

MS. SNYDER: I don’t -- I see I’m moving it on the page. Yeah, I apologize. Is that on page 2?

MR. ORR: There we go.

MR. MARLOWE: Now it is.

MS. SNYDER: Okay, yeah, I don’t know why it wasn’t moving. That’s strange. So, just to kind of wrap up, you know, I think my last point really is going to be the kicker for all issuers and the impact of Sequestration on BABs, and, at the end of the day, I think issuers are -- have been, I guess, a bit burned by

the program, in the past, and, you know, I know that if -- there are many people trying to work to avoid an impact to Sequestration on a Direct Subsidy Program, going forward, but there has also been recent conversations about extending the Sequester. So, again, I think that's going to be one of the main drivers of whether or not issuers decide to use this type of program again. So, I think that's all I have right now. So, thank you.

MR. MARLOWE: Terrific. Thank you, Sarah, I appreciate all of that perspective from the bankers' perspective. First things first, Peter, any immediate reactions to any of Sarah's comments?

MR. ORR: Yeah, no, it's, I think, important to point out that the market dynamics have changed quite a bit to taxable market, as she said, has really, for municipals anyway, has grown quite a bit, ever since the preclusion and prohibition of tax-exempt advanced refunding and also the greater acceptance, as she mentioned, of a traditional call feature, what we would call traditional in the tax-exempt market, on longer-term taxable Munis, that changes the dynamic.

And on a going forward basis, we probably want to revisit the research looking at the market dynamics of today versus what has occurred historically, but, yeah, those are -- no, those are good points. Thank you, Sarah.

MS. SNYDER: My pleasure.

MR. MARLOWE: Terrific. So, one question from -- that has come in from the audience is, and you've both kind of hinted at this, but maybe just to take it to its natural end here, given the policy discussion that's happening, particularly in Congress, right now, how would you both advise on the design of, you know, a new BABs Program or BABs 2.0? You spoke to the concerns about, you know, the Sequester and the need to make sure that those revenues are ring-fenced somehow, if possible. But, you know, generally speaking, if you're advising members of the Ways and Means Committee, right now, what advice do you give about design of another version of BABs?

MR. ORR: I would form a Blue-Ribbon Panel first to analyze the situation. No, I'm only half kidding. I mean, I think the objective of a Federal

Program is to try and support the financing of those activities and those projects that are deemed to be in the public good, right? It's the inherent question public finance is trying to answer, in some ways. And to that end, getting a handle on whether or not having a BAB-like or Direct Subsidy Program and an Indirect Subsidy Program does, in fact, expand the investor universe for the accomplishment of that goal, right?

I mean, you'd certainly think that having both taxable and tax-exempt bonds may ultimately drive down the cost of capital for the purpose of public projects across the board. But I think you'd want to look at that. And then based upon that, you know, figure what the best bang for the buck is, for the U.S. taxpayer, in terms of setting a subsidy rate at a level that ultimately sort of balances that expansion of the market against the cost of the program, both in a direct and indirect way. I mean, the difficult thing for the Federal Government, as it relates to the Indirect Program as sort of traditional municipal bond, is they don't know how much it's really costing either because marginal tax rates are unknown to everyone, not just us

outside of the beltway. So, how much that will be for a 30-year tax-exempt bond issued today, in, you know, 2035, is a bit of a finger in the wind. So, there's risk there, to the Federal Government, in some sense, that is unknown, unknown quantity. You know, another opportunity for a Monte Carlo Simulation, I guess. But, yeah, I wish I could just say, well, they should do it this way today, but I think there is some more research that should be done, before giving a clear answer on that. But it's certainly a good question. Thank you for it.

MR. MARLOWE: Sarah?

MS. SNYDER: I would just also add, agreeing with your points, Peter, that, you know, similar to the Indirect Program, the tax rate changes, the relationship between tax-exempt and taxable changes. So, obviously, as you say, avoid the Sequester. We definitely don't want a Sequester, but maybe the rate that they benefit from has to change over time for those issuing that day, not necessarily if -- once you've issued, it stays with that subsidy. But the benefit, if you actually want your issuers to use it, may need to change over time,

that percentage, to actually encourage your issuers to use the program because, again, if you -- they're the ones who need to necessarily benefit, if you're going to have this as an incentive to build infrastructure. You know, they need to have their lowest cost of capital --

MR. ORR: Yeah, that's it.

MS. SNYDER: -- if they're going to take on the risk.

MR. ORR: Yeah, I wonder if the U.S. Treasury would be willing to take on sort of the delegation of that authority --

MS. SNYDER: Right.

MR. ORR: -- adjust the subsidy rate around, as markets move. That's an interesting idea, yeah.

MR. MARLOWE: Sorry, kind of a follow up to that, and you've both spoken to this just a little bit, but given the surge in taxable issuance, certainly over the last year, six months, year, and there's some specific reasons, you know, we think why that's happening. In your view, does that potentially diminish the value of these sort of Direct Subsidy Bonds, or is -- does it maybe increase the investor base? Is there an

opportunity here for, you know, some of the trend we've seen over the last couple months to kind of stick and have some policy implications, going forward?

MR. ORR: Sarah, go, yeah.

MS. SNYDER: I do think that it obviously helped further the argument that, you know, there is a strong base for taxable municipal bonds. But when -- at the end of the day, when you're -- if you're -- you have two options, whether it be a tax-exempt, new money, or a taxable direct subsidy. You're going to pick the ones that cost you the least amount, similar to when that program was issued. They don't -- most issuers only sold them on the part of the curve that benefitted them. So, I do think that it furthers the argument that there is a healthy market on both sides. But if we want to encourage infrastructure at the lowest cost, we need to make sure that those who are actually borrowing achieve the lowest cost.

MR. ORR: Yeah, I don't -- I don't think I have much to add. That's -- totally agree.

