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PARTICIPANTS:

Opening Remarks:

> JUSTIN MARLOWE
> University of Chicago

The S (Social) in ESG:

> CAROL O'CLEIREACAIN, Session Moderator
> Columbia University

Black Tax: Evidence of Racial Discrimination in Municipal Borrowing Costs:

> **Authors:**

>> ASHLEIGH ELDEMIRE
>> University of Tennessee

>> KIMBERLY LUCHTENBERG
>> American University

>> MATTHEW WYNTER
>> Stony Brook University

> **Discussant:**

>> CASEY DOUGAL
>> Florida State University

Native American Governments' Borrowing Costs: Evidence from Municipal Bond Markets:

> **Authors:**

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>> Kent State University

>> SARAH McCOY
>> University of New Mexico

>> R.Z. ZHANG
>> Kent State University

> **Discussant:**

>> LACEY HORN
>> Native Advisory

The E (Environmental) in ESG:

RANDY LAYMAN, Session Moderator:
S&P Global

Measuring Cities' Climate Adaptation:

 Authors:

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Climate, Race, and the Cost of Capital in the Municipal Bond Market:

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Municipal Market Analytics

Outlook for State and Local Infrastructure Spending:

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Closing Remarks:

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P R O C E E D I N G S

MR. MARLOWE: Good morning, everyone. It's good to see you on the third day of the annual Municipal Finance Conference. My name is Justin Marlowe and I'm a professor at the Harris School of Public Policy at the University of Chicago and it is my pleasure to kick things off here today. We've got a couple opening remarks about where we've been and where we're going with today's conference proceedings. Thanks again all of you for tuning in. The last couple of days have been really remarkable. Our first day was focused more on fiscal policy questions and with a lot of emphasis on COVID, and the COVID response from a fiscal perspective. We are also really lucky to have a terrific panel regarding the G, the governance in ESG on that first day. Yesterday, if you were able to tune in, we had a little more emphasis on the sort of technical union market granular sorts of questions. Really interesting work on fund flows and issuer behavior, lots of stuff there for those of you who are focused a little bit more on the ins and outs of municipal bond market, and we were lucky to have a really wonderful panel on Puerto Rico and where Puerto Rico has been and where it's going. Certainly, a top of line topic for those of us who follow the muni market and a lot of the fiscal policies surrounding the muni market.

Today we are going to round out our focus on ESG. In the morning, we are going to have for the first session, I should say, we have a panel on the S in ESG, and that will be followed by a panel on the E in ESG, this of course being social considerations and the E being environmental considerations, and then after that, we will wrap things up with what promises to be a really terrific panel on infrastructures, particularly the federal response, how that response is playing out at the state and local level, and what we can expect there. So, top to bottom it is a really, really terrific program and today is keeping with all of that. As always, we want to, before we get started, thank everyone who helped make this possible. The Hutchins Center and all the staff there. David, Stephanie, and Haowen, everyone who is involved in making this conference go, thanks as always. Thanks, of course, to our advisory board and to everyone who is involved in helping us to assemble the program, and, of course, thanks to all of my co-sponsors, Washington University, Brandeis, and of course, the Hutchins Center at Brookings.

So, with that, now that we've got the context set for the day, again, wonderful panel focused on the S in ESG and to make that happen, I'll turn things over to our colleague Carol

O'Cleireacain. Carol, welcome, and we'll give the proceedings to you.

MS. O'CLEIREACAIN: Thank you. I thought I had -– I'm muted, great. We have two back-to-back papers here. So, this session really consists of two different sessions. Each paper will be a 15-minute presentation followed by about a 10-minute discussion, and then a further ten minutes for follow up, and I think we should start first with the first paper which is "Black Tax: Evidence of Discrimination in Municipal Borrowing Costs." The authors are Ashleigh Eldemire at the University of Tennessee, Kimberly Luchtenberg from American University and Matthew Wynter of Stony Brook University who is going to be presenting and after his presentation, the discussant will be Casey Dougal from Florida State, so Matthew it is over to you.

MR. WYNTER: Hi, thank you. I am going to share my screen. Can everyone see my slides and hear me?

MS. O'CLEIREACAIN: Yes.

MR. WYNTER: Okay, great. My name is Matthew Wynter. This is truly an honor. We, as academics, work on so many questions, and it's really a privilege and a blessing to have the opportunity to hear from so many market participants that the work you are doing is relevant. So, what do we do. We have our overview and our key findings. Our main finding is that cities and counties with higher percentages of black residents, pay higher borrowing costs. So, for one percentage point increase, and the percentage of black residents within a city or county, we find an increase of about .44 basis points in total annualized costs. This is surprising for a number of reasons. First, the typical county within our sample has a black population of around 7.4 percent. So, we are talking about a rather small share of a city or counties residents being associated with an increase in borrowing costs. Second, within our setting we are looking at rate of direct offers, and because we have access to a rating, economic theory would suggest that I would pay less attention to racial demographics because I already have a good way of identifying the credit risk of the municipality. The way that we are comparing is by using state by year fixed effects, so we are comparing cities and counties at issues within the same state and the same year, and we are going to face several empirical challenges. First, is indoctrinating. Where black residents are located in America is not random. Second, it is difficult to measure tax. It is really challenging to measure racial resentment, to measure racial bias, so we'll use different measures from

the literature, and would take an approach that hopefully takes advantages of time variations within levels of racial resentment. And third, even if you do find that there is evidence of racial bias, it could be statistical discrimination. Meaning that the way municipalities would hire percentages of black residents enter capital markets, leads to -— leads them to offer issues that market participants would price lower, so it could be that these are riskier, that there are less liquid, etc. So, we'll go through a number of steps to deal with these types of challenges, and our big takeaway is that we basically find using an instrument variable from 1980, it's hard to argue that where black residents were in 1980, should matter to me in 2015 or 2016, how much a bond should cost. Second, we'll use different measures of racial resentment, we'll try to use time variation of racial resentment, we'll use all the control from the literature, and our big punch line is that we don't think this is indigenous, we do think that market structure plays a big role, and we also find evidence of mispricing when we look at the Latino population, which we consider to be an out of sample test, because most of our measures of racial resentment, are focused on blacks in America. So, our punchline is that limited competition can enable racial bias to influence municipal bond prices, there is considerable evidence that racial bias can reduce, financial inclusion and credit markets. So, there's work done by Casey and coauthors that shows that historically black colleges and universities pay higher borrowing costs even amongst triple AAA rated issuers. There's also considerable evidence that minority borrowers pay higher car loan rates, despite having lower default rates, and there is evidence all across the country of black homes being devalued. Black owners -— homes that are owned by black residents being devalued. Within our setting the municipalities, there's sort of two ways that we think about this, the first is that racial bias can influence the way that, the municipality is perceived by the credit market, and the second is the way that racial bias can influence the way that municipality accesses the credit market. So, there is work done by Ashleigh and co-authors that shows, that there is lower voter support for spending in public goods, while minorities are expected to be the beneficiaries of those goods. What that leads to are fewer bond elections, and larger offers. Because you have to build coalitions in order to get thee bonds, put forward in the first place. Those large offers from the prospective of an inventory can be considered less liquid, because within the municipal bond market, unlike our other capital markets, we have many smaller markets in which your marginal investor is far more likely to be locally concentrated. So, if I'm facing a fairly large offer to me, as a market participant, this could really

come with a pricing discount, because of the liquidity implications. So, the thing that we want to make

clear, is that there is no evidence that having a racially diverse municipality is associated with the

municipality being riskier in terms of a credit rating. There is evidence that racial bias can influence how

you access the capital market. So, an example, the data that we use from the papers from SDC, but this

is from Emma (phonetic). Our friends at EMMA, we all know EMMA. It is publicly available data and I

think this is a good illustrative example of the sort of mechanism we are describing. So, this is from North

Carolina from the year 2001, you can sort by coupon to see who is paying the most. Which you observe

there is two counties. There is Wake County and there is Brunswick County. So, Wake County is much

large, has a considerably higher share of black residents, 21 versus Brunswick, which has a little bit less

than 10 percent. You can also observe that Wake County's issuance is 150 million versus Brunswick

which is 38 million. What's surprising to us on paper, Wake County should be paying lower, all things

bing equal between these two. So, these are bonds that are issued just two months apart, virtually the

same maturity, Wake County's issuance is Triple AAA rated, its got nearly a million people, much higher

median income, much higher income per capita, but yet, it is still paying more to issue this bond. Now the

way that we think about this more generally within our economic setting. is that we are going to go a step

further. We are going to look at rate of direct offers, so these are all offers that have a rating, we are

going to link this to US Census data, and the key ideas with rated bonds, that are directly associated with

cities and counties, all things sound equal as a market participant. I shouldn't really be caring about racial

demographics, because I know what the bond is rated. And there are going to different ways that

discrimination can operate within the setting. So, there's taste based which is going to argue that it's

really not that having a higher proportion of black residents, makes you riskier, it's that there's some level

of racial resentment amongst market participants, such that these issuances that are associated with your

municipality, aren't really sought after. There's also going to be statistical based. Now the idea behind

statistical based is that all things sound equal the way in which market participants are coming to these

bonds, it's going to result in them having a lower price, a larger discount, regardless of racial

demographics. So, if it's riskier, less liquid, the maturity is weird, all types of stuff. The important point

that we want to stress, again and again, is there's no credit rating evidence that diverse municipalities are

riskier. In anything within our sample, the municipalities with higher percentages of black residents, look

less risky. They have larger populations, higher employment, higher income per capita, and there's also

no evidence that these ratings that are associated with racially diverse municipalities are done incorrectly.

There's one study that look at this in Virginia, Babaduiall (phonetic) in 1996, but they really didn't find

evidence that there were differences in downgrades with these credit ratings. So, here's a snapshot of

our data. The key economic point is that when you look below and above median, you can observe that

the above median counties in terms of black population, are larger, higher income, higher employment,

and they also tend to be in places with higher levels of racial resentments. That's also going to present a

little bit of empirical challenge for us, which is why we will try to use time variation in these levels of racial

resentment. Okay, so what did we do? We predict that a higher percentage of black residents, increases

annualized total costs due to racial bias. And, as we said, the literature has shown us that this can

happen in different ways. One way that this can happen is through the taste of market participants, so

we'll use measure of racial resentment, and so we'll also for time periods of changing national and local

levels of racial resentment. The other way is statistical, statistical argues that it's not really about market

participants harboring racial resentment, it's that you are issuing bonds that are riskier or that are larger,

or that all things so equal are going to make it so that as an investor I need a bigger price discount

regardless of the racial demographics. These are very difficult things to identify, so how are we going to

attempt to identify them? Well, for statistical we are going to use all the things that we have from the

literature. So, our standard credit risk controls, we are going to use the offering size to look at liquidity,

and we'll split bonds by maturity by bond years to get some sense of all the different ways that an investor

would profile an issuance. For taste, we are going to follow the literature. So, we are going to use

different measures of racial resentment. One is from the cooperative Congressional Election Study, the

other are racist tweets following Obama's second election, and the main idea is to identify states in which

residents display higher levels of racial resentment as identified by these measures. We're also going to

be trying to use time variations in racial resentment, and so for this, we are really relying on the political

science literature and also on social science and survey evidence. There is survey evidence that there

were changing levels of racial resentment coinciding with the election cycles of Obama, and also of

President Trump. So, we are going to take advantage of that, there's also political science literature that

shows when you have a local election, gubernatorial election, there are concerns of scarcity that become

much more salient to residents and those have been found to be periods in which racial resentment and

racial bias becomes more pronounced. So, we're going to try to use all of this as different ways -- as

teasing out these different effects. Lastly, we will take a look at market structures, specifically state tax

privilege. The idea being that I'm going to be looking at some markets in which I'm likely to face a

national pool of investors, and some in which I'll face a local pool of investors and what I face only a local

pool of investors within my state, because I get a big tax privilege. It's far more likely that our local

preferences are going to be priced into this market and then we are not going to show this, but we do

show that it's robust to some of those things that have been showing up in the literature like bankruptcy

protection, tax adjustments, etc. Okay. So, our main regression, on the left-hand side, we've got total

annualized cost. On our right-hand side, we've got the lagged black population for the city or county, and

then we have our standard controls, we control for characteristics of the county, they control for

characteristics of the bond, because we know there might be this coalition building, we also put in an

indicator for former QCIP's (phonetic) package together in the same issue. And then lastly, we have state

by year fixed effects, because again we want to account for any local effects, any local policy changes,

and we want to make sure that we are comparing apples to apples. Same bond issue from the same

state and our same -– same states same year, not the same bond. So, all of our errors are going to be

clustered by county and then by year. So, what did we see? Our main result. What we show is that for a

county compared to the other issuers within your same state and year, a one percentage point increase in

your black population is associated with a .44 basis increase in your borrowing costs. So, as we go from

column to column, we are including now more and more controls, and we basically see that including all

of the various controls and there are plenty that aren't listed here, it doesn't really seem to affect the

economic magnitude of what we are showing. We also show that the effect gets even stronger, when we

use our instrument variable, which is the black population for 1980, and again, it is difficult to argue, how

1980 and 2015 or 2016 are one in the same. So, we think this is a good instrument because it's going to

capture some of the stuff that we want and leave some of the indongenati that we are afraid of. What do

we do next? Having had established that black –- that cities and counties with higher percentages of

black residents pay higher borrowing costs, we next want to access what role if any, does racial

resentment play in this effect. We, we are using terciles (phonetic) or splitting states into terciles into

groups of 3, and we are comparing states that have high levels of racial resentment versus lower levels of racial resentment. Our first measure is from the Cooperative Congressional Survey, and what we show is that this pricing penalty is largely concentrated in states that have higher levels of racial resentment. We find similar effects when we look at racist tweets following the election of President Obama, and again, these are different ways of looking at racial resentment, and we kind of find the same effect. So, having had established that taste seems to play a role, we also know that there is going to be a difference in the way in which racial difference municipalities access this capital market. So, we are trying to now access the cyclical discrimination, so we are still using all those same bond controls but now we are splitting samples by offering characteristics. What we are showing her in the presentation is, when we split by offer size. So, what you will observe, hopefully, is that all of this pricing penalty, most of it is concentrated in large offers. When we do a double sort to control for these levels of racial resentment, and also offer size, we observe that its mostly concentrated in places that have high levels of racial resentment. So, as we saw from the example from Wake County, and as we've seen from the example within the data, we know that racially diverse black municipalities with higher percentages of black residents are going to be much more inclined to have larger bond issuances, and that's where the pricing penalty is coming in, what we note is that it is entirely concentrated in places with higher levels of racial resentment. So, next we want to access what role does the market structure in a different way, play in this effect. So, here we are looking at tax privilege. We show that, consistent with what you might expect, the effects are stronger in places that have higher levels of tax privilege, and higher levels of racial resentment. Lastly, we want to figure out, is there a way to identify time variation in racial resentment. So, what do we do? We are going to take advantage of presidential elections and gubernatorial elections. The elections of President Obama and President Trump, coincided with changing levels of racial resentment according to survey evidence. So, we would expect that we find which is that during the election of Obama, the election cycles we see a decrease in this pricing penalty. And, during the election of President Trump, that election cycle we see an increase in this pricing penalty. So, it's consistent with what the survey evidence would suggest, and importantly, we see that these differences, these changes in prices are coming from places that have higher levels of racial resentment, having less of a pricing penalty during the election cycles of Obama, and places with lower levels of racial resentment having a higher pricing penalty during

the election cycle of President Trump. So, it seems to be like there is changing levels of racial

resentment. And that's important. We also know that because it is hard to say with just 3 elections,

whether this is driven by a red state versus blue state theme. Let's take a look at gubernatorial elections,

importantly we show that we observe these same pricing penalties in places that have elected democrats

and republicans. So, it doesn't really seem to be that this is about red state versus blue state, and this is

much more considered something that we think is robust and the various political structures of the US.

Lastly, we take a look to see whether or not this pricing penalty is only something that we observe with

black residents, and the answer is no. In the data, Latino residents are coded as Hispanic, and we use

the Hispanic population we also find a pricing penalty that is there. So, what's our takeaway? Our

evidence suggests that the marginal investor taste and the municipal bonds market structure, can

increase municipal borrowing costs. We find evidence of a pricing penalty that's associated with black

residents. Black residents make up a relatively small share of a typical municipality and this is a large

national sample. We are looking all across the US over a large timespan, and we find this, and it is fairly

robust. We think that this pricing is higher in period of increased racial resentment, and also in states with

more segmented markets, and our evidence is consistent with racial bias reducing financial inclusion in

credit markets as has been shown by Casey, by Ravenal (phonetic), and by many, many others. So,

thank you.

MS. O'CLEIREACAIN: Thank you. Thank you, Matthew, and that was huge and

encyclopedic and I'm now going to ask Casey Dougle from Florida State for his reactions to this.

