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Opening Remarks:

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Financing State & Local Infrastructure Investments:

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**Teachers or Roads: How Fluctuations in Public Finances
Erode Public Infrastructure:**

Authors:

TROUP HOWARD
University of Utah

ADAIR MORSE
U.S. Treasury, on leave from University of
California-Berkeley

Discussant:

TRACY GORDON
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**Maintaining Maintenance: The Real Effects of Financial
Reporting for Infrastructure:**

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PARTICIPANTS (CONT'D):

Discussant:

DEAN MEAD
Governmental Accounting Standards Board

**Municipal Bond Insurance and the U.S. Drinking Water
Crisis:**

Authors:

ASHWINI AGRAWAL
London School of Economics & Political Science

DANIEL KIM
(BI Norwegian Business School)

Discussant:

SUZANNE FINNEGAN
Build America Mutual

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P R O C E E D I N G S

MR. WESSEL: Good morning. I'm David Wessel, director of the Hutchins Center on Fiscal and Monetary Policy at the Brookings Institution. On behalf of the Rosenberg Institute of Global Finance at the Brandeis International Business School, the Olin Business School at Washington University in St. Louis, and the Harris School of Public Policy at the University of Chicago, I want to welcome you to day 3 of the 10th Annual Municipal Finance Conference, our effort to bring together participants in the muni bond market, state and local officials, and academics who are interested in state and local fiscal issues.

You can see the papers and slides and video of the last two days of the conference on our website. Today we're going to talk about state and local infrastructure finance. We have several papers and then later this afternoon at 1:15, if you look at our website there are details, we're going to have two breakout groups open to anybody. The Zoom links are there. One on state and local fiscal issues and economic issues generally and the other on what's going on in the muni

bond market, including the issues around advanced refunding and Build America bonds and stuff like that. So, we invite you to join us there.

So, now I'd like to turn the virtual mic over to my colleague at Brookings, Louise Sheiner, the policy director of the Hutchins Center, who's actually been doing a lot of interesting work on state and local fiscal issues during the pandemic. And she'll introduce the panel and take it from here.

MS. SHEINER: Great. Thank you, David. And thanks, everybody, for being here. We have three really interesting papers this morning talking about infrastructure, which is obviously an incredibly timely topic to be talking about right now.

Our first paper is by Troup Howard and Adair Morse. Troup Howard's from the University of Utah. He'll be presenting on "Teachers or Roads: How Fluctuations in Public Finances Erode Public Infrastructure." Take it away.

MR. HOWARD: Okay. Thanks very much. Hopefully, there are slides being shared.

MS. SHEINER: Yep.

MR. HOWARD: And my audio's not off. I just want to say thanks very much to Brookings and all of the host institutions for including us. We're delighted to have a chance to present this work and to be involved in this conference.

This is a joint project with Adair Morse at UC Berkeley, who's also on leave with the U.S. Treasury. And so I do need to make the standard disclaimer that the ideas and views that we're expressing are ours alone and don't reflect in any way any official policy of the Treasury.

The long-term pattern of declining investment in public infrastructure has been very widely documented and is, of course, as Louise just mentioned, the subject of much conversation right now in Congress and in the White House. One particular way to see this pattern is what you're looking at on the right-hand side of this slide, which simply plots the total stock of public infrastructure relative to GDP. And you see beginning in 1970 or so this long-term secular decline of that ratio continuing to the present day. If that ratio had stayed stable at the pre-1970 level, the total stock of

public infrastructure today would be on the order of \$8 trillion larger, so this is a -- this pattern represents a very large associated amount of declining investment.

Now, given this audience I won't spend a ton of time motivating the importance of infrastructure spending, but will just quickly note that in addition to the direct consumption utility that residents receive from consuming infrastructure services, researchers have also documented that it's very often more expensive to maintain declining infrastructure and infrastructure that's falling into disrepair than it would be simply to invest in new infrastructure in the first place, so that this type of pattern also has long-term fiscal implications.

Now, there's a set of fairly obvious first order political economy concerns that might contribute to drive a pattern like this. Infrastructure allocation, at the end of the day, is the outcome of a public choice process, so we certainly might think that policymakers are facing competing incentives short and long term. And we also think that concern for votes at the end of the day is probably driving a significant

portion of public decision-making on behalf of elected officials.

What we're going to do in this paper is we add evidence on another channel which can contribute to this type of long-term disinvestment pattern. Specifically, we're going to think about how governments rebalance their portfolio of public goods and services when total budgets expand and contract. And what I'm going to show you is that during times of fiscal stress, governments pull dollars primarily from infrastructure-related areas, in order to maintain spending on other necessities, but that that pattern is not matched with concomitant inflows during times of fiscal expansion. The long-term implication here is net outflows to infrastructure goods in service areas and that would exactly suggest a pattern like what you're looking at.

Since this is a very short presentation, I just want to jump very directly into the practicalities of what we're doing in this project. One of our innovations in this paper is to adopt a classic microeconomic model of consumer choice and deploy it in a public choice setting. So, we're going to use this

Deaton Almost Ideal Demand System framework to think about relating the change in budget share allocation for a given category of public goods, "i," provided by government, "g". That's what's on the left-hand side of the equation that you're looking at. We're going to think about relating those changes in budget shares to total changes -- to changes in total public budgets in real terms, that's the first term in green on the right-hand side of the equation. And in this framework we also need a set of controls, which is the price of providing public goods and services, just reflecting that the choice to provide any public goods i depends on the entire vector of prices across all public goods and services provided.

This is a system of "i" equations, one for each category of public good and service. And we will estimate this equation -- this system equation by equation and end up with a set of parameters, the beta-sub-i, which represent the elasticity of budget share with respect to changes in the total public budget.

Now, this framework, this system, has a couple of nice features. One is that the sum of all of these

public good elasticities, the betas, equals zero. What that means is that we're thinking about internal rebalancing of allocations conditional on a total shift in public budgets, an expansion or contraction.

Second is that the sign of the estimated elasticity has a nice clear interpretation. So the null here of beta equals zero is proportional expansion or contraction. If your budget shrinks by 5 percent, the total budget, all departments receive 5 percent across-the-board cuts.

Now, if the elasticity is negative, in this framework that's a necessity good. These are areas where when budgets shrink, these areas actually increase relative budget share. That is, allocations to these areas is maintained. How is it maintained? It's maintained by rerouting dollars away from luxury goods. In this framework those are the goods where beta is positive. So, when budgets shrink, for instance, governments make more than one-for-one cuts to luxury good areas and they use those additional cuts to maintain spending in the necessity goods.

Okay. We're going to use this system to think

about how the total portfolio of public goods and services provided changes with respect to budget expansions and budget contractions. To estimate this we're going to use the standard set of data from the U.S. Census of Governments. This is going to give us detailed expenditure level allocations for the near universe of public entities in the country. We've got full data every five years, so we'll use those full survey years and end up taking first differences over that five-year period.

We're going to estimate the system from two different time periods. We're going to look at the period immediately following the dot-com bust between 2002 and 2007. This was a time when public budgets generally were expanding. We'll use that period to estimate expansion elasticities. And then we'll use the period around the Great Recession where public budgets saw large declines in peak-to-trough terms to estimate contraction elasticities from 2007 -- using the period 2007 to 2012.

I've talked about categories of public goods and services. On this slide you see how we are going to

group expenditures into a tractable number of categories. For nearly all of the areas that you're looking at, we're further going to break these down into spending on current services and spending on capital investment. The last three are financial flows only and, therefore, don't have a capital component to them. These are debt service allocations, funding sent to retirement systems, and direct unemployment transfers. So, except for those three, every other category you'll see is broken into current and capital.

This slide gives you also a sense of absolute and relative magnitudes. You can see that the total dollars involved here are large, pushing \$3 trillion in 2012, without IGA transfers. And in relative terms, you can see that allocations to education unsurprisingly are the largest proportionally, followed fairly closely by general civil administration, public safety, health, and transportation.

Okay. The elasticities that I just described are the central object that's going to drive everything. But it's easier to think about the implications if I show you the changes in levels in dollar terms. So, let

me outline quickly how I do that and then on the next slide I'll put up the results.

So, the first step is to estimate these elasticities. We're going to do that by expenditure category as well as by government level. So, we'll have a set of state elasticities and a set of county elasticities, et cetera. And we will further exploit the rich cross-sectional detail in the data to estimate state level elasticities for all local governments. So, we pool states, but then for cities and counties we'll estimate within state to capture regional heterogeneity and preferences.

To translate these elasticities into dollars shifts we then just need to calibrate a negative shock. The intention here is to realistically model the impact of a severe macroeconomic downturn. To do that we're going to take estimates from about a year ago, constructed by Stephan Whitaker at the Cleveland Fed, on the impact of COVID on state and local budgets.

Now, we've heard a couple of times in the last two days that the realized impacts of COVID-19 for many governments has not been as severe as the projections

were a year ago. The exercise here is to use these carefully constructed estimates of what a severe macroeconomic downturn would look like constructed at the government type and regional level. So, you should think of this in general magnitude as being a decline on the order of 9 percent for state revenues, 5 percent for local governments. And this is fairly close to what the Great Recession looked like as well, although the Great Recession the incidence was split between state and local governments.

But we're going to let this negative shock influence the shift in total budgets and then our elasticities at the government level will drive the rebalancing in the portfolio of public goods and services. And then we will aggregate up government by government and what I'm going to show you is the total breakdown in the aggregate portfolio of public goods provision.

So, here's what that looks like. This figure contains a large amount of the intuition for the project, so let me be a little bit careful in unpacking it. The blue bars at the bottom showed the proportional

reductions implied by the calibrated negative shock. So, the interesting content is not at the bottom. This just shows you we're in a scenario where budgets are shrinking. Here's what that would look like in terms of the areas that we're considering in dollar terms.

