Video Transcription: An Economic Base Analysis of Virginia in 2012 and 2017

Beau: Hi, my name is Beau, and this is Tom, and we did an economic base analysis of Virginia in 2012 and 2017.

Our research question is "what sectors of Virginia's employment industries have the largest impact on their economy?" So we were interested in seeing the value of certain industries and how that effects county-level economies as well as state-level economies in Virginia. The way we did this analysis – this uses basic and non-basic industries to define all jobs or all workers. A basic job is one that brings in non-basic jobs. So it could be a Public Administration position, and by them working it would bring in other jobs such as janitors and waiters or waitresses – and it's important to economic base analysis how the wealth circulates through the local economy.

So, why we picked Virginia – we were interested in seeing how a state with such a diverse industry base uses – or how economic base analysis can show the importance of that. So Virginia is really interesting: it has a lot of Public Administration jobs in the north because of all the government jobs, and then to the south and west it's more agricultural based. So this diversification makes a really good example for economic base analysis.

The existing literature: So Andrews, he explained how there were basic and non-basic jobs. As I said earlier, basic jobs are really important because they bring in non-basic jobs. The next source that we had shows that an increase in basic jobs in a region leads to more non-basic jobs in a region. Meaning that if, one person gets hired like I said earlier, in a basic industry, they can allow for wealth to spread and be respent through other industries that are non-basic. Lee explained why basic employment is crucial to the economy. This is because employment is a result of the external demand for goods and services. And this external demand creates the basic and non-basic jobs of industry – of the economy, and can put one industry on top of the other, and explain how you should invest, or how policymakers of the state should invest in order to enhance their industries.

So for our employment sectors, there are 13 different industries: Agriculture, Construction, Manufacturing, Wholesale Trade, Retail Trade, Transportation, Information, Finance, Professional/Science, Education, Arts, Public Administration, and Other which are non-Public Administration Jobs. On top of those, we also included social security, because as I said, the wealth that comes into the economy and how it's respent is really important, Social Security can play a large role in that because it can explain wealth that comes into the economy that isn't the result of a basic or non-basic job.

Tom: So, as Beau outlined, these are the industries that we're looking at, and so for this economic base analysis, we're looking at basic employment in 2012 and 2017, sorry we're looking at non-basic employment in 2012 and 2017, and it's important for us to look at the basic employment in the years before, and this is because if a, you know, using the example that Beau had, where a person gets hired into a public administration job, their job allows, for example, another worker to be hired at a local movie theater that that public administrator goes to, or another grocer to be hired at the local grocery store. So, it's important to look at basic employment from the year before, because there would be some kind of delayed effect that the basic job in 2011 would have on non-basic employment in 2012. So this is just a graph of the net change in all – employment for all of those industries, and we see that the greatest change in industries comes from professional and scientific jobs, education, and jobs in the arts,

and of course the biggest change is social security recipients, which makes sense. Virginia is a state that, like the nation, is aging, and therefore, more people in Virginia are qualifying for social security payments. In addition, Virginia tends to be a wealthier state so, people have worked in Virginia and want to retire there.

So, when conducting economic base analysis, there's a two-step process. The first (step), is to identify which of the previous industry sectors are basic or non-basic. And the way that we do this is we compare the concentration of employees in a certain industry in the state, and we compare it to some benchmark, so in this case, the United States. And the logic here is that if public administration officials make up a higher percentage of the workforce, there's an outsized demand in Virginia for public administration jobs when compared to the nation as a whole. And using public administration is a really good example because as Beau outlined, not only does Virginia have its usual public administration from schools, local government, state government, things like that, but Virginia is also in very close proximity to Washington, DC, so there is a large amount of federal government workers who would qualify as public administrators.

So, we use a location quotient to identify which of the industries are basic or not. So, since it's a quotient, you're dividing. So, to get – to determine which industries have a higher concentration of workers in Virginia, when you're dividing the concentration in Virginia by the concentration at the national level, you're looking for location quotients that are greater than one, which would indicate that there are more people working that position in Virginia. So in 2011, there were eight industries that qualified as – excuse me – basic employment, those were: construction, retail, information, finance, professional/scientific, other and – other non - public aministration jobs, and public administration. And then in 2016, that there were only four, but this time, we see that social security recipients acted as a basic industry. So there were more social security recipients, as a percentage of Virginia's labor force than there were in the nation.

Beau: So here on the screen is our empirical model. All of the industries on this screen are basic. And as you can see, we were studying 2012 and 2017, however we had to lag those years and look at the previous years in order to see the full effect of basic employment – in 2011, you would have to see what happens in 2012 and the same happens in 2017. We used OLS method in order to estimate these equations, and we can see in 20 – in the 2017 equation, social security recipients were also included because it was a – or it was determined to be a basic job per se, because of how higher valued it was to the national level.

Tom: So when we're looking at 2012 non-basic employment, this is our regression results. So we're looking for – we're running all of the industries that were considered basic by a location quotient and we're using them as independent variables to calculate the change in non-basic employment from 2011 to 2012. So we had a sample size of 132, and that is just a – we're doing a cross sectional analysis of all the independent cities and Virginia and counties in Virginia, and so there are 132 total localities of those that we were able to use as cross sectional data. We see that the r-squared value is pretty high, it's .993, so theoretically, the model explains 99.3% of the variation in non-basic employment, which is good! And identifying which of these basic industries are significant at a 95% confidence level, we're looking at p-values that are less than .05. So we see that six of our identified basic industries do meet that threshold, and those are construction, retail trade, finance, education, other non-public administration jobs, and public administration. However, something that is interesting to note, is that according to economic

base theory, a basic job provides wealth for non-basic jobs, and so we would expect the coefficients for basic jobs to be positive. Here, construction, finance, and public administration all are – all have negative coefficients. And so, to explain this, there are a couple of things we can consider, the most obvious one is that because we're taking basic employment in 2011 and looking at non-basic jobs in 2012, it could take shorter or longer for those non-basic jobs to be added, in which case they would not be reflected in this regression. So, for example, if a public administrator is hired in February of 2011, and the local grocery store, to keep up with this public administrator's groceries hires another grocer in June, that wouldn't be reflected here. So that's probably the easies way to explain why these coefficients are negative.

Moving on to 2017, we're of course including social security recipients, we're including social security recipients, which has an incredibly low p-value, so it's incredibly significant, and public administration also remains significant. However, a couple of things that we notice here is that this regression only explains about 40% of the total variation in non-basic employment, which is obviously not as accurate as the 2012 models. And the probable cause of this is the incredible significance of social security recipients. If you recall the chart a couple slides ago, social security recipients has outgrown growth in any other employment industry in Virginia by a very significant amount. So therefore, it can kind of dominate the rest of the data and skew it so that it's less accurate in predicting the variation in non-basic employment.

In conclusion, we are able to say that social security recipients have become increasingly important to Virginia's economic base. As the population ages, the economy is much more reliant on people who are receiving social security payments then it has been previously. Public administration is probably to no one's surprise still a dominant sector of Virginia's economic base, it remained significant and identifiable by a location quotient in both 2011 and 2016. And also, Virginia's economic base is becoming less diverse: in 2011 we were able to identify eight different sectors that counted as part of the economic base of Virginal, and a further six that achieved significance at a 95% confidence interval, in 2016, that number had dropped to four identified by a location quotient, and only two that met our level of significance.

And these are our data sources and references, the census burea and other data we have used during this presentation. We hope that all of you have learned something interesting about economic base analysis and its practicality, and what policymakers can use it for to make decisions, so thank you for listening to us.