Webinar Transcript: Data Training Webinar: Agricultural Trade Multipliers - YouTube

Good afternoon, everyone, my name is Valerie Negron and I will be your host today. Thank you for joining us for the first webinar of our data training webinar series. This series was created to teach those interested in ERS data how to access and utilize our various data products directly from the experts. You can find the full schedule of upcoming data training webinars by visiting www.ers.usda.gov/data-training-webinars. Before I introduce our speaker, I would like to remind you that this webinar is being recorded and will be posted on the ERS website next week. If you have any questions during the webinar, please enter them into the chat feature at the bottom left hand corner of the screen and our economists will answer them during the Q&A portion. Now, I'd like to introduce our speaker, Wendy Zeng. Wendy is a research agricultural economist with ERS's International Trade and Development branch in the Market and Trade Economics Division. Her research interests center on macroeconomics and labor and spatial economics Wendy holds a PhD in a Master of Science degree in economics from the University of California San Diego and a Bachelor of Science degree in mathematics and economics from Cornell University. Thank you for joining us today and Wendy you may begin your presentation.

Thanks so much Valerie. Hello everyone thanks you for joining us in today's webinar featuring ERS's agricultural trade multipliers, the first in our data training webinar series. I'm Wendy Zeng, one of the contributors to the ag trade multipliers data product.

One of the incredible things about working with the ag trade multipliers is realizing how important it is for informing the public and the government about the benefits of trade for economy and for creating jobs. This is a tweet from Tom Vilsack, the current Secretary of Agriculture, one of his first tweets when he took office in 2021, talking about the role of trade and supporting American jobs.

I'd like to look into more of these statistics in the following slide. This is a quick snapshot to visualize the economy and how it relates to the agricultural trade multiplier. The data is from 2020, the U.S. exported a record total of 150 billion dollars' worth of agricultural goods which generated an additional 154 billion dollars for our economy. This was a total of 304 billion dollars that contributed to our GDP. The 150 billion dollars of exports also supported the equivalent of 1.1 million civil-civilian jobs. I'll go over the math briefly in a later slide, but we can express these statistics in terms of multipliers as for every dollar of agricultural exports an additional one dollar and three cents of economic activity is generated, for a total of two dollars and three cents of economic activity. And every billion dollar of exports supports 7,550 jobs.

So, those are some teasers before I go over a quick road map of today's presentation. First, I'll provide an introduction and background to the ag trade multipliers and discuss some of the recent features that were added to the multipliers. Next, we will look into what the ag trade multiplier data tells us about the effects of trade on the U.S. economy through various lenses. We'll talk about different industries, take an in-depth look at soybeans, which was the largest U.S. export in 2020, and what the multipliers reveal regarding the benefits of imports. Finally,

we will go over the ag trade multiplier data on our webpage and go over how to use the online calculator. So, I'll start with defining the agricultural trade multipliers and talk a bit about why they're useful to look at. The ATMs, short for ag trade multipliers, allow us to measure the effects of agricultural exports on the U.S. economy, in particular looking at the output and employment effects, and specifically focusing on farm and food products. The methodology that we use is an input-output model. So, this is a quantitative economic model that represents the interdependencies between different sectors of the U.S. economy. So, for example, say China wants to export a billion dollars' worth of soybeans from the U.S. Your first thought is that this will bring business for farmers who grow soybeans, but that's not the end of the story. This also helps the fertilizer industry, it requires services from the trucking industry, farmers have to buy and maintain farming equipment, so there's business for the manufacturing industry. Even the bank gets involved if loans are needed. So, the banker gets paid when China wants to buy U.S. soybeans. You see how the trade purchase might just be for soybeans, but it creates activity in jobs in all these different sectors in the economy and the input-output model will help us to measure that.

So, being able to measure the effects of trade- it's a very useful statistic. So, it's not surprising that we've been doing this since the 1980s, as part of a congressionally mandated research initiative. For a little while, the ag trade multipliers were produced as part of a cooperative research agreement. This year, we're bringing the ag trade multipliers back in-house in a collaboration between MTED, IDT, and APM, the trade and modeling branches and we've released the newest set of data from 2020, just last month.