MR. MARLOWE: Makes good sense. Anything else either of you want to add to the conversation here,

before we take a break and get ready for our next panel?

MR. ORR: I don't think so. Thanks for the opportunity, happy to be here, great, great program.

MS. SNYDER: Thank you for the opportunity. I truly enjoy being part of this every year, so, thank you.

MR. MARLOWE: Wonderful and thank both of you. So, with that, we'll break five minutes early. So, we'll have a 15-minute break, rather than a 10-minute break. So, we'll reconvene at 2:15 p.m., Eastern, with our panel of issuers, who will provide some market perspective on a lot of the themes that we've talked about here today. So, we'll see you back at 2:15, Eastern. Thank you.

(Recess)

MR. MARLOWE: Okay. Welcome, everyone. We're back for our final panel of the day, which will be a lively conversation with a group of muni bond issuers, who have been dealing with many of the very issues that we have talked about throughout the course of the conference so far.

I'm really excited about this panel. It's an opportunity to bring together people not just with boots on the ground experience in the areas that we have been talking about, but also to bring together a really nice mix of folks from different segments of the issuer market.

I won't go into a lot of detail about their backgrounds just because we have information in the program, but just to very quickly tell you about who they are going in alphabetical order. We have Dwight Burns, who is coming to us from the Dallas area of Rapid Transit, so he is giving the sort of transit perspective.

We have Manju Ganeriwala from the Commonwealth of Virginia. Welcome. We also have Lakshmi Kommi coming from the city of San Diego to provide the kind of big city perspective here, and Uri Monson, who is with the school district of Philadelphia, to provide the school district perspective.

So, welcome to all of you. Thank you for being here, and thank you for all of the great work that you do. That work often goes unappreciated, but

certainly not by this audience. So we're thrilled to have the opportunity to talk to you here today.

Our basic umbrella heading for the panel is to talk about what issuers are doing to navigate the -- what we'll call the post-COVID muni bond environment. And what we mean by post-COVID is really two things. There is certainly one direct impacts of COVID; the pandemic itself, the changes that that's forced in what we're financing and how we're financing it.

And then the second piece, in some ways potentially more important, is how the response to the pandemic is changing what we finance and how we finance. And, in particular, the huge inflow of federal money that has already happened and is likely to happen in the event of infrastructure spending package, or some other ongoing federal support.

So when we say "post-COVID," we're talking about both the pandemic and the response to the pandemic. But we wanted to touch on three main themes, and each of our panelists is going to speak to their individual experience, their jurisdictions, individual experience with each of these three themes for just a

little bit and then we'll have plenty of time at the end for conversation with the audience.

Those three themes are, number one, priorities. So how has the post-COVID environment shaped and reshaped what you're spending money on, what has happened in your capital budget? Are projects moving faster through the capital budget? Are certain kinds of projects moving less quickly through the capital budget?

You know, post-COVID environment, what do those priorities and reprioritizations look like? The second theme is going to be tactics. When you go to the market, how are you going to the market?

Many of the things that we have heard about already here changes in sizing, strategies, maybe changes in coupon strategies, changes in timing of when to go to the market, short-term versus longer term borrowing, particularly in the face of having to spend a lot of money before the federal reimbursement can happen. Those are changes in terms of tactics. And so we'll explore that a bit.

And then the third part we want to explore is

disclosure, particularly around changing disclosure needs as investors are trying to navigate themselves what's going on in this market, as well as a lot of the concerns that COVID has really highlighted lately with respect to things like climate risks, with respect to concerns around inequity and the need to be investing in underinvested communities, so on, and so forth. Those are all what we'll call "disclosure priorities."

Now these categories aren't mutually exclusive. I'm sure there will be some crossover across all three of them, but we wanted to kind of organize our discussion that way, and again hopefully have some time at the end for lots of conversation with the audience.

So, again, going back to the first scene that we want to explore today is priorities, and for that fortunately Uri has volunteered, or perhaps have been volun-told to go first. So we'll turn to him first and see where we go from there. So, welcome all of you, look forward to hearing what you have to say.

MR. MONSON: Thank you and good afternoon, everybody. I think from our perspective the priorities have shifted in interesting ways. And for anyone who

reads the papers, Philadelphia and its facilities have long been a challenge, particularly with environmental issues and thinks that's where the priority has changed a bit, where it used to be repair and remediation of asbestos, lead paint, and those types of capital issues, which were smaller, more contained.

There is really a focus more on replace rather than repair, with a particular focus on ventilation. COVID has raised those concerns in unbelievable ways. Philly schools have an average age of 70-year-old buildings, several over 120 years.

So you can't do the same kind of -- you know, asbestos remediation is one thing, but to really deal with ventilation, HVAC issues, air conditioning are much larger and really replacing buildings are I think bigger projects in a lot of ways and obviously speed. You know, it's a national issue about getting kids back into schools, and we know that younger kids can get vaccinated.

So how fast can we do things? How fast can we deal with vaccination – not the vaccinations, sorry – ventilation on both a short-term to get kids back in

with a look at medium-term and long-term replacement. But no one wants a 20-year or 30-year timeframe; they want, you know, two, three, five years to get as much done as possible. So I think that's been a real shift for us, both in terms of scope and speed.

MR. MARLOW: Lakshmi, go to priorities.

MS. KOMMI: I am very happy to be here. With the city of San Diego, we are 1.4 million in population and the second largest city in California, very large capital improvement program including the ongoing appropriations, and during the COVID, you know, continued investment totaling about $2 billion. So that is the, you know, breadth of the capital investment in the communities.

Interestingly, I know within the $2 billion program, you know, prior to COVID, although the team's continue, you know, anchors were very larger, you know, pure water programs, purified water, you know, having independent, you know, water supply to San Diego which was over about $1.2 billion program receiving federal funds, not to mention, of course, city actively in the tax-exempt markets both for short-term and long-term

needs for this program.