The interesting content is in the rebalancing component, which the red bars at the top. The positive bars are going to be our necessities. These are the areas where the overall proportional reductions are offset by allocating additional dollars, which are drawn from the luxury goods, which are the negative bars here in the top figure.

So, you may or may not be able to see the small labels. The largest necessity areas, according to our estimated elasticities, are education, both K-12 and higher ed, along with public safety, plus two committed costs to financial flow areas, funding to retirement systems along with debt service. These are the areas where governments are maintaining funding to the greatest extent possible and they are doing that by drawing dollars from the luxury areas in this framework.

Along with the current spending on welfare and

civil administration, the largest luxuries here register as transportation spending, both on current services and transportation spending on capital services, along with most capital allocations. So, you also see a large decline in K-12 capital. When we're talking about infrastructure, what we're thinking about is the transportation allocations, both current and capital, along with the other capital allocations.

And so this figure gives you a sense of the relative shifts. Let me make a little more precise what this looks like in quantitative terms. I am just putting numbers attached to the bars that you were just looking at.

In this contractionary scenario what we see is that governments pull nearly \$70 billion above and beyond the proportional cuts from a relatively small set of areas. And of that nearly \$70 billion, \$56 billion is coming from these areas that are primarily related to infrastructure spending capital and capital spending broadly and transportation spending, both current and capital.

Now, the meat of the project is in thinking

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about how this looks different when we move to considering an expansionary period. So, we repeat the exercise where we go back and we estimate elasticities from this expansionary period and then we posit a positive shock that's just exactly equal and opposite to the negative scenario. So, we're thinking about a sharp reduction in public budgets followed by a sharp rebound.

This figure shows you the results of that exercise in the same way the blue bars at the bottom capture the proportional expansion. These are the exact opposite positive of the negative blue bars on the previous slide. And again, the content is in this top figure. We find the same breakdown between which goods are luxuries and which goods are necessities. So, we still see that governments are treating infrastructure categories, like transportation and capital spending, as luxuries, meaning that additional dollars are flowing to these areas during an expansion. But the main content here is the fact that the magnitude of these rebalancing flows is much smaller during expansions.

So, again, let me just make this precise by quantifying it in this table. During an expansion we do

see additional rebalancing flows going back to these luxury areas, most of which are related to infrastructure. But whereas during a contraction we saw governments pulling \$50 billion out of infrastructure-related categories, during an equally sized expansion our estimated elasticities suggest that only \$5 billion flows back into infrastructure. So, the net pattern over time is going to be a long-term net outflows from infrastructure allocation.

The other thing that we do in the project I'm not going to have time to talk about in this presentation, but we exploit the cross-sectional richness to think about how things vary by state. I'll put up just very quickly this figure which plots the rebalancing flows associated with current spending on transportation as a share, a proportion, of the baseline spending. You can see these rebalancing flows are quite large in some places, approaching 40 percent. And what we generally see here is that transportation is treated more as a luxury in southern states, which are precisely the states that don't have large committed costs going to salt and snowplows every winter.

So, I'm out of time. Let me just go ahead and conclude very quickly. What we show in this project is is that in times of fiscal stress, infrastructure acts like a luxury. Governments pull dollars from this area in order to maintain spending on things like education.

But during fiscal expansions infrastructure loses this luxury-like property. We see expansions that are much closer to one-for-one to proportional expansions. The implication of this pattern is large declines in infrastructure allocations over time as a result of fluctuations in the business cycle. This single expansion-contraction cycle that we outlined suggests an aggregate reduction of \$50 billion.

These findings have, we think, policy implications. It seems very possible this is an area where we need future research, but it seems very possible that increased ability on behalf of local governments to smooth their infrastructure allocations would potentially have large buffer benefits.

So, let me go ahead and stop there. Apologies for running a minute over.

MS. SHEINER: No problem. Thank you so much.

So, our discussant -- before we get to our discussant I just want to remind people if you have questions and you're watching on the Event page, you can scroll down, you'll see there's a link to sli.do. And so you can start asking your questions now.

And let me introduce our discussant, Tracy Gordon from the Urban-Brookings Tax Policy Center. Take it away, Tracy.

MS. GORDON: Thank you. I am going to share my screen. Okay.

So, I'm going to be talking about this wonderful paper, which is actually an idea that I had many moons ago, so as I was reading, I was thinking, wait, is this an Almost Ideal Demand System? It is an Almost Ideal Demand System. So, it was great to see it come to fruition without me having to actually do the work.

So, it starts with this motivation and people asking why is U.S. infrastructure so bad? And I do think this will be the best sidebar conversation about is that so bad? So, you showed the trajectory of spending, but certainly if you look at outcomes, the

conditions and performance reports that the Department of Transportation puts out actually show, as you would expect, that when the Recovery Act put a lot of money into infrastructure, you actually saw an improvement in regions with structural deficiencies, for example. And so I do think that there is, you know, a pretty vigorous debate about what is the right level of infrastructure spending and whether we should go back to the levels that we saw in the '50s and '60s, which, of course, was when we were building the interstate highway system, so that's not something that we need to repeat.

In any case, I think this is an intriguing possibility that state and local governments cut capital more than current expenditures in a recession and they don't necessarily make up for it in the good years. And there's also sort of like folk wisdom in state budgeting that this is what happens to certain expenditure categories, like higher education, that it's sort of understood that we will cut you in the lean years and make it better in the healthy years. But that's actually counter to some of the -- some (inaudible) that you show for higher education, which was puzzling to me.

But in any case, this table from the GAO basically supports -- they're just looking at the long run versus business cycle components of each of these series, also from the Census of Governments, compared to GDP. And they do find this relationship that capital expenditures are more procyclical or more responsive than current expenditures to a recession.

So, you look at tradeoffs, which I think is so great. So, there's a whole literature, Kate Baicker and Nora Gordon, that thinks of state budgets sort of like this balloon where you perturb, you know, one area and then you look to see like where that perturbation shows up in other areas. So, looking at largely, you know, assumed to be exogenous changes, like federal expansions of Medicaid, and where that shows up in, say, education budgets. Also looking, I'm reminding myself of tradeoffs between higher ed and Medicaid is another area in this literature.

There's also, if you go way back in public budgeting theory, this conversation about tradeoffs. So, V.O. Key was this political scientist, who was very influenced by Pigou. And he said, wow, Congress is

really on to something with this whole question of looking at marginal costs. And if only budgets could reflect marginal costs and show people how to allocate that next dollar to its highest -- and marginal benefits to its highest and best use, that would really be something. But economists don't do that, he went on to say, because basically you can't get into the specifics of looking at tradeoffs very easily. It almost always requires more detailed information, so you have people that specialize in particular spending areas or more often -- well, not more often, but it's easier to think about the whole picture if you're looking at tax. But there are very few papers in economics that consider these tradeoffs across budget categories. So, I think this is a great contribution.

And as I said, I think the Almost Ideal Demand System provides a nice framework for starting to think about these things.

So, you look at the responsiveness of budget shares to price changes and changes in overall -- I think I took the wrong equation. I thought this was equation 1, but actually this is equation 2. But in any

case, you're looking at the responsiveness of these budget shares during a contractionary period and then an expansion of (inaudible) prior.

You know, one concern that comes to mind immediately is just how weird the Great Recession was. And this figure actually also suggests that potentially there is this ratcheting down in terms of the bounce-back of infrastructure spending after a downturn. And there are many explanations for this. You know, for some it's sort of myopia among both politicians and voters, that they don't see the long-term benefits of infrastructure. Pervasive uncertainty about, you know, are we really coming back? Is this really okay to spending on infrastructure again? But it would be useful, I think, to try to expand your sample and think about other contractions beyond the Great Recession.

I also think it would be interesting to think about it (inaudible) view of cost writers. So, this is an illustration from this web store that I developed that basically says that for any area of spending you can think about spending per capita as being just a simple decomposition that's recipients per capita,

potential recipients per capita -- I'm sorry, recipients per capita and spending per recipient. And then you can decompose each of those further into basically potential recipients and actual recipients. And then potentially eligible as a policy decision and it interacts with demographics as the number of people who actually can take up the benefits. So, say the number of kids age 5 to 17 who might go to public schools, but that's also going to be driven by things like the number of -- or the degree to which those private schools as opposed to public schools take up.

In any case, beyond just looking at wages, so in my little schematic payroll, which is the thing that you look at, is sort of way down here in terms of the number of things that could be affecting this ending. Caseloads would be lifting, but I really encourage you to think about including in this model. Because you could think about if there's suddenly like an increase in the number of school-aged kids, that's basically an increase in the cost of providing a constant quality education if you wanted to keep expenditures per capita constant. So, there are plenty of, you know, resources

to look at, just basic cost drivers and not a complete universe.

I also think if you're going to look at labor costs, I don't know specifically what the NAICS codes that you were using were, but if it's things like teachers' salaries, it's going to reflect the outcome of a political process. So, if it's primarily public education, those are prices that are being paid, not necessarily the cost of education. And so you could also look at labor costs for a given segment of the market, like college graduates, and that might be more of a reflection of something that's truly exogenous.

I was also confused about -- so I love the fact that it was a contained system, as you said, and there's this adding up. But I wasn't sure how federal grants fit into the story. And in particular, federal grants mattered a lot for education during the Great Recession, although some people say that you could still see a decline after the money went away in 2012. And so that might be part of what's going on with the story.

Also, budget reserves matter, how much states have managed to save. So, it's nice to be able to say

that there's a balanced budget requirement and technically revenues should equal expenditures. But revenues are, you know, based on savings and borrowing in addition to -- and federal grants in addition to money that's just coming from taxes.