There have been quite a few recent features and innovations made recently that I'd like to highlight. Previously, the agricultural products were grouped using USDA's own classification system, we've since modified it to be consistent with the World Trade Organization's classification of agricultural products. A second feature is better alignment of the model's economic sectors with product level trade data. We increased the number of product groups from, previously we had 56 product groups, to 124 product groups. Some of these product groups are the result of new categories such as biodiesel and ethanol as they've become important sources of renewable fuel. We've also broken down existing product groups further such as oil seeds and other crops into more specific groups, such as soybeans, other oil seeds, and we've broken down vegetables into tomatoes, lettuce, asparagus, etc. I mentioned previously that the ag trade multipliers use an input-output model, we recently adapted use of the supply use input-output tables from the Bureau of Economic Analysis, which is an improvement from previously used tables in that the supply use tables augment industry economic account statistics. Basically, these newer tables look at the contribution of specific industries and commodities to GDP in better detail and are also able to account for firm level heterogeneity. We also now supplement our labor data from the Bureau of Labor Statistics to also now include the USDA's ARMS survey to estimate the labor requirements of agricultural production. So, ARMS provides additional detailed categories for certain crops and animals. The labor requirements, which help

us estimate how many jobs are supported by U.S. exports, are measured in full-time equivalents, which you can think of as a typical 40-hour work week, 52 weeks in a year, for a total of 2080 hours in a year. Finally, and yes there's been many changes, the ag trade multipliers now distinguish non-competitive imports such as bananas, cocoa, coffee, tequila, from other agricultural imports. So, why is this an important distinction? These goods are not produced in large quantities in the U.S., so the distinction is important in our model because imports usually suggest that if we didn't import it, we might then produce it domestically. But that's not really the case for these goods, so we want to treat them differently from competitive imports. And they're nearly 10 percent of our imports which is not an insignificant amount.

So that was a bit of definition and background. Now, I want to dive back into the data starting with that first chart that I showed you. There was a lot of information that I didn't get to that I want to talk about now. First, is the calculation of the multipliers, which it's pretty simple once you do it several times. So, remember that we had 150 billion in exports, 154 billion in additional economic activity, for a total of 304 billion in economic activity. We take the additional generated economic activity, 154 billion, and divide that by the export value, 150 billion, to get 1.03, which is going to be our value for the overall agricultural output multiplier for additional economic activity. We also calculate using 1.1 million civilian jobs, divide that by 150 billion exports and get that for every billion dollars of agricultural goods we export- we require 7,550 jobs, which is then our employment multiplier. Next, I want to walk you through how we can break the 154 billion dollars of additional economic activity down into industry groups. So, in this graphic on the right-hand side, 68 billion, this purple stack of coins was in the services, trade, and transportation sector. 41 billion, the black stack of coins, was in manufacturing. 32 billion, was in the farm industry, we picked green for crops. And last, but not least, or actually it is least, 13 billion was in food processing. We can calculate a multiplier that's sector specific or even commodity specific.

So, speaking of commodity specific multipliers that brings me to an example where we calculate the multiplier for soybeans. This infographic walks us through all of the trade and economic activity statistics for soybean exports in 2020. I've broken the image down into three slides but you can view the full infographic online in our *Amber Waves* publication.

I'll walk through some of the key points of the infographic. Soybeans, which was the biggest U.S. export in 2020, had an export value of almost 26 billion dollars. Using the input-output model we calculated how much of this 26 billion was generated in different industries. So, total jobs supported throughout this process was a 135,000. So, beginning at the farm, in section one, you have these cute little soybeans growing. So here 27.8 billion of economic activity was generated in the farming industry and 84,000 jobs were supported. Then we load the soybeans onto the truck and move on to point 2. While here, in total 0.12 billion was generated in transportation along with 500 jobs. Next, we arrive at the soybean processing plant past this gas station.