And then, of course, the strong water program, you know, compliance-driven strong water system, you know, reducing pollutants in the (inaudible) and state and federal, you know, regulations are fairly stringent. And, you know, in that regard, you know, interest capital investment has to occur, then with the COVID, interestingly, and, you know, an important shift while programmatically, you know, all of these teams will continue is the city's renewed focus on climate equity matters.

And I'll regress back to what I mean by climate equity is, which is defined in the context of the city's climate action plan as environmental justice and social equity. So that has taken, you know, significant, you know, front stage in the operational, as well as capital programs, what does that investment program with respect to these climate projects, make buildings more energy efficient, you know, shift San Diego to cleaner energy boosting ordinary forms of transportation and increasing recycling whether it is voluntary or mandated in the state of California.

And now with respect to equity in that took various forms including, you know, libraries equity, parks equity, tree equity, tree canopy equity, digital equity, you know, is still by far, you know, access to all of the communities and the answer is no.

So, you know, the previous panel discussed about taxable markets and most of these newer components of the capital program timing. So will the traditional tools in the tax-exempt markets would fit into these needs and are they important area that is, you know, across the state including city of San Diego is housing solutions to the disadvantaged communities whereas services are an important component.

As we all know, tax-exempt markets traditionally are in the space of traditional brick and mortar, you know, space is providing broadband access, you know, which generally falls into the services category versus brick and mortar with the long asset life.

These are, you know, important issues, challenges, is planting thousand trees in the city and is that a traditional tax exempt use. These are all

important issues currently the city is valuating. Thank you.

MR. MARLOWE: Wonderful, thank you. Manju, do you mind telling us about priorities in the Commonwealth of Virginia? (No response) I think you're on mute.

MS. GANERIWALA: Thank you for inviting me to be on this discussion, and hello to all of my fellow panelists, nice to meet you virtually. So, as I talk about the Commonwealth of Virginia and capital funding needs, and in what we see going forward, let me give you a little bit of context. Commonwealth is a .3 million people. We have a budget of $24 billion that's supported by general funds, tax-supported budget, and another 42 billion or so non-general funds for total loss 67 to $68 billion budget.

So a large Commonwealth with 120,000 employees. Going into the COVID timeframe back, the first nine months of fiscal year '20, which was through February/March, the Commonwealth was growing at a – it's revenues were coming in very strong.

We were projected to grow at a rate of something like a little under three percent, but our

cumulative growth rate going into the COVID time was approximately 6.5 percent, so more than twice what we had projected. That put us in a very strong position going into the last quarter of COVID when March, April, May, June, you know, hit, and we experienced -- you know, the revenue started to decline and unemployment started to rise up.

We thought we would have a deficit of a billion dollar, or so, but we ended up with a deficit of $234 million, which was just one percent of our general fund budget. And, you know, it was two factors that we had strong growth that helped mitigate the deficit and many states did something that Virginia did not do, as you may recall, the federal government extended the tax filing deadline to July 15th and many states kind of matched that and allowed their citizens to file state taxes on or after July 15th as well, which presented problems to many state because it crossed fiscal years.

And because it was crossing fiscal years in Virginia and although we did extend the filing deadline from May 1 to June 15, we didn't go beyond our fiscal year. That was another reason that we were able to

contain our deficit to a much smaller number.

So because we were strong financially going into COVID, and as COVID was taking place, we really did not have to reprioritize our capital spending. All of the capital spending that was programmed continued. We have approximately $5 billion worth of authorizations that have been authorized by previous legislature that for which the bonds are yet to be issued.

Our legislature authorizes spending on financing, bond financing, and they might authorize a billion last year, two billion next year, but we issue bonds on cash flow basis when cash flow is needed for the project. So we really didn't have to, you know, cancel any projects.

I think we saw something opposite. Our universities did get majority of the capital funds that are state-supported capital spending that occurs. And they went on a high gear because the students weren't there, campuses weren't open, they were taking advantage of the timeframe to accelerate and focus on their capital projects, oftentimes which might get delayed because they don't have time to do things sequentially

as quickly as possible. So we saw a lot of outflow and had to go do markets quite frequently.

To keep up with the cash flow needs, the Commonwealth issues debt through a different debt issuing authorities: the Virginia Public Building Authority, and Virginia College Building Authority are two major authorities that we issue debt through. So the business of debt financing and capital project construction, we saw really no changes and we were fortunate in that sense.

MR. MARLOWE: Interesting, interesting. So anyone who is watching, who happens to be a state of Virginia income tax payer, if they were unaware, now they're fully aware that they did not get an extension and they probably need to do something about that right away. Very interesting, thank you.

And then last, but not least, Dwight, tell us about priorities from the transit perspective.

MR. BURNS: Sure, Justin. Just as about every transit agency in the country was impacted significantly by COVID, DART, in the Dallas area was also impacted significantly. However, the impact did not lead to a

change in the prioritization of our capital projects. Our main short-term large capital project we were breaking ground on before COVID hit was a 27 mile new commuter rail in the northern sector of our service area and that continues.

As a matter of fact, we have – although we have seen – experienced some delay because of COVID and some costs increases the commitment from our Board and our ability to continue the financing program for that project has continued.

And just to back up a little bit and just to give a perspective about my agency service area, we also, similar to San Diego, we have a 1.2 million popular service area. And in addition to the city of Dallas, DART also covers 12 other cities in one of the fastest growing areas of this Metroplex.

And one of the key strengths that we have here is the size of our sales tax base. Our sales tax base makes up about 70 percent of our total operating revenues each year, and we are the third largest local sales tax base in the state of Texas, so with over $600 million sales tax, annual sales tax revenues for the

year.

