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LR444 Tax Incentive Evaluation Committee
November 18, 2014

[LR444]

The Committee on Tax Incentive Evaluation met at 8:00 a.m. on Tuesday, November 18, 2014, in Room 1525 of the State Capitol, Lincoln, Nebraska, for the purpose of conducting a public hearing on LR444. Senators present: John Harms, Chairperson; Dan Watermeier, Vice Chairperson; Al Davis; Galen Hadley; Heath Mello; Paul Schumacher; and John Wightman. Senators absent: Greg Adams, Annette Dubas, and Bob Krist.

SENATOR HARMS: We'll start the meeting today. Thank you for, colleagues, for coming. I appreciate it. Today we'll have some discussion from the Revenue Department in regard to modeling, economic modeling. And then afterwards we'll go into an Executive Session and we'll start taking a good look at the recommendations we want to make. And hopefully by the end of the morning, we will be done and we'll have our committee assignments completed. We'll agree upon what we feel are the goals and the metrics that we want to use for evaluation. And hopefully we'll be able to submit that in December to the Executive Committee. So at this point, I think we'll go ahead and get started, if we can. Thank you, first of all, for coming. Would you introduce yourself and... [LR444]

HOAPHU TRAN: My name is HoaPhu Tran. I'm with the Nebraska Department of Revenue. Thank you for the opportunity to work with you and to present this economic modeling, specifically the TRAIN model, from our agency. I've brought a few of us here. Kim, she had a foot fracture so she can't move very well. Iksoo are going to, Glen, and Laura were going to... [LR444]

SENATOR HARMS: Would you like to put someone else at the table with you or...? [LR444]

HOAPHU TRAN: No, this is... [LR444]

SENATOR HARMS: Okay. All right. [LR444]

HOAPHU TRAN: ...fine for now. Thank you. [LR444]

SENATOR HARMS: Well, let's go ahead and get started then and I'm going to leave it up to you. [LR444]

HOAPHU TRAN: All right. So here we talk about economic modeling and TRAIN specifically is one type of economic modeling. We...basically, this is a very high overview of the TRAIN model. The detail can be found in a separate document. Today's agenda we will do some introduction of the TRAIN model, some history of TRAIN, why does TRAIN exist, and then talk a little bit about the structure of how we model it, what

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our assumptions are. And then we run through one example, basically a hypothetical example, and then a result from TRAIN modeling. [LR444]

SENATOR HARMS: Would you care if we would, if we have any questions, we could interrupt you at that point and have that discussion? [LR444]

HOAPHU TRAN: That's fine, yeah. [LR444]

SENATOR HARMS: Or would you rather...or would you feel more comfortable at the end? [LR444]

HOAPHU TRAN: I mean that's fine. [LR444]

SENATOR HARMS: Okay. All right. [LR444]

HOAPHU TRAN: I mean you can interrupt with questions, anything like that. So TRAIN, as it is right now, is a dynamic computable general equilibrium model, which short name for CGE. In economic modeling, a computable general equilibrium model is basically use of actual economic data to have a base equilibrium, and then you apply a shock to the model on any, such as, policy changes in the tax, sales tax, income tax, incentive, whatever it is. If you apply a shock to the model, it will give you the difference from the baseline of that equilibrium. It is dynamic in the sense that it's allowing the model to trace economic impacts of policy decisions through time. So instead of one equilibrium to the next equilibrium, we can specify the impact, economic impact by yearly, year by year, until it's reached the next equilibrium. The TRAIN right now is updated for every two years with a new data set. A data set come from the SAM, which is a Social Accounting Matrix, and various data source that we use to have the Nebraska economy in there. The difference between TRAIN and all the economic modeling out there right now is this is used specifically for Nebraska economy. This contains approximately 1,300 mathematical equations and identity to have an equilibrium map out in for a given economy. Some history of TRAIN: TRAIN was passed, TRAIN was basically derived from a bill back in 1996, which was LB1373, its intent to have the Legislature look at the study of basically tax incentive, was the main focus on that bill. So they need an economic modeling to have detail and effectiveness on evaluating tax credits. So that it is why the TRAIN model was coming aboard. So after that bill passed in 1998, Dr. Cho and Cushing, which is one of the authors here, he worked with Dr. Cushing at the University of Nebraska in Lincoln to develop the TRAIN model. And it's basically an adaptation of the DRAM model, which is a dynamic revenue analysis model that was built by some California Department of Revenue back then, and it was constructed by Berck, Golan, and Smith. And again, TRAIN was specifically built based on that DRAM modeling to capture the specifics of the Nebraska economy. And in 2001, we updated TRAIN to a dynamic version of TRAIN. And then again, the model is updated every two years. So in the real economy, the complex relationship between economic agents is

