Good afternoon, everyone, and welcome to our *Data Training Webinar: Food Price Outlook*. My name is Liz Hills and I will be your host today. As a reminder, this webinar is being recorded and will be posted on the ERS website next week. If at any time during the webinar you have questions, please enter them into the chat feature at the bottom left-hand corner of the screen and our speaker will answer them at the end of today's presentation. Our presenters for this webinar are ERS Economist Megan Sweitzer and Matt MacLachlan. Megan is an agricultural economist in the food markets branch of the Food Economics Division. Her research focuses on food prices, food expenditures, and consumer purchasing decisions. Previously, she worked as an energy industry analyst for the Federal Energy Regulatory Commission and as an economist for the U.S. Bureau of Labor Statistics. Matt is a research economist also in the food markets branch of the Food Economics Division. His research focuses on forecasting food prices. He has also studied the effects of natural disasters and infectious diseases on agricultural production, trade, and markets. Thank you both for joining us today. Megan, the floor is yours.

Well, thank you for the introduction, Liz, and thanks to everyone for joining us today for the *Food Price Outlook Data Training Webinar.* Food price changes have impacts across the economy. They affect producers along the food supply chain, including farmers, wholesalers, and retailers. They affect governments and food assistance programs. And they affect consumers, like you and me, as I'm sure most of you have noticed changes in the prices of food that you buy over the past year. In 2022, food prices grew 9.9 percent, the largest annual increase since 1979. And this is much higher than the average over the previous 20 years where food prices grew about 2.8 percent per year, on average. Prices for food at home, or food from retailers such as grocery stores or supermarkets, increased 11.4 percent in 2022. And prices for food away from home, such as restaurants and fast food, grew 7.7 percent. There is some inherent variability in food prices from year to year. In the charts, you see food at home price changes have varied over the past two decades, including periods of higher growth, low growth, and even price decreases. But both the price changes in 2022 and the forecast for change in prices in 2023 are higher than in recent years.

Here at ERS, we track data on food price changes, and we forecast future food price changes in the Food Price Outlook data product. We publish monthly forecasts of the annual percent change in food prices for the current year and beginning in July for the following year. So, right now in March we publish forecasts for annual food price changes in 2023 and starting in July we'll publish forecasts for 2023 and 2024. The Food Price Outlook tracks prices and publishes forecasts for 22 retail food categories tracked by the Consumer Price Index. The Consumer Price Index, or CPI, is published by the U.S Bureau of Labor Statistics and is the most widely used measure of price changes in the economy. The CPI for food measures changes over time in the retail prices paid by consumers and prices are tracked for a number of detailed food categories. The Food Price Outlook also forecasts seven farm level and six wholesale food categories tracked by the Producer Price Index, or PPI. Like the CPI, the PPI measures price changes over time but, instead of measuring changes in retail prices, the PPI measures the average change in prices paid to domestic producers for their output. Farm and wholesale prices are typically more

volatile than retail price foods and price volatility decreases as products move along the food supply chain from the farm to the wholesale factor, to the retail sector. For each of these 35 farm level, wholesale, and retail categories, we publish a forecast of the expected price change and the range of likely price changes. On the right of the chart here, you can see the range of likely values, or the prediction interval, for the change in retail food prices in 2023, ranging from 5.5 to 9.6 percent. And we'll dive into more detail about these forecasts later in the webinar.

But taking a step back. Why is it important to track and forecast food price changes? Well, spending on food accounted for 12.4 percent of total U.S. household spending in 2021. Food ranked as the third highest major spending category, behind only housing and transportation. And well above other categories like health care and apparel. The food is both a major expenditure category for households and it's also a basic necessity. And rising food prices can force households to shift spending from other categories to purchase enough of it.

Food prices also grew more rapidly than most major spending categories in 2022. Food prices grew 9.9 percent faster than the All Items CPI, which is a measure of the overall rate of consumer inflation. So, the food price increases in 2022 outpace both the overall rate of inflation, which was eight percent, and all major consumption categories, other than transportation.