I also wondered about institutions. So, you're looking at changes for a given state. So, in some sense, you're kind of just subtracting out whatever earmarks or other kinds of spending requirements a state might have. But we did the report that actually went and -- we went and talked to people at the state level about how do you decide what to cut in a recession, or what's off the table before you even sit down to put together a budget? And we basically heard something that's somewhat consistent with your findings, that things kind of move in lockstep when times are good. And this is because, you know, incremental budgeting just reduces political conflict. You just say everybody gets what they got last year plus some percent.

But in a crisis everything is flexible. And so these institutions are less binding in a crisis. And so I think it might be interesting to explore just, you

know, sort of maybe for a particular group of states where there are institutions that people typically look at and point to as guiding spending, but that might not have lasted when the times are rough.

I also wasn't sure how you estimated the regression. I think you said OLS, but when I looked at this I was sort of looking to see any related regressions that -- I don't think it's that different, but basically sort of ensures this kind of adding-up constraint is met.

And then the crisis of bonds. You look at -- so, you did a lot of work getting like yields from specific issuers. But obviously, the choice of sort of when to bring something to the market is endogenous. And you mentioned, too, that for some small issuers they may not have actually gone to the market in the period that you're looking at. So, I just wondered why not use just market rates instead or just yields for the class of bonds (phonetic)?

With the Census of Governments data, transportation, it's just a weird sort of artifact in the data of an earlier time. The transportation doesn't

include public transit, which they consider a utility. So, I think it's important to take public transit from the utility section and stick it with transportation, which is in the general government section.

I'd also consider user fees, perhaps subtracting from areas that may constitute a large part of spending, so higher education, hospitals, and transit, because that better captures sort of the true public subsidies for these activities.

And in terms of this question of sort of was the Great Recession just a really weird period? If you were to look just at states, so I realize you're using the Census years ending in '07 to maximize the detail that you have for cities and counties and other levels of local government, but you could do a lot with just states looking at the annual data.

And then I would just be clear about what's going on with the expenditure categories. Public safety means something very different at the state level than it does at the local level. It's corrections and prisons, which we heard in our report is very difficult to adjust because of just problems that you have people

in the system, you have a certain number of caseloads that doesn't change at least in the near term, and that could be very different from the choices about having the cops on the street and that sort of thing.

But anyway, thank you very much for giving me a chance to look at this paper. I look forward to any discussion.

MS. SHEINER: Great. Thank you so much, Tracy.

So, I'm going to open it to Q&A, but first I want to give Troup a chance to respond to Tracy.

MR. HOWARD: Great. So, Tracy, thank you very much for the really fantastic and detailed comments. We're delighted to have them. You've given us some great things to think about and I don't want to cannibalize the entire Q&A by trying to respond to all of them. Let me touch just on a couple of points that I had a particular response to.

So, I'll mention first that we had heard that same folk wisdom that you're referring to that you have this implicit bargain, you know, we'll cut you when times are tough, but then we'll make you whole as soon

as times are good. And in particular, we went in with the prior that higher education was likely to be one of those areas which would see cuts. This was of particular interest to both Adair and I, I think, since we're both employed in the higher education sector. And we were really surprised, in fact, to find that this seems to register as an extremely strong necessity at the state level.

My sense is, I'm speaking a little bit beyond the paper here, but I'm guessing that it's maybe the discretionary component of higher ed spending that's particularly sensitive to that type of implicit control, implicit bargain.

Your comments about the extent to which the Great Recession is generalizable I think are great. We're working to exploit the full sample of data, which extends back to 1970 and we're starting to allocate expenditures in those years to these same categories, which is easy given the structure of the data, and then think about how to identify periods of expansion and contraction. We're thinking about how to relate those in particular maybe to expectations in some way that

might capture the idea that if you think you're going to grow by 5 percent and you grow by 1, that that is, in some sense, a contractionary environment. So, I think a lot more to be done there.

The comments about federal allocations I think, also, are really helpful. One thing that we had thought might be feasible would be just to look at the RS ending during the Great Recession and try to actually capture how those funds were allocated flexibly enough that we could subtract the allocations, especially to infrastructure and to education, and then re-estimate the system as if those dollars had not gone from the federal government to the states. And we might get a better sense or a different sense of what priorities look like in that sense.

I don't want to cannibalize the Q&A, so let me stop there. But thank you very much for the detailed comments. They're very much appreciated.

MS. SHEINER: And I also want to welcome Adair Morse, who's now on camera, from the U.S. Treasury, on leave from UC Berkeley.

So, some of the questions we have are some of

my questions actually. And maybe you touched on this a little, but I wanted to ask a little bit more. One of the things that I think is quite surprising is how difficult capital spending is given that there are capital budgets. And you would think like this is the perfect time to do your spending is during recessions, it's good macroeconomically. And I'd heard various explanations for that ranging from a lot of states who have to actually go out and get approval for a bond issuance and you don't ask for that when like they are tightening their belts. Or I've heard that there's a lot of work to be done when you're thinking about a capital project and you don't have the manpower when you're sort of having tight budgets.

I wonder if you've thought about that or if there's something in your data that you could exploit about variation across states that might kind of answer that question.

MR. HOWARD: Yeah, I think that's a really interesting question. And so I think our sense is that the pattern that we're seeing as we estimate the system tracks with the notion that you have long-term capital

projects that are being funded by periodic issuance of some portion of a series of municipal borrowing. And I think it matches the idea that it's easy either to slow down or pause those bond issuances in a way that let's you scale back your capital allocations if you aren't comfortable spending that money during contractionary times, if capital markets are such that you don't want to issue that borrowing.

We have not thought as much as perhaps we should about whether we can look at data on access to capital markets and think about using that to split the sample into regions which look like they are not facing any of those constraints in regions which might be and seeing if it looks like the sensitivity of capital allocations looks different between those two. But I think that's a really interesting suggestion that we should be able to pursue.

MS. MORSE: If I can tack onto that, there's also the -- you know, you have a long-term vision for this school district and, you know, you're going after different schools and you pause on the spending to the capital allocation, it's not just the bond issuance.

Right? You can imagine, right, the school having to wait a few more years kind of thing. And that is a real -- you know, we think about the big -- building a bridge, you can't really pause that well with building a bridge, but you certainly can on school projects and other things that are more incremental capital expenditure.

MS. GORDON: Yeah, and I had some concerns about the five-year increments at first and thought, you know, that really seems like it's too big for doing these first differences. But then precisely because of the lags that you're talking about, I think that it's okay. You know, because most areas take a while to respond to changes in the economy just because it takes a while for state revenues to respond. But infrastructure projects, you know, exactly, is this sort of pause.

But I wonder in the paper when you talk about regional heterogeneity, you mentioned things like weather and sort of the demands on roads in the Northeast, for example. And that seems like something that you could control for thinking of it as sort of a

price.

MS. MORSE: Yeah, that was an interesting comment. Right? Your whole getting us to level the playing field. The paper's a little bit thin on robustness and really using the robustness, if you will, to get to the mechanisms that look where the elasticities move by putting other intervals in. And so we took, our early study, took a lot of notes on those different dimensions of really understanding, you know, the age, the demographics point is valid, right, the weather point that we bring up. These different things are totally interesting and we do very little right now on different -- you know, seeing this elasticity, what's really driving them. But your comments were great on that, triggering us to do more on that dimension.

MS. SHEINER: Yeah. I don't know if you consider what the stringency of the balanced budget requirements are and how those vary and whether or not that would effect the -- I don't know if it's in the paper.

MS. MORSE: Yeah. No, but that was one of the other points that Tracy made that I wrote down that, you

know, we need to understand how those elasticities shift by. I have, you know, different buckets of doing some analysis by different stringent -- by age, shift demographics. Right? So, I totally jumped on that for future -- yeah, it's super.

MS. SHEINER: So, we're running out of time. Let me ask, I have one other question. So, in the progression you had a price -- you had prices. What prices are you using? And how much does -- and Tracy kind of mentioned this on wages. You know, how much does it matter if those are measured badly, which we think they probably are?

MR. HOWARD: Sure. so, the prices that we are using reflect the idea that at the end of the day most public allocations flow through the wages in one way or another. So the specific price control is going to be wage by state, by public good area. So, something like, as Tracy mentioned, looking to see what teacher salaries are in Alabama. And we're using QECW along with NAICS codes to construct those measures.

MS. SHEINER: I think, I might be wrong, that construction prices have a lot of energy component in

them. And I wonder if that would be an important thing to think about to the extent that energy prices are varying over the business cycle in some way, differently than wages.

This was really an interesting paper and I really want to kind of think about what the implications are, but whether or not there's something testable using sort of what's happened before to see what's going on now, which is sort of such a puzzle about why employment has fallen so much and whether or not the patterns or the shares are different, which you would expect they'd be different if it's mostly coming from social distancing rather than this theme, which you would expect if it's coming from revenue. And so it maybe is actually something you could use to try to test what's going on now would be really interesting.

Okay. Well, thank you very much. I hope you guys you can join us for our session later where we're going to just try to figure out what's going on today. And let us move to the next paper.

The next paper is "Maintaining Maintenance:
The Real Effects of Financial Reporting for

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Infrastructure," by Ryan McDonough from Rutgers and Claire Yan from Rutgers. And I think the presenter is Ryan. And here we go.

MR. McDONOUGH: Yes. Thanks very much, Louise. And thanks to the conference organizers for inviting us to share our work today. And also, we just want to thank in advance to Dean Mead for discussing our work.

So, I'm Ryan McDonough. This is joint work with my colleague from Rutgers, Claire Yan. The focus of our paper is on U.S. infrastructure and the financial reporting requirements for those assets.

So, infrastructure is a broad term. When we're thinking about infrastructure in this paper, we're specifically talking about state-owned roads and bridges. And we'll talk a bit more about why we're focusing on states. But if I refer to infrastructure in the context of our paper, I'm referring to state roads and bridges.