very complex. We can't...basically, it's the behavioral change of consumer, producer on any policy change or any outside factor change of economic modeling. So the TRAIN model looked at, basically, a mathematical equation to link the producer, the consumer, the government, and then the rest-of-the-world market together. So everything have to either be estimated in the equation or have to be an identity in the system; here "rest of the world" meaning anything outside of Nebraska. So Nebraska is one nation. Everything outside is "rest of the world." We don't consider Kansas, Iowa to be two different identifies. They are just one sector in the modeling which is called "rest of the world." Obviously, the two most important economic agents here is the consumer and the producer. That's determined. So here's the basic structure of any given economy, very simplest form, no government, no "rest of the world," a closed economy. So you have two economic agents here--the firms and the households--which is two of the most critical economic agents in the economy. How do they interact together in that modeling? So the firm...the firm is based...so the firm is the producer and they supply the goods and service to the good and service market. You have two market, the goods and service market and the factor market. And the firm supplies the goods and services. And then, in return, they get their revenue. The firms use that revenue to rent factor production, stuff like labor, capital, raw material, whatever it is. So they pay rent and then you have the household, and the assumption in the model is that firm will choose input, such as labor and capital, to maximize their profit. And then the household you have...they supply the labor and capital to the factor market, which is being demand by the firm. And then, in return, they get the income from the factor market and they use that income to demand for goods and services from the goods and services market. So that's what we call a circular diagram of the economy, very basic and simple in that sense. It gets more complex when we add in intermediate goods, which is just another firm, which is right here. It's basically just another firm. And then you introduce foreign firms, which pay corporate income tax to us. And then we also introduce government into that diagram, which is the government sector participate with both markets, the goods and services market. They demand the goods and services. And they also supply the factor of production--labor, capital--to the private market. And then you have a foreigner which is paying nonresident income tax, which just comes from the rest-of-the-world sector. So putting everything together, we have this massive circular diagram, which then can be modeled based on mathematical equation and identity. So based on that diagram, we separate out the TRAIN model consists of 78...74 distinct sectors in the economy. We have 28 industrial sectors, and we use a three-digit SIC code for that, which is detailed in food and manufacturing and farm machinery. And we have two factor markets. We just use capital and labor, which is very common in economics, and then we have one investment sector. The key about investment sector is we...investment usually is a function of saving. If you took a macro class, investment is a function of saving. But in the TRAIN model, and we have a regional economy, so investment in this model is independent of saving. That is, it does not depend on saving rate because clearly saving can be invested outside of the state. If saving in Nebraska, Nebraskans don't have to invest right back into this economy. It can invest in outside...in

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the rest of the world. So investment sector in our model is...depend on the rental rate of capital. Rental rate is like business strength in capital and then they pay a dividend to that capital. So the lower the rental rate, the more people who are willing to invest in the capital market because they have a (inaudible) higher return. We have nine household sectors, which is detailed by income level, AGI. The reason we have nine household sectors is the higher the income, the more...there's a difference in their spending behavior, depending on where their income spectrum is. So we have nine household sectors, two capital, some of that distinguished on the household spending and saving pattern. Again, this model is very government, Nebraska-specific, so we have 33 government sectors in analyzing the Nebraska economy. This includes state, local, and federal. State we have revenue spending and expenditure of sector in our modeling, so it can come up with fairly detailed analysis of how tax revenue... [LR444]

SENATOR HARMS: Can I ask you this question? [LR444]

HOAPHU TRAN: Yes. [LR444]

SENATOR HARMS: Out of the 74 distinct sectors that you have, how do you mathematically bring all that together to make your recommendations? Do you mathematically bring all those together? [LR444]

HOAPHU TRAN: Yes, we mathematically...basically, if you see that complex diagram, all of that economic agent have to be linked together. [LR444]

SENATOR HARMS: Okay. [LR444]

HOAPHU TRAN: It's either through an estimation of economic modeling or an identity. If you take the simplest case of a macro economy, you have investment, you have saving, and you have a goal in spending, and then GDP is just consumer spending, plus government spending, plus investment. So you have four equation. Three of those estimate and then one of those is identity. That's just for the most basic economic modeling data. So you have four equation, definitely three equation and one identity. In our modeling here, so the 28 industrial sector, that's just 28 equation. That's basically give the price and the price of that output for that 28 sector. Twenty-eight sector is just like agricultural machinery is one sector. So we have basically pricing for that 28 sector. [LR444]

SENATOR HARMS: Thank you. [LR444]

HOAPHU TRAN: Yeah. Then you have 33 government sector, and then 1 out, rest-of-the-world sector which is all agents outside of Nebraska. Here is an example of a sector discussion. You have a household sector. You have nine of them and they're divided up by income threshold, AGI. And clearly, the higher the income, the more

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saving they will do; the less the income, their spending, basically, they spent most of their money. That's how we capture some of that spending and saving behavior based on multiple household position. [LR444]

SENATOR DAVIS: So do you adjust that then as incomes improve or are these fixed? [LR444]

IKSOO CHO: Yes, we can. [LR444]