It's also important to track and forecast food price changes since changes don't occur uniformly for all food items. They differ across food categories, both in the size of the price changes and when they occur. In 2022, all retail price categories tracked by ERS grew by at least five percent. And all exceeded their long-term average rates of growth. Price growth in 2022 ranged across categories, however. Egg prices rose the fastest in 2022, by about 32 percent, and beef and veal prices grew the most slowly, at about five percent. But different factors affect different categories. For example, the rapid growth in egg prices, in 2022, was primarily due to the Highly Pathogenic Avian Influenza outbreak, which affected egg laying flocks. Beef and veal prices grew the slowest in 2022 but that followed behind years of rapid growth, in 2020 and 2021, when beef and veal prices grew the fastest of all categories as the pandemic had an outsized impact on that industry.

So, before we get into the details of the forecast. Let's walk through the data resources we have and how you can find them. ERS updates the Food Price Outlook forecast, data files, and website monthly. Typically, on the 25th of the month. From the ERS homepage, which you see here, you can find the data product pages in a few different ways. On the left side of the home page here, there's a tab for reports, data, charts, and maps, and if you click on data, the Food Price Outlook page is sometimes linked right here on the ERS homepage.

The other way to find the data products is through the top menu bar. If you click on the data product drop down the Food Price Outlook is found under the Food Markets and Prices topic area and there, you'll find a link to the Food Price Outlook data page as well as other ERS food price data sets.

Each month, we update the Food Price Outlook Summary Findings page, which is a narrative summary of the most recent data and forecasts. It provides information on recent historical price changes and discusses the recent CPI and PPI price and forecast changes and includes discussion

of factors contributing to price changes. So, if you'd rather read about the data than download a data file this is your stop each month.

We also publish an interactive data visualization that helps describe and illustrate trends in food prices and in spending. That's where you'll find data for some of the charts we've already presented earlier in this presentation, such as the annual change in food at home prices and household expenditures and price changes by major spending category. And you can use the interactive visualization to look at different time periods or see how those have changed over time. It also contains tabs to illustrate how food price inflation differs between food at home and food away from home among different food categories and in different metro areas across the country.

And it also shows how food price inflation doesn't affect all households in the same way. Lower-income households spend a larger share of their income on food, about twice as much as the average. The rising food prices may disproportionately affect these households.

The Food Price Outlook overview page is where you'll find the data files that contain all of the data we publish. The data files titled changes in Consumer Price Indexes and changes in Producer Price Indexes are the primary Food Price Outlook data files that are updated monthly with the latest price and forecast data. And you can see that they were last updated on Friday, March 24th. We also have two other types of data files that contain past data. The historical forecast files contain ERS forecasts going back to 2003 for the 35 retail, wholesale, and farm level food categories that we forecast. And these files are updated monthly, as well, to add each new set of forecasts. We also have files that contain the annual percent change in prices, published by the BLS, for each category going back through 1974. If you'd like to see how prices changed over time for any of the categories we track.

So, let's look into one of those primary data files, the CPI file, which contains data about the retail prices that consumers pay for food. So, the first column shows a list of food categories we tracked, and this is a partial look at the data for about half of the CPI food categories. The last three columns are the ERS Food Price Outlook forecasts of predicted price changes for the year. And then in the middle columns, these files also contain Consumer Price Index data published by the Bureau of Labor Statistics for each food category. And these include monthly and year-over-year price changes, as well as recent annual changes and historical averages. And the CPI data they're both an input source of data that we use to produce the forecasts and in this file they help provide important contexts for the forecast.

So, let's zoom in and take a closer look at some of the columns here. The Relative Importance column shows what percentage each category contributes to the all-food CPI. And so, this is a proxy for share of consumer expenditures on each category. The food way from home makes up about 35.5 percent of all consumer food spending and food at home is about 64.5 percent. And then each detailed food at home category below also contributes a share of total food spending. For example, meats make up about 7.6 percent of total food spending. So, in this file you can find information about recent price changes including the change in prices over the past month.

So, for example, here we see food at home prices rose 0.3 percent from January to February 2023. You can also find how prices changed from this same month last year.

