

2021 LED Workshop - April 30, 2021
LED Uses: Telework and Commuting Session

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Keith Bailey: It is my privilege to introduce Tim Kestner, Labor Market Information Director for the Commonwealth of Virginia and member of the Local Employment Dynamics Steering Committee. Tim will serve as the moderator for our first session and introduce our presenters. Please welcome Tim Kestner

Tim Kestner: Thank you Keith. Good morning and welcome one and all. As you said I'm Tim Kestner, Director of Economic Information and Analytics at the Virginia Employment Commission and we are delighted that you are with us today.

Like Keith I've been involved with LED since its origins, its early development. I was passionate about it then and that passion hasn't waned over the many years. It's my pleasure to be your host and moderator for our session, LED Uses: Telework and Commuting.

Please note that before the question - the question-and-answer period will be at the conclusion of each presentations, each session in order that each presenter has an equal amount of time. You are invited to post questions in the chat feature as said and we will also take phone questions if time allows.

With us today we have Chris Worley, a Consultant with Fourth Economy an economic development consulting firm, Jeff Rosenthal, Senior Labor Market Analyst with North Carolina's Department of Commerce and Leah Brooks Associate Professor at the George Washington University. So with that said let us begin with our first presenter, please join me in welcoming Chris Worley.

Chris Worley: Tim thank you for that introduction. I'm going to go ahead and share my screen, are folks able to see it?

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Keith: It's coming up Chris, yes thank you.

Chris: Okay perfect. My Internet's been a bit choppy this morning so I'm going to turn off video while I'm presenting but I'll turn it back on for the panel.

Today I'm going to be talking about the rapid shift to remote work. It's a topic that's been on everyone's mind since COVID impacts has flipped our work world upside. Specifically I'm going to talk about how COVID impacts and the rise to remote work has shifted daytime population away from traditional job (unintelligible) and to home locations as remote workers.

As Tim said I'm an Analyst with Fourth Economy, we're a national economic and community development firm based out of Pittsburgh, Pennsylvania. Some of our recent work has focused on COVID impacts. We focused on disruptive shifts like the transition to remote work, helping communities and main street businesses adjust. And throughout the pandemic we've worked with local governments and nonprofit partners to understand changing economic dynamics and help them allocate resources to the most vulnerable households and businesses.

One of the topics that we thought a lot about is the rise of telework and its impact on commuting and the cascading effect that that shift has had on everything from worker supports to mobility and consumer spending behavior, to commercial real estate and it turns out we're not alone. National surveys indicate that remote work may be here to stay and that hybrid and remote work models are quickly becoming the new normal.

Google has been tracking mobility data through mobile devices through its COVID-19 Mobility Data Project which shows how visits to places like grocery stores and parks are changing over time. And the New York Times

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has been writing about telework and commuting's impact on commercial real estate with headlines like, what will happen to all the empty office buildings and hotels. Well we think this is all interesting too so in today's presentation I'm going to cover how LED data can be used to describe spatial shifts in daytime population.

My goal for today is to show how LED data can combine with and leverage other data sources to produce some interesting findings. I'll use a specific example from a recent project in Lansing, Michigan to demonstrate one useful application of this data. And we know that these initial findings are just the tip of the iceberg so I'm also looking forward to hearing what you've been thinking about around these topics and the question and answer in the upcoming panel discussion.

This presentation's going to have four sections. Section 1 will cover the findings but we know that all interesting analysis starts with an interesting question and the question given to us by our client who represents the three county Lansing, Michigan region was, how has this shift to remote work affected commuting in the region?

Well one of the things that we know from our early analysis is that industry is a key determinant of the ability to work remotely. For example those working in food and accommodation industries are unlikely to work remotely while many in finance and insurance may have the ability to do so.

A good proxy for the ability to work remotely comes from the National Bureau of Labor Statistics Job Flexibilities and Work Schedule Survey. This survey grouped data about the ability to work remotely by industry. All told the Bureau of Labor Statistics estimated that 42 million workers representing 29% of all workers across the US could work from home. We fit this data into

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a model of each county in the US and depending on the industry mix of the community the concentration of workers who are able to work remotely generally ranges from about 1/4 to 1/3 of all workers.

One last thing to note while we're on this slide, we've done a ton of interesting analysis around this remote work dataset including looking at deployed broadband Internet, matching up ability to work remotely with typical Internet speed of users in the analysis which we're going to talk about today.

Keith: Chris this is Keith, my apologies for interruptions, you are still on your beginning slide.

Chris: No. I don't know how that happened. I'm so sorry Keith. Are you all seeing my whole screen?

Woman: Yes. If you click on your PowerPoint that should advance your slides.

Chris: This is the nightmare isn't it. It looks like my Internet is offline. I'm going to try to switch networks. My apologies all. You can hear my audio but you can't see me switching slides, is that right?

Keith: Right, Chris would you want us to bring up your presentation on our end and you just ask us to advance the slides?

Chris: Keith, thanks for interrupting me there.