HOAPHU TRAN: The income sector right now, I mean every year we updated it we look at the distribution and then we can change it if we have to, because household one, zero to \$10,000 is always there. And then it just depends on how the distribution lie, and we try to divide up in the distribution sense. [LR444]

SENATOR SCHUMACHER: In the above \$150,000, the top sector there... [LR444]

HOAPHU TRAN: Yes. [LR444]

SENATOR SCHUMACHER: ...of household income, is there any computation in the system for how much of that money is spent or invested outside of the state? Because if they buy a trip to Europe with that money, it's going to have a different impact than they buy a trip to Chadron. [LR444]

HOAPHU TRAN: Like we said, the investment in the state and out of state is dependent on the rental rate. It's not dependent on the savings rate for our equation. So if the rental rate in Nebraska for capital is lower compared to "rest of the world," people will tend to invest in Nebraska more. So for a business trip or a trip to Europe you are talking about, it might not mean capital in the modeling because it's dependent on the rental rate, basically, how much of it is invested in Nebraska. So the lower rental rate, the more people will tend to invest in Nebraska because of a higher return. [LR444]

SENATOR SCHUMACHER: But if I...if somebody takes a trip to Europe or...it's a consumptive behavior channeling capital out of the system. Does the model account for that? [LR444]

HOAPHU TRAN: The model account for it through the rest-of-the-world sector. So let's...whatever is not invested in Nebraska, we consider that to be outside of Nebraska. So the rental rate in Nebraska, if it's lower compared to other states, it doesn't matter if that economic agent or the consumer goes to Europe or he just invests in Iowa. It's the same thing for us. [LR444]

SENATOR SCHUMACHER: Do you have a percentage of that activity of number nine that ends up investing in Nebraska or that ends up... [LR444]

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HOAPHU TRAN: We do not have that calculated in the model. [LR444]

SENATOR SCHUMACHER: Okay. [LR444]

HOAPHU TRAN: Because the model is dynamic so it will just play out however the equation estimated inside the model and we don't have the estimation for that. [LR444]

SENATOR SCHUMACHER: Thank you. [LR444]

HOAPHU TRAN: And then for uses of TRAIN, we use it on tax analysis, incentive analysis, basically estimating the fiscal impacts and jobs created by tax refunds and tax credits of the two major tax incentive programs in Nebraska--LB775 and LB312. And then we report those in the tax incentive annual report. The second thing we use this modeling for is the tax burden study, which evaluates fiscal and economic impacts of alternative tax policy, for example, an income tax reduction. The one we did last year, we consider in a reduction in income tax and then another consider of a reduction in sales tax, and compare the scenario. [LR444]

SENATOR MELLO: HoaPhu, we could, when looking at tax incentives, we could do that same kind of comparison, correct, with the TRAIN model in regards to...and the tax burden said it was a \$100 million reduction in income taxes vs. \$100 million in sales tax. We could do that, for an example, \$100 million reduction in income taxes vs. Nebraska Advantage, correct? [LR444]

HOAPHU TRAN: Yes, those are still tax credit, so the effect on, if you will, call social benefit of all Nebraskans, including state and the consumer. If you call that social benefit, and the social benefit technically can be compared. But the distribution of where those money go, I mean that's the question on...the model can't tell you that. [LR444]

SENATOR MELLO: Uh-huh. [LR444]

HOAPHU TRAN: Yeah. [LR444]

SENATOR DAVIS: And are you able to, in using this to do the tax burden, are you able to drill down into property taxes too? [LR444]

HOAPHU TRAN: No, property tax is not in the system. It will take a considerable amount of time to model the property tax because it's just not there right now. And again, all this is basically very mathematical driven, and when you have something massive change, the equilibrium may not...the set of equation might not solve. [LR444]

SENATOR DAVIS: But if you've got 33 government factors, it seems to me the property

tax would be a part of that. [LR444]

HOAPHU TRAN: Thirty-three government sectors is not just the state. We have federal, state, and some local spending. And...but property tax, in detail, is not in the model right now. [LR444]

SENATOR MELLO: Real quick, under your point under the tax burden study where it says, "examines the shift of tax incidence among agents," is that simply the household income, AGI sectors, or is that all 74? [LR444]

HOAPHU TRAN: You can have house...you have household income and then which of those 28 industrial sectors benefit the most. And then I think we list that out in that tax burden study. So it's both sectors. It's not just one. It's not just the consumer side. It's also the industrial side. All the economic agents, we can do that shift. [LR444]

SENATOR MELLO: Okay. [LR444]