And it also contains data about how prices have changed in recent years. Here we see food at home prices rose 11.4 percent in 2022 and that was higher than both the change in prices in 2021, which was 3.5 percent, as well as a 20-year historical average of 2.5 percent. And so these columns with the BLS price data help illustrate current and recent price trends and these data provide contacts for the forecasts. They help to illustrate whether the forecast price change for 2023 is lower or higher than recent years and how it compares to the long-term average. And that brings us to the rightmost columns, our Food Price Outlook forecast columns. Right now, this file includes forecasts for 2023, and in July, the data file will include forecasts for both 2023 and 2024.

And so, this is a great time for me to turn it over to my colleague Matt to explain these forecasts in more detail and to discuss recent updates to the Food Price Outlook data product, Matt.

Thank you, Megan. Hopefully everyone can hear me all right. So, I'm going to pick up where Megan left off and here, we're going to zoom into a part of the slide that Megan just showed that describes the prediction intervals. We have specifically zoomed in to look at the prediction intervals for the change in all food which describes our expectations for 2023. The midpoint represents the most likely change and the lower and upper bounds are of a 95 percent prediction interval. What does this mean in simple terms? Well one in 40 times we expect the annual percent change to lie below the lower bound of the prediction interval. One in 40 times we expect the price change on an annual basis to lie above the upper bound of our prediction interval, but 38 out of 40 times, or 19 out of 20 times, we expect our annual percent change to fall within this range. Together these points provide a picture of how we expect prices to change and which price changes we may not want to rule out with the available data.

For those of you who have been following the Food Price Outlook you might have noticed some changes to our methods and reporting at the beginning of 2023. We implemented the methods described in our recent ERS report called time series methods for forecasting and modeling uncertainty in the Food Price Outlook. In this report, we developed and evaluated a new approach to selecting forecast models and representing uncertainty about these forecasts. In each month for each price series, we select an auto regressive integrated moving average model based on how well it fits recent data. Using this type of model selection, we improved forecasting accuracy and precision, or how close our forecasts typically are to the actual level of inflation. At the same time, we are able to identify a good rule for picking the best model each month, allaying concerns that our specifications are falling out of date. Obsolescence and specifications is a serious concern due to recent shifts in food markets and rapid improvements in time series methods. Recent large shifts in food prices also highlighted the need to rigorously address uncertainty about forecasts. At a high level, overall food prices increase 9.9 percent in 2022, well above those of recent history. As Megan pointed out earlier, egg prices increased by over 32 percent in 2022 and have fluctuated widely throughout our data. These patterns and food prices indicated that a wider interval was likely necessary but intervals that are too wide may not be informative. Using a statistical approach, we provide ranges that are as narrow as possible while

reasonably conveying uncertainty. Additionally, prediction intervals narrow throughout the year as more data become available. For 2023 we will be much more certain about annual food price changes in December than we were in January.

So, how well do our prediction intervals perform? Food prices can be difficult as unforeseen disruptions affecting inputs in the food supply chain can have substantial impacts on food prices. Nevertheless, we find that in our Januarys between 2011 and 2020 our predictions interval included the actual level of inflation 8 out of 10 times for all food, 9 out of 10 times for food away from home, 8 out of 10 times for food at home, and 10 out of 10 times for dairy. And dairy represents a particularly difficult to predict food category. Across all 22 retail categories that we report, we found that the actual level of inflation was in range 188 out of 220 possible times, or just over 85 percent. This performance represented a substantial improvement over existing methodologies.

We have drawn this figure from the ERS report that I mentioned earlier. Here we plot prediction intervals for dairy products in 2020. As a reminder the food system changed dramatically at the beginning of 2020 as consumers and food retailers adjusted to the COVID-19 pandemic. 2020 was simply not an easy year to make forecasts. along the X-axis we plot when the forecast was made using price data through the previous month. By December, we have all but one month of the data for 2020. We can see that the interval starts wide and then narrows in on the actual level of inflation. By the time we have April data and May, the midpoint of the prediction intervals within about a percentage point remains within this range for the rest of the year.

Next, even more- a more difficult case. In 2022 food at home price inflation was at its highest since the mid-1970s.It was very difficult to predict at the beginning of the year that this would be the case. However, by May's forecast, using data from April and earlier, we have a prediction interval that includes the elevated level of inflation and then midpoint estimate that remains within about a percentage point of the actual level of inflation throughout the year.