And this is the National Highway System. It gives a fairly good representation of what we have in mind. The state-owned roads and bridges, though, are

more comprehensive than the National Highway System. So, these roads are critical to the nation. They connect the nation. They're important for the economy, for mobility, and defense. State-owned roads account for about 20 to 25 percent of all public roads, but they carry the bulk of all traffic, especially when thinking about heavy trucks, tourism, and daily commuters.

And so they're very important, but, as we just heard, to some extent there's been some concerns about the condition and funding of infrastructure. And, you know, the American Society of Civil Engineers, admittedly, they have somewhat of a tradition of this, but have rated U.S. infrastructure quite poorly: roads at a D and bridges at a C. Estimates suggest that the repair bill is in the trillions. And even just the backlog of maintenance and repairs is somewhere around a trillion dollars.

California, for instance, they're one of the few states that actually disclose their deferred maintenance in their annual infrastructure plan. They indicated that they have deferred maintenance for their transportation systems of around 36 billion, and this is

down from close to 60 billion just a few years ago.

So, there clearly are some funding concerns. We're not at all suggesting that the U.S. doesn't have a comprehensive, in fact, perhaps the most comprehensive, infrastructure system in the world. We're also not focusing on capital investments and new construction, things like that. But I think most would agree that maintenance of the current infrastructure in places is really critical. So, that is the focus of this paper in the context of state roads and bridges.

Importantly, and perhaps somewhat surprisingly, prior to 2002, these roads and bridges were not generally reported by state and local governments in their annual financial reports. They essentially were off balance sheet. GASB 34, which was issued in 1999 and effective generally beginning in 2001, especially for the states, required that these infrastructure assets be capitalized and so it effectively enhanced transparency around infrastructure. And so we're going to use that in our paper.

But importantly, the standard allowed governments to use one of two approaches for reporting

on their infrastructure: the depreciation approach and the modified approach. And that's going to be a key feature of our setting. So, we use the implementation of GASB 34 to understand whether and to what extent governments' financial reporting policies impact their infrastructure maintenance. Right?

And again, a key feature of this is going to be differences in the reporting policies that states have adopted. We think this is important in the context of the fact that there's been a tendency by governments to cut and defer maintenance, in part because it doesn't really generate much recognition for politicians. And you can, in essence, defer maintenance without there being any major noticeable impact until there is a noticeable impact, of course. But pushing or cutting maintenance a little bit in one year is not always noticeable, and so there's this tendency to kick the can down the road. And we ask whether financial reporting policies help to mitigate that.

So, the idea is that by increasing transparency around these infrastructure assets, governments will be less likely to defer infrastructure

maintenance. And essentially, they'll be able to make better budgeting and infrastructure maintenance decisions. Now, again, an important feature of this is that we will argue that there's varying degrees of transparency as a result of the different approaches adopted by governments.

And so our first hypothesis is that infrastructure maintenance will be increasing in the extent to which the quality of information about a state's infrastructure -- in the extent to which there is a high degree of transparency about a government's infrastructure. And we think that this will work through improved budgeting and resource allocation decisions, which we test by looking at a government's propensity to cut its midyear -- to enact a midyear budget cut to general fund transportation spending and to divert dedicated transportation funds to non-transportation programs and activities.

So, how do we test this? Well, first of all, we look at the 50 states. These are the governments for which we have the data on to actually test these hypotheses. There's going to be variation in the

reporting policies, which we're going to talk about in the next couple slides. We collected a lot of our data from the Federal Highway Administration, so states are required to report to the Federal Highway Administration, which is a division of the U.S. Department of Transportation, information about their roads and bridges. And this is all accessible online.

Now, we understand that there are some challenges in this setting. We realize, of course, that the infrastructure reporting policies, the modified approach and the depreciation approach, were not randomly assigned to governments. And so we do a number of things to try address those concerns. We have a variety of measures and robustness tests. We conduct some falsification tests. And in terms of just testing our main hypotheses we use a variety of research designs, you know, from simple OLS regressions, of course, with controls and fixed effects, to a two-stage model that we'll talk about, and we also adopted a difference-in-differences approach. All trying to get at this idea that the enhanced transparency around infrastructure leads to better infrastructure

maintenance outcomes in terms of the amount spent and the condition of the infrastructure.

So, in terms of measuring the financial reporting policies, we make use of the fact that the GASB ultimately allowed for one of two approaches to be adopted. So, initially, when GASB 34 was in the process of being established, the GASB had proposed the depreciation approach for infrastructure, like all other capital assets. So, you record the infrastructure's historical cost and you depreciate it over its estimated useful life.

After some constituents during the standard-setting process expressed concerns about the usefulness of the depreciation approach for infrastructure, because these are very long-lived assets, they -- governments tend to, at least in theory, maintain and preserve them because replacing, say, a road is not nearly as easy as, say, replacing vehicles. They argued that depreciation accounting really was not appropriate. And so, ultimately, what happened was the GASB included an alternative approach called the modified approach.

Now, this modified approach requires

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governments to meet certain requirements and provide disclosures about their infrastructure. So, they have to measure the condition of their infrastructure. They have to report on the condition of their infrastructure and demonstrate that they've been maintaining their infrastructure approximately at or above the target condition levels set by the government. They have to also disclose estimates and actual amounts spent on preservation.

So, they meet these requirements. They then will not depreciate the infrastructure and instead what they'll do is they'll expense the cost incurred to maintain and preserve the infrastructure at or above -- approximately at or above the target condition level. Okay? But either way, under both reporting regimes the states are going to be capitalizing their infrastructure assets. Okay. There's just a difference in, you know, how the accounting and reporting works on a go-forward basis after they're capitalized.

So, we can see from this map that about half of the states, specifically 23, initially adopted the modified approach for their infrastructure. Okay. And

in essentially all cases it was for their roads and bridges. Okay. So, 23 states adopted the modified approach.

Two states switched. So, these choices have been quite persistent. Two states switched: Colorado switched in 2008 and 2010; and Texas, they actually had only adopted the modified approach for their roads, they switched in 2014. So, both went from the modified approach for some or all of their roads and bridges to the depreciation approach. But besides that, the initial adoption choices have been quite persistent.

Now, what do these disclosures look like? Well, they're quite long and so we had to summarize them and still split it across two slides. Now, here's New York. They're a modified approach state. They indicate that they use a modified approach for their roads and bridges, like essentially all other state governments that have adopted the modified approach.

They indicate that they will not depreciate these roads and bridges, but instead will expense the cost to maintain and preserve them. They describe their infrastructure networks, the roads and bridges. They

describe how they measure the condition of their roads and bridges. And they disclose their target condition levels. Okay.

On the next slide they demonstrate that they have, in fact, been maintaining their roads and bridges approximately at or above the target condition level. And they disclose the estimated amount, the annual estimates of the amounts needed to maintain and preserve those assets, as well as the amounts actually spent.

Now, this is not quite getting at deferred maintenance, but it's about as close as the states get in terms of reporting on deferred maintenance in their annual financial report. So, they're not required to, they don't do it. Some disclose deferred maintenance in their budgets; not many. California was an example from before.

These disclosures here are about as close as we can get to understanding whether and to what extent states are allocating sufficient funds to maintain their roads and bridges. And if they're not, it'll show up in the condition ratings that are reported.

Now, remember, this is only for the modified

approach states, not for the depreciation approach states. And even across modified approach states, they may use different measurement scales, target condition levels, and things like that. So, we really can't compare across states because they're not all providing these disclosures. Even the ones who are, their disclosure may not be comparable.

Nevertheless, we're arguing that these disclosures enhance transparency. So, essentially, the modified approach results in better financial reporting quality about infrastructure assets because users can see and understand whether and to what extent the infrastructure has been maintained and preserved and how much is being spent for those purposes.

So, we have --

MS. SHEINER: Ryan, you have about two to three minutes, so if you want to --

MR. McDONOUGH: Okay, thank you. So, we have two groups of tests: we look at the post period, so after adopting GASB 34, and we also look at a difference-in-differences design where we compare changes before and after the adoption of GASB 34.

So, for the post period analysis, I'll go through this kind of quickly, but we use instrumental variables to try to address this issue that, as I mentioned before, these reporting policies are not randomly assigned to governments. This is sort of a first stab at it. We realize there may be some issues. We do validate the instruments. They are obviously highly correlated with the modified approach. Ruling out the exclusion restriction assumption is obviously difficult. But nevertheless, we find evidence consistent with the modified approach governments spending more on the maintenance of their infrastructure assets already in place. So, this is -- these estimates are based on maintenance per square meter of infrastructure. Okay.

We also look at condition levels. Again, this is all reported by the Federal Highway Administration, so it's comparable across governments and across time. We look at roads in poor condition, bridges that are classified as structurally deficient, and, again, find that modified approach governments have fewer roads in poor condition and fewer bridges that are structurally

deficient, consistent with the idea that they're better maintaining their roads and bridges.

We also look at this in a difference-in-differences design. In the interest of time I'll skip through this because the results are generally consistent.

And then we find that a mechanism that appears to be linking financial reporting to infrastructure is a lower propensity to enact midyear budget cuts to general fund transportation spending and a lower propensity to divert motor fuel taxes. So, dedicated revenues for the maintenance and repair of roads and bridges.

We did some additional analyses to assess the sensitivity of our results and to further provide support for our hypotheses. And ultimately, we think this is a contribution to the academic governmental accounting and public policy literature. We also think it's important to the GASB and its constituents given that accountability is the cornerstone of governmental accounting and reporting, inter-period equity being a part of accountability. And when states defer maintenance, they're effectively violating the inter-

period equity principle by pushing costs to future taxpayers. And a former GASB board member indicated that there may sort of a disclosure deficiency here in that we really don't have a good sense of the magnitude of deferred maintenance for infrastructure, but it's likely a big deal.