HOAPHU TRAN: (Exhibits 1, 2, and 3) So here is...let's look at basically a hypothetical example, a shift of basically \$100 million in tax credit per year to select industry. So this is \$100 million per year for eight years, in a six-year time frame, 2013-2018. And the base for the model is 2012 economy. So whatever in the 2012 economy, we set that to the base year and it's in equilibrium. Now we apply the shock to this model, which is \$100 million in tax credit to selected industry. And the way we divide up for this example is we just use a base, a historical distribution on the credit based on some averages of 775 and 312 to divide it up into selected industry, and then we will examine the result for the impact on the state overall tax revenue, impact on state employment, and impact on state income level. And here's the graph for that change in tax revenue. It might be better if you.... So this graph is basically the same in your handout. Look at the change in tax revenue. The line with the horizontal line here, what do we call that line, I'll call it green, the bottom line here is the tax credit, which means it's \$100 million negative in tax revenue for eight years. And this is not cumulative. This is per-year basis. So the state gives out \$100 million in eight years...in six years, sorry. [LR444]

SENATOR MELLO: Is that \$100 million each year? [LR444]

HOAPHU TRAN: Each year, yes. It's not cumulative, so every year it's a new point. So if you want cumulative, you have to take this area under this curve from the zero line. And so based on that tax credit, the theory is, with a given tax credit, the producer will face a lower rental rate of capital, because now they get a credit, lower after-tax rate of rental for their capital. So with the lower rate of capital, rental rate of capital there will be more investment. More investment leads to more employment. More employment leads to more tax revenue. So you have the green line up. The blue line up here is the extra revenue that has been generated by that economic activity: sales tax, income tax,

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corporate income tax. All that stuff is in here. The first year it's kind of smaller because it takes time for investment to occur. It takes time for the employment to adjust. It doesn't take one year for the whole thing to play out. So you have an increase every time up into eight years. This is extra revenue. So if you take the tax credit, subtract off the revenue generated, the state in whole is liable for that loss. So this is up to eight years. The red line shows the loss in tax revenue for the state after subtracting out the tax credit, direct credit, with the new tax revenue generated. So clearly, the point here is not...the point here is that the state will not pay for itself if you look at the revenue sales, okay, because this area here, after 2018 the credit over, you see a sharp decline in tax revenue and it's gradually declining. So clearly this area here, from the red line and the zero line, is not going to equal to that big area anytime soon. Okay? So tax credit based on the TRAIN model will not pay for itself. But again, if you look at next, the effect on income and revenue, so this is the red line from the previous slide. This is revenue surplus from the previous slide. And here look at the red line here now become the household disposable income. So this is income generation by the household, additional income by the household, okay? [LR444]

SENATOR MELLO: It's additional income? [LR444]

HOAPHU TRAN: Yes,... [LR444]

SENATOR MELLO: Okay. [LR444]

HOAPHU TRAN: ...by the household, due to that tax credit now, because of the employment increase. With the demand of more employment, you have higher wage. So you have more disposable income. So if the goal of the state is to maximize social welfare of its citizens by improving their disposable income, then the state as a whole is doing its job by a tax credit. So it depends on what the goal of the state is. Clearly, here you see a increase, massive increase in disposable income. Now if you take that disposable income, subtract off all the losses by the state revenue, you still end up with this green line which is the net effect. If you will, call it social benefit of the tax credit. So you generate income for the state overall. And again, this is Nebraskan overall, including the firm, the consumer, everybody. The distribution of that is...we didn't do the distribution of that for this presentation. [LR444]

SENATOR MELLO: You can stratify that, though, based on the household income sectors though? You could take this chart... [LR444]

HOAPHU TRAN: We can see who was the benefit. [LR444]

SENATOR MELLO: Yes. You could take this chart and stratify it based on where the benefits are going in that household income change. [LR444]

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HOAPHU TRAN: Yes. Yes. But overall, the producer, the consumer, everybody, if you take together the government, basically all Nebraskans together, then this actually maximizes social welfare, okay, increase in social welfare, I should say. [LR444]

SENATOR SCHUMACHER: Does this also then compute in the drag on the economy that the other sectors having to absorb or the other entities having to absorb more tax burden... [LR444]

HOAPHU TRAN: Yes. [LR444]

SENATOR SCHUMACHER: ...has in depressing revenues? [LR444]

HOAPHU TRAN: Yes. So the sector that gets the money, the tax credit, will face a lower rate of rental capital compared to another sector that did not get the credit. So clearly, with the sector that gets more investment, they can hire more people. But with the demand for hiring more people, that basically draw some of the employment from other sector to that particular sector. So everybody is facing a higher wage, higher labor wages to pay to their employees. So there's always a winner and loser. [LR444]

SENATOR SCHUMACHER: So then does this model assume an unlimited, trained labor supply to fill those jobs that are being taken into the incentivized sector? [LR444]

HOAPHU TRAN: The model assumes for fixed labor and capital ratio, so if you increase capital, labor will also increase. And... [LR444]

SENATOR SCHUMACHER: And how does that happen? I mean how do... I mean when you increase that activity, are a lot of people expected to flood into the state? [LR444]