MR. DOUGAL: Thank you so much and thank you Matthew. I really enjoyed the paper and the

presentation. And thank you to the conference organizers for inviting me to discuss this paper. So, this

paper looks to establish the existence of the black tax. What it finds is that the municipal borrowing costs

increased with the percentage of municipality population that is black. So, how big is the effect? So, a 10

percent increase in the percentage of the black populations, which is roughly equivalent, just say a

standard deviation increase. Say, moving from 10 percent by a population of 20 percent black

population, increases annual costs by about 5 basis points. And that's relative to average issuance costs

by about 200-270 basis points. Or, in dollar terms for the average bond which has a face value of 24

million dollars, and a maturity of 15 years, the black tax is equivalent to about $18,000 over the life of the

bond. Or, to make it even more concrete, DC has a population that's 45 percent black, Baltimore has a population that is 63 percent black, so were you to issue say the same bond in DC and Baltimore, holding everything else equal, you'd have to pay about 10 basis points higher in Baltimore than DC. Is 10 basis points bigger or not, I mean it just depends on your perspective. I was talking to a munity bond professional a couple of days ago and he said that he'd sell his mother for 10 basis points, so, it just depends. And this seems to be in line with other research that is done on the past, So Berkshesher, Cohen and Shane (phonetic) find the effects of roughly similar magnitudes. So, I'm going to offer my comments as I go. So, my first comment is kind of relative to the method they used to establish this tax. So, I call it kind of the kitchen sink method. Essentially its oldish regressions with issuance costs as the dependent variable controlling for the percentage of the issuer of the municipality black population and, then the rest of the kitchen. So, all the things that could be correlated with issuance costs. And so, the first comment I would have is, if you are going to include the kitchen sink, there's a few things that you ought to include. Two things in particular are some control for underwriter efficiency. And so, this is an alternative story that the Berkshesher (phonetic) paper kind of discussed, so you can control for like underwriter fix effects or underwriter experience. They control for the possibility that potentially that high black population municipalities were using less efficient underwriters. Another thing that we found that's relatively important for issuance costs is the issue of financial advising. All right, the second point is, it would be interesting at some point to see results where you discretize the percentage of the black population to see if there are nonlinear effects. So, do we see the black taxes increase monotonically with the proportion of black people in a municipality, or is it driven primarily by say the tail? Is it driven by primarily by areas that have very high populations. A third comment relative to the methodology is in the regressions. There doesn't appear to be any relationship between the offering amount and issuance costs. So, you estimate a co-efficient on the offering amount that's roughly easy, it's probably consumed by some county demographics that you do control for, but it is kind of surprising because most paper's do find a very strong connection there. I only mention that, because it does seem like there is -- might be something going on where black populations, bond size, area populations, there's -— there are kind of confounding effects. So, for example if you look for the characteristics of bonds issued by below median black population areas versus above median, you see below median areas issued might be 14,000 bonds

versus 52,000 bonds, average population for below median areas, is 274,000 versus 851,000 from above median. Average size is 14,000 for below median, 26 million for above median. From these results what I kind of get is --kind of just evidence that black people tend to live in cities more than rural areas. And so, what my concern is, is that its potentially the percentage of black population is actually kind of a proxy for this urban versus royal sort. So, you do control for county population, but maybe it's say controlling for say population density. or something like that. I would feel much better with the results if you did some sort of matching estimator. So, match counties and demographics and then look for the tax -– the black tax -– within kind of the match. Another issue where I was kind of just confused about, page 5 it says the focus on the least of paid bonds, which would most appeal to institution investors we restrict out analyzes to rated deals. And, then in table 2, it says only 16 percent of issues have long term ratings. So, I was kind of confused, do you have a rating for each issue, and if so, are you controlling for it, or do you only have the long-term issuer rating? And, then if you do -– I know you have the long-term issuer rating –- the progressions, I probably prefer you to use kind of a dummy variable rather than say a continuous variable, in that instance it's, you know –- it might be some moving from rating bucket to rating bucket, might have a different effect on costs. So, you establish the existence of the effect, next you look to explain it. Primarily looking a discrimination-based reasons. So, there's two main economics models of discrimination. The first being, taste-based discrimination. In this instance, the black tax would be due to buyer's just simply disliking black people, and by extension, black areas, and the bonds they issued. And so, it was kind of the fining in our paper, what we found is that when historically black colleges issue debt it was harder for the underwriters to find buyers for this debt. And, so they charged more in issuance costs because it took them longer to find buyers when these bonds traded in secondary markets, they sat in dealer inventory for 3 days longer, than say a similar non-HBCU bond. The alternative story is a statistical discrimination one, where buyers simply believe that the percentage of the black population is a proxy for risk. Credit risk or some other kind of risk. Now it's interesting -– municipal risk models can include county demographics. So, if this is the case, it kind of suggests their models might not be that good. So, unlike you say credit ratings for individual, where it is illegal to consider race, municipal bond models can consider this. So, one of the other –- it is important to distinguish though because under taste-based discrimination this is not an optimal, statical discrimination at least economically, you think

this is profit maximizing. Now the paper find evidence for both. It finds tax -— black tax —– is higher in more racist areas -- in more racists time periods. It also finds that some of it is statistical discrimination. Now, I think the statistical discrimination stuff is a little weaker, so I am going to focus more on the taste-based discrimination. I think the strongest results are that you find -— within lots of different soft samples, that the effect of the black tax is much higher in the most racist areas. My only caveat to these results is that I'd like to see some formal statistical test between the black tax between the high and the low areas. Just to show that it is statistically different. You also have time series variation and racial animus, and it's interesting, when we wrote the HBCU paper we had a similar idea to do a similar test, but for the exact opposite reason. So, I'm a little less stoked about these results. And, in particular there are two reasons why. The first is, why do we think the Obama election would reduce the black tax? Well, there is two potential reasons. One, it reduced prejudice, or it could be that Obama's election was correlated with expectations of favorable federal policies for black cities which would then decrease their credit risks. I don't know how to distinguish between these 2 possibilities. The other reason I kind of don't like these tests is, it's kind of unclear if the Obama election reduced or increased prejudice, and when I say that I know that there is a lot of survey evidence that the average population had a reduced prejudice, but what we really care about is the population that buys municipal bonds. And, so originally, we thought about doing this test and what we thought was that liquidity for these HBCU bonds would decrease around the Obama election because we'd think that, you know, the rich white older person might have increased prejudice with Obama being elected. We don't know but we think that's something to think about. But I think whether or not an increase or decrease prejudice likely depends upon the survey population. I'm running out of time, but what I want to say is that I think the best test for the taste-based discrimination, which I would suggest doing is a subsample analysis where you include –- insure fixed affects. So, you look at only insured bonds, and then you include insured and fixed effects and so you are essentially comparing bonds, with -— that were issues within the same year, that are insured by this same insurer, so we can essentially shut down that credit risk jam. And so, if you fund black tax there, then you absolutely know it had nothing to do with credit risk. I think I am running out of time.

       MS. O'CLEIREACAIN: You can take half a minute if you want, because I also want to give Matthew a chance to get back to you. Because I think it would be verry good for you guys to have a

little colloquy here. Go ahead and finish.

MR. DOUGAL: Absolutely, and so, I guess my final comment is finally it -- once you establish it, once you find the explanation a little bit more on the mechanism would be nice. If you think it is taste based discrimination showing that these say black city bonds have higher liquidity risks or if its statistical discrimination, why it is statistical discrimination. Is it because the percentage of black population is simply correlated with simply city financials, or is it discrimination at the municipality level? Is it something to do with the higher risk of social unrest? So, Matheson & Bait(phonetic) from the violent protests can cause a shortfall of municipal finances. So, it could be the case that black or non-black cities, same finances just maybe the risk of social unrest leads to higher credit risks, or it could be something like discrimination at the state level, where maybe black cities potentially are less likely to obtain financial help from their state when they encounter fiscal difficulties. So, figuring out why –- what the mechanism is, I think would really kind of push the paper up another level. All right, thank you so much.

MS. O'CLEIREACAIN: All right, thank you very much Casey, and I want to give Matthew or any of his co-authors a chance to respond to that. Go ahead, Matt.

MR. WYNTER: Casey, thank you for much for your discussion. It is very helpful, and you can tell we were heavily influenced by your work, so it's good to hear our feedback. To answer the two or three things that we can kind of quickly. Regarding the ratings, we do only include rated bonds, the difference is that some, are from issuers with the long-term ratings and some are from issuers without a long-term rating, but all of the deals are rated, so that is something that we will clarify in the writing. With regard to Obama and to the Trump test, we also shared your thoughts, like is there a potential reverse causality, is it maybe that this is coming from people expecting there to be some sort of federal support or anything like that, that's part of the reason why we wanted to look at places with high and low levels of racial resentment, because based on that survey evidence it would suggest that it was really places with higher levels of racial resentment that saw a decrease in their racial animus during these election cycles, and what we find is evidence pretty consistent with that, but we don't think of that as, sort of like the, smoking gun, we think of it as one piece of a whole body of evidence that taste is important. And then lastly the point about trying to dig into the mechanism, so we have looked a little bit

about some of the non-linearities and what's kind of -- I don't know what the right word for it is either, damning or shocking or sad, pick a word, is that even at relatively low levels of the black population, you still observe that there is a difference in pricing. So, it's not the case that, where I mind wants to jump sometimes, is that, oh, it must be that we are thinking of like a Cleveland or like a Detroit, but even at places that have relatively small percentages of black residents you start to see these differences kind of emerge. But we definitely receive your comments and your notes and if you are okay to send me your slides outside of this, we would love to have them. Thank you.

MR. WESSEL: Can everyone hear me? I think the slides are on our website. Carol, there was one question from the audience that I wanted to share. Matthew, the question was how do you measure the cost of the bonds? In the example, you gave, you were using the coupon, but of course, a lot of bonds are not sold at par, so how are you measuring the cost of the bonds?

MR. WYNTER: So, that example, was just an example. We're doing the total annualized cost. So, we include both your yield and your gross spread, because we want to basically kind of get exactly what we're saying, but the fact that it's not really so much the coupon. But that's what we are doing in the papers, the annualized total cost, so this includes the gross spread and it include the yields and maturity.

MS. O'CLEIREACAIN: David, are there any other questions because if not, can I, am I allowed to ask a question?

MR. WESSEL: You are encouraged to do so.

MS. O'CLEIREACAIN: Okay, well, I'm kind of more of an institutionalist I guess, than you or Matthew or Casey also, my reaction to this from some of my life experience is, for example, looking at the state of Michigan, did you guys think to look at institutional issues like whether the state -- whether the environment -- the political has -- takes over or -- it -- does emergency managers for -- because you look at the state of Michigan all of the emergency managers have basically been in black -- probably black communities, or, on the other hand did you look at whether states give their own backing and financial support may have something like the Michigan Financial Authority, which will borrow on the behalf, or which will wrap its credit around the local authority.

MR. WYNTER: One hundred percent. So, we kind of looked at that in two ways. We

didn't – first, we didn't have the good idea to directly look at the race of the person who is tasked with

intervening, that's a very cool idea. What we looked at was based on what's been done in the literature,

which is looking at whether or not the state has like, proactive default. If the state is able to step in on

behalf of the municipality. What we show is that in states where the state is able to step in on behalf of

the municipality, you don't observe a significant difference in pricing. It's really in states where the default

falls on the municipality, which is kind of consistent with what you would expect, you would expect that if

there is not really a default or credit risk that falls on the municipality, then this characteristic that we are

showing, really the market doesn't really seem to pay a penalty on, so we do show that. We are also

concerned about the political structure, and that is part of the reason that we wanted to look at places that

elect both democrats and also republicans, because there are so many stories of reverse causality,

based on, because you think this is -- because black residents are likely to be in areas that are going to

receive larger public surplus, or in places that are going to be more progressive or whatever. There's so

many reverse causality stories, so that's why we wanted to use the level of black population in 1980, and

that's also why we wanted to look at places that elect democrats and republicans to show that this is kind

of pervasive. Lastly, in the paper we do regional analysis, we show that this is true all across different

regions across the US, and we do year by year analysis, we show that you find this pricing penalty in

virtually every year of our sample from 1990 to 2019. So, we did think about those institutions –-

MS. O'CLEIREACAIN: And, what about past history?

MR. WYNTER: Yes.

MS. O'CLEIREACAIN: What about, you know, places where they really had won, they

were against the wall and know they've gotten better, do you see any differences there?

MR. WYNTER: So, we didn't think to look in terms of that in terms of the credit history of

the place, does it matter if you have had a place that has had traditionally poor credit history, or really bad

credit experiences that's something we can certainly look at.

MS. O'CLEIREACAIN: Because I think it shouldn't -– you shouldn't assume that the

rating they get reflects all that. Because you're not, you are also in the position where you are not

assuming that the credit rating has absorbed all that anyway, everything else otherwise, you are trying to

control for everything else anyhow, and maybe that's one of those other performance indicators that you

should be trying to control for.

MR. WYNTER: No, that's certainly a cool idea. We –- one of the things that we've thought about looking at, are places that have had like previous episodes of -– previous episodes of racial resentment or previous episodes of like some sort of racial crises. We weren't even thinking about also looking at –-

MS. O'CLEIREACAIN: Defaults, more defaults –-

MR. WYNTER: Yes, that's a super cool idea, we can definitely look at that.

MS. O'CLEIREACAIN: Okay.

MR. WYNTER: Thank you.

MS. O'CLEIREACAIN: Thank you, anything else? David, no other questions, issues? I think this was great. I think you guys have a lot in front of you, right? A lot more, I really appreciate it. I knew nothing of this background literature either, so thank you very much for the contribution. And we can move on now, I think. If I am a little ahead of schedule, I suppose that is okay, to the second paper in this session on the S in ESG. The second paper is Native American Governments Borrowing Costs, evidence again from the Municipal Bond Markets. There are three authors, Serena Loftus from Kent State University, Zhang from Kent State University –- RZ. Zhang from Kent State University, and Sara McCoy who is at the University of New Mexico. All of these authors are, I believe accounting academics and their training is in accounting, which is also very interesting. And Sara McCoy is going to be the presenter. And she will be followed by a very interesting discussant, Lacey Horne, who is the Founder and CEO of Native Advisory, which is a fiscal consulting firm that works with native American tribes. We've changed our environment here, and I'm going to hand it over to Sara and you've got your 15 minutes to present your paper. I look forward to it.

MS. MCCOY: Great, thank you. Let me just share my screen here. And so, thank you for the introduction I'm going to just jump right into our paper on Native American Borrowing Costs, evidence from the municipal bond market. The United States Government recognizes 574 tribal governments as sovereign nations. These are independent governments located within the geography of the Unite States. Tribal governments collectively control 100 million acres of land and represent nearly 10 million citizens. They are responsible for carrying out many of the same functions, as state and local

government like law enforcement, judicial systems, healthcare, infrastructure, development, maintenance, and at the same time they also have to develop their local economies for their citizens. However, tribal governments report unmet capital needs tallying 44 billion dollars annually, which impacts their ability to provide services and infrastructure for their citizens. I have a quote here on the slides from Dante Desidario (phonetic) who uses the analogy, what water is to farming capital is to economic development. And, to quote "Indian country has been starved by not receiving the capital it needs, the water it needs, and it is reflected in the policies." This view of this lack of access to capital is echoed by many tribal leaders and advocates. This lack of access to capital has real consequences to tribes. For example, one third of the Navajo nation here in New Mexico lacks running water. Native Americans are less likely to have access to plumbing and electricity. There are also healthcare implications for quality and access for Native Americans. So, how do the governments get capital, how do they get money? Typically, state and local governments can use tax revenues, an avenue that is pretty limited for tribal governments. They can also access borrowing, particularly through the municipal market. Tribal governments can also raise money through the municipal market. But internal revenue code establishes that tribal governments should be treated as states, which allows them to issue tax exempt debt, however, the IRC, places additional restrictions on tribes that are not present per state in their issuance of tax-exempt debt. First, the IRC only allows tribes to issue debt for essential government functions. Where essential government functions is not a very clearly defined term, but it does not include functions, "not customarily performed by state and local governments". In addition, the IRS restricts tribes from issuing private activity bonds, many of which are tax exempt bonds, for qualified projects including airport and hospital. Tribal leaders specifically call out this lack of tax purity and that it limits their ability to obtain tax exempt financing for many capital projects. Many articles have discussed the limited access tribes have to municipal capital. A research working paper from 2013 documents that only 17 percent of tribes have issued municipal debt. An article from Matthew Gregg (phonetic), from the Brookings Institution documents a 559 polled difference in issuances between state and tribal governments and municipal issuances. In addition, articles have found that there are higher IRS audit rates for tribal municipal bonds, specifically for their tax-exempt debt. They are 30 times more likely to be audited than the state and local government tax exempt debt. In our sample, which I'll get to shortly, to discuss more about our sample. We find that

tribal issuances account for .01 percent of all municipal debt issuances, which is significantly less than the 3 percent of the population that American Indian and Alaska Native enjoy –- individuals make up. In addition, we find that tribal issuers are less likely to issue tax-exempt debt relative to state and local issuers. In our sample, we find that 73 percent of tribal issuances are tax exempt versus 93 percent for state and local governments. That's –- we see the regulatory obstacles to issuing tax exempt debts, specifically those embedded in the internal revenue code. And we also are seeing these repercussions of these restrictions in the form of underuse of municipal capital by Native American governments. There have been many attempts to remove the restrictions. These restrictions to capital have broadened