And while COVID did put a dent in our sales tax collections, the dent was much more minor than we had anticipated and we had budgeted for in the midst of COVID, and we basically came out of COVID really only having dropped our – having experienced a sales tax drop of about two percent for over a year.

And just as other places are seeing this year with the recovery, our sales tax is coming back with gangbusters. We're seeing sales tax numbers for the last three months, of course, more than we experienced last year. That's to be anticipated. But now we're seeing sales tax returns higher than before COVID, record-breaking numbers, as a matter of fact. So this treasurer is happy with regard to the revenue stream.

The commuter rail project I just told you about, we also got some really significant assistance from the U.S. Department of Transportation. They ordered us a $908 million loan from their so-called RRIF program, the Railroad Rehabilitation Improvement Pro=gram with a really favorable interest rate.

But even more than that, during COVID they

really, really helped us out by offering to refinance that debt, that loan at a lower rate, at the prevailing rate that's tied to the 30-year treasury rate.

So we were able in the midst of COVID to actually go back to the U.S. Department of Transportation and get a refinancing that saved us a substantial amount of future debt service for that billion dollar plus commuter rail project we're doing.

Longer term the impacts of those permanent structural changes that might be caused by COVID in terms of, like, commuting patterns to the central business district and the use of buses and where our ridership will land permanently, well, that's still an open question and so we'll have to wait.

And our policymakers are going to wait and see what long-term impact that has on us, but so far we are really fortunate I think with regard to our sales tax revenue stream from the continuing support that we're getting from, for example, from the federal government with COVID relief funds we've got breathing room to be able to figure our way forward.

MR. MARLOWE: Great to hear. Anything anyone

wants to add on priorities real quick? (No response) Those were great answers and clearly some common themes there and I'm sure we can come back to a few of those a little bit later.

Okay. Well, with that, then let's go on to our second piece which is tactics. When you go to the market, how are you going to the market and is it different from when you went to the market pre-COVID?

One thing, if possible, it would be great if you could speak to what has been a theme all morning and that's the role of taxable issuances and the potential value of taxable issuances to your jurisdictions.

So when you go the market what's different? And maybe for this one, if Manju wouldn't mind starting, that would be great. (No response) I think you're muted.

MS. GANERIWALA: COVID did force us to make some changes to our normal issuance strategies. However, we see these deviations as temporary and not likely to continue much longer once we are back to our new normal and go back to our standard practices. So let me kind of talk about how we typically issue our

debt and then, you know, what changes did we have to make.

So Virginia typically issues debt for 20 years period. Our duration for most of the projects is 20 years. Some bonds are issued for 30 years if it's transportation-related or Virginia-port, or some being issued on behalf of some pool issuers.

But, generally, for most projects we choose the 20-year issuance schedule and the debt is typically amortized in a level debt service basis over that 20-year period. Except for our general obligation bonds our Constitution requires us to have level principal payments for general obligation bonds.

And we normally, because we are a triple, triple A rated state, we have found that going to the market competitively works the best for us. We always have anywhere between 10 to 12 bidders on any time we enter the market. So we tend to do more competitive bids, really rarely do any negotiating bid.

However, when COVID first hit in March, we had a $500 million deal lined up to go the market in late March, I believe it was, and then suddenly mid-March we

got the notification from our governor we are going into an emergency, everybody is closing down, everybody did go remote, nobody come back to their buildings. And the markets, if you may recall, were just became very – I mean the markets froze.

For several weeks, there was a lot of – you know, volatility in the market at that time. So we kind of pulled back the deal for a few weeks and my staff and team quickly pivoted to convert that competitive deal. Because it was $500 million, large amount, our advisor said it would be best to go on a negotiated basis because even in April the market was still volatile and it was completely back to normal.

So we, within a matter of three weeks, we went from doing a competitive deal to, you know, procuring or putting together a consortium of underwriters and issuing our POS, the day before, and going to the market next day on a negotiated bid. We did okay. All right. Even though the market was slightly volatile, we came out doing all right.

Following that deal, we did another deal for 650 million for our Virginia colleges and universities

and that, too, we decided to do; that was in June we decided to go negotiated on that. Both of those deals, I think the Virginia College Building Authority deal, we had a TIC (phonetic) of 2.5 percent and on the other deal it was somewhere around the two percent, too, on the new money bonds – no, sorry, on the Virginia College Building Authority, we actually got 1.86 percent, 340 million of that was new money; and on the one that we did in April, we had 2.5 percent on the new money bonds.

So, again, while the taxable rates are low, Virginia generally doesn't do refinancing unless we see that there is money, there are savings in there. So we have been doing taxable refinancing because the taxable rates ae so low, you know, in the last couple of years, especially since the pandemic, that many of our deals that bonds that were issued a few years ago, or five years ago, are still, you know, coming out despite having to do escrows and everything else that we can save money.

We have been doing that. We have analyzed shorter calls and have done some deals with shorter calls in the past, but really that hasn't worked for us.

So we're sticking more to the 10-year clock area.

The one area where we have to make most changes in our issuing tactics was the higher ed sector. The universities and colleges, as you might imagine, was one area of state government that was hit the hardest with the students not coming back to campus, no dorm fees, no dining fees. And our universities finance a lot of these projects that are revenue-backed, dorm and dining projects, recreational facilities, athletic facilities, these are all based on fees and revenue they generate.

As a result, they really needed help and in order to help them we worked with the governors office. The treasurer's office worked with the legislature to get special permission to do some restructuring. Because Virginia is very conservative, we hardly ever do – in our refinancing it's we are mainly a lottery financing just to, you know, do this savings and not extend the debt duration.

But here to really provide them some debt relief, we would have to do restructuring where we would be extending their debt duration saying you're like

tacking on, extending the duration. So we had to go to the legislature and seek some legislative authority to do that for general obligation bonds, although we had he authority to do for bonds that don't have the general obligation pledge behind it.