HOAPHU TRAN: No. We have a migration equation which it takes time for migration to occur, okay? It takes more than one year. It takes a multiple period for migration from out of state to respond to a higher wage. If there's not enough labor then new wage have to go up. If real wage go up, then they can attract more labor. [LR444]

SENATOR SCHUMACHER: But if another state is doing the same thing, it cancels out, doesn't it? I mean if another state is raising its labor too, I mean we're not making this TRAIN labor fall out of the sky. [LR444]

HOAPHU TRAN: Right. But the base year for the model, we compare it to the base year. So if we give this tax incentive credit to a selected company and, in response to this incentive, other company outside of Nebraska start to raise their revenue, then the model basically just doesn't compare to that new scenario because that is not in the base year. The model is fixed for a particular year. So let's say in 2012 Iowa didn't have anything. All they have, whatever they have, we capture that in the social accounting

matrix. And let's say we impose this law and we lower the rental rate of capital for a selected industry and then Iowa, in response, they will also impose a tax credit on whatever industry they have. That is not...we don't model the response from Iowa. So your case might be correct, that Iowa might just (inaudible), because they'll start losing employment so they might do the credit, but that is not in the model. [LR444]

SENATOR SCHUMACHER: But this still assumes the ability, a very elastic ability for labor, with the proper training, to surge into the state in response to this deployment of capital. That's inherent in the model. [LR444]

HOAPHU TRAN: You want to say something on that? [LR444]

SENATOR HARMS: We'll get a chair for him. [LR444]

HOAPHU TRAN: He's the math. [LR444]

SENATOR SCHUMACHER: I'm sorry. (Laugh) I didn't mean for this to be... [LR444]

HOAPHU TRAN: No, I mean that's... [LR444]

IKSOO CHO: In that case of labor model...I forgot before, my name is Iksoo Cho. And then we can make a scenario, two kind of scenario. One kind of scenario is the unlimited labor market. In that case, the people (inaudible) freely move in and then out. That depend on the condition. And the other scenario is that they're limited to some kind of...you mention about that, some...the other state is doing something. In that case, the improve the (inaudible) limited. In that case also we have the other scenario. So models can do it. But, however, the models cannot, the concern about the other state policy, something like that. It's basically the model is, we can say it is, general equilibrium model. So the basic important assumption is the model is equilibrium. That means the economies are good and everything is (inaudible). So it doesn't affect the current and coming years of the specific economic conditions. We provide the baseline. So when the economy is good, what's happened. So actual economy is there's something going up and down, some (inaudible). But the model (inaudible) baseline (inaudible) provide. Yeah. [LR444]

SENATOR WATERMEIER: Question: I guess you made a comment in your statement there, you said that there was either one of two scenarios--you had unlimited supply or it was inelastic. I mean so is it a switch you turn off and on and look at it both ways? I didn't quite follow what you were saying there about the labor supply. I think that's what Senator Schumacher was getting at. [LR444]

IKSOO CHO: Yeah, it's... [LR444]

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SENATOR WATERMEIER: Is it...I mean, you look at it both ways or is there a happy medium or what? [LR444]

HOAPHU TRAN: No, no, we did not account for unlimited labor supply... [LR444]

SENATOR WATERMEIER: You do not account for it. [LR444]

HOAPHU TRAN: ...for this model, for this example. [LR444]

SENATOR WATERMEIER: And that's the way I had taken it before in discussions with TRAIN is that TRAIN assumes that there is basically unlimited, that you do not account for this draw and which would become more-expensive labor as you start pulling it out from somewhere else or other states. So is that correct? I mean that's...it's not a switch you can turn on and off. It's...you just assume it's an unlimited supply. [LR444]

HOAPHU TRAN: Do you want to answer that? [LR444]

IKSOO CHO: Yeah. Currently, yeah, basic model is that it's unlimited. [LR444]

SENATOR WATERMEIER: Okay. [LR444]

IKSOO CHO: Yeah. But we can make it the other scenario, some limited. [LR444]

SENATOR WATERMEIER: You could make it...turn the switch, I mean, basically and change the model and look at it both ways. [LR444]

IKSOO CHO: Yes. [LR444]

SENATOR WATERMEIER: Okay. [LR444]

SENATOR DAVIS: So can you factor in national unemployment rates then into this, which would give you some clue as to mobility of people? [LR444]

HOAPHU TRAN: We...the labor supply is a function of wage rate. The higher the wage rate, the more labor supply there is. I mean you can't consider all the states' unemployment and...because the goal of economic modeling is not to tell the true economy. It's an economy simplified so that the mathematical model can work. We can't take everything into account like if your income goes up by a certain amount you spend this and...we...modeling doesn't do all that stuff. [LR444]

SENATOR DAVIS: I guess it seems to me that the national labor rate would have a lot to do with mobility of people. If we had 30 percent unemployment in... [LR444]

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HOAPHU TRAN: Yes, but... [LR444]