Very interested viewers of this webinar who want to learn more about forecasting methods behind the Food Price Outlooks forecast, should visit the documentation tab on the Food Price Outlook website. At the top, in the blue box here, we have several resources related to our work. Lower, circled in red, we have the previously mentioned ERS report that details our methods for model selection and developing forecast intervals. This report also includes four case studies that detail how the Food Price Outlook forecasts- forecasts may be enhanced or applied to series not currently included in the for- Food Price Outlook monthly forecast. It is a great resource if you would like to know how the forecasts have evolved over time, recently improved, and how they may continue to improve in the future.

The new methods have also impacted how the summary findings are written. These reports now focus on the midpoint of our prediction intervals while acknowledging the uncertainty characterized by the prediction intervals. For example, we can see that we expect all food prices to increase by 7.9 percent in 2022 and the prediction interval includes values between 5.5 and 10.3 percent.

The Food Price Outlook serves a very wide audience of different data users with equally diverse backgrounds. We regularly correspond with the food and nutrition service of the USDA to provide specific analysis and forecasts about prices for foods of particular importance to their food assistance programs. Other USDA and federal agencies reach out to us when they have particular questions about food prices and markets. Agricultural financial or retail analysts will reach out with questions to help them inform their expectations about budgets or valuations. Media often reach out when reporting about rapid changes across food prices when a particular food price changes dramatically. As Megan discussed earlier, egg prices increased by over 30 percent in 2022 due to an outbreak of Highly Pathogenic Avian Influenza. We also have many other users from Academia- Academia who regularly reach out to us. To folks who use the Food Price Outlet but do not reach out to us.

And with that I would like to wrap up by reviewing a few key takeaways. First, the Food Price Outlook has been developed for decades. It began as an informal, internal USDA product. It is now a highly vetted product with many domestic and even international users. The Food Price Outlook uses BLS data on monthly food prices to comment on recent trends in food prices and develop forecasts. We also have a suite of data visualizations that capture trends and statistics about food expenditures which provide context for our monthly report. These products are typically updated annually as new expenditure data become available. ERS periodically evaluates the methods used in the Food Price Outlook forecast, identifies areas for improvement, then we Implement these changes after receiving feedback from our many- many sister agencies and stakeholders.

And with that I would like to open it up for questions. Megan and I have also posted our emails here in case viewers would like to send their questions following the presentation. We are public servants and strive to respond as quickly as possible.

Thank you, Matt, thank you, Megan, for your presentation. We'll go ahead and open the floor up for questions now. As a reminder, questions can be submitted through the chat feature located at the bottom left-hand corner of your screen.

For our first question: which forecast model do you use for forecasting?

That's a good question and I think I can take this one on. So, we use a selected auto regressive integrated moving average forecast model. So, this is typically referred to as an ARIMA model, we select it based on a Bayesian Information Criterion which helps us balance model fit with parse moding. Simple models tend to perform better and provide better forecasts than do overly complicated models.

Thanks, Matt. For our next question: there is a lot of different price data out there from places such as the Economic Research Service, the Bureau of Labor Statistics, the Agricultural Marketing Service, etc. How do they differ and how do I know where to go to get what I need?

This is a great question and I think Megan is in the best position to field this one.

Thanks, Matt and thanks for the question. At- at ERS, our primary product is the forecast. The ERS reports, some recent BLS data along with our forecasts, like we showed earlier in the

presentation. So, for a snapshot of recent trends and recent changes for the food categories that we track, our data files provide a convenient way to access that information along with the forecast. But if you'd like data on longer trends in food price changes, or for food categories other than the categories we cover, you should go straight to the source because the BLS, the Bureau of Labor Statistics, CPI and PPI programs, they publish a wealth of price data um going back decades in some cases. And the- so the CPI and the PPI data that we've been talking about, those are price indexes, so they track changes in prices over time and that- that's the data we forecast, the change in prices. So, these do not report actual price levels, like an average price, and so if you're interested in data on price levels or average price values there are some data available but they're more limited than the CPI indexes which cover a representative basket of all retail food items. So, the- the BLS CPI program publishes- does publish average price data for about 70 food items and then the USDA Agricultural Marketing Service also tracks weekly retail prices for several hundred commodities from major retail supermarkets. And so, the- the Agricultural Marketing Service data are drawn from advertised price data and so these data can provide price levels and also high frequency data for detailed commodities.