So, with that, I will turn it over to Dean. Dean, thanks again for taking the time to provide comments on our paper. And thanks again for including our paper on the agenda today. We look forward to any comments that the audience has. Thank you.

MS. SHEINER: Great. And remember, people can send questions to sli.do.

And I want to introduce our discussant, Dean Mead, from the Governmental Accounting Standards Board. Dean, take it away.

MR. MEAD: Thank you very much. Let me just take a second here to make sure I get my slides up for you. And, of course, it's not showing up on the right screen, so just give me one second. I just want to make sure I have it in the right place. There. Can you see the full screen now? Excellent.

Well, good day to everybody. Thank you so much for asking me to discuss this paper, which I think makes important contributions in several ways that I look forward to talking about. Before I go further, though, I do need to note that whatever I say today are my comments, not GASB's. And GASB positions are established only after extensive public due process and deliberation.

And also, in the interest of disclosure I should mention that this research that Ryan and Claire have done is based in part on work that they did a couple of years ago under a GASB research grant. So, I've had some exposure to this work prior and I can't necessarily say that I'm a disinterested or dispassionate commentator because I liked what they did for us before and the work that they've done to build on top of it I think has been really good as well.

I've provided them with direct feedback on the paper already, so I don't plan to use this time to make a detailed critique of the technical aspects of the research. Instead, what I want to do is highlight the value I see in this research in particular and similar

research in general in terms of public policy and standard-setting.

Initial thoughts that I had when I first read this paper a couple of months ago were reinforced upon reading an updated version of it this week, starting with the sad conclusion that it does not demonstrate that following GASB standards makes your infrastructure better. But then again, I wasn't exactly expecting it to find that.

But the research does meet my expectations, however, in that it is very timely in terms of both policy because infrastructure is such a major topic of policy debate nationally, as was emphasized in the prior paper presentation, and standard-setting as well because GASB is in the midst of a multiyear research project on capital asset accounting and financial reporting, which is the first time that we've reexamined that area since before Statement 34, which Ryan referenced. So, more than 20 years in between extensive examinations of those standards.

Their research, also, in my opinion, is a great example of a point that we've been making

throughout GASB's 37-year existence, which is that research can be successful both as an academic endeavor and as a resource to policymakers and standard-setters and other decision-makers. The GASB's Crain Grants, which they received for the earlier research they did, are premised on encouraging and supporting that kind of research. And they're named after the late Professor Gil Crain, who set an example for simultaneous academic excellence and practical contributions.

So, I'd be remiss if I didn't take this opportunity to mention that the GASB is always eager to hear from those of you who are conducting research in areas that could be relevant to standard-setting and in doing whatever we can to either provide financial support or non-financial support to help you succeed in that research and to -- you know, both as -- you know, in the academic sphere as well as in producing findings that can be acted upon in both the policy area and standard-setting.

In case I've been speaking for so long at this point that we've already forgotten what Ryan and Claire's research found, let me summarize how I

interpreted it. They insert [sic]XXXSHOULD BE assert?XXX, and these are my words, that higher quality financial reporting, of which the modified approach to reporting infrastructure is an example, leads to better maintained infrastructure. And in particular, states using the modified approach are less likely to defer maintenance on their infrastructure or to divert or cut funding that was intended for infrastructure maintenance.

And what did they find then? Again, in my words, that the modified approach states, the states that are using the modified approach invest more in infrastructure maintenance than other states. They have roads and bridges in better condition or at least not in as poor a condition as states that are using just depreciation. And the modified approach states don't cut or divert maintenance funding as much as other states.

Any time this kind of research is being done, looking at connections between accounting requirements and financial reporting of information by governments and the "real world" implications or ramifications of

that reporting, it always raises a chicken-and-egg question. You know, is it that governments take better care of their infrastructure because they use the modified approach in their financial statements or do they use the modified approach because they take better care of their infrastructure?

I'm not entirely convinced that this chicken-and-egg issue here matters after 20 years of experience with this. But I believe Claire and Ryan have taken meaningful methodological steps to sort this out and to support their finding that the diagram on the left is the right one, that governments using the modified approach have achieved these positive outcomes with respect -- in comparison to those governments that don't use it.

One of the reasons I view this research as being valuable for standard-setting is that it's hypotheses are solidly founded from a conceptual standpoint. They're highly consistent with the conceptual framework under which the GASB standards are established, including the idea that one objective of financial reporting is to give the public information it

needs to evaluate whether governments are investing sufficiently in their capital assets, including infrastructure. So, our concepts may not explicitly mention deferred maintenance, but I believe it is implicit in that objective of financial reporting. And I am certain, even though it predates my time at the GASB, that the Board and staff that worked on GASB Concept Statement 1, where that objective financial reporting is found, were well aware of deferred maintenance and of the public's concerns about it.

Takeaways from a standard-setting perspective, I think there are both encouraging and discouraging signs based upon what they found. It's encouraging to me that their research supports the GASB's own findings when it established the modified approach and in research that we've conducted since then, that the information governments report about the physical condition of their assets and the degree to which they spend sufficiently on preserving and maintaining those assets is highly valuable to financial statement users.

It's discouraging, however, that the progress that the Board had hoped for with regard to governments

moving toward capital asset management systems that could support more widespread use of the modified approach has not happened. If anything, there are governments that started out using the modified approach and have stopped using it since then. A couple of the states that had started are no longer using it and not much evidence to suggest that governments started using depreciation have since moved to using the modified approach.

At the time those standards were issued, you know, the Board made the modified approach optional because there was evidence that governments didn't have the systems that were necessary for it to be a requirement. And despite assurances at the time from folks in the infrastructure business on both the public and private sector sides, there hasn't been a noticeable movement in that direction that we've seen, which may cast some doubt on the long-term viability of the modified approach. Because it does come with some implications in terms of comparability between governments that use and governments that don't, which is particularly significant for the states because there

are 22 or 23 of them that use it and 27 or 28 that don't. Whereas for local governments and county governments, it's a much smaller percentage that use the modified approach and so the potential implications for comparability aren't quite as great.

From a policy perspective, this research drives home that transparency and accountability make a difference. When the public has good information, they are better able to demand from their governments what they believe are the best policies. I suppose depending on your point of view that could be either good or bad news, but it's clear that the information doesn't sit there without effect. It's used and it makes a difference.

At the time that the existing capital asset standards were issued, you know, 20-plus years now ago, GASB was being accused of trying to force governments to invest more in their infrastructure. The argument of those critics being that once the public got this information about the condition of capital assets and what governments were doing or not doing to maintain them, that the public would demand that governments do a

better job investing in and maintaining their roads and bridges and water mains and so on, which is kind of the point of financial reporting.

So, the government -- you know, didn't then and it doesn't now have an opinion on how much government should spend on infrastructure any more than we have an opinion on whether and how big their fund balance should be or what types of investments they should hold. Our job is to make sure the public gets the information it needs so it can assess those issues on their own and tell their policymakers what they want them to do on their behalf.

But that criticism effectively made the GASB's case, I think, for providing the information because it would make a difference with respect to the policies governments follow. And Claire and Ryan's research I think confirms, in my opinion, that the Board made the right choice.

And then lastly, if you consider these findings in connection with research on bond market effects with modified approach information it makes a point that should resonate perhaps more with

policymakers in that it can reduce costs. There's plenty of research on what proper maintenance can save in terms of long-run capital investment and maintenance costs, but a 2016 article in the *Journal of Governmental & Nonprofit Accounting* by Rebecca Bloch, Justin Marlowe, and myself suggests that it can reduce borrowing costs as well. So, that's an additional, perhaps unexpected ramification of governments that are using the modified approach and are doing a better job of maintaining their assets than governments that don't.

So, with that, I very much look forward to what questions come up. And again, thank you for the opportunity to have commented on this paper.

MS. SHEINER: Great. Thank you so much for those comments. I'm going to actually -- well, I'll give Ryan a chance in one second to respond to you, if you have something. But I was a little -- your first slide that said that disclosure doesn't improve roads, I didn't quite understand that one since I thought the paper sort of said that it does.

MR. MEAD: Well, I --

MS. SHEINER: So, can you --

MR. MEAD: I said, you know, governments -- following GASB standards doesn't make your infrastructure better. It's, you know, providing that information I think as a result of following those -- that option in the standards. I think they did a good job of demonstrating that it does, in fact, make a difference.

MS. SHEINER: Okay, good.

MR. MEAD: But I wouldn't -- you know, I would never assert, though I would love to be able to, that it's because governments follow GASB standards it makes things better. There's an underlying assumption, I think, in standard-setting that, you know, providing that information to the public makes a variety of things better in at least the way that they're better informed when they're making decisions. But I don't think I can claim that just being a government that follows generally accepted accounting principles makes them, you know, a government with glistening roads and bridges.

MS. SHEINER: I see, okay. Ryan, did you want to respond to Dean?

MR. McDONOUGH: Yeah. Dean, thanks again for

taking the time to read our paper and provide some comment.

I think that, you know, your chicken-and-the-egg slide obviously, you know, hit the nail on the head. We clearly have a problem here where certain governments chose to adopt the modified approach. And we know that they are and were different than the depreciation approach states. And so we try to address that in our research design choices.

Of course, there are still some limitations. We try to be careful about that. But ultimately, we try to make the case that there's this incremental increase in maintenance spending.

You know, also to the point about whether this should be required of all governments, I would just emphasize one thing. Our results are on average. We're not suggesting that all modified approach governments have experienced increases in improvements in infrastructure maintenance or that all depreciation approach governments have poor infrastructure. That's not the case.

So, I think the point there is that we need to

do a little bit more work on trying to better identify the conditions under which these disclosures do lead to better outcomes and when they don't, and what sort of frictions are in place that maybe impede these disclosures from ultimately impacting decisions in any case.

My co-author's here. Claire, did you have anything that you wanted to add?