So, to the next slide so right now the truck is at the warehouse at 0.3.So, this place includes food processing services and other manufacturing industries which generated a total of 15.9 billion in economic activity and 50,000 jobs. And finally in point 4, trade services which include warehouse storage wholesale services was 0.14 billion and supported 600 jobs.

So, in total soybean exports comprise about 17 percent of total U.S. ag exports and we can multiply this export number by our multiplier 1.72 to get the total economic activity generated, which is going to be 44 billion. So this is similar to the 304 billion total economic activity number that we saw in the previous chart and we can multiply our export number by 5,275 jobs per billion exports to see that soybean exports supported 135,000 jobs.

So, that was soybeans. This table also shows statistics for corn, cotton, beef, and biodiesel. So, for biodiesel for example, from the third column you could say that for every dollar exported in biodiesel this generates an additional 74 cents in economic activity, for a total of a $1.74 of economic activity. And in the second column we can say that every billion dollars exported in biodiesel generates 4,444 jobs. I want to point out how these statistics can vary quite a bit between commodities, and this reflects the different labor intensities required to generate a particular commodity. For example, it requires more labor to produce beef than to grow soybeans. The multiplier here is more than double at 11,000 compared to soybean at slightly over 5,000. The additional economic activity multiplier is also more than doubled in the case of beef which reflects the higher labor requirements but can also reflect the higher use of capital input materials such as packing materials, etc. A higher labor requirement doesn't necessarily have to have a one-on-one correlation with the economic activity multiplier. So, for example, if you look at corn and cotton the second and third rows, cotton has a higher labor requirement but generates less economic activity per dollar of exports. So, there's a total of 124 different products shown on our website if you're interested in looking through the other commodities and I'll go over how to access those and use the website at the end.

So, we've been talking a lot about how U.S. agricultural exports helped generate economic activity in the U.S. beyond just creating the value of the exports and also how it helps support jobs. I'd like to switch gears a little bit and talk about what we learn about U.S. agricultural imports from our data. A common conception about imports is that they subtract from our GDP calculations. However, with our data we can look at the bigger picture and show that imports contribute to GDP by encouraging economic activity. For example, we might import cattle, but we feed this cattle with corn or other feed grown in the U.S. We slaughter and process the cattle in the U.S., which requires labor, equipment, and for example, packing materials. So, in total, what we found is that the net economic activity generated by competitive U.S. agricultural imports is positive. This would be the total economic activity generated, minus the import costs of the import goods.

Finally, let's look at how to use the ATM calculator. This is the link to the landing page for ERS's ag trade multipliers, which will have the 2020 data. If we click on that link we'll be brought to the following slide.

This is what the landing page looks like for the agricultural trade multipliers. Before moving on to the calculator, I want to point out that here you can access the link to the report for the outlook for U.S. agricultural trade in the middle. This was a report that was also published last month. As well as a lot of other information. On the left-hand side bar there's a glossary of definitions at the bottom, documentation that describes the data and methodology, and also a 2020 data overview page that includes tables and analysis of the impacts of agricultural trade in 2020. We can click the calculator tab highlighted in blue to bring us to the calculator.

So, this is a calculator page. The first step is to choose a commodity group category. You can choose a broad industry category. So here we've selected all ag exports as an example, or we can click on step 1b to choose a customized bundle of individual commodities, which I'll show in the next slide. I want to note here that when you're using this calculator, after you hit submit for each step, it will look like nothing has happened, but don't worry the calculator is taking in your input. So, to proceed to the next step you're just going to have to manually click on the tab for the next section.

So, here I'll show step 1b, where you can go ahead and select any customized bundle of commodities that you wish. So, I can select several of these by just clicking on the white boxes. Next, we'll select the multiplier type. So, there are two types of multipliers: producer and port multipliers. The difference between these two multipliers is that producer multipliers reflect the value of the commodity at the farm gate. While the port multiplier also is going to include transportation and trade costs. The producer multiplier is pretty straightforward, if you select that you can go ahead to review the results.

I want to go over, if you instead want to select port values, you'll be prompted to enter your own margins and ERS also has suggested margins on the left-hand side, based on the data you've selected. I would say, in general, unless you have very specific requirements on your data, I would just copy the ERS multipliers and move on to the results and you'll see why in the next slide.