So some of the bonds that Virginia issues, we'd refer to them appropriation backed bond. We don't put two-year-old pledge on all of the bonds we issue. But some of the some of the university bonds were GO bonds. And once the General Assembly passed that legislation back in last January, this past January, we were able to go to the market and what we did was the scoop and toss restructuring where we took the first two years of debt service payments and tacked them on to and extended them by two years on a project basis.

So it was a very complicated financing because we don't issue debt on project-by-project basis generally. We issue in a pool for a basket of projects and then provide the cash as those projects need them. So we have to do that for our higher ed sector.

So, as a result, we were able to provide, you know, tax relief to them – I mean debt service relief, a

combined debt service relief of almost close to $90 million in year one and year two, collectively, to our higher education institutions. There were 13 universities part of the initiative.

Oh, we also tried one other thing that we had planned on trying in 2020, was the electronically bidding platform. You know, vendors had come to us in the past, like, hey, you should try this, and I was curious to try that. But in 2020, with the way the market was we put it off, but we tried it in spring, this past spring.

For our notes, we issued some five-year notes for our school, K-12 schools, and these notes help school divisions finance their IT needs and their security, information security needs. So it's $60 million over a five-year period, we gave it a try and that was interesting. It went well and we showed 60 million at .32, 0.32 percent.

So those were some of the changes that we made in our tactics and how we go to the market.

MR. MARLOWE: Excellent. Thanks, Manju, thank you very much. So, left to right, on my screen, would

mean that Lakshmi's next.

MS. KOMMI: Thank you. You know, we were in the markets very actively during the last 12 to 18 months. I suppose, you know, that's, you know, gave us a crash course on how to adjust, adapt to the everchanging landscape which it works, you know, starting with April of 2020, and see, you know, I was just aggregating, you know, what are the categories of, you know, instruments that we were in the markets for.

Of course, city has, you know, a diverse set of credits that may be essential utilities. These are all of the things that we were in the markets for, short-term, long-term, general fund, water, utility, and (inaudible) convention center, you know, that, in itself, was an interesting, you know, dynamic going into the markets where there is major dependency for the City obviously as a tourist destination.

So, as to the bond financing efforts, of course, all these are very successful offerings and with the short-term paper, clearly, as with my colleagues, you know, if you were in the short-term space, March and April, where a significant, you know, there were

concerns whether is there market access or what are the (inaudible) all over paper will be set at, and so diverse active management on the city's part, you know, to the extent there is a flexibility to sit in the sidelines, you know, week-by-week.

That's an important consideration, especially in mid-March through early April, and also, you know, we'll be able to, you know, observe the considerations given by the honorary community city because of our long-term bonds activity close to six bond offerings within that taxable advance refundings.

The interest rates were still favorable, you know, especially after the federal intervention and diverse, you know, market has settled, continue to be favorable, you know, past the credit concerns, you know, that the investors and/or credit rating agencies, you know, could have taken into account.

So, in that regard, you know, great outcomes with respect to call options, you know, 10-year calls and split couponing has occurred while the earlier papers this morning have discussed about institutional investors, for instance, versus retail and, of course,

you know, it goes without saying, as a double A agency with all of these credits still maintaining stable outlooks in March, April, May time period last year when the city was in the market.

You know, our job as towards of the local government is to get the best rate possible. So there was, you know, clearly, from staff standpoint, as well as, you know, working closely with the municipal advisors and underwriters to ensure that while the city's interests are protected in the structure space, you know, equally able to see the, you know, shifts in the market during that period and so be cognizant and work together in finding the optimal structuring elements.

So there was split coupons adopted, you know, five percent in some places, most of the places are basically on the curve and, likewise, 4 and 4 1/2 percent as well. And city has been, you know, in second week of April, last year, of course, the very first time, perhaps, you know, in he Zoom interactions in setting the prices and there is some adjustment to even measure, you know, investment banks.

Regulatory, they have to, you know, have in-house exceptions to have the trading activity, you know, interfaced in, you know, in this virtual space. But, end of the day, you know, San Diego had great results and especially in the context of while the city was not in the ESG, you know, space, clearly, many of the, you know, uses fell indirectly in that, you know, spectrum.

So there is a lot of active interests, you know, from the investors in the context of, especially general fund credit, you know, we were there for release of the new bonds, and we were there for volatility except, you know, meshing with the, you know, with respect to the COVID in the case of general fund, how are the finances, you know, what is the tax collections or not, you know.

Was it a withdrawal (phonetic), you know, of property tax collections or such, or draws on the reserves or not? So these are important, you know, inquiries that the takeaway is more than ever it's important that the issuers and, of course, speaking for the city, realize that an active engagement by the

issuer, you know, and coordinating with the market players on a new transaction, of course, led to, you know, a good result, you know, given that the market was, as Manju said, you know, quite volatile and influx. Thanks you.

MR. MARLOWE: Thank you. Uri, could you tell us about tactics and that sort of thing?

MR. MONSON: So COVID hit at a very interesting time for us in our recent borrowing history. In ’20, Philadelphia school district had been having financial difficulties and really had very little access to capital markets; 2015 and 2016 were spending $30 million a year on capital and we should have spending eight to ten times that, and we have been improving our finances since then.

And, actually, of 2018, got an investment grade rating for the first time since 1977. And, as I have said, we kind of hit a sweet spot and that we were investment grade, but because of our rating we’re also a decent yield at a time of low yield, so it made us rather popular out in the market which was nice.

And on the theory of better lucky than good,

we actually did the largest borrowing in the district's history, November of 2019, so, you know, timing is everything. And that was about a 500 million – we did a $500 million borrowing, plus a $30 million green bond.