MS. YAN: A little one. Yeah, I definitely agree with Ryan's assessment. I thank you, Dean, for your insightful feedback, which will be very helpful for us to revise the paper.

So, one of your comments is can the depreciation approach states still adopt the modified approach? We think perhaps they can, but maybe with a higher cost. Right? So, the necessary condition is those states, they need to have the asset management system in place to continuously track the condition of their network system. And they have to commit to preserving their infrastructure assets at or above the target condition level in the long run. So, unless they can do this long-term commitment, probably they don't --

they won't adopt the modified approach in the first place.

So, one of the issues that we are considering that is under work right now is we want to separate those states into two groups. So, one group, obviously the choice is very clear, either they have the capacity or they don't have the capacity, so the choice is more obvious versus in another group of states, they do have the choice. Even though some states, they have the information system in place, but maybe they still use the depreciation approach because of the reporting burden or other considerations. So, maybe we want to separate the states into two groups and try to identify the stronger results in the states which have the -- which they do have the choice over the two methods.

So, yeah, thank you for that comment.

MS. SHEINER: Can I ask a question? So, there are sort of two questions that are related.

One, so you were using data from the DOT to see the effects of adopting the modified approach. Is that correct?

MR. McDONOUGH: Yes.

MS. SHEINER: So, like, so an investor or a voter could look at the DOT data. So, what additional information came through requiring this disclosure? Is it just where it is on the, you know, the balance sheet or is it -- it means that's -- you know, it has additional information that was provided above what you could have looked up by going to the DOT data?

MR. McDONOUGH: Yeah. Well, part of it is that the modified approach governments are providing insights into how they're managing their infrastructure. They're also providing estimates of the amount needed to maintain and preserve those assets. So, this is not information that they'd be reporting to the Federal Highway Administration, which is part of the DOT. So, there is more information in those disclosures that's more closely linked to their financial statements than the information that we were able to get from the Federal Highway Administration. But the data from the Federal Highway Administration is comparable across both depreciation approach and modified approach governments, so we have to rely on that.

Yeah, and so that's kind of the idea.

MS. SHEINER: And who do you think the real audience is for these things? Is it really voters who are going to look up this data? Is it lenders? And so, as Dean mentioned, so that maybe it would affect -- so the question, what's the disciplining? Why are they being disciplined? How do you think that mechanism works?

MR. McDONOUGH: Yeah.

MS. SHEINER: Or is it just the fact that they have to write it down that sort of makes it a focal point that they're all like, oh, shoot, we've got to write down our roads are getting worse, we don't want to do that? Like how do you think about that?

MR. McDONOUGH: So, yeah, definitely this would differ depending on the level of government. I think at the local level there may be some citizen and voter involvement or awareness where they may sort of push back on local government officials. I'm not so sure about that at the state level. We need to clarify this in the paper a little bit. So, it could certainly be from the debt markets. There is some research suggesting that these disclosures may be used by bond

analysts and bond holders.

Perhaps more likely, though, it's having an impact on internal decisions, so essentially learning and internal monitoring by the different agencies involved and, you know, accounting and budgeting people involved. So, we think probably that's where the effect really is coming through more so than from external pressure.

We need to try to kind of sort that out a bit. We're not quite sure yet -- I mean, certainly we have the results related to budgeting and diversions or lack thereof of motor fuel taxes. But how does disclosure actually flow into those decisions? We haven't yet sort of pushed into that kind of black box.

MS. SHEINER: All right. Okay. Well, we are out of time.

MR. McDONOUGH: Thank you.

MS. SHEINER: I look forward to seeing it when you do because this was such an interesting paper. So, thank you very much, everybody.

We're going to move right on to our third and last paper of the conference before our breakout

sessions later this afternoon by Ashwini Agrawal from the London School of Economics & Political Science and Daniel Kim from the BI Norwegian Business School on "Municipal Bond Insurance and the U.S. Drinking Water Crisis."

MR. AGRAWAL: Thanks very much. As many of you know, in the U.S. right now there are a shocking number of cities that do not provide clean drinking water. As we've seen in cases like Flint, Detroit, Pittsburgh, a number of cities have caused the residents these towns to drink water that is -- or at least been exposed to water that's contaminated with things like lead, *E. coli*, other types of bacteria. And, in fact, what we've seen over the past 10 to 15 years has been an increase in drinking water pollution across many of these cities.

In fact, the American Society of Civil Engineers has recently rated, in addition to the road infrastructure as mentioned in the previous paper, the drinking water infrastructure in the U.S. is quite poor. And there's a very large funding gap that needs to be completed quite soon.

Now, when we read about these events, you know, the common explanation you read about in the press and what's typically discussed is that it's a result of local governments facing tight budgets. And the argument is that local governments face tight budgets. And in response to these pressures they substitute towards cheaper, but lower quality forms of water infrastructure.

Now, this explanation is helpful, but it doesn't really get at the deeper issue, which is why is it that some cities are facing these pressures and still able to provide drinking water while other cities are not? After all, you would imagine that, look, tight budgets are kind of a universal problem impacting local governments. And yet, in spite of that, some governments are still able to deal with these problems while some governments are not.

So, that's kind of the motivation for this paper. We want to better understand why is it that we observe a rise in pollution in some cities, but not others? And in this paper we're going to offer what we think is a novel explanation that hasn't really been

talked about before. And we argue that the rise in drinking water pollution across many U.S. cities can actually be attributed to the collapse of the municipal bond insurance industry.

Now, the story that we have is pretty straightforward, but it has two parts, and I'll just go through them right now. The first part is just kind of setting the stage. In the U.S., municipal debt is oftentimes raised for public water infrastructure and for a number of years this debt had been increasingly insured. The way this works is that when a municipality wants to raise money for its infrastructure it goes to its investors, it raises bonds, and they oftentimes have the choice to pay for insurance whereby they pay an insurance company a premium and in exchange the insurance company will offer to repay any debt repayments that are not paid by the municipality in case of default.

Now, the way this kind of setting worked is that there were a small number of AAA-rated insurers. At least the largest four were all AAA-rated for a number of years. And what they were effectively doing

was reducing borrowing costs. When a municipality takes out insurance, investors are willing to support these bonds at a lower interest than they would be if they weren't insured.

And as you can see, for a number of years, up until 2007, kind of the top four, the four largest bond insurers, all maintained AAA ratings throughout their operations. In fact, if you looked at the water infrastructure that was -- the debt that was raised, for a number of years municipalities were raising more and more debt and a larger and larger fraction of that debt had been insured up until 2007.

Now, trouble starts brewing in the late '90s when some of these insurance companies also become involved in securitized financial products. Some of them, but not all, start insuring products like residential mortgage-backed securities, CDOs, et cetera, that are unrelated to muni bonds. And the idea is that these securities, when they're paying off the investors they're fine, but if they, you know, go into default or don't pay off the investors, then the insurance company agrees to step in and pay out what was promised.

As we know, for many years this business was working well until 2007. When these products crashed in value, this led to massive outlays required by the municipal insurance companies. As we see, out of the top four largest insurers, three of the companies that were heavily exposed to these products crashed in their credit ratings: MBIA, MBAC, and FGIC. Whereas FSA, which did not have comparatively as large exposures, maintained their AAA rating through this period.

The implications for municipal financing were quite significant. You saw that municipalities, when they were raising debt, they were still raising debt for water infrastructure. However, now a very small fraction of that debt was actually insured.

So, the first part of our story is just kind of setting the stage and illustrating that the collapse of the bond insurance industry seemed to have a very large impact on how debt was being financed in this space.

The second part of our story is that because of this crash in bond insurance companies, this effectively led to an increase in borrowing costs for

some municipalities, but not others. And in particular, the argument that we put forth is that downgraded insurers are less likely to insure new debt and the municipalities that had relied on these companies that got downgraded find it relatively more expensive to find new insurers.

And the idea, Louise, what we hypothesize is that for a municipality to get insurance and raise financing, it's going to be cheaper to go with an existing insurer that they've already done -- already have a relationship with, whereas for a new insurer it requires a lot more due diligence, more risk exposures. And the yield in which they are able to attract with a new insurer is going to be higher than that that they would get with an existing one.

And so the story, again, that we put forth is that because of the collapse of the municipal bond insurance industry, that led to differences in the cost of financing facing some municipalities relative to others. And these costs are going to manifest in the kind of pollution patterns that we see.

To test this hypothesis, what we're going to

do is look at municipalities across the U.S., and all we're going to do is look at what happens to these municipalities before and after 2007 as a function of who their insurance companies were prior to the crisis. So, for example, just to give you a simple visual picture of what we're doing, imagine we're comparing two counties: Saline County and Geary County, both in Kansas. They're both raising debt for their water infrastructure and 68 percent of the debt in both counties is insured. The difference between the two counties, though, is that Saline County is relying on MBIA and FSA to insure its debts, whereas Geary County is only using MBIA. And remember that MBIA crashes during the crisis, whereas FSA does not.

So, what we're going to look at is just a very simple before and after picture. What happens to the water infrastructure in Geary County relative to Saline County after the shock to the bond insurance companies?

Now, imagine we're doing this, this is not just Saline and Geary, but we're doing this nationwide. Let's call Saline County our control and then Geary County our treatment, the one that's relatively more

affected. In our sample we have around 1,000 counties that are relatively well-dispersed throughout the U.S. You have counties in orange, which are strongly affected by these downgraded insurers, and counties in blue, which are not. Okay. So, this picture just kind of illustrates that we're looking at a very large cross-section of geographies in the U.S.

And then interestingly, if you look at the characteristics of these counties prior to the crisis, they look remarkably similar across a lot of dimensions. So, Saline and Geary, and just like more generally the other counties in our sample, they look very similar when it comes to things like, as of 2006, their underlying credit ratings, the size of their population, the property tax revenues that they're raising, the amount of money that they're raising from water service revenues as well as their outstanding debt. So, this kind of table just illustrates that we're really comparing counties that look very, very similar prior to 2007. The only difference really being the types of insurers that they're working with.