So, here is the final stage showing the calculator results. This table was actually very long, so I'm showing just the beginning and end of the table. So, you can see kind of what it looks like on the bottom. The first two columns give us the multipliers using the ERS calculated margins. The first column you'll see is the employment multiplier and the second column is the total output multiplier. And then the third and fourth columns will show the results from the margins you may have inputted from the previous step. The first- so, in the third and fourth columns the first line will show the overall multiplier for all the commodities selected and the entries below that will always be blank. So, it's- it's not because you failed to input something. And then, finally at

the bottom there's options to display the ERS calculated margins, print the results, or save the table as an excel file.

And so, before I close, there's just a few ways to stay up to date with ERS research. We have a social media on Twitter and Linkedin, we have a chart of note where you can find the chart that I showed previously, as well as the infographic, and of course the website has a lot of information and data. All right, so thanks so much to everyone for listening and Valerie I'll hand it over to you for the Q&A portion of the webinar.

Thank you, Wendy. Well let's go ahead and open the floor for questions now. As a reminder, questions can be submitted through the chat feature located at the bottom left hand corner of your screen. A few additional economists from our agricultural trade multipliers team are joining us today to assist in answering your questions and I'd like to introduce them now. Joining Wendy we have Steven Zahniser, Maros Ivanic, Fengxia Dong, and Megan Husby. All right, Wendy, for our first question: what is the difference between competitive and non-competitive imports?

Thanks so much for the question, Valerie. So, the difference between non-competitive and competitive imports is that the non-competitive imports are going to be goods that are not produced in large quantities in the U.S. So, in our model we want to distinguish between the two because if- because usually with competitive imports that would suggest that if we didn't import it we would produce it domestically, but that's not true for the case of these goods.

Thanks, Wendy. Next question from someone who says: I noticed for the soybean multiplier that the infographic reports 1.72 as the multiplier but the calculator reports 0.72 as the multiplier, can you explain why there is a difference?

That's actually a really great question. I'd like to clarify that. So, I'll take us back to slide 12. So, here we're showing 1.72 as the total multiplier and then in the following slide you'll see, right as the listener uh mentioned, 0.72 as the multiplier. So, this is uh actually not an error. The 0.72 is the additional economic activity multiplier on top of the value of the exports. So, once we add in the value of the exports, that becomes the total economic activity multiplier, which is going to be the 1.72 that we see here. And, in general, when we're reporting the multipliers in our data, on the calculator, or in our publications, the- the keyword I think you want to look at is whether we're using the word "total", which is going to add the value of the exports or if we're using the word "additional", which is going to be the 0.72. For the soybeans, for example. But thanks, great question.

All right, next question: can you explain again the difference between port and producer multiplier?

Of course. So, let me go back to, I believe it was slide 19. Yes, so we actually calculate both port and producer multipliers. So, the producer multiplier is going to be the value of, yeah, so it's going to be the value of the commodity, without any of the shipping or the trade costs. And then,

so that's the producer value multipliers. And then, the port value multipliers are going to include these trade and transportation costs.

Thank you, Wendy. For the next question: does the data product also have import multipliers?

I believe- so, I'll pass this question on to Megan. Megan, would you like to answer this question?

Sure, thank you Wendy. My name is Megan Husby. The- the end use of a product is what determines its multiplier effects. We currently do not have import multipliers, as there's no end-use data available for imports that would allow us to be able to measure their indirect economic activity. So no, currently there is not an import multiplier.

Thank you, Wendy. Thank you, Megan. For your next question: in comparing the 2019 and 2020 multipliers, why are the multipliers for 2020 lower compared to the previous year?