Native American access to tax exempt capital. A temporary program was introduced in 2009, the Tribal Economic Development Bonds Program, which provided a $2 billion cap in total to all 574 federally recognized tribes, this allowed tribes to issue tax exempt debts for many of the same projects that state and local governments are able to. These funds have been mostly exhausted. Many legislative acts have been introduced that would reduce the restrictions in the internal revenue code, among other things, but none have successfully passed. The most recent attempts were in 2021, with the Tribal Tax Investment Reform Act of 2021, and the Build Back Better Act of 2021. This was one of the provisions in that act, but neither were passed. There is still some debate about whether the Build Back Better Act will be brought back, but it seems unlikely. And there has also been many legislative hearings and reports, many which have recommended removing these restrictions in the internal revenue code, but nothing has been done. We hope that our paper and our findings can contribute to the current policy discussion surrounding tribal access to capital. So, when our paper -- what we are going to look at are those tribes that have overcome these regulatory obstacles and are able to successfully issue municipal debt. And we examined whether Native American governments face higher borrowing costs for their municipal bonds, than state and local governments do. To address this research question, we first identified a sample of Native American municipal bond issuances by searching the emergent municipal bonds securities database for a number of tribes name keyword s=and their derivatives. This resulted in a sample of 362 bonds issued by 56 tribal nations, from 1992 to 2021. If you look in our paper at the time series graph, you can see tribal issuances peaked in the 2000's. Total issuances were capturing at about 4.9 billion dollars of taxable and untaxable municipal debt. Our variable of interest and our empirical test

is the initial bond yield. So, we require all observances, all bonds, to have that initial bond yield, which reduces our sample size to 277 bonds issued by 42 tribal nations. This is a small sample, most of the academics here are probably thinking this is a pretty small sample. But this is the reality we are faced in working with this space. Next, we have to identify a sample of state and local governments. We tried to make this comparable to our tribal sample, by selecting those issuances from state and local governments, that are in the same state and year as tribal government issuances, as well as, that have several features as tribal government issuances and requiring non-missing yields, results in a sample about a little under a million bond observations under state and local government. I would like to caveat this by saying that although Native American governments and state and local governments face a similar pollical and economic climate being located in the United States, they are inherently different entities, since the IRC says Native American tribes should be treated as states, we think this is an appropriate and useful comparison to make. But we do acknowledge that these are inherently different entities. This table presents our descriptive statistics, and this is probably the smallest test you are going to see on my slides, I'll blow up the font size in a minute. But I wanted you to see the differences between tribal and non-tribal governments on various bond characteristics, so, here with have the bond characteristics, here we have tribal government, non-tribal government and the difference. So, for example, you can see the average yield for a tribal bond is 577 basis points. For state and local governments their average yield, measured is basis point is 288 basis points. The different is 289. So, that's a simple comparison using sample average tribes borrowing costs are double that of what state and local governments are. But, however, you can see in the last set of columns, a lot of stars which mean there are a lot of differences between tribal governments bond issuances and non-tribal governments, state and local governments bond issuances. And you can see many of the characteristics of bonds for tribes are characteristics that we'd associate with a higher yield, a higher interest rate. For example, tribes are much less likely to have a financial advisor, 13 percent versus 70 percent for state and local governments. They are less likely to be rated, 73 percent of tribes are unrated versus 40 percent of state or local governments. When they are rated, they have poor credit ratings, a higher rating the way we coded the variable means, it is poor credit quality, so we have poor credit ratings and, in addition, they are more likely to issue taxable municipal debt, than state and local government. So, all of these would indicate tribal issuances just

because of the characteristics of the bond should have higher yield, which necessitates us to move to specification that controls for all of these differences in the bond characteristics and the credit worthiness of the borrower. So, our basic empirical specification we regressed the initial bond yield, we administered in basis points on an indicator per tribe. Along with controlled variables and fixed effects, we're also double clustering by issuer and issuance year/month. The hypothesis our prediction is that Beta 1, the co-efficient on the tribe indicator will be positive, meaning that after controlling for the bond characteristics, credit worthiness tribes, relative to state and local governments, pay higher yields. Our main results are here presented, this is an expert from table 3, You can see in column 1, this just echoes the unvaried evidence, I presented in the couple slides ago, that tribes have doubled the borrowing costs, but when we add in, control variables, state by year and rating, fixed effects, this drops to 154 basis points, so that's a -- premium tribes are paying, when they issue their municipal debt, relative to state and local governments. Given what the non-average tribal yield is, tribes pay about 53 percent higher interest than non-tribal governments, given the average tribal loan amount. This is resulting about $190,000 more in annual interest for the average tribal issuer over the average 10-year loan term. We move on to sub-sample analysis, given there are so many differences between tribes and state and local governments, we try to focus on a more uniform sample. So, in column 1 here, let's focus on that, this is a sub-sample of just rated bonds, which restricts us to a quarter of our tribal bond issuance sample, and here we still find there is a premium tribes have to pay when issuing their municipal debt. They are paying a premium of 64 basis points relative to state and local government, which is 22 percent higher than state and local governments, which would be about 79,000 more in annual interest costs for these tribal governments. We also restrict our subsamples to tax exempt bonds, insured bonds, non-callable bonds, large loan amounts and fixed rate bonds and the tenor of our results and does not change across any of these specifications. For empirical robustness we do several things, we do a couple of matching technique, causes first the Propinsees (phonetic) score match with replacement and Harris-Neighbor (phonetic) score match without replacements. We do intrepid balancing, we do alternative fixed fact specifications, we are also doing more with the credit ratings. So, in lieu of just controlling for the credit ratings, the continuance variable and also controlling just for the credit rating fixed effects, we are including an indicator for rated, to capture the rated versus unrated effect, as well as an interaction between rated and

rating in the model. In addition to this, on a related project, we've obtained all of the official statements, and continuing disclosure for tribes that are subject to that FCC rules and we are currently coming through those disclosures on a different project. But one thing we are doing we are making sure that the credit rating that we have, given that 25 percent of tribes, only 25 percent are rated, we are making sure that Mergent actually captures the credit ratings that was officially listed per tribe, so the results on that will be forthcoming. But we don't expect that to change the results of our paper, much, if at all. So, to conclude, Native American tribal governments pay premiums of somewhere between 65 to 224 basis points on their municipal debt. If you are going to quote me, quote me on 64 because I'm an accountant and I like to be conservative. Given that the average tribal municipal yield is 577 basis points and non-tribal is 288, this premium results in somewhere between a 22 to 87 percent higher cost of borrowing for tribal bonds. So, these results highlight the tribal governments challenges in accessing municipal bond capital do not end when they are able to access municipal markets, rather tribal governments experience significantly higher borrowing costs than state and local governments that may affect the benefits of their borrowing. So, we hope to contribute by informing policy makers, understanding of the borrowing landscape for tribal governments, and we also hope that our research can provide a foundation for future research to explore additional factors that may influence tribal governments borrowing costs. And, so, next I just want to thank the conference organizers for this opportunity. It is rare that I get to work with people that are in the – on the ground working in practice and it is has been a real excellent opportunity to work with Lacey Horn, and we really look forward to her comments. So, thank you very much.

       MS. O'CLEIREACAIN: Well, thank you, thank you, Sarah and you, just sort of did my job, so I'm going to turn it over to Lacey Horn for her comments, thank you.

       MS. HORN: Thank you very much. Hello, everyone. My name is Lacey Horn and I'm the CEO of Native Advisory Strategic and Financial Advisory Services firm serving Native American tribes, and I feel it is important to just give a little bit more background on more, and my experience so that you can have a foundation for the comments that I'm about to make about this paper and give context on what the tribes are facing. So, from our perspective what this actually translates to. I'm a citizen of the Cherokee Nation and I live in the Cherokee Nation in eastern Oklahoma, and I'm a CPA with big 4 experience in financial services audit. And, during my tine at KPMG, I was able to view numerous

corporate bond structure, as well as work with several banks' asset managers, and other financial

services firms that were involved with municipal debt. I also served 8 years as the treasury of the

Cherokee Nation overseeing all financial functions of the Cherokee National tribal government. During

my time as Treasurer of Cherokee Nation, I had the opportunity to be a part of several different parts of

debt issuances by the tribes and this you can see, including bonds, lines of credit, syndicated loans, with

most of these qualifying as tax exempt debt. So, I draw on these previous experiences, as well as, my

current experiences, working with numerous tribes across the country, and becoming aware of the

taxable and tax-exempt debt structures that they already have, or that they are in the process of

procuring. So, hopefully that gives a better bit of color as to who I am. So, I also want to thank Brookings

and the authors to speak today, as well, as the work and efforts that have gone into this paper and this

conference. Because native American stories aren't ones that are usually even told, or if they are told

they aren't told very well, and the authors have done a great job in ingraining this ability to very real issue

that the tribes are facing. Next, I want to validate the issues raised in this paper. In my experience, the

issues the authors raised are very accurate and I have always suspected there were differences in the

ways tribes borrowed versus other government, but there was never any evidence to back up my

suspicion and now we have it, so I just want to share my screen here and show my slide. I just have the

one, but it's an excerpt of the paper. And, let me hit the button here, and go full screen, and yes, so there

we have it, it is in black and white. We are paying 100 percent more than state and local governments

and that's equating to 190,000 to 310,000 annual additional interest payments, so I'll talk a little more

about that. So, stopping the share and going back to my comments on this, you know, why, you know

100 percent that's double why would we be assessed the entire borrowing costs and is this our risk

premium, is this a misunderstanding of Indian country as a whole, or is this something else entirely,

because the costs to us, are very real. And, so, let's first address the consumer's perspective and let's

get a little bit of color on Indian country in general. The tribes have been in this country since time in

memorial. And, like other governments we will never move. There's a –- it's like looking at a corporation

if there's a better tax code in Mexico, we're not going to pick up and leave, and I remember recently in the

news there was talk that Disney World was looking to leave Orlando, and as someone who has been

there countless times, you know, we know that that is wholey impossible to do. And that's the same with

tribes. We aren't going anywhere; we are here, and we are very place-based people and that's why we're

borrowing is to make our lives and our tribe's better for all who live in and around house. We have a

permanency of existence in this country, and we were here long before the federal government existed,

and we'll be here long after. But here we are, being treated like Johnny Come Lately Risky Bets, paying

a premium for what I believe is just a continuation of long-standing histories of exploitation of tribes, as

well as this just overall general lack of understanding. And my observations are rooted in history. Tribes

have been taken advantage of time and again. We've had our investments stolen, and now we are

seeing in there -- in an academic paper how our borrowing costs are documented to be unbelievably high,

and as was stated earlier, there are limitations on the types of projects we can even pursue with tax

exempt debt, and then we do borrow, we're asked for extreme over securitization and over collaterization

that's pretty much demanded of us. So, there's barriers and risks for tribes everywhere. And these keep

us in a cycle of financial traumas and so the biases in the municipal markets drive us to taxable debt, you

know as Sarah has reported, you know we're not showing up very much in the tax-exempt bond markets

very often anymore, and it's -– and, she said there was a peak in the 2000's. So, though we are going in

a few different directions now. We're going towards taxable debt, or we're not borrowing at all or even

worse, we are looking toward more alternative and riskier types of credit that further destroy our faith in

debt obligations as a whole and cause debt to become a very political issue for our leadership. I should

mention here that of the 574 federally recognized tribes, we are all very different from each other and

there are very little apples to apples comparison and just because you work with one tribe or two, doesn't

mean that you are an expert on the third, fourth and fifth tribe that you work with. And then, a common

theme that I hear, is in doing business with the tribes, is that it is risky to do tribes because you can't sue

them, due to tribal sovereign immunity. And I can assure you that in all of these debt obligations that we

are going into, we're asked to, and we do grant limited waivers of tribal sovereign immunity in the event of

dispute. So, the issue of being "unable to sue the tribes" doesn't exist and so that's not a reason to imbed

a risk premium. And, so, as we look at this data though, we can see these systemic overarching

problems that any one tribe would face at the outset of seeking capital. And, again I think this is based on

the lack of understanding, which is totally fair, because as I said at the beginning, our stories rarely get

told, but when they do get told, they don't get told with much accuracy. I see banks that have worked for

tribes for years still showing that lack of understanding, members of congress totally unclear on tribes, the fight is having that direct government to government relationship with the federal government. We are not accurately portrayed in movies not taught in classroom, but we know that, that are demographic data subs are lacking in the truth, and misrepresentative. So, it makes perfect sense that this lack of understanding, this distrust for us, mystification of us is one of the major contributing factors to us that we face in the capital markets in my opinion. So, now I have given some perspectives on some of the frustration and the challenges that we face in the borrowing process. Let's talk about the importance of capital to tribes and what that increased premium actually translates to, in real dollars and services. As I said before, tribes are borrowing for projects to enhance the quality of life for our people. We're borrowing for health care centers, infrastructure projects, and other necessary governmental functions to move our tribes forward. And these aren't usually speculative bets because our hands are tied by the regulatory essential government function test, and so that limits the types of projects that we can even pursue. And so, what does the 90,000 to $310,000 annually translate. And, in over 10 and a half years the average bond terms, you know 2 million to 3.3 million dollars, you know what can that do? You know it can save a native woman, you know with higher rates of violence against native women, than any other race, a few hundred thousand dollars a year could go to towards salaries and supportive services for native women and girls in danger. It can save native languages, with indigenous language in the United States being a critical risk of extinction. A few hundred thousands of dollars a year could go toward salaries and digitization of native languages to preserve them for future generations. And finally, a few 100,000 can go towards education, providing college scholarships for native youth to pursue financial careers to help overcome the barrier, we are facing in the traditional capital market. Which leads into my recommendation to all the stakeholders, service providers and institutions in the entire municipal bond sectors which is to hire natives of these federally recognized tribes to be on your team. So, that when you are at the table, you have a better chance of finding understanding so that the tribes don't have to pay the 100 percent risk premium. So, in summary tribal credit worthiness is inherent, we have a permanency of existence and a long-term outlook. Sometimes we are the square peg trying to fit into the round hole without data and our due diligence, but I promise you the information exists to support our ability to be good partners in financing. If we can solve this issue, then tribes will be able to borrow at

rates, at fairer rates alongside their non-tribal government peers, and the capital that is so severely

needed in Indian country will be able to flow to us. As a paper state, that's an estimated 44 billion dollars

annually. So, this is an incredible opportunity to serve -– it's a need to be met and, you know, we talk

about the S in ESG, this is it. So, I leave you all with this challenge. Let's start with the extremely high

borrowing costs, but not stop there. Let's revolutionize the system to bring much needed capital to tribes

and restore faith on all sides. Thank you so much for your time and attention.

MS. O'CLEIREACAIN: Thank you Lacey and I would like to give Sarah, or any of her co-

authors, the opportunity to respond to the issue raised – the several issues you've raised. In particular,

the way in which they hope their work can contribute toward what you are trying to do. So, Sarah, back to

you.

MS. MCCOY: Yes, thank you and we have spoken with Lacey before and this it is just

really helpful for us to hear from tribal members about how this is impacting them. We hope that our

paper maybe comes out that this is just one tiny piece of evidence, in a stream of evidence. This

supporting sort of idea that there is this issue with their access to capital, and even just removing those

regulatory obstacles, which I think many people have been lobbying for, many organizations have lobbied

for, that's just, you know, the first step. There will be more hurdles in terms of increasing access to

capital. But, you know, yes, we really appreciate Lacey's comments as it has been an amazing

opportunity to work with her.

MS. O'CLEIREACAIN: May I ask in putting this together, this project together, did you

find it hard to just come up with the basic facts on the ground? For quite – both for credit worthiness and

credit access now and is there – might there be a thing that you guys could do to expand this into sort of

like presenting the basic facts. I'm looking at what you wanted in your last slide to be the contribution of

this moving forward, and I'm thinking that there are things that you have done here in an academic way,

that could be done in a much more general way to help educate the people that you, and, as Lacey was

pointing out, needed a better education on this.

MS. MCCOY: Well, I think what we are looking at, we are working on other projects in

this area, looking at sort that cross-sectional variation and tribal borrowing to come up with more

understanding of why they are charges premium. Likely, as he said, there might be this general

misunderstanding, this risk premium assigned to tribes, because of just misunderstanding of what Native American tribes are and what they represent, so we are doing more in that. We are sort of, in terms of the data available, as empiricists, there's a real lack of data in this space. We are drowning in FOIA requests trying to get more data on tribes and it is, that is the most challenging part of working in this area is not having good data on tribes. You can get census data, but that doesn't really represent a lot of kind of understanding what these tribes represent.

MS. O'CLEIREACAIN: Yes. Because my first reaction of course was okay, if you've got a borrowing issue here, from the lender's point of view, how does this get paid back. Right? What are your revenue sources here and how deep are they?