And I think the biggest issues for us was to look at tactics are, interestingly enough, not that I want to say that there was a positive side to COVID, but one of the advantages it did have is, while students were out of the buildings, we were able to do more work in a year than we normally could have.

So where we would normally spend 100, $150 million, and the majority of the work in the summer, we spent over $250 million during the last fiscal year. So how we think about our ability to spend the funds, we did our first full strategy for our new school building, which we hadn't done in the past, so that thinking about in terms of cash flow on a bond on a one-time payment and for a building of $80 million opposed to regular fund, how we think about the sizing of a deal is really important.

I think the two issues -- I'll say sizing, in particular, because we have committed to about a third

of our Recovery Act funds, so over $300 million going towards facilities, so looking at that as a piece in our capital spending toolkit, how that works with what we'll borrow, and obviously timing issues.

And, in terms of the taxable, non-taxable, again, because our last deal was 12 times oversold in terms of offers, and, you know, we have that nice spot in the market, might there be an advantage to taxable as we look into our next issue and this is going to be in the fall.

So we're keeping on our schedule. But the flexibility is from taxable, in addition to kind of a different place, the marketplace, in terms of how we spend and what we can do with the money while we're balancing spending the federal money in the time period that it has to be spent, along with having some flexibility with the capital money borrowed this way has kind of created new wrinkles for us which is a positive, I mean, how we can take advantage of those, so it's changing some of the strategies.

And then the only thing I'll add is we have spent a lot of time, the debt portfolio was a little

interesting. When I started at the districts, five or six years ago, a lot of backloaded deals and things like that, and we spent a lot of time looking at this very (inaudible), which I'm very happy about.

But it gives us an opportunity to really look carefully at where our gaps are over the long-term, how we can best take advantage of what's going on in the market, again, taxable, non-taxable, but all of those are kind of on the table, as we think about – we know what we have to do, how we want to do it, and what can best fit those priorities and let the funding schemes match what the capital priorities are.

MR. MARLOWE: Wonderful, very interesting. Dwight, I wonder if you had a similar opportunity, no one riding the trains, did that give you a chance to work on the trains at times you might not otherwise be able to?

MR. BURNS: Well, definitely, and give us also an opportunity to do some improvements into our infrastructure but, and so, yes, it is. So before I talk about DART debt over the last year or two, I have to speak to something that Manju just said about the

Commonwealth, and she spoke proudly a bout the triple A's that the Commonwealth carries.

Well, I spent eight years during the early 2000's at Moody's, as an analyst, and I remember actually being in rating committee voting on the Commonwealth credit rating – so, you're welcome -- (laughter) – no, because it's a well-run, well-run state.

So what my experience with the issuing debt during the time of COVID was really dramatic. I was actually in New York pricing a series of bonds in March of 2020, on the very day that the markets started shutting down, that the city of New York started shutting down because of COVID, in the middle of our bond sell.

And so, our bond traders were – number one, they were worried about themselves, right, but they're trying to get to work, so they rolled up their sleeves trying to get the deal done and were chasing the buy-siders, the investors, trying to find them to purchase the bonds while they're trying to leave Manhattan.

I have gone through a lot of bond sales in my career, but that was the most interesting one. The sale was successful, but it was a really eerie flight that calm to Dallas. I have never had a flight back from Manhattan that was empty like that on a plane, So it was a really, really interesting time.

Speaking of that, of the bond sale, and that kind of goes, Justin, to your other point, is how we're structuring things these days. Of course, that sale was not impacted by COVID, but it was impacted by, of course, the inability to advance refund, you know, on a tax-exempt basis.

So we had almost a $300 million deal, about a third of it was taxable. And so we split the deal onto a tax-exempt portion and taxable portion and it was a negotiated sale, so we decided to split the syndicate into two and to allow one team to focus on the investor base that was more interested in the taxable debt and another incentive to get down the tax-exempt debt.

So we spent one day in the headquarters of the bookrunner, who was running the tax-exempt deal, and the next day, the really interesting day that COVID kicked

off and the actually on Wall Street price and bonds with one of the other deals, and since then we did one more taxable deal later in 2020. It was successful, but unlike Uri, it was not 14times oversubscribed. I'll just say it like that. We had to work on that deal to get it done.

Bur our credit is great. Like I always tell my ole ex-colleagues at Moody's, I said, this is a sales tax deal. This deserves high rating. I always tell that they have a double A, too, rating right now; S&P has double A plus; CRO has a triple A, and so I tell my friends at Moody's that you are, like usual, underrating my bonds.

So we continue, in terms of couponing -- well, back during the times, if any of you all have been around since last, the previous economic downturn when the Build America bonds ratio, from way back then, when I was issuing debt, I insisted that we continue to call the deal even though it was taxable and that was a new thing back then, right, but to put a 10-year call on taxable deal.

But in talking to our municipal advisors, we

were like, this is muni debt, you know. And muni debt is accustomed to a 10-year call, so just that we didn't have a problem back then. We didn't have a problem putting a 10-year call with related structuring couponing on it with the deals we have done since then.

So keep our fingers crossed that perhaps Congress may come around and let us do tax-exempt advance refundings again, but I won't hold my breath on that. And we'll just have to keep doing what we do.

MR. MARLOWE: Makes good sense, thank you. Okay. Well, then, let's go into our third piece with the time we have remaining and we have a little bit of time for some questions here at the end. Dwight, I know there is few we can start with and watch me on this one.

The third piece, of course, is disclosure. We have certainly heard about issuers on the market who have fell on to, you know, more structure, more sophisticated investor relations programs and are doing a lot more in terms of outreach and proactive disclosure, financial disclosure, and otherwise.