And what we observe in the data is very

interesting. We observe four outcomes. The first is looking at borrowing costs. And what you see is that from 1990 to 2007, these counties, effectively Saline versus Geary, or more generally the entire sample, these counties have remarkably very similar bond yields. In gray, we have the 95 percent confidence intervals and you can see that there are no statistically significant differences in these bond yields over time.

In addition, they're raising similar amounts of debt for their water infrastructure. They're investing similar amounts of capital in the infrastructure. And finally, they're experiencing similar levels of pollution over time. So, prior to 2007, these counties are following remarkably similar trajectories in how they're financing their water.

After 2007, you see a very interesting picture. The first thing is that counties like Geary County that were more reliant on downgraded insurers experience significantly higher borrowing costs to 2007. Not only is the debt more expensive, they then respond to that by cutting the amount of debt that they raise from financial markets. They then cut back on the

investments that they make in water infrastructure. And then interestingly, they also experience higher levels of water pollution.

And sort of these pictures kind of summarize the main result of the paper, that as a result of this bond insurance industry collapse, those municipalities that had relied on downgraded insurers experience significantly higher borrowing costs, they cut back on investment, which leads to higher levels of pollution.

And so the takeaway from our paper is that we argue that it shows how water pollution in the U.S., across different types of cities, can be partly traced back to financial market failures tied to the Great Recession.

Okay. So, that's kind of the paper in a nutshell. We only have a few minutes left, so what I wanted to do is just quickly illustrate kind of how we go about this analysis and then address kind of what we think is an important confounding explanation that we want to rule out.

So, here basically just kind of visual pictures of what we're doing to show you numerically how

we're going about this. I'll just show you a simple regression table where all we're really doing here, this is just kind of the numbers behind the actual figures. Here's a simple regression where what we do is look at, let's say, interest rates on the yields -- or the offering yields on bonds that are offered by, let's say, Saline versus Geary. And in this regression we're controlling for a lot of different factors that we think would otherwise impact borrowing costs, so things like the underlying ratings of the county that we're looking at, the population, the property tax revenues, et cetera. And what you see here is that across the different specifications you get remarkably stable estimates in the impact of these downgraded insurers on borrowing costs.

In our sample what this translates to is that municipalities that had been reliant on these downgraded insurers experience an increase in borrowing costs from about 5.16 percent to around 5.3 percent per year. Okay. So, this suggests that borrowing costs are relatively higher by around 14 basis points per year.

Now, that may not seem like a lot in a given

year, but remember we're talking about sort of an accumulated effect over time. We estimate that this translates into around \$1.5 billion less for water infrastructure per year. This then translates into cuts in water infrastructure investment of around \$274 million less.

And in terms of how this impacts pollution, we collected data from the EPA and we found that this is leading to around 165 more violations of EPA drinking water standards per year. And what we mean by that is the EPA, they sort of -- they have a Safe Drinking Water Act that specifies maximum contaminant levels for different types of compounds, like lead, *E. coli*, et cetera, in the water. And one violation constitutes to a violation of those standards for a particular water system. To give you a sense of what this means economically, one violation in our data typically corresponds to an exposure of around 450,000 people.

So, the first part of our paper, again, is just kind of establishing or at least finding some statistical findings that suggest that the collapse of the bond insurance industry has played a major role in

explaining differences in water pollution patterns that we see across the U.S.

The last part of the paper that I'll talk about then is just solidifying whether we can interpret our findings as supportive of the collapse of bond insurance as opposed to other things that could be happening during this time period. In particular, 2007 was the beginning of a major crisis. And what we want to rule out and make sure of is we want to be sure that our results can be attributable to the collapse of bond insurance as opposed to, let's say, general economic trends that are taking place during this time.

In particular, one sort of confounding explanation could be that perhaps those -- you know, the worst insurers or the downgraded insurers happen to be associated with municipalities that just had a larger decline during the crisis. In which case everything that we're finding could be attributed to sort of a decline in general economic conditions as opposed to the collapse of bond insurance.

Now, we will offer, at least for now, at least three arguments that suggest or three pieces of evidence

that suggest that this is not the case. The first is, as I mentioned, prior to 2007, municipalities in the control and treatment groups have remarkably similar trajectories. So, it does not appear to be the case that these counties are kind of picking up very different economic conditions to begin with.

And then even after 2007, if you look at a lot of metrics that we think would pick up general economic conditions, they also look remarkably similar. So, if you look at things like population growth, property tax revenues, and even drinking water service revenues in the immediate years following 2007, they look remarkably similar for counties in both groups. So, it suggests that if there was a real problem, if this was solely attributed to sort of a decline in general economic conditions, you might expect to see that in some of these outcomes, but you don't.

And then finally what we do is we look at not just revenue bonds, but we also look at GO bonds, general obligations bonds. And this is important -- where we find that our results hold for revenue bonds, but not for GO bonds. And this is important because GO

bonds, as you know, can be paid back using whatever funds are available to the municipality, whereas revenue bonds are tied to the cashflows generated by the streams of projects that are being funded by those bonds.

If it were the case that what we're picking up is really related to just sort of generally economic conditions, you would think that you would observe this pattern not just for revenue bonds, but also for GO bonds. But you do not see that.

So, based on this evidence we believe, we think it's a little bit more persuasive to argue that the patterns in water pollution and funding costs, et cetera, can, in fact, be attributed to the decline in bond insurance and not just kind of general economic trends that are taking place during this period.

So, to conclude, this is just kind of -- I know, in 15 minutes we just want to give you a snapshot of what the paper's about. In conclusion, what we're doing is we're trying to get at a better understanding of why we observe drinking water crises in some cities, but not others. We've seen a massive rise in population in some cities, whereas other cities are still able to

provide clean drinking water. And we believe that an important contributor to what we're observing is the collapse of municipal bond insurance around 2007. We think this is important because typically, we don't think about bond insurance as having a major role, particularly because municipalities have very low default rates. But we argue that in spite of that it's important to understand how well that market is functioning before we talk about whether these public goods are being provided in an adequate way or not.

Thanks very much.

MS. SHEINER: Thank you so much. That was a really interesting presentation. Let's turn to our discussant, Suzanne Finnegan from Build America Mutual. Suzanne.

MS. FINNEGAN: Hi, there. Yeah. Thank you for the opportunity to review the paper. It was very interesting. I wanted to start with just a very brief history on municipal bond insurance and as it applies, I think, to your thesis.

At the outset -- and I have actually been in bond insurance for a very long time, so I remember the

outset -- so, at the outset, really bond insurance was used as credit enhancement. Almost all the issuers still got underlying ratings on their own credit quality and then the bond insurance brought it up to the AAA level. But what we saw over time, as bond insurance gained greater and greater market share, that it actually became credit substitution as opposed to enhancement. And many issuers did not get underlying ratings.

So, as a result, when the crisis happened, a lot of investors found themselves with insured bonds with no underlying rating and a real problem in terms of trying to identify what the credit quality was of their portfolio. So, I think that was a big market shift that happened really very early on in the crisis.

And while I don't think that the downgrade of the bond insurers was the leading cause of the drinking water infrastructure deficiencies, I do agree it had an influence. And I think your paper really focuses on the rising cost because of the higher interest rates and that the investors demanded higher yields because of the lower credit ratings.

I also noted that the paper mentions that there are constraints on the rate-raising flexibility from municipal utilities, so, they couldn't just raise rates. And while municipal utilities are typically less regulated than corporate utilities, there are some constraints, but there are more practical constraints and you do address that as well.

I think that because they're local governments and because they are in the communities, they are very sensitive to affordability of rates. And so in a very - - you know, in a time period where unemployment rates were rising dramatically, I think most municipalities were loathe to raise water and sewer rates or property taxes to increase them. They tried to keep them as low as possible.

And just for perspective, in 2008, over the course of that year, the national unemployment rate ranged from about 4.9 percent to 7.3. But then in 2009, it jumped up from 7.8 to 10 and stayed above 9 percent for all of 2010 and almost all of 2011. So, a really long protracted period of pretty tight economic conditions.

And I think what happens is that municipalities in these types of time periods say to themselves do we need it and can we afford it? And those are kind of what drives their actions.

And I think one of -- your prediction about the resulting -- responding to higher borrowing costs by cutting into investment, and I think what happens is they prioritize what they have to have. Right? How important, what's the most important thing? And one would think water would be, but different municipalities took different actions. And I think they tried to address the most pressing issues first.

One of the things that we did see during this time period is that a lot of municipalities chose to reduce the amount of money they were paying into their pension systems. And it precipitated a pension crisis really as well. And so in the priority the pension payments don't go out to the people today. They go out in the future. And so they could be deferred a little bit more easily. So, you did see municipalities making choices like that, but I do think that, you know, each one had to make their own decision.

Flint was an interesting situation because that was really driven by an existing financial crisis in the city: the appointment of a state oversight manager, who made a decision to save costs by not buying water from Detroit. And, of course, Flint's water was not of a reasonable quality.

I think one other piece that maybe also played into it is that during the crisis there was an auction rate market that had been used and that was not as large, but there were also variable rate bonds, which had much lower interest costs. And for both of those products virtually all of them were insured. And so that created a bit of a crisis.

And what did happen was a lot of issuers converted those products into bank debt where they would either issue public debt secured by bank letters of credit or they would just take direct loans from the bank to transition during what they hoped was a temporary period. And so that is a very difficult market to get your hands on. A lot of people have tried to figure out how big that got, but that also played a role.