MS. MCCOY: I should mention in our sample, the vast majority of our tribes are casino operators, so that's –

MS. O'CLEIREACAIN: That was going to be my next question.

MS. MCCOY: There's limited tax, right, there's a limited tax base, they can't do property tax, most of their land is held in trust by the federal government, they have limited tax basis, so they have to get there, they have to pay it back with revenue sources from their business ventures, which to develop those business ventures, you need capital. But, you know, most all of our tribes are casino operators. I believe there is one that has extensive smoke shops, that is a source of significant revenue, but most are casino operators. Lacey, would you agree with that? I know you don't know the ins and outs of all of our -–

MS. HORN: Yea.

MS. MCCOY: -- tribes in our sample, but.

MS. HORN: Yes, so tribes on the whole are because of what Sarah just raises, we don't have a tax base from which to tax upon, we have to create our own revenue sources and that is typically through economic development ventures, so the biggest one being casino gaming. There's also lots of work being done in federal contracting, as well as, other smaller sources of revenue, that tribes have looked at from food production to convenience stores, you know. It really spans the gamut. The tribes are looking to monetize, and create revenue, economically, in any way they can.

SPEAKER: Great. And I have another question. And it also is mirrored by somebody

who sent a question on the Q and A, which is, Okay, that's the, that's the supply side. You guys are, are, are, are trying to use accurate, you bonds with Casino revenue. Who's buying? Who, who, who, who are the holders of this paper? And that's not just my question, but also a question from somebody who wrote it in to me.

MS. HORN: We have not looked at holdings data. I do know that most of our tribal bonds, it's probably 40, 40 percent —- 40 percent are negotiated offerings, and 40 percent are private placement. So, they may not be widely held.

And also, when our —- as we've been obtaining the official statements and continuing disclosures, a lot of these bonds are going to be closely held, and not subject to certain SEC rules, so it's a very —

SPEAKER: DO you know if those are financial institutions or individuals?

MS. HORN: We don't have that data right now.

SPEAKER: Is it gettable? Those data are gettable?

SPEAKER: So, I know that whenever we went to call a 2006 series of bonds, that we asked that question our trustees who are bondholders, and they were not able, and would not reveal who they were. And —- but we did know that it was all private placement of our bonds. And so, we did not know if these were individual investors institutional. We were not given that insight.

MS. HORN: And I would just like to chime in to add that many people in the audience may not be aware of the complexity of lawmaking surrounding these entities. So, for instance, when you talk about tax revenue, you're thinking, perhaps, about estate setting or Federal setting, but these entities are operating in an intersection of tribal authority, disputes over state rights to tax revenue, and Federal issues. And so, we've —- as we jump into this, kind of, subsample analysis, it's been an area that has required us to really, in essence, treat this more as a field project in understanding the individual tribe, and the jurisdictions and complexities that apply to each entity, as opposed to making the types of, kind of, generalizable statements that we often see in finance and accounting research. And so, I know that that can be frustrating, but it's important for us. Because of the variation in these nations.

SPEAKER: Thank you. I appreciate that. You have to do it at a very micro level here,

right? Gross aggregates are not going to cut it.

SPEAKER: Are there any, David, are there any questions coming in from the audience?

MR WESSEL: Dan Bergstresser notes that if insurance companies hold these, or mutual funds, that would have to be publicly disclosed. That could be painstaking, because they don't have code for American Tribes, I'm sure.

I was curious about the same thing. Whether Lacey, or the authors have had any conversation with the mutual fund to buy taxable, and non-taxable muni gap, whether you, either Lacey or the authors have had conversations with the mutual fund to buy taxable and non-taxable muni gap. Whether they're even willing to play in this area. Or whether they just look at as too, too small a market for the area.

MS. HORN: No. We haven't met with any mutual —- mostly we've met with people who are on the issuing side, those who are involved with the issuing, or helping tribes with this process. So, we haven't looked at the demand side, but I think that's a really interesting insight. And it would be cumbersome, and you know we have the mutual fund holdings data, but we have —- there aren't a ton of observations in our sample, so that's one good thing of having a small sample, is we only have a certain, might be —- it might not be too cumbersome.

MR WESSEL: I'm hoping that by sharing this work, and by the conversation we've had here, that there are a lot of municipal bond market participants on the conference. And I would encourage anybody who has insight into this, or, particularly, anybody who has any idea about where the institutional demand is, to reach out to the authors. And if you need help, we can happily broker the conversation. That's one of the goals of the conference.

MS. HORN: We would greatly appreciate any insight, and any conversations. Thank you.

SPEAKER: I thank you. You've done a really heroic job here, of getting this in front of people who have, probably, never thought about it. And so, I think it's —- we're very grateful.

MS. HORN: Thank you.

SPEAKER: Thank you. I'm sure there were will be much follow on from this. I intend to write you a few things. And I suspect David and some of the people on the advisory committee here may

do the same. So, thank you very much.

MS. HORN: Thank you. Thank you very much.

SPEAKER: Powerful women here.

SPEAKER: We're breaking now, and we're scheduled to come back for a measuring of climate adaption at 12:30. So we're on break until 12:30.

MR. LAYMAN: Okay. Welcome back everybody. My name is Randy Layman, I'm a Director with S & P Global Ratings. I'll be moderating for the next 2 presentations. I just wanted to say thank you to Brookings for putting on such a great conference and thank you all for attending. As a reminder to our audience, viewers can submit questions by visiting the Web site, sli.do, and entering the code muni finance (phonetic), one word. In this session, we'll discuss 2 papers relating to measures of climate risk, adaptation and other ESG factors, with municipal bond characteristics, including pricing. Which is an area of growing interest academically, and for the industry.

The first paper we will discuss is entitled, "Measuring Cities' Climate Adaptation," and is authored by Anya Nakhmurina and Shirley Lu. Dr. Nakhmurina will be the presenting author, and our discussant will be Alexa Horb. Dr. Nakhmurina is an assistant professor of accounting at the Yale School of Management, research interests revolve around Financial Reporting, Governance and monitoring. Current work explores these topics in the context of municipal markets, as well as by focusing on institutional investors and shareholder activism. Dr. Nakhmurina earned her PhD from the University of Chicago.

Additionally, she holds an MBA from the University of Chicago. Outside of academia, she worked with venture capital and equity research.

Alexa joined Goldman-Sachs in January of 2013 and is a portfolio manager within Goldman Sachs Asset Management's Municipal Fixed Income Team, where she is responsible for portfolio construction and implementation for municipal separate accounts.

In addition, Alexa leads the team's ESG strategy. Prior to joining Goldman Sachs, Alexa worked at Wells Fargo, most recently on the Muni Institutional Sales and Trading Desk. She's a member of the Municipal Bond Club, Women's Bond Club of New York. Alexa has a BA in Economics from UCLA, and an MBA from NYU.

With that, please take it away, Doctor Nakhmurina.

DR. NAKHMURINA: Excellent. Thank you for the introduction, Randy. I want to start out by thanking the organizers for inviting (inaudible) to the conference. Can you guys see my slides?

Okay. Great. Um. Yeah. We're really grateful to be a part of this fantastic event, and we're looking forward to feedback from academics, market participants, and especially, I'm very excited from comments by Alexa. Thank you, Alexa, for sending some of your comments in advance. At this point we're trying to understand how to measure a city's climate adaptation, and what is the determinants of city's adaptation?

We're motivated by the fact that, this is important, a lot of high-level bodies recognize that the cities are at the front line of climate risk. They face a lot of climate related risks, that tend to be compounded. And they don't really have a choice but to adapt.

They're going to be the absolute frontline of resilient development. It seems that there's a recognition that climate adaptation is a worthwhile thing to do. But we actually don't know that much, empirically, which cities are adapting, and why.

So, this is our objective function in these papers is to measure and to understand why some of these cities are more prepared. (inaudible) climate change has risk. A key challenge in this project, and, really, as a project that could focused on the actual adaption, because we don't really have a lot of empirical data on what cities do.

Cities themselves know what they do, and they usually have some risks. Somewhere, but there's no —- determinants of adaptation, or the consequences of it more precisely.

So, in trying to address this challenge, by introducing measure of cities' climate adaptation. Our measure's meant to be based on the comprehensive analysis, textual analysis of a set of cities' national disclosures, over time, and we're going to go out in the field and collect all types of disclosures.

And we're going to zoom into the main determinants of adaptation. And so, we are finding this paper just a preview, as a results (inaudible) for you, that variation in adaptation is going to be explained by four major things. It's going to be explained by the flood risk, by the political ideology, and (inaudible) climate change, capital constraints, and by the outlook of (inaudible).

I want to be very clear, that in this paper we're focusing specifically on one aspect (inaudible) specifically flood risk. And this is a conscious choice that we make. We look at the flood risk for 3 major regions. First, we know that elevated flood risks is a consequence of climate change. There's enough evidence in the literature, including on meteorology and climate science, that flood risks is a consequence of climate change. Warmer planet temperatures contribute to heavy precipitation, to increased number of hurricanes, to rising in the sea levels. And that has been more or less established.

Secondly, (inaudible) flood risk is because flood related events tend to dominate other events, both in terms of numbers, and U.S. dollar damage costs. So, this risk is very salient, and it's very current to, to the state of cities nowadays.

The third reason why we are looking at flood risk, is because, as a humanity, we kind of know what to do about flood risk, and how to address it. So, there is this specific set of solutions, which is not perfect, but it is specific. Which is going to be the easiest first capture this textual analysis. And our main contribution is this paper in the main in the (inaudible) is to do a set of textual analysis on this set of financial disclosures of the cities.

And, more specifically, we tried to be very comprehensive, and capture, basically, all the national disclosures. It seems important in measuring flood risk. And adaptations of flood risk. We're looking at a comprehensive annual financial reports, because they reflect the current adaptation projects that these cities might have. We're looking at budgets. Because budgets are going to contain information about forward looking at adaptation plans. What are cities going to do in the future?

And we're looking at bond prospectuses because any funding for adaptation project, which tend to be capital intensive projects, are most likely to be raised from bond prospectuses.

We're going to collect this data from Emma, and a lot of times budgets and (inaudible) are not available on them, and so we're going to look at cities' Websites, and reach to cities to obtain a panel of 356 cities that are located in 41 states and D.C., over the period between 2013 and 2019. And we're trying to capture all the cities that could be considered major, so we're going to be focusing on populate, on the cities that have population exceeding 150,000 people. And for cities that are located on the coasts, we are capturing all the cities that exceeded a population of 40,000. Once we have collected this data, we're going to apply our methodology on this data. And our methodology is rooted in defining

adaptation in the following way, we're going to define adaptation, as a set of 2 categories. Either hard

adaptation, or soft adaptation. Those categories are rooted in climate science literature. The climate

science says that there is the hard adaptation infrastructure project that could be undertaken to reduce

flood risks. So, this could be sea walls, dykes, flood walls, or the city has a sea wall, or make some

improvements in the sea wall, they're going to be able to extract this information using our textual

analysis.

The second big measure we're using in this paper is soft adaptation. There's a huge

body of literature that says that, oftentimes, soft adaptation, or investment in nature and sediment-based

oceans could help reduce flood risks, specifically for these cities that are located on the coast, could be

cheaper, better for the environment, and better overall in certain situations. So, what we're most

interested in trying to extract this information from the cities' annual reports.

So, once we have defined our adaptation measures, we're going to build a dictionary. An

adaptation dictionary, that is going to help us, actually, create those measures empirically.

In order to build our dictionary, we're going to search the right literature, we're going to

search the various industry reports for the initial list of keywords that are related to adaptation projects.

And we're going to validate this set of keywords and augment it manually by reading the financial

disclosure of the cities from 3 states. Over time, we will try to make sure that some were not missing

anything important.

And then, we are going to be left with 93 hard adaptation keywords, 31 soft adaptation

keywords, and 20 general adaptation keywords. And we're going to use this dictionary in order to

construct our measures.

This is how our measures look over time. They seem to be increasing with time, across

the board. We don't see much variation in annual reports, but overall, it seems that the number of

sentences in the respective documents seem to be working out. Just tells us that cities are adapting

more and more. So, so (inaudible). There is a relatively high correlation between the flood risk and

adaptations. As we see that the areas for flood risk is higher, those tend to adapt more, and it gives us

some comfort that maybe the measures we have constructed actually captures the underlying constructs.

Then do 2 formal sets of analysis to really validate our measures, will show that cities that

have higher adaptation also tend to have lower flood insurance premium rates. This tells us that market participants and the government are recognizing the efforts that were made, and that were actually by the cities in order to adapt, and that we're actually capturing those analyses perfect, well.

We also look at cities' municipal bond strengths. Some of the prior papers, including, I think some of the papers that were presented on this previously show that cities' flood risk is priced in muni bonds, which show that this flood risk premium is attenuated when we control more adaptation measures in cities with adaptation rates reduce flood risk premium.

That all makes sense to us and gives us some comfort that we actually constructed good measures.

Now we'll move to the more interesting part of the study. When we're actually looking at the determinants of climate adaptation. And the first thing that we do is we're basically examining the relationship between flood risk and adaptation. And all this map, I'm showing you all the cities that we have, and where the colors —- the brightness of the color red indicates flood risk. So, the redder the dot or the bubble, the higher the flood risk. And the size of the bubble indicates the extent of cities' adaptation efforts. So, the higher, the bigger the bubble, the more is done by the city in terms of adaptation. Just eyeballing this map, we can see there is a correlation between flood risk, and adaptation. What confirms this association using regression analysis, which shows that flood risk is highly associated with those.   Full adaptation measures, that is, a combination of hard, soft and general separately with hard adaptation, separately with soft adaptation, and separately this is a very (inaudible) analysis where we are controlling (inaudible) fixed affects, as well as the size of the city, and the size of the documents from which we have extracted our measures.

We'll also show that this relationship intensifies following the exposure to (inaudible) hurricanes. Once a hurricane hits a state, very massive and explosive hurricanes, it hits the state, it becomes one where flood risk is permanently salient, and is a trend to adapt more. Which, we think, is interesting.

The final part of the paper we are trying to control for the flood risk, in the examine what kinds of determinants are there? What kinds of things are associated with a higher adaptation? We're looking at 3 sets of determinants. We're looking at partisanship, at capital constraints, and at the

planning (inaudible). What we find is that partisanship, especially Republicans, having Republican mayor, is negatively correlated with adaptation measures. I want to say out front that we're not claiming any causality here, just observing the association. We've observed that Republicans are negatively correlated with adaptation measures. But when we zoom into counties, into areas where citizens are more worried about climate change, this relationship is significantly attenuated. What we conclude from this analysis is that there is a higher association when the beliefs of the citizenry and the extent of the adaptation efforts, and a performed by the city.

Next, we'll look at the capital constraints, and we'll find that cities that have more funds at their hands (inaudible) fund balances are more likely to invest in adaptation, that makes sense to us because we believe that having more money is going to be helpful in investing in those capital-intensive projects. They tend to take long time and tend to require higher investment.

Our final result is the planning (inaudible). What we do is we will (inaudible) capital budget outlook for the number of years for which city has reported their capital budget plans. FCIPs. It turns out the longer is this planning outlook the higher the adaptation. So, we interpret it as, you know, planning matters and thinking about this long-term risk. Planning, having longer horizons could be instrumental in planning out for the, for the long-term risks, such as climate risk.

This brings me to the end of the presentation. Just to sum the paper briefly for you, we introduced new measures, the city level climate adaptation, and we're trying to take this first step in understanding the determinants of city adaptation. Thanks a lot and looking forward to Alexa's discussion.

MR. WESSEL: Thank you Anya. And with that we'll turn it over to our discussant, Alexa.

MS. HORN: Thanks, guys. Thank you so much. I think that was really helpful, Anya. I really liked hearing about the presentation of the paper.

Just to preface, I wanted to make sure I note these are my personal views that I'm sharing. They're not representative of Goldman Sachs, nor do any of my comments qualify as an investment advice or constitute anyone listening to this as clients of Goldman Sachs. So, with that said, I would love to give my takeaways from the paper

So, I think after reading the paper, and hearing the comments just discussed, I had 4

main takeaways and reactions. I think, first, was a real affirmation, in terms of what we're doing on a day in, day out basis. And, you know, I think where that stems from is that one of the biggest challenges, as an investor, which the authors really got to experience firsthand, is that there's no consistency in terms of the way issuers talk or think about topics, including climate change, or any other topics for that matter. And I think that's just the nature of our markets. So, the municipal markets, for those that aren't fully up to speed, represents over 50,000 different issuers, of all different shapes and sizes, each which operate in states that have their own unique set of laws or requirements on how and what to disclose. And so, because of this, issuers also have very numerous ways that they can disseminate information, and that may be on Web sites or in budgets, or in formal filings, in press releases, or other.

And, as an investor, it's almost the biggest challenge just to capture, synthesize and analyze all of the different metrics that are gathered from multiple sources.

So, seeing the hundreds of cities that were examined, as well as the 10,000s of documents, it was very validating.