And certainly with all of the emphasis these days on the climate risks and lots of emphasis, as has

been touched on before, about more information about climate risks and ESG, more generally, how is that hitting all of you Talk a little

About the disclosure environment you're in, anything different you're doing with respect to disclosure in this post-COVID world?

Lakshmi, go head.

MS. KOMMI: Right. So the fact that in the previous topic we have covered city, we were in the markets of a variety of credits, approximately $1.5 billion, you know, investment is what, you know, through the net markets, whether it is long-term bonds, or short-term paper, or federal loans.

And so we have seen, of course, you know, by being in the primary markets, of course, as an issuer, you know, developing the primary offerings statements with these, you know, topics that, Justin, you have just mentioned, COVID disclosures, of course, right and center.

But all of these credits, you know, of course, you know, mostly the general funders, which we were in the markets, and general fund, you know, credits the

emphasis on, you know, loss of a revenue base. In the case of the city, you know, would there be an impact on property tax base? Would there be an impact on safe stacks generation?

And, importantly, you know, for San Diego, on the transient occupancy taxes on the logics. And, of course, you know, SEC's guidance early on in April/May timeframe, you know, providing some leadership in issuers may pay it all in the dark as to what the revenue is going to trend in our case.

And is there any federal support; or in the case of FEMA's assistance, and how do you prepare these disclosures, you know? Of course, there is a worse case scenario that can be built; but also, you know, but so many, you know, moving parts telling our story.

SEC's suggestion that good faith effort on the part of the issuers, you know, tell what we know, you know, at the moment, that definitely, you know, put to rest some unease. We don't know what we don't know. And that, you know, led to, of course, you know, from a credit evaluation standpoint, what are our liquidity levels? Is there sufficient cash flow to run the, you

know, daily operations?

And in the case of reserves, of course, reserves are meant to be rainy day reserves. And as the former mayor was quoted, "Well, this is hurricane season, you know, the rainy day reserves are meant for this."

And in the case of the city, you know, city was one of the few large cities that found that, you know, 1,000 and above population has in the very initial round of KSAT (phonetic) benefitted with over $300 million in influx in, you know, direct expenditures related to COVID and public health.

So these are the disclosures that took center stage that was not, of course, there before. And then, moving on to all things related to climate change and the risks that are offered in that space. And, you know, it comes to mind last year the California Debt and Investment Advisory Commission put out a report and analysis, data analysis, albeit, with respect to enterprise issuers suggests that there is a, you know, growing awareness, a shift

Even starting 2019, you know, the larger the

issuers and more frequent the issuers are going to market, there is clearly a recognition that there is – it's important to recognize, you know, all things related to climate change and how it is effecting the operations, the finances, and the risks for the investors.

Rather in the case of city of San Diego, the sea level is rising and/or coastal erosion, you know, cliffs and bluffs, you know, are becoming a daily event. And some observers say 2020 calendar year was the worst of the Wi-Fi season in California, and a lot of active management on the part of the city and with some luck, you know, we did not have to face, you know, significant Wi-Fi loss in the southern California region.

And, finally, you know, is it because of the COVID, or, in general, the transit disclosures with respect to cybersecurity and information, you know, information technology and while it is a growing need in the ESG space, communications and, you know, as we previously touched on, digital equity, you know, city becoming all things to all people, but at the same time exposing itself, you know, to security measures and how

it effects the finances which, of course, is an important disclosure issues that, you know, responsibility falls on the city to convey these disclosures.

And, finally, it goes without saying, the private debt whether it's bank loans and/or financial obligations, which is the, you know, SEC's definition for the previously coined bank loans and, you know, as one issuer here agree that bank loans and the risks associated with the, you know, exposure date in the bank loans and before the due date to disclose all of that, and would like to note that, you know, with the growing interests among the investors for an ESG, you know, topic, all things related to that, and the risks and the climate change and all of that, you know, city very recently took the opportunity to make, while these are not investor materials, recognizing the important need to communicate, transmit, be transparent, you know, availing the MSRBs Emma page and, you know, recently posted all were included in the primary offering disclosures, but importantly on the issuer investor page dedicated for ESG and sustainability materials on Emma.

So this is all, you know, clear recognition is there. There are, you know, new disclosure topics for those issuers that are in the markets suggest city, as well as, you know, those important disclosures that are the backbone for the city to, you know, take our, you know, borrowing needs to the markets.

MR. MARLOWE: Very interesting, very interesting. This one will go right to left on my screen, so that would mean Dwight's next.

MR. BURNS: Thanks, Justin. With regard to disclosure, we really have not made any significant changes to our policy with regard to disclosure since COVID. We have, of course, just made sure that during our normal disclosures, you know, in our bond packages and in our quarterly disclosure statements -- we do quarterly disclosure here. It goes back to the days when we needed to provide – we were a newer transit agency and needed to provide assurance to the buy side because there were sales tax, you know, but we still do that to this day.

It's really, a really frequent, and updated, and detailed disclosure. So any contingent factors that

pop up including COVID, we just make sure that we include that just like everybody else does.

One of the most interesting things for us longer term, with regard to disclosure is how much detail – this is the questions we're asking ourselves. How much detail about ESG, about, you know, sustainability, about any efforts to attract that portion of the investor base that is geared towards sustainability, green bonds, things like that, the question for us as to how much effort do we need to put into our offering documents to try to bring in that sector of the market?

I'm still not convinced that slap a green bond designation on my OS, is it going to move the needle when it comes to our Tick and just haven't seen that yet. And so that means that the more effort, especially for these cheap treasurer, the more money I have to spend to try to get some designation it's, like, where is my return on it, you know, in terms of issuing – everything we do here at the transit agency, any time we sell a bond it's going to be sustainable and it's going to add to sustainability.

It's going to be adding to getting cars off the road. It's going green. It's going to be moving toward, year-by-year, towards using less and less fossil fuel. And so we're, you know, we are all about sustainability. So it's just, you know, how much effort do we put into our disclosure to actually prove the obvious to the markets and what are the due course?