Keith: Yes okay.

Chris: And not letting me run through the whole thing. I think...

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Keith: What slide do you want me on Chris?

Chris: Let's start with Slide Number 8.

Keith: There we are. Are you now seeing Slide 8?

Chris: I still see the first one but I'm not sure if that's just on my end.

Keith: Okay so we're getting confirmation from others that they can see the slides, thank you. Let's go ahead and assume we're on track Chris thank you.

Chris: Okay sounds good. All right so let's talk about Slide Number 8. So a rise in remote work means a shift - means shifts in commuting. This example is of a map that comes from the tri-county region in Lansing, Michigan. This region has an economy that's based on education, health, manufacturing an emerging finance and tech sectors.

Major employers in the urban core include Michigan State University, state government employees and a regional health system. This analysis that we're talking about today matches data for the ability to work remotely by industry and coupled it with the LED commuting data using work and home locations by industry of worker.

We examined the shifts in commuting patterns and changes in daytime population. In the analysis for this region there is a visible shift in daytime population away from the urban core and into suburban and rural areas as a result of increased remote work during the pandemic.

The map shows the pre-pandemic to post-pandemic change in daytime population. Areas in blue on the map are those that gained daytime

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population, i.e. instead of commuting to work folks are working from home, and those areas that are red on the map are areas that lose daytime population.

In total the three county region sees an overall loss of 5800 daytime population because of less inbound commuters. The losses are most concentrated in six zip codes in the urban core where there is a loss of over 20,000 workers, a loss representing 14% compared to pre-pandemic levels.

Why is this important? Well this analysis reveals the potential geographic impacts on spending behavior especially at restaurants, retail and services and we'll circle back to this a bit later in the presentation. Keith if you want to forward.

Section 2 will cover some of the methodologies, we'll look at tools used, data used and the basic model used in this analysis. So first we're going to look at tools used. All these are free to download, they include Census OnTheMap, a spreadsheet software, I use Google Sheets and I use Tableau Public for mapping. Next.

The data that I used in this comes primarily from Census OnTheMap. I use both home and work area profiles. And for this analysis I selected all primary jobs for the analysis. Go ahead and flip.

The basic model and premise of this analysis is that the change in daytime population is equal to the post-pandemic daytime population minus the pre-pandemic daytime population. Let's look at pre-pandemic stuff first. The pre-pandemic daytime - stay there yes, thanks Keith. For the pre-pandemic daytime population we accounted for some base level of remote workers and we set this at about 4% of workers based on the American Community Survey data.

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Where it gets really interesting though is the post-pandemic population for the daytime population. We - what we did there is we said that there was some base number of workers based on work location of primary workers, this is who you would expect to work and be at their work location but we subtracted from that folks who were remote workers by industry and these are the workers who are working at home instead of at their historic work locations. On top of that we added the home location of remote workers by industry. These are where remote workers are living and spending their daytime hours working remotely. Okay let's flip to the next slide.

So the daytime population changes with remote work. This next sections asks so what. Go ahead and flip. We think there are far-reaching implications for this work including on commuting data, consumer spending behaviors at restaurants, retail and services and for commercial real estate. And over the next few slides we'll return to the Lansing, Michigan region to ask the so what question and look at an application of this data and what it means to revenue loss for main street businesses there. Go ahead.

Keith: I'm on 15 Chris.

Chris: Okay thanks. So here commuters could result in a loss in demand for restaurants, retail and services and traditional employment hubs. Remote workers won't buy a coffee on their way to work, they won't have lunch with coworkers or drop their laundry off at dry cleaners. And we know that main street small businesses are most at risk. In these six zip codes in the Lansing region that lost workers there are 2100 main street small businesses with \$184 million in monthly sales, employing 14,300 workers. Go ahead and flip.

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So what does this shift to remote work mean for these main street small businesses? If all workers who could work remotely do work remotely these six zip codes would see a shift in commuters of about over 20,000, a loss of 14%. If we assume that that loss in commuters represents the same 14% decrease in sales these main street businesses would lose an estimated \$25 million in monthly sales. This demand decrease could impact up to 2000 workers using a sales per estimate - per worker estimate from the economic census.

So we use this data to generate conversation with our client strategies for addressing - this analysis could include, you know, our business supports the map. We know that PPP loans and state of Michigan grant work towards supporting these businesses but if everyone that worked - who could work remotely did work remotely these supports would cover three months of lost sales.

We also think that there's an opportunity for a potential buy local campaign. We know that spending on experiences and services could rebound and a buy local campaign could help this area make a comeback. We also think that this data presents an interesting opportunity for rural and suburban areas and perhaps folks are spending closer to home rather than in those traditional urban commercial corridors. Go ahead and flip.

So in closing, and flip again, I hope that some of what I presented today gets you thinking. I'm interested in what you're thinking about and hearing what's on your mind during the panel discussion. What are you seeing in your community, what are the problems you're trying to solve, what are your so whats. That wraps up my presentation. Keith thank you so much for the save and assist. And this next slide has my contact information. I really appreciate being here today, thanks so much.