I think one of the reasons that this paper was especially topical, and resonated so much with municipalities, is that because there is a very long-term view in municipalities. What I mean by that is that, typically, in a corporate space, a corporate entity could get up and move headquarters, whereas municipal cities cannot relocate. And so, they must adapt, or else they face some type of extinction. And beyond this, their horizon is infinite. So much longer than the quarterly or annual cadence of a lot of corporate earnings calls.

So, to this point, my second takeaway was a huge appreciation for the innovation utilized in the paper. I think oftentimes we think of financial markets and decisions driven by numbers, and I think this exercise, where we were using words and semantics, felt very different. The authors take this, took this approach to, kind of, qualify and quantify some of the risks and adaptation methods, by using language processing, and impressive back testing, which you all heard about in the previous presentation. And this really allowed for scale. Which is really important, given the myriad of issuers and documents that we just spoke about.

I think I was also impressed by the utilization of industry accepted sources. And so, a lot of that was related to science-based groups, and leaders in our space, specifically the municipal space,

such as CDP and IPCC. And this really helped make the paper defensible from a scientific perspective, as well as kind of, make it, have it make sense at a hypothetical level. I think the cons to that, which were noted in the paper, is that it's very challenging to apply some of these scientific concepts down to specific boundaries in a consistent and comparable manner. And so, I think they experienced some of those frustrations as well.

But the machine learning, and the systematic approach, by building a dictionary, was a great template that we could potentially use for other solutions down the line, whether it's social or environmental metrics that we're looking to extract from different documents.

I wanted to make a quick note on the scope. And I know we talked about the scope a little bit. But I think the narrow focus was good for this exercise. I think this is the beginning papers. And this is a starting point to help validate a theory.

I would note that, in future papers, it would be really interesting, and I would urge the authors to look beyond the flood risk and, obviously, understood why the flood risk was chosen. But there are many other acute physical risks, whether it's wildfire, water stress or droughts. And then, thinking about some of the chronic risks, like temperature rise, or loss of biodiversity that could be really analyzed in future versions.

I think also including additional cities would allow for a larger, more representative sample size. Given in the U.S. there are 19,000 cities, towns and villages. I would love to see if the same conclusions hold true for additional cities. Especially if you're looking equally at coastal and non-coastal cities.

So, you know, I completely understand why the authors focused on the coastal cities, given the current sample, to maximize the power and you know, there is additional intent to focus on further cities in the future.

But lastly, I think it would be really interesting to look at some more recent data. The paper spans until 2019, and I think a lot has been growing, and changing on week by week, month by month, and year by year basis. So, it would be really interesting to examine some of the more recent results. But —-

My third takeaway was around adaptation, and what that actually means to and for

investors. So, in this paper, adaptation is actually defined as the number of sentences that contain

adaptation keywords. I would say from an investor perspective, I think there's a real difference between

disclosure, or talking about a problem, versus commitment to addressing the problems over the long

term, with strategic goals, and short-term realistic targets. So, when it comes to municipalities, especially

for material risks, what we want to know is that management, similar to other corporate entities, are

committed to addressing these systemic issues with clear plans in place. And I think that goes a little bit

beyond a word search. It needs to be seen in tangible plans.

And so, I think this does bring up a couple of salient points around city budgets, and how

far they should go, thinking about the long-term time horizons, to properly reflect some of these long-term

risks. But I do think we want to see, not only the risk involved, but also the mitigants in place. And that's

a big piece of, just, governance. And one of the biggest drivers for financial decisions that we're making

in our market, day in, day out.

In the adaptation analysis component, I really did love reading about the determinants.

Which I thought was one of the really interesting pieces of the paper, especially why some cities might

focus, or invest, more in adaptation. And so, I think, from my perspective, preparedness is key, and

understanding some of the headwinds, or tailwinds, is extremely important. Whether due to some of the

political, or even capital constraints involved. And when you think about this on a practitioner's level, if a

city can't even keep the lights on, or pave their roads, how are they going to start thinking about problems

that might occur hundreds or thousands of years down the road?

So, the last topic was pricing, and this was definitely my favorite section. I would say that

greeniums are a common topic of conversation in my world, which is more referring to impact bonds, and

green labeled bonds, and intersection of sustainability and municipal finance. But this paper takes it one

step further, excuse me, and actually talks about whether or not some of the material risks are

incorporated into —- or appropriately priced into the yield of the bond. Both from a primary and

secondary trading perspective. With, by, by essentially comparing the yield of bonds to the

corresponding, matching treasuries.

To that point, I think my only comment would be that, in our market, the typical market

convention is to compare these municipal bonds, and their yields, with municipal curves, whether it's triple

A or other, rather than a treasury. And so, what this paper doesn't necessarily take into account, is the potential for the out, or underperformance related to using 2 different asset classes. I would say that, generally, treasuries and munis trade in tandem. But there have absolutely been times of dislocation, where that relationship is not correlated at all. So, I would love to see this pricing piece done with a municipal curve as a benchmark.

So, that aside, I think the takeaway is cities with higher adaptation, faced reduced climate risk premium in municipal bonds. And while I hope that's true, I think there may be somewhat of a muted effect, and this is also brought up, but I think there are high recoveries after floods or natural disasters from agencies like FEMA, and I know we've done a lot of work in this space and, historically the Federal Government has stepped in after large natural disasters. And oftentimes municipalities actually end up coming out ahead, due to the economic improvements after rebuilding following some of these natural disasters. So, I do know this was fully realized, I just wanted to address it.

I do hope that, as disclosure improves, that these material and physical risks become more and more priced in. And, from my perspective, that is going to happen following improvements in both the quality and consistency of data across issues.

So those are my 4 takeaways. And, with that, I'm happy to wrap it up, unless there are any questions?

MR. LAYMAN: Thank you Alexa. Did we have any questions from the audience?

So, I think to facilitate conversation, David, unless you wanted to chime in —-

MR. WESSEL: No. No. There were no good questions. There was one specific question, which we'll handle by email, about a citation.

MR. LAYMAN: Sure. Sure.

MR. WESSEL: So.

MR LAYMAN: So, I have one question. You provide a dictionary of adaptation related terms that primarily focus on flood related infrastructure, you know, water sewer, stormwater improvements, or levies. I was curious how you might differentiate between projects that are more, like capital budgets versus projects that might be specifically geared toward climate change related adaptation efforts that might be new infrastructure, compared to improvements of existing assets?

DR. NAKHMURINA: Yeah. Thank you for the question, Randy. This is a really good point, and we can't really disentangle the 2 in our analysis. What —- the implicit assumption that we take is that there is a constant frequency of projects that are repairing the infrastructure, right? So, if the city needs to repair ITS infrastructure, to always do it with a certain frequency. While with adaptation you've got to be adapting more and more.

So, our research design, where we controlled for the fixed effects of the cities, is going to try to take care of this intertemporal variation, but unfortunately, this is the best we can do with, kind of, sort of, with this approach. Where, you know, what we do, or at least we capture how city talks about it, right?

And if they're talking —- hopefully they don't need to talk too much about the repairs, but if they're talking more about it, it's just some of the noise that's introduced in the data.

MR. LAYMAN: All right. Makes sense. And, somewhat related, you mentioned certain analyses, or certain terms, certain items included terms such as tension, storage systems, stormwater improvement. I guess, terms related to specific enterprises. You know, while most do, now, cities, manage utilities or enterprises where adaptation related language may pop up more frequently, right? Such as stormwater projects, or even entire water expenditure sewer systems. I guess, does the study put any fixed effects, you know, for cities? And whether or not they operate these types of enterprises?

Like a good example, in Florida there's often regional water, or stormwater districts. And that's a state, obviously, exposed to high flood risk. In Louisiana, you know, is another example. A lot of cities don't manage levee infrastructure, they're managed by levee districts. And there was the financing for said levies as well.

I was just curious, do you think if taking those items into consideration, if they weren't, in some kind of fixed effect, would make a difference on some of the conclusions?

DR. NAKHMURINA: This is a great question, and actually in constructing a dictionary, what we did in order to validate it was to look at the most common words, and most common diagrams. Diagrams is just 2 words you often go together. And storm water just blows up, right? So often —- due to the reasons that Randy mentioned, you know, there's some districts and some cities just talk about it, because it's an issue for them, right? It's doesn't mean necessarily that they're preparing or adapting.

It's just, like, a topical issue that comes up in a lot of cities' financial disclosures.

So, we've made a conscious choice, and we've tried to be very conservative in constructing our dictionary, where we just removed, you know, all the stormwater words that were not explicitly related to the flood risk.

So, we're trying to get around this issue by, kind of, being very precise and very narrow. But this is something that definitely came up. So, I'm glad to hear the validation, which is (inaudible) sounds like this is something that comes up in practitioners' minds.

MR. WESSEL: Randy, I just want to share one comment from an anonymous viewer. He or she points out that Dave Sanchez from the office of Municipal Securities at the SEC, has recently made disclosures on ESG, and provided a reminder of what materiality standards apply here.

DR. NAKMUHRINA: Okay. Not aware of these comments, so I'm not going to go into a lot of details, but we're going to definitely look into that.

MR. LAYMAN: I can relate this to the SEC's efforts on expanding (inaudible) related disclosures would make into offer documents, (inaudible) the media markets are picking this up in its own way through their own regulatory body. And, you know, one other item that is so —- summing it up from a policy solution or what, you know, this might lead to, I thought it might be interesting findings, related adaptation and state grants as a mitigant. You note that, in states with larger grants for adaptation related projects, financial constraints aren't necessarily significant in terms of higher levels of adaptation, or its political affiliation.

So, you know, what policy solutions might this entail for states that have a smaller grant, specifically targeted toward adaptation projects, or even states already working at this, again, through a state or regional level, if this is an important area, yeah, what are some reasonable policy solutions if the, you know municipalities may not have the full and complete information, just due to some technical limitations? Is there any effort for regional or state level collaboration? Or just tackling some of these challenges?

DR. NAKHMURINA: Yeah. Thanks for making this known, Randy. We try to be cautious, and not make many policy recommendations, because our analysis on (inaudible) correlations. But what we find definitely suggests that state grants might be helpful in alleviating the capital constraints,

right? So, the 2 findings that Randy talked about is that, first, capital constraints might —- cities that don't have as much money don't invest in adaptation as much as other cities.

But at the same time, this relationship is not as strong in states that have large state grants available for the cities for adaptation related efforts. So yeah. Could be that each state was, that had smaller grants spend it, their grants' amounts, it could help the cities potentially. But we can't really claim causality here, because we don't know what determines, as a size of the state, the state stays state grant for now. But I agree that it's very interesting associations that just grant further investigation into the matter.

MR. LAYMAN: We're at time. So, we'll wrap up this panel. Thank you so much to Anya and Alexa, for providing your insights for the interesting paper, continuing to add to this body of research on this, kind of, emerging topic. So, thank you again, we appreciate it.

MS. HORN: Thanks to you guys both.

DR. NAKHMURINA: Thank you. Thanks, once again, to Alexa for her helpful comments.

MS. HORN: You're very welcome. It was very interesting. I appreciate the time.

MR. LAYMAN: Well, we'll wait for our upcoming panelist to join us. The next panel we'll discuss is entitled, "Climate, Race and the Cost of Capital in the Municipal Bond Market."

So again, the title of the paper, "Climate, Race and the Cost of Capital in the Municipal Bond Market," on a similar tract. There are 6 contributors to this paper. Among the authors, Erika Small will be presenting. And Evan Kodra will join for the Q and A session. Tom Doe will be our discussant.

Erika is currently a Bond Analyst at Breckinridge Capital Advisors. She's also completing a PhD in Environmental Policy at Duke University's Nicholas School of the Environment. Erika's research focuses on the relationship between the municipal bond market, the quality and resiliency of community water services. She works with the Water Policy Team at Duke's Nicholas Institute for Environmental Policy Solutions. It supported the recent development and launch of the water affordability dashboard.

At Breckenridge, Erika assists the team with the credit analyses, and serves as the team's environmental policy expert, to guide ESG analysis. Prior to her time at Breckenridge and at Duke, Erika was a water resources engineer in Colorado. She holds a BS in Civil Engineering from Penn State University, and an MS in Civil and Environmental Engineering from Colorado State University.

Evan is Senior Director of Climate and ESG at ICE Data Services (inaudible). Evan was the co-founder and CEO of Risk, the Boston-based company acquired by ICE in 2021, focusing on driving climate change, adaptation for science and analytics, and holds PhD in interdisciplinary engineering from Northeastern University.

Our discussant, Tom Doe, is the President of Municipal Market Analytics, oversees all operations and analysis generated by Municipal Market Analytics, also known as MMA. MMA provides strategic analysis and commentary on current and historical quantitative conditions for the U.S. Municipal Market. In addition, the firm performs portfolio credit surveillance, and consults industry participants in a variety of capacities.

Tom's career has included frequent participation as a speaker in resource industry groups, government officials and the media. Tom served a 3-year term as a public member on the Municipal Securities Rulemaking board. He currently serves, or recently served, on the advisory boards of Public Wealth, (inaudible) Risk in the Center for Municipal Finance at the Harris School of Public Policy at the University of Chicago. Mr. Doe received his undergraduate degree from Colgate University, and a master's from Harvard.

So, with that Erika, we're looking forward to your presentation, and take it away.

MS. SMULL: All right, thanks Randy.

I'm going to go ahead and share my screen here. Okay. Everyone's good and can see the slides? Just give me a thumbs up. Okay. Awesome.

So, once again, I just want to thank the —- thanks to Randy, and thanks for the conference conveners for putting together this organization. This event and allowing us to be a part of it. We're really excited to present this work. And a big thank you to all my co-authors. Evan Kodra, as mentioned here earlier, and then Adam Stern, Andrew Teras and Mike Bonanno of Breckinridge. And then also Martin Doyle with Duke.

All right. Let's get into it. So, we focus on both climate risk and race. And I want to explain why we're looking at both of those at the same time. So, both may certainly affect municipal bond yields, and both have started to receive attention in the financial markets. Especially with the rise of ESG investing, as has been the focus of much of this conference.

In addition, there's been acknowledgement of costs from the growing frequency of extreme events in climate change. And then, for the race variable, there's definitely been some level of racial reckoning at the national level. In the national conversation. Especially after the killing of George Floyd in 2020.

However, both have received relatively limited empirical research in the municipal market space. And I also really want to harp on why we think these questions are super interesting for the municipal market in particular.

For climate risk, and this has been brought up a few times today, the municipal market is a really interesting and important venue, because issuers are largely considered to be on the front lines of the climate crisis. And what I mean by that is, namely, that issuers cannot easily relocate due to adverse impacts of climate change. But then, also, the residential properties that generate tax revenues to repay bond investors are largely underinsured from physical climate risk.

And then, finally, consideration of multiyear, and multi decade trajectories is, kind of, is certainly a major part of municipal planning and infrastructure planning. And, therefore, climate is very salient.

For race, I think it's —- the municipal market is really interesting to look at, because bond proceeds are, you know, by nature invested back into the community of issue. And, therefore, the geography of each issuer, and I don't just mean the physical geography, I also mean its current and past economic and racial attitudes and policies, is inextricably linked with investment decisions.

So, I believe that we, collectively, as a community, still need more empirical work on, one, how the market is responding to this new climate data, and climate risk understanding. And then, 2, how the market might be propagating racial inequities, or racial bias.

I want to mention, too, while I don't specifically cite it here, there was some really great work presented in the earlier session today, by Ashleigh Eldemire, et al, and Serena Loftus, et al, which specifically looked at 2 different pathways of discrimination in the municipal bond market for Black Americans, and Native Americans.

All right, so I don't think I need to convince this audience of this. But, you know, just for the broader viewership, I want to highlight that climate and race are really much more mainstream topics

in the financial sector now than they ever were, so we can see some headlines here from some major news sources on climate change and racial justice or equity. And there are many others you could draw on.

I still find this staggering, even though I work in this space, that current projections are expecting about a third of global financial assets to be ESG focused in just 3 years. So, by 2025. So that's about $50 trillion. So, there's, therefore, certainly demand on the investor's side to better address these risks and issues. But, once again, we need better understanding of price implications.

All right. So, we look at 2 variables in our analysis. Or we have 2 variables of interest. We first are looking at physical climate risk. And I'll explain exactly what that measure is in a moment. And then we also look at the percentage of the issuer that is Black. So, for the physical climate risk, some of the recent literature that has been done has shown that there is some level of pricing influence from climate risk in the municipal bond market. However, these studies have largely focused on specific geographies of the United States, and/or have focused on specific hazards. And they often use climate level climate assessments, or county level climate assessments. So, some of that work is by Painter, and then Goldsmith-Pinkham.

So, you know, a big focus has been on sea level rise in coastal communities. And we wanted to look at a broader swath of physical climate risk. We also wanted to look at that at the issuer level. So, a little bit more of a refined approach. So, we assessed issuer level climate risk for combined hurricane, flood and wildfire risk for the entire continental U.S. And we're, therefore, not really downgrading these climate risk assessments.