One interesting part about, you know, people going back, issuers using the same bond insurer over and over, had to do with usually at the outset the issuer would get a bid from everyone and just go with whoever was the lowest cost. But if you were refunding a bond that had been previously insured, you would almost always get a better bid from the original insurer. And so you would see that happening over and over again, so I think that's a valid point and a valid conclusion there.

And so, you know, generally, it definitely had an influence on the cost. It definitely had an influence on the market dynamics. I think a positive result in the market is more transparency because now even in the current insured world where bond insurance currently is about 8 percent of the total market, we're seeing that many, many issuers are opting to still get their underlying rating. And investors, I think, are really demanding it.

MS. SHEINER: Thank you so much. Ashwini, is Dan going to join us. Do you want to respond to Suzanne?

MR. AGRAWAL: Sure, sure, yeah. I thought Dan would come, but, if not, that's okay.

First of all, Suzanne, thank you so much. They're very helpful comments. And I just wanted to ask everybody --

MS. SHEINER: Here he is.

MR. AGRAWAL: Oh, I guess Daniel's here now. You know, Suzanne, one thing she had done, which we also wanted to thank her for and just mention to everybody, she had emailed us a few weeks ago, also, with a lot of detailed comments that we have been working on and that really helped us improve the paper a lot.

So, for example, what she just mentioned right now about the refunding and the fact that, you know, once you had a particular insurer that you're almost, you know, more likely to get a lower bid from that person, it really helps to have someone with experience just tell us how things work. Because stuff like that is not something that we are going to have great knowledge of and it's something that we might theorize in our little heads, but it is super useful to kind of get that sort of confirmation and information from her.

And she had just given us a whole bunch of comments that really, really helped improve the paper. You know, there were some things in the paper that we did not really think through. And so we're super grateful to her for the initial comments and then even the comments now we're very grateful for.

I don't really have anything specific in response to anything she said. I do think that -- I think one thing I should have maybe said more correctly in the presentation is, you know, just in terms of, you know, whether this is a leading cause or not, for sure. I mean, the leading causes are things like aging infrastructure, tight fiscal budgets, and things like that. Here we're not trying to say that, you know, look, the collapse in municipal bond insurance is explaining everything that we observed. Maybe it's a little bit too strong in the way that I stated it.

But really what we're trying to examine is just this puzzle that we see, which is, you know, how is it possible that there are so many cities in the last 10 or 15 years that are just off -- you know, that are just -- you just can't get clean water? It's shocking. I

mean, now I live in London. I used to live all over the place in the States. And just seeing that is just kind of puzzling. And that's what kind of got us motivated into studying this project.

So, anyway, so that's a very long way of saying thank you twice to Suzanne. And we are happy to take any additional questions and any feedback you guys might have.

And, Daniel, if you have anything to say. Sorry, Louise, I cut you off.

MS. SHEINER: Oh, no.

MR. KIM: I just wanted to thank you three times. Your comment were really, really appreciated. And I don't have -- you mentioned really, really good points about the auction rate of the bonds and those are really, really helpful to get us to pin down the channel a lot better. So, yes, I really want to thank you very much.

MS. SHEINER: And thank you very much for those comments because that is really what we're trying to do with this conference, is to get people with experience, with institutional knowledge, and the

academics together to improve the project. So, I'm glad it really worked in this case. It's really nice to hear. And thank you, Suzanne, for being so thoughtful about going through an academic paper and figuring out how it all works.

I've got a few questions that kind of got touched on right now, which is you do motivate the paper, which is like, oh, we have terrible drinking water and here's why. And I see now you're like, well, maybe not exactly. But I think that the measures that you have are some revenues and some violations. And I wonder if there's any more detail on those violations.

When I think about the drinking water crisis, I think -- I don't know that much about it, but I know that lead is a huge problem, it's going to dwarf everything else in terms of the economic cost. That I think is not a new -- I think that is not a new problem. So, my guess is that that's not what this is about, although the Flint thing was sort of this weird thing where lead happened because they sort of -- they had this thing in place that they stopped doing that sort of then let the lead leak in -- leach out.

You mentioned *E. coli*, which I guess has pretty bad economic consequences as well. But when I'm just looking at that chart of violations, you know, what else is in there? Are there like really differences in sort of how much you care about them? And how do I think about that?

MR. AGRAWAL: That's a very good question. And I did not really get a chance to talk about that so much. Actually there were two things that you mentioned that I wanted to address.

So, you know, we -- I mean, so, it's true, we're not trying to say that this is the only cause of pollution. But for sure we do want to state, though, in a strong way that, look, if you want to explain why we observe variation across different cities, I don't think it's sufficient to say that, look, budgets are tight. You know, that's typically the account that you see. But it's clear that, you know, there are tight budgets everywhere, but that's still not sufficient to explain why we see some cities significantly worse off than others. So, I do think in that sense we do want to make sort of a useful statement in that regard.

Now, with respect to the types of pollution measures that we're looking at, in that graph -- and that graph has been floating around in a few other papers -- what the EPA does is actually very interesting. They provide, and it's publicly available, something called a Safe Drinking Water Information System, where what they do is for community water systems across the U.S., they have a reporting system where, you know, local water systems need to kind of test the water and then report levels of lead, *E. coli*, you know, what are called coliform bacteria. And there's a whole list of contaminants and things like that.

And you're right that lead is a huge problem when it's there, but it's not the most frequent. The two most frequent types of contaminants that, my understanding and what we see in the data, are typically, you know, *E. coli*, like coliform, and as well as water treatment byproducts. So, typically, when you put in things like chlorine and all sorts of other chemicals to treat that, if you don't put those chemicals in sufficient -- or in the proper quantities,

then the byproducts that result or remain in the water is very unhealthy.

So, what we did in the paper is, you know, for the purposes of what we're trying to do, we only looked at violations of drinking water that were related to kind of poor health outcomes. So, that graph that we showed as well as whatever we look at in the regressions were basically the EPA just saying that, look, in this water system we observed violations. Some of them are related to health, some of them are things like they didn't report their tests on time. We just excluded that. And we just wanted to focus on water pollution that we think is actually costly for the public.

So, that's how we thought about it. We didn't separate it, though, into lead, *E. coli*, and all that kind of stuff.

MS. SHEINER: So, there are several questions and I had one, too, about like just, you know, we're talking about something that happened, what, 14 years ago? And how is it that this market hasn't healed, especially if we see this sort of lack of insurance has these, you know, big welfare implications? Is something

else going on that means that we're not going to go back to where we were or how do we think about that? Why couldn't they just switch? I imagine there's switching costs, but.

MR. AGRAWAL: Yeah. And actually this is something I'd be very curious to hear Suzanne's thoughts on. I think she would have much more to say than I would. I mean, I also find it puzzling. I mean, I think from what I've read in articles and stuff that the bond insurance industry's really been picking up the last few years. But it is curious, I mean, you know, for an academic. And this is why it's so useful, as you were saying, Louise, to have people like Suzanne talk to us.

You know, theoretically, it's really puzzling that these bond insurance companies crashed and there weren't new players stepping in. Of course, it requires a lot of capital and expertise and things like that. But, yeah, I mean, Suzanne, if you have any thoughts on why we didn't observe a pick-up in this industry earlier, I would love to hear what you think.

MS. FINNEGAN: Sure. So, I think a couple of

things drove it. First, after the financial crisis there was a rating recalibration done by the rating agencies. You know, historically, it didn't appear that municipal ratings were done on the same scale really as corporate ratings. And so as a result of a lot of the things that went on during the crisis, the rating agencies all took a look at their rating scales and really recalibrated the municipalities. So, that resulted in substantially higher municipal ratings, which reduces the need for bond insurance.

The second thing I think that happened is most of the bond insurers who had diversified into those other business lines away from kind of the traditional municipal insurance did so to increase their returns. You know, investors are only willing to pay so much for insurance in a sector where the default rate is very low. So, they like the protection, but only at a certain cost. And so that really wasn't sufficient enough, I think, to drive the returns that the legacy companies really needed to keep their shareholders happy.

And so I think those two factors resulted in

really a lack of interest in entering the market, also because you do need substantial amounts of capital. Build America Mutual launched in 2012, but we're a very different model. We're a mutual insurance company. We don't have stockholders and so we don't need to generate that same kind of return. And so, for us, that was an option. But, again, we had to have substantial capital as well.

MR. KIM: Suzanne, can I ask you a follow-up question on that? So, I know that there are three big rating agencies out there. Right? There's Moody's, Fitch, and S&P. Now, I know that in 2010 Moody's did a recalibration of their rating on muni bonds. But I wasn't aware that these two other rating agencies did a recalibration. Did they?

MS. FINNEGAN: S&P did as well. I don't know that Fitch was as -- I don't know that they announced a recalibration, but S&P did as well. And they do do it periodically. You know, they take a look at default rates.

And, you know, one of the -- it's not a problem, it's a great thing. There are so few defaults,

it's hard to draw a lot of conclusions because they are so few in number. And so that forces them periodically to take a look and see, you know, are they on the right scale? Are things calibrated equally across the different segments that they rate?

MS. SHEINER: All right. We're actually out of time. This is just such an interesting paper. There's a bunch -- if you want to look after on the sli.do, there are bunch of questions we didn't get to from the audience that you might be interested in hearing about. But thank you so much for being there.

Let me remind everybody at 1:30, in nine minutes, we're going to reconvene in our breakout sessions, one on what's going in municipal finance markets, one more on what's going on with state and local. You know, this is our chance to actually like, you know, schmooze together and see each other and really, like, just exchange ideas the way we would do in person. So, I really encourage you to come. It's kind of an experiment, but we hope it happens.

The Zoom links are on the Event page. If you scroll down you'll see two different Zoom links for each

session. And I hope you can join us for what should be a fun, but very informal discussion.

So, thank you very much. Thank you to all of our presenters today. And for people who aren't coming to the breakout sessions, thank you all for attending this conference.

* * * * *

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

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