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Tim: Thank you Chris that was certainly enlightening, very valuable work and I look forward to some discussion about this.

Our next presenter Jeff Rosenthal will speak to us about his work, recent cross-county commuting pattern. Chris if you're ready - Jeff I'm sorry, Jeff if you're ready please proceed.

Jeffrey Rosenthal: Sure I need to see if I can figure out if I can share my screen and do you see the key slide from here? Do you see a PowerPoint slide.

Keith: Not yet Jeff, this is Keith. Have you enabled the sharing feature at the bottom of the WebEx screen?

Jeffrey: I may not have. So share, I finally got it okay thank you. PowerPoint.

Keith: Okay Jeffrey we can see it.

Jeffrey: Excellent. All right thank you very much Keith for, Keith and Tim for introducing.

I'm honored to be here as representative of North Carolina Department of Commerce's Labor and Economic Analysis Division otherwise known as LEAD. This morning I would like to talk a little bit about some of the research that we've done over time regarding commuting patterns and labor markets but before I lead LEAD's presentation using LODES data for the LED workshop I'd like to say a word or two about LEAD.

We are - we do a wide variety of different things from provide some of the official employment statistics for the Bureau of Labor Statistics and the loss

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data. The unit I'm a part of, the Economic and Policy Analysis Team, not only does employment projections but we also do some independent research and all sorts of different data gathering for a wide variety of different constituents from the governor's office and the legislature to the workforce and economic development communities to students just trying to figure out what they want to do for their careers and getting some career information to anyone who wants to make data-driven decisions using economic and demographic data.

This particular research that I'm presenting this morning was from a blog article that's posted on our blog, the LEAD Feed, and a little bird told us that we have joined the 21st Century, we have two Twitter handles, @CareersInNC focuses more on career information and @LeadNC is our general handle.

So this morning again I'd like to talk a little bit about the bits of pieces of research that we've done over the years to try to better understand commuting patterns in North Carolina and labor markets as well. To lead off with this one piece of the research that we've done used American Community Survey data and basically shows that the commuting time in North Carolina has increased really over the last 15 years but in particular over this past decade at the state level. I show this map the counties that are in blue show a statistically significant increases in commuting times and that's a - those are 40 counties out of our 100 counties overall across the state.

Our interconnected markets research uses LODES data and basically what we do is we apply USDA commuting zone information. What happens there is they basically look at cross-county commuting patterns when the relationship between workers coming and going between two counties. They recalculate and build up clusters and they fill this out in order to get different size commuting zones that have stronger or less cohesion.

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The counties that are in dark blue are the more cohesive labor market in our state versus the counties that are the areas that are in grey. In our state in particular for the folks who aren't intimately familiar with North Carolina geography we've got the Triangle area, the Charlotte area and the area in the mountains or nearby Asheville as our most cohesive labor markets.

Now the research I'm going to focus in on today is going to basically take this information, workers are taking a longer time for commuting and they also worked within labor markets to try to better understand what's going on in our state regarding commuting and labor markets.

So the first set of questions we want to ask is basically do workers live and work in the same county and if so how has this relationship changed over time. When we work with people we often urge them to think more regionally rather than at the county line because we often - because often there are situations where workers work outside the county lines.

For example for the economic development community they may have a particular situation where they're looking for a job site in County A but they're going to be looking for workers not only in County A but also the surrounding counties. Likewise with the workforce development community you may have an educational institution in County A that's training for particular positions likely serving the regional of County A but also with the understanding that people might take their skills and work in surrounding counties.

Another way of looking at this is kind of in the way that we measure region - another case for regional rather than county level is to consider the statistics

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that we wind up working with. This picture is worth a thousand words but it's also an anecdote.

I personally live in Orange County, North Carolina and I started working for recently but my labor power is located where I live in Orange County, North Carolina. So when you look at the LAST data, Local Area Unemployment Statistics, I'm part of Orange County's effort. However my job is located in downtown Raleigh, North Carolina which is located in Wake County therefore my employment numbers are associated with Wake County. So we want to think regionally when we do this.

How has this relationship changed over time? We've noticed that it could be possible if there are longer commuting times that people are more likely to travel longer distances. We wanted to - in order to try to understand this we decided to use OnTheMap and the LODES data. OnTheMap is a great, a very user-friendly tool I won't actually show you how I clicked on any of these things but basically we used the - we focused on the inflow-outflow analysis in order to build our analysis and it's very straightforward.

The - if you're looking at this picture the arrow from the left hand side are the people who live outside the county and commute into a county for work. In this particular case it's Alamance County is the visual. We have the bottom of the circle of the people who both live and worked in Alamance County then finally the arrow coming out of the circle to the right are the workers that are - that live in Alamance County but they commute outside for work and it's no they're not only going east to the Triangle they also go west to Greensboro.