We, secondarily, or, you know, additionally focus on the percentage of the service area that is Black. Because Black Americans have been subject to well documented racial and economic segregation and disenfranchisement, which has had negative income and wealth impacts that have persisted for decades. We look at racial composition of the service area directly. Which has not been done for the whole market, again, with the exception of some work that was talked about earlier today, in some earlier sessions here.

Note that work done by Bergstresser, et al, and Bruno and Henisz have all addressed race, and racial discrimination in the municipal bond market. But they have done this somewhat

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indirectly, where they're looking at things such as education bonds issued by Historically Black Colleges and Universities.

All right, so our conceptual approach is as follows: We have 2 different data sets, and 2 response variables.

So, our 2 data sets are, number one, the whole municipal bond market, outstanding as of Spring of 2022. And that's minus a couple of filters. So, we first filter out sinkable bonds, and then we filter bonds with long settle periods. This data set, then brings the total number of individual securities, or individual (inaudible) to just over 712,000. We then, also, look at water and sewer revenue bonds only. And the reason we look at water and sewer as a subsector, is because there's a very clear, direct exposure for water and sewer utilities to physical climate risk.

And then also, interestingly, kind of, regardless of economic status or any racial composition, if you look empirically, historically, people pay their water bills. And, therefore, defaults in this sector are exceptionally rare. I believe, if you look at a recent MUDUs (phonetic) report, that between 1970 and 2019, there's only been 2 defaults in this sector.

Four response variables, we first look at the market spread, via a cross section of the market in late April of 2022. And these are secondary market evaluations. And then we look at the spread at issue. So, we look at spread, and not yield. With spread being the difference between the yield on the bond, and risk-free market rate. So, the market spread values are provided directly from Bloomberg's eval, and the spread at issue is calculated using the yield at issue, and the appropriate MMD curve. The Municipal Market Data curve.

All right. We test 2 hypotheses. Hypothesis 1 is that municipal bonds issued by communities with greater percentage of Black individuals pay higher yields on their municipal bonds.

And then hypothesis 2 is that municipal bonds issued by communities with greater physical climate risk do not pay higher yields. But water and sewer bonds issued by those same communities do pay higher yields.

This is a little diagram, as opposed to a lot of equations, to try to explain how we structure our analysis. So, we structure our analysis similar to that of Hedonic Pricing Analysis. And our models are fairly standard OLS regressions. So, for both data sets, and both response variables, we, we kind of

run 3 separate models, and we are adding variables to the models where model 2 includes all the factors, or all the variables of model one. And then model 3 includes all the variables of model one and model 2.

So, we begin by looking at bond structure only in model one. And then model 2 we add non-race socioeconomic factors. And then, model 3, finally, we add both race and climate. I, I can list a lot of the things that we control for, when looking at the bond structure, and there's a lot. I'll list some of the important ones. So, we include the years until the bond matures, and the issue year, as well as the coupon rate, and issue size. We also look at the security for the bonds, and the market sector of the bonds in the state of issue. We have some dummy variables for its tax status, if it's insured, and if it's callable. And then we, critically, are looking at the bond rating. So, for the bond rating, we don't include this as a continuous variable. We include it as a categorical variable, where we're looking at 4 different categories. So, we have high investment grade bonds, triple B bonds, non-investment grade bonds, and then unrated bonds.

The, the non-race economic variables we add in model 2 here, are those that have been pretty well documented to impact credit. So, these include the Gini index as a measure of income inequality, the service area population, and per capita income.

And then, finally, in model 3, we add race and climate, where the race is the percentage of the service area that is Black, and the physical climate risk is the, is the risk score, or the risk Q score, which some people on this call may be familiar with. So, risk Q, is a third-party data provider, and they aggregate these physical climate risk hazards, and give a relative measure on 0 through 5 scale.

For the market spread models, demographic data are from the most recent year available, which in this case is 2020. And we can look at race and climate together because the correlation is relatively minor.

The spread at issue models are structured very similarly, the biggest difference is that we also include market condition data. And that's because bonds are issued in different years, on different days, and market conditions can vary tremendously from day to day, week to week, certainly year to year.

So, the market condition data is from Municipal Market Analytics, or MMA, and these variables include a measurement of pricing momentum in the market, a measure of evaluation metrics in the market, a measure of flow into or out of mutual funds. Which is a good proxy for weekly demand in

the market. A measure of bids wanted in the secondary. And finally, a measure of par, and number of blocks being offered.

Additionally, all demographic data are tied to the issue year for these models, as opposed to being the most recent year.

All right. This table is just a summary of all the different data sources. So, we are using both public and proprietary data, where the bond structure data is largely coming from Bloomberg. The climate data and demographic data are coming from risk, which is now intercontinental exchange. And then the market condition data is coming from MMA.

All right. So here is some of our results. In the interest of time, I'm not going to show all of our results. If time allows, or there's a question, I do have results, kind of, posted on the end of our slides, which you can see online.

So, these are showing results, here, for our regressions for just continuous variables. For the whole market, data sets are not just water and sewer, but the whole market, using spread at issue as the response variable.

And all results qualitatively show the same thing for both response variables and both data sets. First, contrary to our hypothesis, climate risk is not meaningful for the whole market or for water and sewer only. The coefficient is ever so slightly larger for water and sewer only, but it's still not meaningful. So, I know you're looking at this and seeing that the regression results do show significance for the risk score at the .1 percent level, however, a one unit change in the risk score is a significant increase in financial risk from climate-related events; so, a basis point change of .6 per unit change in risk score is not actually consequential.

Race on the other hand is significant and meaningful, and I want to drive home that this racial coefficient that we find here, which is .19 per 1 percent increase in percent black of the issuer; that this is after controlling for the bond structure rating and these other economic risk variables.

Because this race coefficient was something we

really wanted to try to dig into more and because we know that it's difficult to fully disentangle the variable of race from other socioeconomic variables, we ran a robustness test where we basically randomized our sample. So, what we do is for each CUSIP we maintain all real data except for

percent black which we randomly shuffle about at the issuer or CUSIP 6 level, and this shuffling breaks any potential real correlations between race and credit spread. We then run this simulated data set through our model with race a thousand different times and we obtain a Monte Carlo distribution of race coefficients; and these 1,000 randomly simulated coefficients are then compared to our original model finding which once again showed that coefficient of .19, meaning that all else equal a 100 percent black community pays about 19 basis points more on its debt than a 0 percent black community; and you can see that number here, this vertical line, with the simulations here in this histogram.

Our simulations showed us that at most the coefficient is .05 and the median value is somewhere just above 0. Thus, if race did not matter and only economic variables move spreads, we would expect a much lower coefficient on race.

All right, so now some concluding points here. So, for the race piece of our analysis, our study definitely shows racial bias in the Municipal Market that both negatively impacts black communities and black Americans across the U.S. So, the black penalty that we find means that, again holding all else equal, a hypothetical community that is 100 percent black pays about 19 basis points more on its bonds than one that is 0 percent black; and when we aggregate this across the entire Municipal Market, weighting each issuer by its respective racial composition, this sums to roughly 900 million U.S. dollars annually and additional cost of capital for black Americans across the whole country. That is 900 million in aggregate that cannot be invested in these localities, making it harder for predominantly black communities to manage their infrastructure and especially their climate risk.

For climate risk, our study shows that climate risk is not yet priced into the Municipal Market and that's despite known real cost and revenues impacts from climate change and climate events. The coefficient on the risk score that we find of 0.6 to at most 0.8 means that a change in risk score of 0 to 1 of 5 equates to at most 4 basis points. So, to put that in sort of plain English, that would mean that a change in climate risk exposure from basically the lowest climate risk in the U.S., such as Liberty County, Kansas, to some of the highest climate risks in the U.S., such as the Florida Keys, only results in a 4 basis point increase in borrowing costs; and that's practically negligible given the fact that a change in risk score from 0 to 5 is about a 32 times increase in insurance equivalent financial risk.

Combined, these two results definitely indicate mispricing of risk in the Municipal

Market where climate does not matter but race does; and with that, I will turn it over to Tom; looking forward to the discussion and any questions. Thank you.

MR. LAYMAN: Thank you, Erica. Tom, yeah, we're looking forward to your discussion.

MR. DOE: Well, it's always good to be part of the Brookings event and it's nice to be asked to participate on topics that I'm particularly interested in. I'm always reminded -- as I've listened to other speakers and presentations for this conference -- is that -- as we say -- Municipal Market data is messy and it's cumbersome and it's awkward to work with, and sometimes it makes it really hard to come up with hard and fast conclusions; but all that being said, I think it's so important at events like this is that we delve into it and try to make sense of the difficult data and try to come up with some themes so that we can strategically invest dollars.

I think with the whole thing with climate and race, I think it's great that these issues come into the financial markets and we're addressing them now. I'm not so sure that it's the market's responsibility to solve the solutions as what it certainly does is reflect the challenges both of climate and race, and hopefully maybe we do kind of delve into them and risks become more pronounced that then there is action that the financial markets can participate in somewhat of the future.

Particularly on the climate side, I've now been -– I think it was in 2018 when I really started to get involved in climate as it pertains to municipals –- and it just to me seems unconscionable that the municipal industry continues to not price in climate risk that's so well-documented now by a multitude of data sources pioneered by the folks at risk and now that is simply not there; and Erica is absolutely right and her work has echoed and reinforced what our anecdotal observation has been over the last four years. That being said, it's understandable as to why it's not priced in and I think primarily it's the tax exemption itself. All we have to do is look simply at the migration patterns over the last four years, and particularly during the pandemic, as populations have moved to states that have a lower income tax rate and the avoidance of taxes is a big driver in people's behavior and it certainly is a big driver in how the Municipal Market invests its dollars; and I think that's a lot of the reason, especially in the last two years, predominantly when the bonds were issued that Erica was looking at, is there was tremendous demand for tax exempt securities and the business of the Municipal Market was to take investor money and invest it in securities that were available; and when there was a supply demand and balance, risks

were ignored and the industry has been dealing with that for some time.

On the race side, I think where it is more pronounced as Erica teased out of the data, that really is a reflection of the historical discrimination that's been in our country for a long time, and I think this is where the Municipal Market does play a role in being able to highlight it through the spread relationship. There is no question that minority communities and those that have been disenfranchised or also been denied of the opportunities for economic growth and that's certainly reflected in their fiscal conditions, and I think that's where you're seeing the spread differential.

One of the things I was thinking about as I was reflecting upon the paper was that if the spreads that we're seeing on the basis of race might tell us something about what the future might be in areas of the country that also start to experience the reverse migration that they've experienced the last few years and taxpayers start leaving areas of the country, and then for those people that can't move because of economic conditions is that one of those disenfranchised people, how do we maintain infrastructure and what's the cost of maintaining infrastructure when the market precedes risk? I think some of the complimentary work that Chris Berry from the University of Chicago has done on the discriminatory practices around property tax certainly echo these kinds of challenges that we see in the Market.

Regarding the approach that Erica took in the paper, there are just a couple things I have to add to comment on that I think are important, and while structure and credit were taken into account; I think there is no denying that the date that she took the comparison of April 27th, which also represented about the low on a price basis in the Municipal Market, and I think we all know that the Municipal Market has performed poorly in the 2022 and in fact it's the worst start of the year that we've had since the first half of 1969; and April 27th almost met the bottom, as we've seen. What was important about that or what may influence some of the analysis and some of the results is that we're also aware is that 3 and 4 percent coupons or bonds were trading at a deep discount, also started to be trading at a lower price point; and therefore a wider spread because of de minimis penalty and if we look at the distribution of coupons across the Municipal Market inside short of 2,035, it's 5 percent coupon is the predominant coupon. Beyond 2,035 is 3's and 4's with some 2 percent and some 5, mostly 3's and 4's. So, this can skew the spread relationship, especially when you're comparing those same bonds to a 5 percent

benchmark curve which is represented by MM D&B val; and that's a challenge through our market. We don't have a good way of handling that, our base data is problematic, benchmark data is problematic and the eclectic coupon structure that's in our industry and in our marketplace inhibits a lot of analysis, as does the tax exemption itself.

The other thing I kept thinking about is we do a lot of work on secondary breaks, so after a bond is initially priced when it's released from syndicate to trade in the secondary there is a movement in those bonds relative to how the general market moves; and that out and underperformance relative to general market after the bonds break may be additional analysis to take a look at what the price penalty is at the time of issuance. There's been little question in recent years that bonds when they're priced -- much like an equity IPO –- when they're priced in the primary, they're priced at a higher yield in order to have the bonds clear and then when they break in the secondary, they move to a lower yield. So, that would also be a way of measuring the degree of penalty the issuer experiences as a result of either race or climate.

The other thought I had was –- again looking -– credit sectors are such a big driver in the Municipal Market –- we look at 32 different credit sectors -- Erica broke out the water and sewer -– I think we could go through all 32 sectors and divide up the market to take a little bit closer analysis again of overlaying race and also overlaying climate.

The other item I guess I also thought about was looking not just at –- again -– the time of issuance and then that April 27th I think creates some challenges in terms of interpretation of the data, but what I also kept thinking is I'd also be interested in looking at what would the issuance size -- looking at states that were issuing in tax sensitive states where investors might have greater interest in the bonds or not based on the tax structure within a particular state.

The other thing is also looking at how these

bonds trade in the secondary and looking at block size -- are institutional blocks trading differently than retail size blocks – and kind of get an idea of what is the investor perception of climate and race and see who is the driver there; is it the many purchasers as retail investors or is it really the large institutions that are setting the tone.

The last thing I would take a look at is start looking at the underwriter and the

bond counsel and seeing what the advice that the issuer's getting or what's the risk capability of the underwriter who's involved with these different credits, and to the extent that bonds that are being penalized or have wider spreads because of a race descriptor; do they attract a different underwriter and is that a different risk to manage.

So, those are kind of my thoughts, good or bad, on the paper. I've found it incredibly interesting and engaging. I think it's -- as I said at the onset and everyone knows –- Municipal data is messy, it's complex, supply and demand is a big driver, the tax exemption inhibits a lot of price discovery, and just the absence of actively trading of the bonds also inhibits the price discovery and the limited data points that where the Market is pricing and were dependent on the evaluation measures that are provided by third parties; but as always, conferences are engaged ideas and gives us a basis to move forward and think creatively about our industry. So, kudos to Erica as the lead author and all those involved. Thanks.

MR. LAYMAN: Great, thank you, Tom; interesting insights. I think many of us in the industry have similar sentiments on that front. I wanted to touch on one thing you raised that I do think would be interesting to see, given some of the nuances in the Municipal Market; and it's probably been in this conference as well, so a few other papers over the past couple of days have highlighted unique ownership compensation of the Municipal Market like the lion's share held by retail investors in contrast to institutional investors for other types of debt markets. I mean, do you think the composition of buyer's could explain some of that variation in pricing from racial composition or climate race; I guess with the thought that these retail investors tend to be from households that are generally wealthy and can take full advantage of the tax benefits?

MR. DOE: One likes higher yields, so the extent that race is creating wider spreads and higher yields is something that from the investor community, they may be apt to ignore, right; they're not out to correct that issue. It's kind of like disclosure, right; not everybody wants -– everyone talks about having good disclosure –- not everybody wants it because bad disclosure can mean higher yield and that can be good from an investor perspective.

SPEAKER: Can I just lay on that, Randy? I'm kind of puzzled by the market failure here. Given that so much of the Municipal Bond Market, as I understand it, the retailer investors are buying

through mutual funds and if you buy a municipal mutual fund, you have no idea what's in it; I mean, I know they disclose it, but I'm sure no investor looks at it. So, I'm just puzzled by the market failure. If I could really get a higher yield by buying bonds of largely black communities without taking more risk, why isn't that happening? I'm just sort of puzzled by how this market works.

MR. LAYMAN: Yeah, I don't have a really good answer for that. Tom or Erica?

SPEAKER: Erica, what's your answer? I want to hear Erica's answer.

MS. SMULL: So, why is the market not exploiting that?

SPEAKER: Exactly.

MS. SMULL: I actually don't think that there's every been -— I think the Market's been in somewhat of a denial that that exists. I don't think this is something that is largely accepted in the Market; that you can -— for the same effective risk —- you could receive a higher yield by just investing in a more black community. I just don't think that's widely known or certainly widely accepted.

MR. DOE: I think if you look at what the issuer is and look at the amount of issues specifically that have a racial component or penalty to it, it might be interesting what the entire par outstanding of those issues are; it may or may not be a lot. I wasn't quite sure, Erica you may have a comment on that?

MS. SMULL: Yeah, I don't have a comment specifically on that, Tom; but I do want to just pick up on something that you brought up with the secondary —- and this was something I didn't really totally realize until I was in the world of asset management -— just how infrequently so much of our market trades; and so I just do think that there's much more opaqueness in the market and not just because of what's included or not included in disclosures. There's just less frequency of transactions that can give really good quality data on these sorts of price implications.

MR. DOE: Well, as you pointed out, Erica; the challenges with all the data is that the comparison to residential real estate is so apt and the ability to have good evaluation —- I mean -— we have 1 percent trades and the market —- all these CUSIP's that you have outstanding are basically priced off a thousand institutional blocks that trade each day. So, it's amazing what we as an industry have to extrapolate out in order to create daily data in which to do any type of analysis.