SENATOR DAVIS: ...Illinois and none here, people would be coming here. [LR444]

HOAPHU TRAN: But this model assumes 2012 at the base, so anything shocked through that, basically, we can see theoretically how they improve in employment and things like that. It can be seen. If you have full employment, then technically every time...the employment at full employment is not zero employment...unemployment rate. There's always another wave of unemployment. So if you provide enough wages, high enough wage, there will be people working for you. So it's just a function of wage rate. [LR444]

SENATOR MELLO: I guess I just want to get some clarification. I think Senator Watermeier and Senator Schumacher asked, and for this specific example, you used a fixed labor force or an unlimited labor force for this example here? [LR444]

IKSOO CHO: The unlimited. [LR444]

SENATOR MELLO: Unlimited. [LR444]

IKSOO CHO: Yeah. [LR444]

SENATOR MELLO: And the question that I think Senator Watermeier poses is that you could change your equation and consider a fixed labor force moving forward, correct? [LR444]

IKSOO CHO: Yes. [LR444]

SENATOR MELLO: In that equation, do you take in consideration then by looking at...and this is hypothetical, I understand that, because this is based on unlimited. Using a fixed labor force, would the model then consist of taking in consideration the loss of labor in other industries for the newly created positions and/or where the investment credit would be drawing labor from other sectors? Because that seems to be an ongoing, ongoing question that we've been discussing as a group, is the impact a tax credit would have on other industries and other businesses that are losing employees to these newly created positions and what that economic impact is on those other industries who have lost employment, thus, having vacant positions, thus, possibly losing production capacity, productivity, etcetera. [LR444]

IKSOO CHO: Yes, yeah, the current model is...we got the pattern of how much is degree of the movement, is we got...this pattern came from the economy researchers, and they research model. Then also, the concern about that is labor's mobilities have some kind of limitation. So we have the...we added the scenario I use. But in that case

is not concern about the average sectors rather than a kind of limited halfway, something like that. So that is not that very detailed show of as to how much is limited between industry by industry. But we provide a general guideline of when the labor market is quite tight. (Inaudible) for example, he said economies are not bad so almost at the full employment conditions. In that case, labor movement is quite limited in that scenario so we can examine. [LR444]

SENATOR SCHUMACHER: This whole line of questioning comes up from what we're hearing at a number of different sources that particularly in outstate Nebraska there's a real drag on the economy because there is not sufficient trained labor and people cannot find people to do jobs. So in that environment, you have to assume some finite labor source and see how it affects the system, because that seems to be reality. People are not willing to migrate in sufficient numbers to man these particular industries and businesses and activities. I can't speak for Omaha. I don't know. But we hear that very, very loud from outstate Nebraska. [LR444]

HOAPHU TRAN: Again, that's the reality is in economic modeling we can only do what their echo is. I guess the movement, I guess if you pay enough money, there will be people working. And if a company complained there is not enough labor, that means they don't pay enough. [LR444]

SENATOR SCHUMACHER: Right. That's theory, but we have to pass laws for reality. But thank you. [LR444]

HOAPHU TRAN: I understand, but... [LR444]

SENATOR SCHUMACHER: All right. Thank you. [LR444]

HOAPHU TRAN: ...but this is more of a compared to the baseline if this is what would happen. And again, I mean, if you say this is...this is just an estimation, after all. It's not like if you do this, this is what you're going to get. But in theory, in a perfect world, this is what you will get. In the world that we...where all the assumption is met in the modeling, then this is what you will get. But reality, that's...this just shows you the sign, the positive or the negative. I'm pretty confident on that. But the estimation is always in question. I mean if you run it through three different modeling, you will get three different result. There's no doubt about that. But this is one model that we have. [LR444]

MARTHA CARTER: HoaPhu, could I just ask you to clarify? When we did the performance audit looking at the tax incentives, we made it clear that the modeling over the ten-year period was not considered forecasting. [LR444]

HOAPHU TRAN: Right. [LR444]

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MARTHA CARTER: And would that be...I think the way you've explained it today, is because it's a theoretical, it's against the base of 2012,.... [LR444]

HOAPHU TRAN: Yes. [LR444]

MARTHA CARTER: ...it's not the actual expenditure expected. [LR444]

HOAPHU TRAN: And let me clarify that. [LR444]

MARTHA CARTER: Okay. [LR444]

HOAPHU TRAN: The forecast, every forecast like, okay, so that table that you see in the incentive booklet, the amount of credit earned is forecast outside of the TRAIN model. We did the forecast on that based on historical data, based on macroeconomic data from a national...and then we forecast how much credit will be given out for that ten-year period. Then we take that number. We plug it in this model, basically doing the same thing here, assuming a certain amount of tax credit goes into a certain industry, and let the model simulate. So this is a simulation model. It's not a forecasting model. This doesn't do any forecasting. [LR444]

MARTHA CARTER: So I think that's just important for the policymakers to understand that that is not... [LR444]