Thanks, Megan. For our next question: you mentioned that you provide forecasts for 22 CPI categories and several PPI categories. Can you give us an idea of what categories are covered?

That's a great question. We covered 35 retail wholesale and farm level categories. I fear we don't have enough time to individually go through each of those. We are here on our slide 17, we show some of the big retail food categories in terms of overall expenditures. All food is going to be an aggregate of all retail categories, food away from home is a standalone category, and then we break out food at home into 19 component parts. This will include very large categories, like meats, poultry, and fish, very specific categories, like dairy products, as well as other miscellaneous categories, like other foods and sugars and sweets. Which capture a lot of different goods that are typically more processed. On the whole wholesale side, we also provide forecasts for producer price indices, or PPIs, and this will capture goods before they hit retail markets things like cattle, beef, so that the wholesale level, wholesale wheat, and farm level- farm level wheat, and wholesale flour. So, I won't itemize each of them, but broadly we- we cover a lot of different categories from the farm, through wholesale, and retail levels.

Thanks, Matt. For our next question: do the summary findings include information about what is driving food price changes?

Yes, the summary findings will provide descriptions of what are oftentimes considered to be important factors in aggregate food price changes, or at the real broad scope what might be driving all food prices to increase, as well as descriptions of why food prices could be increasing due to recent events. Things like Highly Pathogenic Avian Influenza, that was mentioned earlier. We also- this is a great time I think to talk a little bit more about the summary findings and say that it is a great resource that describes long-term changes in food prices and trends, recent changes in CPIs or retail level food prices, as well as changes in our Producer Price Indices that I mentioned to answer the previous question. Megan, do you have anything to add to that?

No, just it- it also includes links to additional ERS Outlook publications where you can find additional information and analyzes on farm level prices for a number of the commodities covered in our forecasts.

Thank you. Our next question is: can I access the BLS data you used in your forecast?

This is a great question and I'm going to pass it to my colleague, Megan, to answer this one.

Thanks, Matt. Yes, all of the BLS data used in the Food Price Outlook files and in the forecast process- we use all publicly available data. And all of this data you can find on the BLS website bls.gov. They have a number of tools to make their data available. They put out press releases, they have- like I mentioned earlier, quite a wealth of data available through their databases. So, you can do a database search, or use their data finder, and you can also use their API. So, there are a number of ways to access the data and none of the data that we use is non-public, everything we're using in the data- in the forecast is public- publicly available data.

Thanks, Megan. Our next question is: what are the factors that contribute to food prices?

That's a very broad question. I think there are some very important factors that are going to contribute to aggregate food prices across the board but then there are going to be factors that affect specific food categories differently. It's important to, I think, about price changes for energy prices and labor, that's going to affect all food commodities as well as retailing the food. But then there are going to be specific commodity level factors, for example, recent droughts impacted lettuces- lettuce prices disproportionately, that's not necessarily going to be true for all the products we can see. I think- when thinking about it we have also pointed to things like the federal funds rate, which when that increases it places downward pressure on all prices in the economy, including food prices. With that intro, I will ask if Megan has additional thoughts on that broad question.

Thanks, Matt. Well, in addition to what- to what Matt said, at ERS here one of the other data sources we have that can help provide some insight into that question is the ERS Industry Group Food Dollar data product. So, this data product illustrates how 12 different industries along the food supply chain can each contribute to food production costs. So, for example, it shows that food processing is the most expensive step along the food supply chain and that accounts for about one quarter of food at home costs. Where retail and wholesale trade together contribute about 39 percent of it at home costs. And then agribusiness and farm production, or what you think of as on-farm activities, these industries together contributed only about 15 percent of food costs. And so that's the ERS Industry Group Food Dollar data product that's able to provide some of that information as well.

Thanks, Matt, Thanks, Megan. Our next question is: how are the Food Price Outlook forecasts different than other forecasts? Such as the World Agricultural Supply and Demand Estimates, also known as the WASDE.