It might be interesting too, to do a comparison of taxable and tax-exempt

municipal bonds to see -– by eliminating the exemption as a variable –- is whether taxable municipals that have a racial bias also have a different trading pattern than those who do not.

MS. SMULL: Yep, that's good. We control for the tax status but being more explicit and breaking those out as two subgroups would be an interesting analysis.

MR. LAYMAN: Thank you all for your comments. We are a couple minutes over time here. If you have any questions, please reach out to the authors. We didn't get to hear from Evan unfortunately because he has a wealth of knowledge on the highlighted information, so please –- if you were missing that part of the conversation –- open up the dialogue. Thank you all for attending. We'll take a short break and we'll re-adjourn at 1:50 Eastern for an overview of infrastructure spending in state and local governments.

MR. DOE: Thank you, Randy.

SPEAKER: Thank you.

MS. SMULL: Thanks, Randy.

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OUTLOOK FOR STATE AND LOCAL

 INFRASTRUCTURE SPENDING

MR. WESSEL: Good afternoon, everybody. I'm David Wessel, Director of the Hutchins Center at Brookings. On behalf of my colleagues here and at Washington University at Brandeis and at University of Chicago, I want to welcome you to the final session, but not by any means the least important session of our annual Municipal Finance Conference.

We're going to talk today about the outlook for

state and local infrastructure spending. I think it's well-known to everybody in this group that state and local governments own much of the physical infrastructure in the United States and do much of the infrastructure investment; and I think that the best data I've looked at suggests that the trend

before the pandemic was –- as a share of GDP -– both federal, state and local infrastructure spending had been on a downward trend. Of course, there's been substantial political appetite to reverse that, most notably in the Infrastructure Investment and Jobs Act -- also known as the Bipartisan Infrastructure Bill -– that would increase federal spending on physical infrastructure above the baseline by about 550 billion dollars over the next decade; and there's money in this bill for broadband, transportation, water and a host of other things.

I want to note that we here at Brookings do not want to suggest that investing in human capital is unimportant. We think that investments –- particularly in children -– is crucial to our future economic growth, but for today's discussion we're going to focus mainly on physical infrastructure; and I think we have some conflicting forces. On one hand there is all this federal money, if they can get it out of Washington and into the hands of state and local government so it can be spent. State and local governments are in fairly good shape as a whole, but we are now seeing rising interest rates, which of course make it more expensive for state and local governments to borrow to pursue infrastructure spending.

So, we have actually a great panel. We've tried to get several different perspectives. Let me introduce them in alphabetical order. Ryan Berni is the Senior Advisor to Mitch Landrieu, the Infrastructure Implementation Coordinator in the White House. He previously worked for Landrieu in the City Government in New Orleans and before that he worked for James Carville which I think would probably be a 45-minute session in and of itself.

DJ Gribbin's resume is so long that if I read

it all, it would take all 45 minutes. He's had a number of roles in the public and private sector. Most relevant for this conversation, he was the Special Assistant to President Trump for Infrastructure in 2017 and 2018; and previously was General Counsel at the Department of Transportation –- the federal one -– and Chief Counsel to Federal Highway Administration. He has also worked in the private sector for quite a while for Rocori Group and is now at Stonepeak Infrastructure Partners and at his own firm called Madrus.

Shoshana Lew has been Executive Director of the Colorado Department of Transportation since December 2018. Previously she was at the Rhode Island Department of

Transportation, but she's also been at the U.S. Department of Transportation and at the Office of

Management and Budget and the Domestic Policy Counsel in the White House.

Eden Perry is the Head of the U.S. Public Finance Operation at S&P Global

Ratings. Unlike everybody else on this call, she hasn't changed jobs very much. She's been at S&P for

more than 20 years.

So, with that, we're going to delve right into discussion. If anybody has questions

– as we said before – you can go to the website sli.do #munifinance and put your questions in there, and

we'll try to get to as many of them as possible. Ryan tells me he's joining by phone, but I think that

should work.

I thought I'd start with you, Eden Perry; if I

might. So, compared to say the pre-pandemic years and the pandemic years of 2021, what

do you see ahead for local and state infrastructure spending in terms of volume, types; and how

responsive is -– in the current environment –- especially given rising interest rates –- the Municipal Bond

Market to funding infrastructure projects?

MS. PERRY: Thank you, David. Thank you for having me here, I appreciate it; my first

time being at Brookings, so I'm very pleased to be here. So, what we're seeing so far –- I think I was on

a prior panel, and I heard someone say this -– this has been a pretty rough year for the Municipal Bond

Market in terms of volume and we're down significantly from the last two years, but they were very strong

volume years. This year we're seeing a real drop off in the volume in the Municipal Market, but that's

actually because we had really strong years in terms of refunding activity; and this year we're actually

seeing the market being driven by new activity by new issuance. So, this year new issuance as of May

was up at 139 billion and that was more than 10 billion from the last year and 20 billion the two prior

years. So, we're actually seeing a lot of new activity in the Municipal Bond Market and that's not

surprising given what you already alluded to, the Infrastructure Investment and Job Act. So, the biggest

growth that we saw so far this year is in the utility sector whereas the other sectors primarily have been

down a bit.

What we're expecting is continued growth actually in terms of new issuance. It

might not be actually new issuance in capital spending, a lot of it will probably be pay-as-you-go capital

spending; and it shouldn't be surprising given the level of infrastructure projects that are still needed across the country, the IIJA and also the American Rescue Plan Act; and then also, the still relatively low interest rate environment and I think a lot of issuers are still wanting to get into the debt market prior to the interest rates rising.   However, we noted in a recent report that we just released earlier this month called "Increase in U.S. State Debt Levels in 2021 was a Blip", published earlier this month; total state debt increased by 4 percent in 2021 and that's actually a real departure from prior trends, and it's not something that we expect to continue due to the influx of federal aid across debt states which has increased the push to fund capital projects on a pay-as-you-go basis.

According to Nasbo, states increased capital spending on infrastructure by 9.1 percent in fiscal 2021 and that was the strongest growth in 15 years, but 72 percent of that was pay-as-you-go funding, and we expect this level to remain high over the next several years given the federal aid funding that states and local governments received.

Discussing that, the trillion dollars in the Infrastructure Investment and Jobs Act, we're expecting that to fund primarily traditional infrastructure needs across the states, roads, bridges, airports, transit rail; but the bill also targeted risks related to resiliency, energy transition, electric charging stations and cyber security; but the largest portion -– 284 billion -– was for transportation, which is something that we see often in the municipal bond sector and is always well-received.

In terms of resiliency, we're expecting the focus to be on improved power grid effectiveness, reduced wildfire risk, and to ensure western water availability. The existing program certainty will also fund setting for five years of highway trust fund, drinking water and clean water state revolving funds, and then there was 1.25 billion for cyber security.

But in terms of what you were talking in your introduction, going forward we expect to see; it depends on a few factors –- which should not be surprising to anyone here on the panel -– what happens with inflation, supply-side disruption, the difficulty finding workers for projects, the increased wages for workers; and what we're expecting because of this is we're expecting that states and local governments may be changing the scopes of projects, focusing on smaller and more impactful projects; or even some states and local governments stretching out the timing if possible.

Lastly, we've been hearing some discussion of trying to get the federal

reimbursement for some of these project costs. All of the projects that we've discussed would be well-received with the Municipal Market, these are projects that are really the staple, the bread and butter of the public finance community. There was a report issued about a year from our Chief Economist, Beth Ann Bovino; the report was entitled "How U.S. Infrastructure Investment Would Boost Jobs, Productivity and the Economy" and a few takeaways from that piece is that a trillion dollar investment like the IIJA would add 1.4 trillion dollars to the economy over a eight year period or a fiscal multiplier of 1.4 times; and the private sector productivity would be a boost of around 10 basis points on average per year. In terms of job creation, it would be over 883,000 jobs, mainly in the middle class; and per capita income would increase by 10.5 percent with this type of investment; and these types of outcomes are always welcome in the Municipal Market. The municipal community likes stability and they like economic growth.

MR. WESSEL: I just want to clarify one thing. When you say "pay-as-you-go" you mean instead of borrowing, they use current revenues to pay for something?

MS. PERRY: Exactly. Yeah, that's a term we use often.

MR. WESSEL: I just meant to clarify. So, Shoshana I know we can't see you, but I understand you can hear us and we can hear you; is that right? You're on mute, so I can't hear you.

MS. LEW: Sorry. There are folks trying to fix my video, but yes; can you hear me?

MR. WESSEL: We can hear you loud and clear. So, how does the world look from Colorado? Are you flooded with federal money, what are you spending it on; and when you look ahead for the next couple of years, what are the issues that worry you?

MS. LEW: I would say the view from Colorado is superior to the other seas. You know, I think it's a mix, right; and in Colorado we're lucky to have a policy environment where our state legislature and governor work together on a funding package that actually preceded the federal package. So, we are doing –- with the confluence of work that we did a year prior to the federal bill, with the additional resources that came following that and those coming together in a way that is allowing us to pay for a lot more than we would've before.

The slightly tempered upside and downside is that the formula funding from the federal allocation is significant, but it doesn't change our annual amount by an order of magnitude. It gives us roughly -- on average -– say we get an extra year to year-and-a-half worth of funding over the

five year period of the bill which is a lot, but it's not enough to kind of wholly change the order of

magnitude of the program; and when you combine that with what we did for ourselves first through the

state package, it's enough to really get our capital plan done if we stay disciplined.

So, the view is a good one, but it's also one where we have to manage

expectations because if we don't stay focused on building the plan we have, that amount of funding could

dissipate quickly. So, what we're doing is we quickly plugged the resources into the plan that we had

been developing for a matter of years and are just kind of going through it in an orderly fashion; and trying

to make sure that the public can see the results of what we do.

Of course the economy right now means that there is some variability in the

pricing of projects and sort of figuring out what can come in relatively close to the original budget is

another vector of this exercise, but it's a lot of the accountability and project management work of making

sure that we are clear about where dollars are going, how much is available for projects; and we build

scope to the dollars we have.

MR. WESSEL: And are you getting enough guidance from Washington on the

discretionary part of the IIJA?

MS. LEW: There are an awful lot of federal discretionary programs now. Some of them

are new, some of them are variants of ones that have been around for several years; and I think by and

large what we are trying to do is figure out how to write a finite number of good applications and focus

what we're applying for again on getting our sort of host envision done.

I think our federal friends have a hard set of

challenges on their plate delivering all of these new programs. I would applaud DOT for

trying to combine the sources where they can. They put out a single funding notice -- in one instance --

for three different programs so that instead of having to apply three times, we could it once. The more

they can do that the easier it is for people where we sit to actually avail ourselves of those programs. I

think on the backend, how they project manage those could be challenging if they're not very organized

because the dollars will flow through different operating administrations with different roles, so making

sure that they're as adherent to consolidation on the backend as they have been on the frontend I think

will be important; but considering the magnitude of new programs, they're getting those out quickly and

we are applying for them.

MR. WESSEL: Nice. So, Ryan tell us what you're doing right and what you're doing wrong in the administration.

MR. BERNI: Well, for once we actually have money to go out to states and cities. It wasn't that long ago when I was Deputy Mayor in New Orleans dealing with DJ and we were talking about a lot of P3 opportunities but not a lot of real money and now we have this once in a generation opportunity to really push into cities and states primarily; 90 percent of the funding is going to be spent by states and cities, very little of the money is spent by the Federal Government and direct spend.

We've really been focused on just getting organized to setup everyone for success. We view this as a five-to-seven-year endeavor and in many instances the money will be spent ten and twelve years out, given the way that things work. We have really started to build a team at the White House to focus on project delivery, focus on setting up the right structures. Each state has appointed a State Infrastructure Coordinator at our direction –- with one or two exceptions –- and we're working really hard on making sure that low-capacity communities have the resources needed to both plan for and apply for funding.

The bill –- as Shoshana just referenced and she knows better than most –- is 375 programs, 125 of them are brand new; and most of those are competitive and just the process of setting up the mechanisms, the staff. One of the biggest things we're doing is hiring federal agency staff to be able to process paperwork and reviews, and to write all the frontend. The Department of Energy went from a primarily research and development-based organization to now having 60 billion dollars to spend on clean energy infrastructure and overnight. So, they've had to create an entire new undersecretary –- whole new officious – and so a lot of our early efforts been spent there.

We've pushed out 110 billion dollars to date in announcements -- the obligations and alloys follow -- in order. We've rolled out a lot of the major programs that are formula-based that are a lot of existing programs that maybe have some tweaks and changes; maybe a new climate lens, maybe a new equity lens, but primarily existing funds; and then we're moving now into rolling out a lot of these clean energy resilience programs to be coming this summer and we're now making awards.

So, two weeks ago we announced a billion dollars of grants to airports for airport

terminals; the first time the Federal Government has invested in terminals themselves, typically the federal investments in runways and control towers and stuff like that. In a few weeks we'll have announcements for the Raise Program, which is one of the most popular transportation programs that's competitive for cities; and so, we really feel like we've hit the ground running. We've got a good process in place, we've got a good team and structure setup; and as Shoshana can attest -– because we had a call with her on Friday –- we're also really focused on how do we actually build things again in this country and maybe not even act like we ever got it right in the first place; how do we actually reconstruct the process to be able to make the system work better so that this doesn't have to be just a once in a generation opportunity. We can improve and be successful, and hopefully Congress will act to continue to give us money in the future.

MR. WESSEL: You raise a good point. I once heard a trademark Rahm Emanuel rant about how hard it was -– I think DJ was at that event actually -– how hard it was to get anything built in Chicago and pleading with Washington to help basically override a lot of local and state rules in order to just get things done. Have you thought at all about why it takes so long to build things in the U.S. and how expensive it is, and what we might do at the federal level to streamline the process?

MR. BERNI: Yeah, no, for sure. There are a lot of different inputs there. I would say a lot of folks get focused and sometimes stuck on the permitting piece, but we have released a permitting action plan; we are doing all the kind of best practice things of coordination, public timelines, full transparency to really lean in on that piece; but there's contracting methodologies, there's just litigation risk here. The more community engagement you have on the frontend the better it is on the backend, there are a lot of things. So, one of the things we are actually going to do this Fall is host a kind of project delivery summit of best practices to kind of lift up.

Here are some good examples of projects that

have really worked well and how we deliver them –- Mitch's mantra is on time, on task, under budget -- any one of those things would be pretty hard to do, we're trying to do all three; but that's our goal and so we are really -– it kind of gets driven and beat into everybody's heads day in and day out -– and we're working with states. As you mentioned, a lot of this is not just federal regulations and rules, a lot of it happens with the layering of federal, state and local; and so, we're working up and down the

stream. We worked with the State of Michigan -– for example –- on its own permitting action plan to kind of mirror some of the things that we're doing here at the Federal Government level.

MR. WESSEL: Thanks. So, DJ; I remember talking to you when you were in the White House and I think you said your job was the President wanted you to figure out a way to –- if he gave you a nickel on infrastructure, you should turn it into 25 cents. You didn't have the advantage that Ryan has that Congress actually puts some money into this. So, I basically have two questions of you. One is, given all the things we've just talked about with Ryan, how do you think this administration is doing; and then secondly, to what extent do you think we'll do more than talk about public-private partnerships in this space?

MR. GRIBBIN: Those are two really good questions and I'll start with the first one, how the administration's doing -- and Ryan I will save some rebuttal time for you at the end of my comments because you will comment –- just a good one to set the stage. I'm going to split up the analysis into two parts, politics and policy in terms of how this administration's doing.

On the politics side, they're doing a phenomenal job. As Ryan mentioned; we've passed the bill with money in, then we're making the money available, now we've got a NOFO, now we're taking formula funds and applying to this project –- they did a phenomenal job in kind of building the public's confidence that this money that's been invested in infrastructure is actually being deployed and moving and moving well. I'd also give the administration points for bringing Mitch Landrieu and Ryan onboard. There is a world of difference -- and Shoshana knows this as well from being a federal policy person and being a recipient of us on the receiving ends of those policies –- and having a team with their experience and other people's experience on those lines is very-very helpful.

Communicating, I think the (inaudible) really well. So, it's important –- as everyone can appreciate -– to not only have a nice law, but also to go out and make sure the public understands what you're doing with that; and I think in terms of communicating to the public and communicating with potential grant recipients at the state and local level, the administration's doing a fabulous job.

The second part, in addition to politics, we're talking about policy; and while getting the bill passed –- kudos to this administration for getting the bill passed -– obviously it's something we weren't able to do. That bill is a hot mess and I think Ryan is being polite. David, you mentioned in your book

about opportunity zones, how if you have an idea that's really innovative and creative, and you sort of toss it into a big piece of legislation at the very end of the process it doesn't work well. Now, remember where this bill came from, right; there was like two handfuls of senators that got together –- almost like got together over beers –- and threw a bunch of stuff that was on the shelf into a bill, sent it to the House, the House did nothing with it, passed it and now we've got a 135 new grant programs; and as Ryan touched on, my gosh we tried to do one program –- the Urban Partnership Agreement in the Bush administration –- and that was incredibly difficult.