When we're trying to - as we're building - when we first built this analysis we did it completely by hand and what we did is we basically took an Excel spreadsheet and we built all of our counties. We didn't have enough room for

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all 100 counties so I did the first four alphabetically. We've got our first three variables in here and eventually what we wanted to calculate for the - a majority of workers - a majority of residents who work who both live and work in the same county. In this particular case we don't have a majority, none of these in the far right column are over 50%.

Now a technical note I'd like to bring up right now is that if you're going to do this it is a little bit painstaking by hand but you can could also download the data - download the LODS data and calculate it using like a statistical program, in my particular case SAS. I will point out that if you do this for Column C, living in the county but employed outside the county, it could get difficult to match your numbers to what is on OnTheMap because OnTheMap includes all of the - that you might live in a particular county but work outside in a different state so you'd have to figure out a way to work that or make the assumption that you're just only looking at people who will live and work in the entire state or region you're interested in.

So what did find? Basically what we found is that over time workers are less likely to live and work in their same particular county. People are crossing county lines for work more over time. To date this, this is when we published this 2017 was the most recent data. 2018 has 14 counties where this is the case and they are the identical counties as 2017.

How does this look on the map? We see in the dark blue the counties that have the majority that live and work in the same county spread out across the state. These are regions that are large metropolitan regions, small metropolitan regions, some rural areas. They're pretty much spread out across the state in different kinds of labor market sizes.

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By 2018 we have a lot fewer. These are not only your large urban areas which you would expect such as Mecklenburg County where Charlotte's located, the Triangle area where both Durham County and Wake County are, and other metropolitan statistical areas across the state. But you also - we also have a couple of examples where we have kind of local labor markets, they're kind of like small and self-contained. Like, in Macon County in the far western part of the state, in Watauga County which is the northwest corner of the state where Boone is and Appalachian State and finally out at the outer banks where Dare County is located.

So taken together we're trying to better understand how labor markets might fit in. We wanted to do - to dive in and see whether or not there's something about the size of the labor markets that matter in this particular case. So our questions that we have here were basically do workers who live in large metropolitan areas go to work in large metropolitan areas or do some of them actually commute outside. We kind of know what the answer's going to be but we also wanted to understand the degree to which this is happening. And flip side, do workers from rural areas commute to the larger labor markets.

So what we've got here is the, a snapshot from an establishment survey that we put out every other year called the Employer Need Survey, this is 2018's version, where we wanted to look at employer needs by the size of the labor markets. What we noticed in some of the research regarding recovery from the Great Recession is that the different size labor markets had better recovery than others. So the really large urban areas nationally and in our state as well such as the Charlotte area and the Triangle area fared better than other regions across the state to the point where even the rural areas had not recovered all the employment that they had lost over the course of the Great Recession.

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So we broke out the labor markets by size basically by using the delineation maps, the metropolitan statistical areas, micropolitan statistical areas and then the rural counties which are neither metropolitan nor micropolitan statistical areas. Quick note the large labor market again is the Triangle Charlotte area, the medium labor markets are all the rest of the metropolitan mass statistical areas.

Now nuts and bolts behind this...

Jeffrey: The nuts and bolts behind this is that I assigned the labor market size to each of the counties and I also made a special note to see whether or not workers lived and worked in the same county which will become important very shortly.

So what we found here is not terribly surprising, there's basically a relationship between labor - the type of labor market someone lives in and where they work but this relationship becomes less strong as the size of the labor market decreases. So for those who live in large labor markets a full 86% of them also work in large labor markets and about 75% the same for those who live in medium labor markets but work in medium labor markets.

A full 40% of rural - of people who live in rural counties will commute to metropolitan statistical areas for their work. This doesn't necessarily operate in reverse though. Very few low percentages of workers who live in largely metropolitan and micropolitan statistical areas will commute to rural locations for their work. Part of this makes sense because there aren't nearly as many jobs in rural counties but still these numbers are fairly sharp.

One of the reasons why there's this pattern is that people generally live and work in the same county so statewide there's just under half of workers work

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in the same county that they live in but this varies by labor market size. So those in larger labor markets are more likely to live and work in the same county while those who live in counties that are rural counties are less likely to live and work in the same county that they live in.

When we take the results that we found a couple slides ago only focusing in on those who work outside their home county we find very similar results . I will point out though that those who live in micropolitan and rural counties, so non-metropolitan statistical areas, are very likely to - if they're going to work outside their home county they are very likely to work in counties that are in large metropolitan statistical areas.

So in summation workers in these smaller rural and micropolitan areas are more likely to work in a different county than their residents. They're also more likely to drive to larger labor markets to work or commute maybe perhaps telecommute as well, however this process doesn't necessarily work in reverse. So the jobs that are coming into these smaller areas are not necessarily being filled by the people who live in the larger areas.

This has implications for the way that we kind of consider our economy and the labor markets and the way that jobs come in and we're interested in following up with this and learning - continuing this line of research and we're also interested in kind of a little bit more future research that we're thinking about taking into consideration are to update the interconnected markets research. It's been several years since we've done that but we do want to see what the degree to which these have shifted over time.