HOAPHU TRAN: Yes. [LR444]

MARTHA CARTER: ...a forecast of what is...what the incentive is expected to... [LR444]

HOAPHU TRAN: Generate. [LR444]

MARTHA CARTER: ...generate. [LR444]

HOAPHU TRAN: That is correct. [LR444]

MARTHA CARTER: Thank you. [LR444]

HOAPHU TRAN: But based on the model, that...you can think that that might be the result, but it's not a forecast. [LR444]

MARTHA CARTER: Thank you. [LR444]

HOAPHU TRAN: The forecast is only on the tax credit and that is outside the model. [LR444]

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SENATOR MELLO: HoaPhu, just for a follow-up, if you could find a way to produce, based off your example here, that stratification of the household AGI income based off this example, I think it would provide, I guess, some...a little bit more clarity in regards to how this household disposable income breaks down in regards to the nine household sectors that you use as part of the model, to see where that disposable household income is going, so to speak. Is that something, Commissioner, is that something that we can request, is just a one-page follow-up on... [LR444]

HOAPHU TRAN: How long (inaudible). [LR444]

KIM CONROY: We'd have to see how long it would take. (Inaudible) question (inaudible). [LR444]

SENATOR MELLO: Okay. Okay. Okay. [LR444]

HOAPHU TRAN: So if you just want a simple table, we can see what we can do on the time frame. How's that? [LR444]

SENATOR MELLO: Uh-huh. Okay. [LR444]

HOAPHU TRAN: We will try to get that to you. [LR444]

SENATOR MELLO: Okay. [LR444]

SENATOR SCHUMACHER: One of the things with that table, the top household income was only...this creates a bracket of only \$150,000. That's two people making \$75,000 a year. They're melded in with the folks who may be making \$1 million or \$1 million a year. Is it possible to stratify that further over that top bracket? A hundred and fifty thousand dollars a year is, you know, is not the kind of income that you would consider terribly wealthy, but \$10 million a year is probably pretty good. [LR444]

HOAPHU TRAN: But I think that's really in close to what 1 percent of Nebraskans. [LR444]

SENATOR SCHUMACHER: Right, but when you average that in with the...you know, you see, you understand. [LR444]

HOAPHU TRAN: Yes, but if you consider the person making \$500,000 or a million bucks, I don't think...I shouldn't say I don't think, but we believe it's not going to change their spending behavior. [LR444]

SENATOR SCHUMACHER: It's not going to change their spending behavior. Right. [LR444]

HOAPHU TRAN: Yeah, but... [LR444]

IKSOO CHO: But before that, that is a technical difficulty because the most the federal government, that the data provide us, you generally classify an assumption like a rent. So they cannot distinguish the \$300,000 and \$700,000. That kind of grouping is just one group like that. So we cannot...you had to get the information about that group definitely, so in the model is how...there is how to break down for more detail in higher income. There's technically something (inaudible). [LR444]

SENATOR SCHUMACHER: But if you have a tax credit that is offsetting the income tax, for most likely in the case of somebody making \$500,000 a year or more it's going to have a different effect. I mean that isn't shared by the family making...two wage earners at \$75,000 a year. So that has a different economic flavor to it. [LR444]

HOAPHU TRAN: Yes, that does have a different economic...but based on the data availability, we can't go to a very...I mean in a perfect world, if you can do anything then we wouldn't even use TRAIN for the industrial sector. We'd just do every single sector there is. But that's just not feasible for the mathematics. [LR444]

SENATOR SCHUMACHER: I guess what I'm trying to do is get an idea of the limits of the model and when... [LR444]

HOAPHU TRAN: Yes. Uh-huh. Yes. [LR444]

SENATOR SCHUMACHER: ...you know. Thank you. [LR444]

SENATOR HARMS: Any other questions? HoaPhu, would you like to continue? [LR444]

HOAPHU TRAN: And the last slide here I have is the change in employment, this again compared to the baseline. Clearly, you see after the credit and it...employment comes back and then it gets to, after a certain amount of time, when the effect on the economy wear out. You actually have basically...if you stop the credit, it gets worse than before based on that modeling. And one possible explanation for that we can come up with is the model assumes for fixed rate labor, labor/capital ratio, so in the period of a tax cut, you improve...you get more people into the work force. The more people (inaudible) rate of return. The more labor you added, the less value they're going to get. And to some extent, we believe it's reduced the productivity of the labor after a certain amount of time. So when you cut out the credit, you see some of this, basically a drawback effect on the lower productivity of the labor. With labor productivity being lower, there will be tend to cut off. Because the model assumes for fixed capital/labor ratio, so you have a lower productivity, you have lower capital, leads to lower employment. And that's what that. So I guess what you can take away here is once you begin this, you can't really

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stop. And we have the description of the TRAIN model in detail on the Web site, tax incentive analysis, and the tax burden study. They are all out there with a great more detail on how the modeling works. And I thank you for the opportunity. [LR444]