This bill has a competitive program from culverts, and I don't know who the head of the culvert lobby is that got this in there, but that person should get a huge bonus. For those who do not know, a culvert is a pipe that goes underneath a road or a railroad to just channel water away from the infrastructure. There is now a new federal competitive grant program for culverts. So, there's going to be lots of programs, lots of money and lots of chaos.

I would also differ a little bit with Ryan on the Permitting Action Plan the administration had –- and Ryan I am one of those people that fixates a little bit on the permitting process -- because again all the jobs, all the economic developments, all of the social equity we're looking for and none of that happens unless the money is actually spent on a project; and you can't spend any money until you're permitted. The Permitting Action Plan creates eight new intragovernmental agencies, has ten new sort of guidance regulatory requirements including new regulation, and has eight new reporting requirements for every agency to have; and there seems to be almost like a faith-based approach to permitting where we're going to have a plan and we're going to want it to go faster, but then we're going to create lots of layers of activity; which in my experience a government never makes anything go faster. So, it's good and then it creates lots of communications, but every one of those communications takes time, takes effort; and my gosh, we have like the world's slowest permitting plan in developed countries already, do we really need it to be any slower?

One thing that's a little counterintuitive when it comes to infrastructure is you think getting communicates more involved is always a good thing and usually it is, but one of the things I worry about is all of this communication and money going directly to communities; it could end up taking the NIMBY Program which is "not in my backyard" where no one wants infrastructure in their backyard and now

creating new NIMC Program which is like "not in my community" where we're handing communities vetoes over critical roads or transmission nor whatever longwinded new infrastructure we're trying to build.

So, I'll wrap up by saying I think a phenomenal job on the politics side. On the policy side, they've been handed a disaster of a bill, they're applying lots of new regulations and new sort of systems in place that almost assuredly will slow it down; and it was really comforting to hear Ryan say money's not going to be spent for seven to ten years. I'd actually be more optimistic than that, I think it will be spent sooner than that, but it's going to be five, six, seven years; and that's going to bump into the public perception that this bill has passed, money's available, now our infrastructure problems will be solved.

MR. WESSEL: I'm going to stop you there and get to the public-private parts of the minute. So, Ryan; I don't want to hear your commentary on what the Congress did because I don't think you could tell us the truth anyways, but do you want to respond to DJ's comments about how you've administered the thing and –-

MR. BERNI: Well, I don't think he was really even making a comment about how we administered it. I think we have gotten 110 billion dollars and now that money is going out to spend on projects, we are breaking ground on projects that are going to the ground. One of the positive things I think about the structure of the bill, particularly on the formula funding, is that they did spread out money over five year increments; and so that is why you will have -– if people are not getting money five fiscal years out or six years out and they're planning for it –- those projects take two to three to five years, depending on what it is -– which of course we have to make work better. That's how you get to the ten years out mark.

I will say there's not an area of the bill –- it is a lot –- I don't think anybody would dispute that it's a lot -– there are kind of 12 core areas -- but with 375 programs, you've got a lot in it -– but these are areas that have been significantly un-invested in for centuries. Our infrastructure is not just our roads and bridges; it is our water systems that are failing, it is the high speed internet that is critical to everything we do in the world today -- and don't have to sit through the last two-and-a-half years to know that –- and so, cleaning up the legacy pollution, investing in clean energy; that is really the crux of what the bill does; and so those programs all fit into those loose buckets.

So, that would be my only point; and look, on the Permitting Action Plan, I think there's a lot of agreement about the types of things that work, and we're really committed to just making sure that it's a priority; it's one of the first things we rolled out. Two things; one was working with Inspectors General in the DJO to make sure there was no waste fraud abuse; and the second thing was developing a Permitting Action Plan because we have to be able to build things better and faster in this country. That's a fact and you don't have to be a Republican or a Democrat to agree with that statement.

MR. WESSEL: Shoshana, can you pick up on that? How do you handle permitting in Colorado, how do you deal with the Nimbyism and the fact that our system makes it so easy for someone who doesn't like a project to litigate it; "in my own backyard" in Washington there's just one example after another of things that get drawn out, including a new metro line just by endless litigation by people that seem to have endless amounts of money to spend on lawyers?

MS. LEW: Yeah, it's an interesting and longstanding question where you can kind of argue it a few different ways with different projects. Just to kind of set the framework, what we call permitting is really probably a consolidation of hundreds of different decisions, right; it's everything from implementation of the Clean Air Act and the National Environmental Policy Act to better America and delve us back into local authorities that bring to bear even on projects at other levels of government sometimes. Here, some of the municipalities will sometimes invoke a role that gives them sort of a permitting process in our projects and the landscape differs in different places, and there are pros and cons to each of these processes like there are to everything.

My view is that sometimes the National Environmental Policy Act gets a bad rap on projects and that if you're strategic about you implement it, it can actually help to solve problems rather than create them. To use an example —- and this is one that DJ knows well —- we have a project that's coming to closure in Denver now; the segment of interstate 70 that goes through the city where it was deliberated upon for about a decade before it actually got a shovel in the ground. On the face of it you could say "Darn it, the permitting process took too long". If you dig beneath the surface on that project, part of what happened is that the agency that I now run really pushed back on taking community concerns seriously. When everybody finally got to the table and dealt with what were real concerns about what it would do to the fabric of the neighborhood seriously, they were able to reach a resolution and the

execution of the project has actually gone off pretty smoothly since it got under construction.

What we learned from that was that we actually needed to change the way the process works to make us do more at the beginning so that you work through that stuff in year one, not in year nine, right? If you're going to end up doing things like air quality monitoring, which is actually the best practice to understand the implications of a project, do it at the beginning and don't argue about it for eight years. Yeah, that doesn't solve everything; I don't think that would have fixed the purple lion, right; the issues there are a little bit different, but I think there's a way to structure the way we execute these processes so that they become kind of frameworks for solving problems instead of creating them.

One interesting point on that is that there are a few different ways to do some of these permitting processes and sometimes the intuitive thing is to do the fastest one, but that also creates litigation risk whereas if you're going to have a controversial project, you're actually better off acknowledging that it's controversial from the beginning and going through a somewhat more extensive process that inoculates you a bit more on the backend from litigation because of the nature of how you document the process.

So, long story short; be clear about what the obstacles are going to be, be honest in the risk registers and how you are candid about who likes it and who doesn't like it, try and bring everybody to the table whether or not they agree at the beginning; and I think the more organized you are about troubleshooting one challenge after the other, the more it gets to closure; and sometimes the projects that take long have fundamental problems, sometimes they don't.

MR. WESSEL: Yeah. So, Eden; I wonder if you could talk a little bit about climate change? I have two questions; one is, does the Municipal Bond Market fully reflect the risks that climate change poses to some communities; and secondly, is there enough ESG appetite to reward municipalities that are doing resilience projects with lower yields or is it just more of a talking point?

MS. LEW: That's a great question and it's an area where I think it's somewhere in between, right?

MR. WESSEL: Right.

MS. LEW: I think that knowing how you appropriately model these risks is an area of practices not as mature as they think it will be ten years from now, right; whether that's the air pollution

that affects the people who live in the neighborhood and breathe the air or whether that's how likely your

road is to washout because of a flood or a mudslide or a fire; things that are unfortunately affecting places

all over the country depending on what your risks are. Here it's more about rock-fall and mudslides due

to the mountain environment. In Florida or even New York or Maryland it's going to be more about the

flood risk.

I think those things –- the risk to infrastructure -– are very real and we're going to have to

get better at being honest about what they are and the cost benefit of doing projects when they entail

some of these risks; and frankly, knowing what we can control against and what we can't.

MR. WESSEL: Eden, what do you think about that?

MS. PERRY: David, can you repeat the first part of your question again? I just want to

make sure I know how to answer it.

MR. WESSEL: One is, does the Municipal Bond Market fully take account of the risks that

climate change, the ones that are most vulnerable; and secondly, does the Market reward -– is there

enough appetite for ESG -– is green well enough defined so that you get some benefit when you do a

resiliency project or is it all just homogenous?

MS. PERRY: So, in terms of the first question, I think it's complicated because one thing -–

you had an earlier panel that talked about disclosure in the Municipal Market -– I think that disclosure is

really difficult; and I think there's been a lot of work in that area, I think there's a lot of new data that's

come out, there's a lot of different sources -- different vendors -- that are working towards getting better

ESG disclosure. However, I don't think ESG is something new. I think this is something -– the

terminology is new, talking about environmental social governance is new terminology –- but it's actually

something that we've looked at for years and years; I've been doing this for 20 years. We have been

asking governments forever about droughts, about floods, about wildfires; this is actually nothing new

about -- conversation is not new –- it's just a new terminology to talk about environmental.

Social is not new, we've talked about

demographics forever; that's been in our criteria forever. If you have a declining

population, that affects your ability to have economic growth; so, it's just a new term. Governance is not

new; we've talked about management forever, management is the key rating factor and always has been

for us since I started rating bonds. So, I just think the terminology is new and it's become a very hot

button item; but none of these factors are new, this has been in our criteria. We've looked at this since I

became a Rating Analyst in 2001.

        So, I don't know if that answered your first question, but I do think it is something

that we've always looked at and I do think governments have focused on this. I remember rating bonds in

2001 and talking to different places in North Carolina; they didn't have Chief Resiliency Officers, but they

had capital plans that dealt with floods or dealt with different issues that they now deal with today that

they might have a Chief Resiliency Officer who is focusing on. So, I do think – what was the second

question?

        MR. WESSEL: Let's hold off on the second one, I'll come back to it.

        MS. PERRY: Okay.

        MR. WESSEL: Ryan, there's a question on the chat that I hear a lot -- I could answer it,

but I'm going to let you do it –- which is; Isn't spending all this money on infrastructure at a time when we

have inflation just going to make inflation worse?

        MR. BERNI: Well again, this goes back to the structure of the bill; so, the answer is no.

One -– and outside folks have definitely said "yeah, sure. Of course, spending any bit of money right now

may be inflationary" –- but the impact of this bill is positive on the inflation issue for a couple of reasons.

One is, we actually are going to fix the supply chains that have created a lot of the situation that we have

today in ports and rail, and airports and railways that have increased the productive capacity of the

economy with a lot of what we have.

        The second thing is, we're actually just not spending that much money in this

current year. A lot of the money –- as I've said –- goes in the out years; and then there was actually a

bunch of programs that are actually designed to specifically lower costs for people in the immediate term

like the Lower Cost Internet Program or Weatherization or Energy Efficiency which ultimately, we think is

good on all those fronts.

        MR. WESSEL: So, DJ; public-private partnerships may be a phrase that's used at least

as often as ESG, and I wonder what does it actually mean in practice? So, the Federal Government is

going to pump all this money in; is this something where we're going to see public-private partnerships or

is the public money basically crowding out the private here?

MR. GRIBBIN: I think it's a little bit more of the latter to be honest with you. So, public-private partnerships for those not familiar with it; in essence it's a broad phrase that includes a number of procurement methods whereby the public sector that owns -– as David mentioned –- infrastructure of America is owned almost exclusively at the state and local level where those state and local governments invite a private party in to accept more risk than a traditional procurement in exchange for the private party investing in that infrastructure and actually using private equity.

Very-very important to note that private equity is not free, you have to pay it back. There is a common misperception that public-private partners will bring more funding into the infrastructure. It actually doesn't bring more funding, it brings more financing tools so that states can accelerate these projects. At the end of the day, infrastructure funding comes from two sources, users and taxpayers: full stop, that's it. So, if your using private equity, you have to pay it back from taxpayers or from users of the facility.

I think that's going to be crowded out in two

ways. First of all –- as everyone has mentioned –- there's more funding –- and as Shoshana's point's dead-on –- which it's not this tidal wave and tsunami of funding, but it's 29 percent more in the highway area and transportation area; so, there's significantly more funding available so there's less need to look for financing alternatives than you might have otherwise.

Secondly, crowding out in terms of time. So, I'm sure Shoshana's team and other state DOT's and cities to counties across America are getting their teams to focus on how do we apply for federal funding and grants as opposed to how do we think of new innovative ways to involve the private sector in funding this infrastructure? So, there's probably two levels of crowding out; it will still be an important tool, it applies really just to a relatively small subset of infrastructure projects; so, it's a great tool to have in the toolbox, it can be useful, but in the current environment given the amount of cash that's coming in and the need to hustle pretty aggressively for the competitive grant programs, it's unlikely we'll see a significant uptick in public-private partnerships.

MR. WESSLER: I see –-

MS. PERRY: David, I'd just like to –- before I ran the department, I was the State Analyst

and we include P3 debt as state debt; we don't consider it as a pass-through, we do include it in the debt of the state.

MR. WESSLER: And you agree with DJ on the appetite for that now, given the things he said?

MS. PERRY: I do agree.

MR. WESSLER: How much of a problem, Eden; do you think inflation is at the moment for these infrastructure projects?

MR. GRIBBIN: I'm sorry, who are you asking?

MR. WESSLER: You go first, DJ and then Eden.

MR. GRIBBIN: Okay. I think it's enormous and I think one of the -– my first remarks that going too long, I was going to talk about that a little bit but –- three years of inflation at the current level pretty much wipes out all the benefits of increased IIJA funding. So, getting inflation under control –-

MR. BERNI: That's only true on roads and bridges –- that's just not true DJ -– I don't want to -– I just -– the bill is much more than just the one sector that we're talking about.

MR. GRIBBIN: That's exactly what I said –- FRA -– Federal Railroad has like a 486 percent increase; so yeah, no level of inflation is going to wipe that out; but as mentioned earlier, the best bulk of spending is on transportation and for the transportation part of the pie that we would offset in terms of EV's, grid spending, Amtrak spending -– all these spendings of whole new big chunks of money, obviously that won't be offset because it's programs that don't exist now, so it's all new funding.

MR. WESSEL: Right. Eden, what do you think; does inflation give investors concern about these projects?

MS. PERRY: I think the concern is finding the workers as the big issue and paying their wages. I think that's a huge issue right now, is finding the workers and for the governments to get them done. So, I think that's a big issue with inflation right now.

MR. WESSEL: Shoshana, how big an issue is that in Colorado for you?

MS. LEW: Significant, but it's also uneven in different areas even within the road and bridge discipline. Things that we've seen kind of correlate to what logic would hold, right? In areas that are more rural where the workforce is more sparse, you're seeing more of the constraints due to the

supply of people to work on the projects. The commodities are not all the same and can fluctuate, and also often are related to sort of the location of where production occurs; so, depending on how far you have to move materials, that can fluctuate as well.

I think the other thing is that there is a need to kind of control for how much we let project costs run over because of the assumption of inflation. We are getting nontrivial pressure from parts of the industry to approve of cost overages without the results; we're not going to, right? Making sure that each time you let that happen you crosscheck it and document it and identify also whether it's worth paying for the price of inflation right now. That conversation has to happen on every single project to make sure that even in an environment with inflation we get the best return on taxpayer investments.

MR. WESSEL: Yeah, that's a good point. I'm beginning to think that now anytime you have any problem with any service provider it's always -– there's a supply chain problem –-

MS. LEW: Remarkable –-

MR. WESSEL: -- If you're getting your coffee at a restaurant; oh, there's a supply chain problem. It's becoming an all-purpose excuse. So, Ryan; we're almost out of time, so I wonder what have we not addressed that you think is important for people in the community of people we've assembled for this conference to think about in terms of how you're implementing the IIJA, if any?

MR. BERNI: I think Eden just kind of hit one of the points. There are two things that are kind of universal that come up in every conversation we have, whether it's a public sector, agency, the Federal Government level, state or local government, contracting community, private sector; and thereto workforce-workforce-workforce and then local technical capacity and just skill to be able to execute federal contracting, particularly for low-capacity communities, small towns, rural America where we're really trying to make sure that these dollars reach the places that need it the most; and there's a lot of that.

So, we're very focused on a couple core --

workforce, pipelines, in the broadband space, electricians for all the various components that go through there –- and then the general construction and building trades as one where we just have a declining workforce overall and we have this huge increase in investment over the next decade; and we're all going to have to figure it out. This is not a Federal Government problem and there's not going to

be a Federal Government solution. it's very regional, it's very occupation specific, even smaller than

sector specific; and so, we're going to have to have really some local regionalized approaches to move

forward.

MR. WESSEL: So, with that, I want to thank Eden, Shoshana, Ryan and DJ for an

interesting conversation; and I want to thank everybody who participated in the conference overall. We

are going to send around a Survey Monkey, we're interested in your advice on how we can do this better

in the future; hopefully someday in person in the future, even though broadband seems to work at least

for three out of four people on the call. With that, thank you all and on behalf of Brandeis, Washington

University and the Harris School of Chicago, I want to thank my colleagues at Brookings; Megan Waring,

Haowen Chen and Stephanie Cencula for helping us run this so smoothly; and we'll see you next year if

not before.

MR. BERNI: Thanks guys.

MS. PERRY: Thank you.

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