That's a really great question. So, for just a bit of background if you go on our website here. So, you can actually grab the multipliers from 2019, as well as 2018 and 2017, and in that sense, you can compare them to the multipliers for 2020. So, the multipliers for 2019 are lower than for 2020. And there's a couple reasons why the multipliers for 2020 are lower, compared to 2019. One is because of the change in composition of export products. For example, recently soybean exports have really increased by a lot and the multiplier for soybeans is quite low compared to those of other commodities so that will bring down the average multiplier that we see. Another reason, and this kind of speaks to the fact that having a lower multiplier doesn't necessarily mean that's a bad thing. So, due to increasing capital intensity and higher labor productivity, that allows us to produce goods with fewer resources and fewer workers. So, for example, the number of workers required to produce a billion dollars' worth of soybeans could be less than the number required in previous years. So yeah, this will also help bring it down the multiplier.

Thank you, Wendy. Next question: if there is a fluctuation does that imply the structural change in supply chain?

Let's so-

Let me go ahead and ask that question again, Wendy. So, one of our listeners-

Ok, can we compare the employment multiplier year by year? If there is a fluctuation, does it imply the structural change in supply chain?

Okay, yeah so if the implied- employment multiplier is changing from year to year. Does that imply structural change in the supply chain? So yeah- so I mentioned that one of the reasons could just be due to increasing labor productivity, or increasing capital intensity? But yes, I think changes in the structural- in the structure of the supply chain could also be a reason.

Thank you, Wendy. Next question: Do you have any other industries, or economic activities, to compare this impact to in order to put it in context? I believe this question may have come up

around slide 13. So, let me go ahead and ask that question again. Do you have any other industries, or economic activities, to compare this impact to in order to put it in context?

Yeah, that's a really great question. So, I'll pass this question on to Maros. Maros, would you like to answer this question?

Yes, thank you Wendy. I'm Maros Ivanic. So, if I understand the question correctly uh there are additional industries that are included in this um calculator, a total of 124, I believe. These are all agriculture related industries, we have not presented them here because it would be just a big table, of course. You can go navigate to our website, go to the calculator, and you'll be able to get these multipliers for every single commodity industry included in the- in our calculator. Of course, non-agricultural industries would not be available. They were not addressed in this way.

Thank you, Maros, and thank you, Wendy. For our next question: how can these data be useful in policy decisions?

That's a really great question. So, we've actually gotten quite a few requests uh over the past year from other government agencies uh and they're basically working with these multipliers to estimate the benefits of a lot of programs, I think like- such as subsidies. So, they- they use the multipliers to see if the value of their programs, what is the total economic activity that they can expect to come out of them. So, those have been some kind of bigger ways that the government has used our data.

Great, thank you. Next question: what are some of the biggest exports in 2020?

Yeah, that's a really interesting question. So, in 2020- so we saw that the U.S. exported 150 billion dollars' worth of agricultural goods and we split this into 124 total groups. I believe the top 10 export commodities made up more than half of the value of these exports. And so, the biggest export, by far, of course was soybeans at about 26 million. And that was about 17 percent of our total exports from the statistics in the infographic. The second highest export was corn. And beef and pork were the largest meat exports and wheat, and cotton were also included in that top ten.

Thank you, Wendy. Next question: is it relatively easy to extract pre-2017 ATMS and, as a follow-up to that prior question on the comparability, would you advise against comparing ATMS? So, let me ask that question again. Is it relatively easy to extract pre-2017 ATMS?

Yeah, so that's a great question. For the first question, yeah, whether it would be easy to extract pre-2017 ATMS. I- well the- we previously had like 2016-2015 data, but they were removed so right- so no- so right now we don't have those available. But we potentially are looking into making historical- our historical values available on the website.

And Wendy-

Sorry, could you repeat the second question for me?

Yeah, of course. As a follow-up question: would you advise against comparing ATMS year over year? Wendy- I think you may be on- on mute. The follow-up question is: would you advise against comparing ATMS year over year? Maros, would you like to?

Um, if I may? Thank you, thank you, Valerie. So, I would say that, of course, we are producing this time series with the hope that some interesting information can be extracted and understood from the variation over time. But, I would like to also mention and direct our listeners to the methodology description, which also makes it very clear that we rely on a lot of data sources, which are not updated annually. So, some major updates happen only every five to seven years. Some updates are more frequent. So, it is important to read the documentation and understand that some of the differences in the ATMs may come from these changes of the underlying data that served as input for our work.