We want to see how commuting patterns may relate to industry patterns, to goods producing industry serve as a pull for workers to come in, how they may relate to population growth or decline, do counties that are showing

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population decline what are those commuting patterns. Like, is that part of the story, how much of the story that I had just told is can be explained by that.

And finally given particularly given this particular panel and the great presentation that we've come off of before from Chris we'd like to keep our eye on this relationship going forward with the potential increases in working from home. So we really want to see whether or not this is indeed a structural - a full on structural change and what this might - the implications for this might be for considering not only the way people commute but also how labor markets may cohere our state.

Thanks very much for your time. If you have any questions or want some SAS code or what have you please feel free to email me, thank you.

Tim: Thank you Jeff that was terrific always. I follow your work and hold it in high esteem and you've done a super job with this and I look forward to more great work from you.

Jeffrey: Thank you Tim.

Tim: Our next presenter is Leah Brooks. She has a fascinating title here, I love this, Three Graphs and Two Maps, Jobs and Teleworking During the Coronavirus, Leah.

Leah Brooks: Thank you, let me make sure my slides - could you give me a thumbs up if you can see this slide.

Keith: I see the first one yes.

Leah: Okay great. So actually...

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Keith: Leah if I may interrupt briefly this is Keith.

Leah: Yes.

Keith: We do not know if Stan is actually on the audio line so we are trying to get in touch with Stan.

Leah: He is not coming.

Keith: Okay thank you Leah I appreciate that. So my apologies for the brief interruption.

Leah: That's okay. All right great, so this is joint - I will say, first let me start the timer so I don't go over. This is joint work with Jaclene Begley who's at Fannie Mae and Stan Veuger who's at the American Enterprise Institute. We wrote the article that you guys reached out to me about in the spring of 2020 as a sort of a small policy brief to think about what things you needed to think about to design a COVID response.

So with that let me say that I wrote this brief as my - in my role as the director and a writer for the Center for Washington Area Studies at the George Washington University. And the mission of the Center is to improve the lives of people in the greater Washington area by studying the neighborhoods and communities of our region. And what we do is we produce policy-relevant research on the capital region and we host events for the public on topical issues.

And usually we write an annual report which we call the State of the Capital Region and we did that last year. We did it right before the pandemic hit. The

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report was already, you know, it was at the designers, you couldn't fix anything and then it became clear that what was written just was no longer topical.

So what you guys found on the web was our attempt to update our thinking about a region - our original report's called the Region and Economic and Demographic Transition was to update what we found in the report to focus on what we thought we would see over the coming years in response to COVID.

So with that said what I'm going to do is first I'm going to show you our graph and then I'm going to talk very briefly about how we made them and I'm happy to answer more questions about that if needed.

All right so let me just first say what we're focusing on. We're focusing on the capital region and you can see DC plus Arlington and Alexandria, the original diamond there in dark blue. The areas in light blue we call the suburbs and the areas in green we call exurban.

And here's what we were thinking as of Spring 2020, we were trying to get answers to these four questions, are regional workers high income enough to withstand a big shock, how viable is telework for the regional workforce, three, who can telework by sector income and location and four, which area in this metropolitan area should we be most concerned about. Which - and we thought those would be those with low - where workers had low telework potential and that were heavily rental because by the time we wrote this I think the federal government was already thinking about how to scale up a response to mortgages but had thought less about how to respond to problems in the rental housing market.

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So this is the first point we wanted to make, we wanted to show that incomes have grown but that the middle class has hollowed out. So there is a set of workers that would be quite vulnerable and a set of workers that likely wouldn't be. So this is the region's income distribution as of 1990. And since you are data people I'll tell you that the backstory which is that these are Census tract level - either tract or block group level data from the American Community Survey and you can see that in - as of 1990 the median income in the capital region was about \$90,000 and 1/4 of households were earning somewhat less than \$70,000 and another 1/4 of households were earning, you know, about \$120,000 or more.

So I'm going to just put those up there. You can keep them in mind for the 1990 distribution and then I'm adding now the 2018 income distribution which is the most recent when we made these charts. And you can see that this distribution is actually quite different. The median has increased to 102,000 and 1/4 of the - the bottom 1/4 or the bottom earning 1/4 of households now actually has a higher income cutoff of \$73,000 cutoff.

The top 1/4 of households is earning even more. So not that cutoff there has increased quite a bit to almost \$140,000. The bottom line here is that there is a smaller middle class so that middle class hump in the income distribution has shrunk and there are more wealthy households and that's the tail of that income distribution as it heads out towards pretty high income.

The second thing we wanted to understand was what types of jobs the region had and how vulnerable the jobs were to issues of telework. So this is a chart, now I think I'm at the LODES data, looking at the share of regional jobs by industry. And what's most notable about the capital region is that there's this huge concentration of professional, scientific and technical services. So if you're thinking of lawyers that's in that bar but, you know, you can also see

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that we have doctors and nurses and health assistants in the second bar. And we've got a fair number of retail workers, that's the fourth bar accommodation and food services.