SENATOR HARMS: HoaPhu, thank you very much for your sharing the TRAIN information with us. Do we have any other final questions? Paul. [LR444]

SENATOR SCHUMACHER: On the change in employment graph that you just had there, it seems as we approach the 2018 point the change in employment begins to flatten out. If this were projected out with the credit continuing till 2024, would that line run flat? [LR444]

HOAPHU TRAN: The way it looks, likely, yes. [LR444]

SENATOR SCHUMACHER: Okay. So then we're just, by coincidence then, 2018 is about the end of the rapid growth. [LR444]

HOAPHU TRAN: Yeah. I mean when have the first shock of the system, you get a lot more bang for your buck. And another reason that might happen is when you have the flat line, because the company basically, they're expecting the credit to be over, so they're not going to put too much money down on further. So if you're extend this to like '18 or '23, however long there is, you might still see an improving from '16 to '18. But at the end we all will be like this, because sometimes companies plan ahead and they expect the credit to run out and they're not going to invest. [LR444]

SENATOR DAVIS: So is there an aspect of this formula that would include the discretionary spending generated by higher wages in the rest of the economy with how it would percolate out? [LR444]

HOAPHU TRAN: Yeah, do spent more revenue. That's why we get in more tax revenue on the first slide. [LR444]

SENATOR DAVIS: From additional spending with other merchants. [LR444]

HOAPHU TRAN: Yes, additional spending. [LR444]

SENATOR DAVIS: Okay. [LR444]

HOAPHU TRAN: You get more tax, sales tax, more income tax on employment and all that stuff. [LR444]

SENATOR HARMS: Do we have any other final questions? [LR444]

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SENATOR MELLO: And this may be a question for Iksoo, but I'll pose it to you first, HoaPhu. Is the nine household income sectors that you listed, only the last sector only goes, tops out at \$150,000... [LR444]

HOAPHU TRAN: Yes. [LR444]

SENATOR MELLO: ...household AGI or more. Why did you stop at that number? How did you come to that? Because those household incomes are relatively...those sectors are relatively small dollar amounts in between them. [LR444]

HOAPHU TRAN: Okay. We use federal data to account for some of the spending behavior, consumption behavior, and that is all the federal data provides us. [LR444]

SENATOR MELLO: Okay, so it's all just based on federal data then,... [LR444]

HOAPHU TRAN: Yes. [LR444]

SENATOR MELLO: ...those nine sectors. [LR444]

HOAPHU TRAN: Yes. [LR444]

SENATOR MELLO: After...there's no other federal data outside of that then. [LR444]

HOAPHU TRAN: Right. [LR444]

SENATOR MELLO: Okay. Thank you. [LR444]

SENATOR HARMS: Any other questions? Paul. [LR444]

SENATOR SCHUMACHER: One follow-up question: Would the model be capable of running a projection if at some point we imposed a tax on the rental of capital, either for consumer or production side? [LR444]

HOAPHU TRAN: The rental capital is, we deal with after tax, so if you impose a tax on a rental capital, then the after-tax rental rate capital just increases for everybody. Yes, we can do that, basically just imposing a higher after-tax rental of capital rate. We have that in a variable. [LR444]

SENATOR SCHUMACHER: So, which would be the equivalent of like a little bump in the interest rate. That would be about the same difference. [LR444]

HOAPHU TRAN: Yes. [LR444]

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SENATOR SCHUMACHER: Thank you. [LR444]

SENATOR HARMS: Do we have any other final questions? Seeing none, HoaPhu, thank you very much for your sharing this information with you. As just sitting here listening and looking at it, it's pretty complex. [LR444]

HOAPHU TRAN: This is pretty complex and it's...(inaudible) anything new we want after this, it's basically because a new resource area. And whenever you deal with a resource topic, time and specialty in that particular area is...I mean like...I don't know fully on the general equilibrium model. I mean it's just not my field of study. [LR444]

SENATOR HARMS: There seems to be an awful lot of moving parts on this. And so you really have to fully understand all of it to comprehend the end results. That's why I asked you about the mathematical formula and how all that tied together earlier. [LR444]

HOAPHU TRAN: Yeah, we use... [LR444]

SENATOR HARMS: But it's all interconnected, isn't it? [LR444]

HOAPHU TRAN: Yes, we use GAMS, which is a specialized programming for algebra, to solve this modeling, so. [LR444]

SENATOR HARMS: Well, I admire you, both of you, for being able to put this together. It's, as I said, it's pretty complex, but I can see the benefits of it. So thank you very much for your testimony and thank you very much for coming. [LR444]

HOAPHU TRAN: Thank you. Well, thank you all. [LR444]

SENATOR HARMS: Okay. Thank you. I think we'll just take a quick five-minute break and then we'll get ourselves organized for the last half of this. So thank you. [LR444]

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