Thank you, Maros. Next question: do you estimate the multiplier of U.S. agricultural exports to specific countries? For example, China?

So yeah, that's a great question. So, right now we don't do country specific multipliers, but it's- the issue definitely a possibility in the data.

Thank you, Wendy. The national multiplier may be different from that at the state level. Any advice as to how to adjust the calculation?

That's also a great answer and I think- or a great question and I think that's actually been of interest from a few of our stakeholders. So, the input- so the big thing, so right now we use the current national multipliers for requests about state multipliers. In general, if you want to get more specific, so more accurate for the state level, would require the use of constructing a state level input-output table which, currently, we're only using the national level input-output table from the BEA. But-but, it's a- it's a good enough- it's a- it's a proxy for now, I suppose.

Thank you, Wendy. Here's another question: is it relatively easy to extract pre-20- oh I already asked that one, my apologies. Next question, Wendy: how are biodiesel and ethanol input-output data incorporated? Were they updated in the source data or updated in your calculations?

So, the biodiesel was- the biodiesel and ethanol, I believe, were updated in our in- our- in our calculations and in our model. But, Steven, would you like to expand on this?

Actually, I don't think that I would be well positioned to answer that question, this is Steven Zahniser, but so I'll pass on that one.

Okay, no worries, so yeah, so something that we added to our model I believe that BEA previously also had these commodities in their input-output tables because the supply use tables from the BEA are not agricultural specific.

Thank you, Wendy. Let's see what the next question we have another-

I believe Maros has something-

Okay yeah thank you- I believe mars also had something to add to this question. Maros, please go ahead.

Yes, thank you my apologies. I wanted to only bring the attention of our listeners to the fact that the input-output table, for example, in this case was not updated by the BEA. So, at that source, the bio biodiesel biofuel would not be updated so we can only introduce it in uh whatever um trade data that we were able to get updated for the last year. So, I'm just demonstrating that parts of our input data will get updated more frequently than others.

Thank you, Maros, and thank you, Wendy, for that answer. Next question and we may be coming close to an end here: how can the agricultural trade multipliers be used to decide what subsidies to provide to agricultural exports?

Yeah, that's a great question as well. Okay so I think the thing that I would want to note is that the- the multipliers are going to tell you how many jobs will be supported from each commodity as well as the economic activity multiplier. But currently, the data doesn't speak about, you know, which group would benefit the most or like what- what is the U.S. efficient at producing. So-so I think those questions have to kind of be kept in mind when you're thinking about these things.

Thank you, Wendy. Next question we have from one of our viewers they wrote: I noticed that ethanol and biodiesel had identical multipliers. Is that a coincidence? So, from our tables, I believe that is not- it's not a coincidence. So here the numbers are a bit rounded. But if I actually notice when working through the data if you- if you like go in and look at the individual values coming from our model they'll still vary by very little bits, in like the decimal places. So yeah, so great catch but, yeah, they're not quite identical, so yeah.

Thank you, Wendy. And that's all we have for today. Again Wendy, thank you for that great presentation on ERS's agricultural trade multipliers data and thank you to the rest of the ag trade multipliers team for joining us to answer questions. Finally, thanks to our listeners for taking time out of their day to join us.

Additional questions, let me switch over to that slide so you have um their emails, additional questions uh here- additional questions about the ag trade multipliers data can be directed to either Wendy Zeng or Fengxia Dong at the emails listed above. We would also like to take this opportunity to invite you to the next webinar in the data training webinar series on ERS's agricultural baseline database. Learn more about these 10-year projections of the U.S. farm economy by joining us on Thursday, April 28th at 1pm ET. For more details make sure to visit us as at www.ers.usda.gov/data-training-webinars. You can see the link right there on the screen registration information will be available on that page soon. Lastly, we would like to invite you all to download the ERS Charts of Note mobile app for digital snapshots- snapshots of ERS research delivered straight to your mobile device. Thank you all for joining and this concludes our webinar, thank you.