So what we wanted to understand was we know who works in which sectors but how vulnerable are these sectors to the problems of COVID. So to understand that we turned to a different data source. So this is a - some estimates that were posted in the spring by an economist from the University of Chicago and what those estimates were was the share of jobs by sector that were unable to telework.

So the way to read this chart is to say okay professional scientific and technical services, you know, most of those jobs can telework. Maybe slightly under 1/4 of those job, at least from this viewpoint and in the spring would be unable to telework. But jobs in accommodation and food services almost all of those jobs would be unable to telework.

And putting these two together gives you a graph like this and what you can see is that telework is difficult in some of the region's largest industries. So for the region's very largest industry, professional, scientific and technical services most of those workers were predicted by this measure to be able to telework and in fact were able to telework. But as we all well know retail and accommodation and food services workers which is a large share of the regional labor force really could not work in a telework fashion. So that was our second insight.

Our third insight comes from putting LODES data together with American Community Survey data. So what I'm showing you here is on the X-axis the median income of a neighborhood and on the Y-axis the share of jobs that

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cannot telework. Each dot in this picture is a Census block group in the greater Washington metropolitan area.

And I think what is clear or you can see even without, you know, any lines or additions is that people who are less likely - people - neighborhoods with jobs that have low likelihood of teleworking tend to be poor neighborhoods, neighborhoods with jobs that have a greater likelihood of teleworking tend to be wealthier neighborhoods. And interestingly the share of jobs that can telework seems to bottom out at least by that measure at about .4. so in almost every neighborhood there are about 40% of people who had a job by this early measure who could not telework.

And our, you know, our maximum here is somewhere about 3/4 of job - people in neighborhoods - in a neighborhood have 3/4 of the jobs that people in that neighborhood cannot telework. And so we thought first of all this is interesting, it makes you most concerned about people who may lose their job because they cannot telework and don't have a high income, you know, perhaps some buffer stock from their high income to fall back on.

And then furthermore what we thought was interesting and this is actually spawned from academic work, is that even for a given income, so if you look here at people for example who are earning - a neighborhood with a median income of \$100,000, I've drawn three different lines here that best fit that dots for exurban, suburban and urban neighborhoods. So at \$100,000 people who live in urban neighborhoods are much more likely to have jobs that allow them to telework. People who are in exurban neighborhoods are much less likely to have jobs that allow them to telework. And this is true at \$100,000 but it's true almost throughout the entire income distribution.

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So it's - what this led us to the conclusion that people who are probably more likely to live near their jobs, those urban residents, are also those who are most likely to be able to telecommute and that was a bit of a surprise to us when we found this.

And then finally we wanted to think carefully about who was going to be the most vulnerable. And I think I mentioned before that the federal government stepped in pretty quickly to think about how to make a response to the COVID crisis in the mortgage market because the federal government controls a lot of levers in the mortgage market. It controls fewer levers in the rental market.

This picture shows you the share of renters by block group using data from the American Community Survey. On the left you have the - and also the neighborhoods in darkest purple have between 78 and 100% of renters and you can see also at the bottom in the lightest purple there are neighborhoods that have all no renters. So that's a big variety. The red lines on top of the map are DC's metro lines, that's rapid transit, and you can see that renters are concentrated near these rapid transit lines.

This is the map using the same geography but instead of plotting the share of renters it's plotting the share of jobs that cannot telework. And what we or what we suggested that policymakers should be most concerned about would be jobs would be neighborhoods with a lot of renters and jobs that cannot telework. And if you look, if you compare the two maps you can see that those neighborhoods are mostly those on the eastern side of the metropolitan area.

So for example in the very far suburbs of the metro area you see a lot of neighborhoods with jobs that are not teleworkable. On the other hand a lot of people in those neighborhoods own their homes so they're more buffered

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from the COVID shock than people who are renters. So we said, you know, looking forward we think policymakers should focus on these neighborhoods.

So that's the graph, let me tell you a little bit about behind the scenes. How do we make these? I gave you some heads up a little bit about that data but here is sort of looking big picture here's what we used. For income and rental information we used the American Community Survey tract level data. For job by residence we used the LODES block data.

And just as an aside particularly in the capital region we're really glad that you guys have gotten the federal workers back in the LODES data. I think in other jurisdictions it wouldn't matter so much but for us it really matters. And for telework we used an index by Dingel and Neiman by industry. And if you're interested in that index you can Google them and to find their paper.

All the graphs I've shown you I made in R, so I used R for everything. I loaded the data, I manipulated the data, I made maps and I created graphs all in R. I used the Tidyverse package which I use mostly for graphics especially Digiplot, and I used a package called SF which is the newest package for maps and spatial analysis.

So thanks to everybody for listening and thank you very much to the Census for the great data without which I would be devastated.

Tim: Well thank you Chris, Jeff and Leah. All three of those were fascinating pieces of work and I do believe sincerely that it's going to build a good foundation for work going forward as we come out of the pandemic and things come back from new sense of normality.