That's an ongoing question. But, most importantly, of the buy side is to make sure that every disclosure that we're transparent, that we identify issues and challenges before the buy side does because they're going to already know what our challenges are anyway. So it's good for us to make sure that we're on top of it.

And that's it, Justin.

MR. MARLOWE: Makes good sense, makes good sense. And one of the running themes of this conference over the years has been the – you can notice it – slapping the ESG or green bonds label on things and how the market responds versus doing very different kinds of borrowings for very new projects, certainly, an ongoing conversation everywhere in the market. It is very

interesting to hear your experience with that.

There is just a couple of minutes left. Uri, anything you want to add on disclosure from your vantage?

MR. MONSON: Just a few quick things. So, again, and I think partially because of our troubled history on the markets, I think we had very robust disclosure to build up trust I do think one issue that's interesting that flows through some of the disclosures is that we can all go through and say, we have just had the ultimate stress test and we have all survived, which I think is really important post-COVID.

You know, we have looked at our systems, you know, what could have happened to our financing? And I think the fact that we had a really good story, you know. We had built up the reserve but used the reserve the way it was meant to be used, that financing came back, that the state stepped in when they should, the fed stepped in, as a really good story which lends into the disclosures as well.

I agree with, you know, philosophy about cybersecurity is becoming a growing issue which is

separate from COVID, but just how you deal with that is fascinating to me. And just one comment on the green bonds, so I agree with Dwight completely that I haven't seen the value in the market for us in terms of that return, in the market, per se.

But so we have been doing a lot of keys to energy projects, excellent energy projects, as ways to do some of our facility's repair because so much of it is environment and HVAC-related type things.

Because those projects were being done in a discreet way and already have the measures at green bonds are looking for, we focus the green bonds on those, separated them out from our regular capital issuances, which made our disclosure requirements and reporting requirements much easier because we had to do them anyway as part of the energy projects, and although didn't see the value in the market we had hoped the public opinion value, the value from our funders, from the city and the state is sky high, so the value where that pays off there were don't (inaudible) has real value to us.

And because it's not costing us on the

disclosure side, it's actually been a real strong approach for us, and as we look forward to an issuance the forward private file, the same model with larger general capital but also these are focused green bond issuance.

MR. MARLOWE: Very interesting. Yeah, great point the intangible value, the optics value, so to speak, hard to put a dollar value on that but it is real for sure.

Manju, I'm going to give you the last word on disclosure.

MS. GANERIWALA: All right. Well, quickly, not a whole lot of change. But one thing Virginia did do was establish a dedicated investor rep site in 2018, trough the bond link platform, virginiabonds.com, so that has allowed us through COVID to always post all of our information on our dedicated investor website. But, of course, we continue to post on Emma R Annual report, and certain financial and economic data, as it becomes available throughout the year.

I believe In as much transparency with the investors and, you know, provide more rather than less.

During COVID year, last year, in June, we went out with a COVID disclosure, interim disclosure, and then updated that in December just to kind of let the investors know what was happening to Virginia, and its revenue, and what measures was our governor taking to contain the COVID spread.

Now with vaccinations, we have started to include vaccine status, too, in Virginia, which I'm glad to say we're one of those states that has 70 percent of adults vaccinated, or at least one short.

With regards to two things, cybersecurity and ESG, I know rating agencies are focusing more and more on that and getting information from issuers on that. We haven't included in any formal fashion in our disclosure those two areas, but we are internally discussing as to how best to incorporate that and, you know, look to doing that in our future issuances. That's it, thank you.

MR. MARLOWE: Wonderful. Well, I think we have been able to speak to the few questions that have come in from the audience and the conversation that we have had certainly – well, lots of curiosity about the

surge in taxable issuance, the potential for babs (phonetic), many of the things that we have spoken to here already.

So I think we have done a nice job of making the points that we planned to make, as well as responding to some of the audience questions. So thank you all so much for that. Its been a real pleasure, appreciate all of you taking the time and you certainly gave us a lot to think about and brought to life a lot of the research questions that have been kicked around here at the conference.

So thank you all, particularly to those of you who have taken the time on, you know, given the where we're at in the market and given where we're at with Zoom meetings, and everything else, I appreciate all of that.

So, with that, I think we're good for today, although I want to hand it back to David Wessel for any wrap up.

MR. WESSEL: Thank you very much, Justin. I really want to thank you, in particular, four hours of moderating on Zoom is heroic. You deserve something.

Maybe we'll get you a municipal bond paper certificate painted in green – (laughter) – to celebrate. And I also want to thank the panelists and, of course, the authors who presented earlier today. For our audience, we're going to resume at 11:30 tomorrow with a discussion of papers on financing infrastructure, and then at 1:30 tomorrow afternoon we're going to have some breakout sessions open to anybody.

Zoom links are on our website, if you want to know what's going on in the state and local sector, and the other on in the muni bond market including the interesting developments about Build America bonds and advance for funding, and all of that.

So, with that, thank you again, and I also want to thank Brookings staff: Stephanie Semsula (phonetic) and Hwang Chen (phonetic), who have helped make this day a virtual success. As you know, these things are never bug-free. Today went pretty smoothly and where there were bugs they stepped in and I appreciate that. So, with that, have a good afternoon and see you tomorrow.

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I, Carleton J. Anderson, III do hereby certify that the forgoing electronic file when originally transmitted was reduced to text at my direction; that said transcript is a true record of the proceedings therein referenced; that I am neither counsel for, related to, nor employed by any of the parties to the action in which these proceedings were taken; and, furthermore, that I am neither a relative or employee of any attorney or counsel employed by the parties hereto, nor financially or otherwise interested in the outcome of this action.

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