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We have time, plenty of time for questions. Earlene do we have any questions from the chat or from the phone lines?

Earlene Dowell: Operator are there any questions on the line?

Coordinator: No but if they want to ask a question have them please press Star 1, unmute your phone and record your name to ask a question on the telephone, thank you.

Earlene: And while we wait for the questions to come up on the phone I'd like to remind everyone to please be courteous and keep your questions pertaining to the presentation with one follow up question.

We received a few questions regarding the presentation and recording of the workshop. These items will be accessible at lehd.cef.census.gov under the "learn more" tab.

Also for chat questions please make sure that you show all panelists or use the "everyone" when asking your. And also another reminder, please do not enter any sensitive information in the chat.

Tim: And while we are waiting I have a burning question in my mind. Something I think most of us have been thinking about is what work will like in terms of a physical or telework presence. Here in the Richmond, Virginia area a couple of large companies have not publicized this but, you know, things leak out that many staff will have a choice or be mandated to work from home for the foreseeable future. Not so much because of the virus but because we realized that it works and we can do that, that we can do these jobs from home.

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I will welcome any thoughts from the three presenters on what you think the real estate market's going to look like in the next five years or so and then, you know.

Leah: I can give - I can start. I would say that it seems likely that at least for the temporary future downtown particularly retail real estate is going to take a hit and office real estate also likely to take a hit. I think the retail hit is going to be harder than the office one but I think that's a medium term. I don't - I think it's too early to say what the long term impact is going to be.

Tim: Right, right could be certain. Jeff you have some thoughts?

Jeffrey: Yes I think it's a great question. It's something that sort of keeps me up at night in terms of trying to figure out what the future is because I work on employment projections and trying to figure these things out.

It's possible that there is - there really will be a long term structural shift towards greater telecommuting perhaps across the board, perhaps certain types of occupations like that have kind of been noted with the research this morning.

One of the things I've been reading and even anecdotally there's been consideration of potential for some sort of hybrid situation where people who were coming to work were very successful with, probably successful with teleworking might still have some sort of situation where people would telework perhaps most days but maybe come in - report into the office one or two days a week. So that might have implications I think for where people wind up living.

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So I think I remember hearing something perhaps on Marketplace on NPR where there are people who might move further and further out than they ordinarily would for daily commute but if they only have to commute perhaps one or two days a week then they could handle the say hour, hour and a half of long commute that they might be in for. I think it might lose its charm over time if someone has an hour long commute each way but nevertheless.

Tim: Great thank you, Chris.

Jeffrey: Thanks.

Chris: Yes and we've been looking at this across our work portfolio. As I said we're based in Pittsburgh, Pennsylvania, our downtown has a vacancy rate traditionally historically around 15% and with the pandemic had a vacancy rate of around 40%. And so who's to say whether that's a shock or the new normal but certainly I think a lot of businesses during the pandemic have realized just how feasible remote work is and the shift to remote work for their employees.

Tim: Thank you all. I won't take up your more time for my thoughts. Earlene are there questions in the chat?

Earlene: Yes sir, and let me just doublecheck, are there any questions on the phone?

Coordinator: No there are no questions on the phone.

Earlene: Okay so we had a question that came in, one of the questions was, my team created an online application for the purpose of creating labor sheds based upon a percentage of commuters to specified Census tracts using the LODES data. It took a while to understand all of the tables and learn how to

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manipulate the data to work as desired but we managed. The site is located at <http://www.enterprisezonesillinois.com>. The users need to collect a lot of data to apply for an enterprise zone so now they can go to the site and download their data report.

All right and another one was, in the Chicago area we have heard some corporate property management and real estate professional speculate that many people even after the vaccine might not feel comfortable on trains, subways, public transits and also now the companies had to adjust to remote work. Employees got used to it and saving of money on commuting costs. So now employees are thinking of cutting overhead on office space and looking into reallocating in the smaller suburban spaces. Guess those are kind of some comments.

Leah: I would say - thanks Earlene. I think the bottom line from these questions is whether companies can operate as efficiently with a remote workforce as they can with an in-person workforce because up till now everybody had a remote workforce. Pretty soon we're going to be in a situation where some companies may have a remote workforce and others may have an in-person workforce. If we see companies that have an in-person workforce doing a lot better than companies that have a remote workforce I don't think the remote workforce is going to do stand up as a long term viable strategy for companies.

And I think the - it's just an open question whether that's going to be the case for companies and it's an open question, you know, that could also vary by industries. I mean some industries where people really can work remotely successfully and other industries where they can't. And I don't think we really have a good sense yet of which industries or job types those are going to be.

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And I want to point out this interesting finding that we saw in our work which is that you would think that the people who lived far away in these exurban locations even before the pandemic might want to be in jobs where you could telework sometimes. And in fact that's not what we find. We find those exurban residents are the least likely to have teleworkable jobs. And that suggest to me that people are choosing that their residential location is about something else other than just their commute.

And if your residential location is a choice also about whether you can, you know, at the end of the day go out to a - you can walk to a dinner that you might want to go to or go to a concert or go to a movie or be able to, you know, here in downtown DC walk around the mall or if you're out in sort of the urban suburbs and DC, VT walk around the urban, sort of an urban suburban neighborhood you're not going to - you assume you will be able to do that without thinking you're about to die and once you're able to do that it's really not clear to me how viable these suburban alternatives - they'll still remain viable but how viable they'll remain. Maybe the other - the two other panelists might have some thoughts too.

Chris: Yes I think - let me hop in real quick. I think early on in the pandemic we saw these huge shifts in the residential real estate market where folks were escaping cities and moving to the suburban and exurban places, you know, to kind of have a bit of a buffer to the density that cities brought. Certainly I think that's an interesting finding about the quality of life amenities being still important in driving location decisions and especially for remote workers.

I think there is two a potential for an opportunity for rural communities to develop small main streets to attract remote workers that who may have otherwise wanted that sort of small town feel but were had to be co-located

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with their job that was in a large metro. So I think it presents opportunities across density spectrum I guess what I'm trying to say.

Jeffrey: Yes I agree with a lot of what's been said. I think one of the things that - I really like the point I was making that this teleworking situation might just be a fad. I think before all of this happened IBM was starting to recall their workers and they had long time experience with teleworking but they had decided that actually in-person was the way that they were going to go in the future but they had years and years of experience on this.

It's going to be interesting to see how the laboratories of experiments across all these different sectors and these different types of jobs will kind of get - hopefully will get more and more data and more and more research such that we'll understand these patterns.

And as for the some of the residential things I think they are great points and I think that we've kind of talked about that internally in our office in terms of these considerations of these more rural locations. Main streets are really trying to figure out a way to get the infrastructure of broadband in such that you could telecommute from very long distances.

But so far some of the amenities like say the - I don't know if this is too outdated but like, you know, kinds of richer Florida for the creative cloud data professional jobs. The Triangle is great in terms of those regards not to be a one person sales for the ultimate source date we just got Apple as well so.

Tim: One final thought on that I could imagine businesses, you know, perhaps large or small using the ability to telework as a bargaining tool to renegotiate or negotiate long term leases. I know if I owned a large business and I certainly

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would use it the next time, you know, at least talks came up. Earlene anything else in the chat?

Earlene: Yes there is one more, what's the ability to look at or control for other demographic factors, age, race, education? Seems like the x-hub workforce would look different from urban workers and explain differences in being in telework ready jobs.

Leah: Oh yes I - you are entirely correct that as the exurban workforce looks different than the urban workforce. And part of that difference of location absolutely is driven by age and education and we see very strong racial patterns in the capital region data though those are - I know I'll probably just leave it at that.

So what you can do given the data availability is you can observe by neighborhood the racial composition of a neighborhood, the age distribution of a neighborhood and the education composition of a neighborhood.

What I can't tell you is whether these exurban differences versus urban differences persists even conditional on age distribution. And I don't know so I won't speculate but one could do it. It is doable. So sort of mechanically you would connect LODS data with American Community Survey data.

Chris: Linda I'm glad for your question because this is the sort of where I was hoping this conversation would lead to is recognizing this equity issue. Not all workers have the ability to work remotely and certainly that's impacted by race, ethnicity and also something that we haven't mentioned salary.

A lot of lower paying jobs don't have the ability to work remotely and all this is also present in the Bureau of Labor Statistics job flexibility and work

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schedule data that I mentioned it comes up. So there are equity considerations around who has the ability to work remotely.

Jeffrey: And I think I, not to speak for the great folks who are part of the Center for Economic Studies or like folks like Erika McEntarfer, but there are some of these variables that are associated with the LODES from age, race and education. You don't necessarily have - think that education has a lot of intuitive data but still you can get this information.

And ideally if the folks who are working on the ACS and occupation statistics which I think if Linda's still there if you could somehow work with the folks on this to try to figure out a way to collaborate it would be a long term project. I think it - the degree to which it could be successful could be dynamite for this particular community that has attended this program today.

Tim: Thank you all. Earlene are there any more questions?

Earlene: There is a question but it is not pertaining to the presentation. We will just direct - redirect that question.

Tim: I see thank you. So in summation here these fine presentations once again show me that or tell me that there's typically not a dataset that answers all the questions. That, you know, good research comes out of a robust mix of pertinent data whether it be SDLA, LED, taxation et cetera, that it really makes our work more robust.

I'd like to think this does conclude our session. I'd like to thank all the presenters for this fabulous work and robust conversation. And I will turn it over to Keith.

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Keith: Thank you Tim, thank you Chris, thank you Jeff and thank you Leah. Very much appreciate that. As the person overseeing the LEHD program I am very grateful to see external researchers grab on to the data, marry it with other data and other sum speculation and assumptions that are built into this information but it really showcases what is available and what could be done with the information that comes out of the voluntary partnerships with our states.