That's that's a great question and I think I can take this one. The USDA Food Price Outlook differs from other USDA forecasts in that it focuses primarily on retail food prices. We also provide forecasts of food prices up the supply chain at the farm and wholesale levels, but our

primary focus is on the retail level. Whereas products like the WASDE and then the Livestock Dairy and Poultry Outlook of the USDA Economic Research Service typically focused on the farm and wholesale level prices. This is a core distinction of our product versus some of these other products that provide forecasts that are provided by the USDA.

Thanks, Matt. Our next question is: how long will you continue publishing the Legacy version of these reports?

I'll pass that one over to Megan.

Okay, and just to maybe remind everyone or- or let everyone know what the Legacy version of the reports are, so, Matt mentioned earlier that in January of this year we implemented a new forecasting method which was the method that- that Matt described here in the presentation. And so, prior to that, we had been publishing using a different method um since about the early teens and so referring to that as the Legacy method. And so, when we implemented the new method in January of this year- we're- our plan is to continue publishing both the new method and forecast using the Legacy method for six months. So, we'll continue to produce the forecast using the Legacy method through June of this year. And then beginning in July we will transition to using solely the new time series forecasting method for our forecast going forward.

Thanks, Megan. For our next question: who uses your forecast or- excuse me, let me repeat that. Do you know who uses your forecasts and what they are used for?

It's a big question we have a lot of different data users. Here on slide 31, we can see some a select list of some of our users. We certainly know our sister agencies are looking at our USDA products, the other federal agencies that reach out to us, the folks who send us emails. We- we have some broad sense of the amount of web traffic that we receive but we do not necessarily parse that out by individual users by any means. So, we have a good sense of our users are who contact us, but there are many others who use our products, perhaps infrequently too, that um we're not- we're less aware of. So, for sure we know that uh media reaches out to us and asks us questions, so we know for sure those folks are using it. We know these analysts who reach out to us and ask us more detailed questions are using our products and these other agencies who reach out to us as well. Megan, do you have anything to add to that?

I would just add that like- like all ERS products, we're publishing, you know, data on our website and then we're also communicating some of these- some of our data products, some of our findings, through different outreach tools. So, we're publishing reports, we're publishing Amber Waves magazine articles, and we're publishing charts of note like you see on- on the slide here. And so, these- these are available both to subscribers on our website but also these get published on Twitter on LinkedIn and so we're reaching audiences who are generally interested in, you know, the topic of food prices and- and we're helping to provide that information in a hopefully easily digestible way um just to a general audience as well.

Thanks, Matt. Thanks, Megan. Our next question is: how far into the future do you make your price forecast?

I believe this is something that Megan touched on early in the presentation. In short terms, we provide annualized percent changes in food prices for the current year and then starting in July we will begin forecasting next year. So, we forecast up to 18 months into the future with those next year forecasts that begin in July. Megan, do you have anything to add to that?

And, I guess, just to provide maybe a little more clarity on- on how that works. Is so in July of this year when we start publishing the forecast for 2024 and we'll also be still publishing the forecast for 2023. So, at that point, for 2023, we'll have five months of- of realized data of changes that already occurred in 2023. And then we'll be- for we'll be using that data and forecasting for the total change in 2023. And, at that point, we'll also begin forecasting for 2024 and we obviously won't have any realized data yet for 2024 at that point. And then moving into December of this year, we'll have 11 months of realized data and we'll be forecasting one additional month for the total change in 2023 and then we would be forecasting again for the whole year in 2024 next year.

Thanks, Matt. Thanks, Megan. Our next question is: have food at home prices risen faster or slower than food away from home?

That's a great question. For the period up until 2009, or right into the Great Recession, we saw that food at home and food away from home prices roughly tracked one another if the price changes were pretty similar. Since 2009, food at home prices typically grew more slowly than food away from home prices. So, the foods you buy in the grocery store typically grew at a slower rate than the food that you bought from a restaurant. And in 2016 and 2017, we actually saw price deflation for food at home, meaning that prices actually declined in those years. It was a small decline, but we actually had declines. Since the onset of the 2019 pandemic, however in 2020, and in 2022 we saw food at home prices grow more quickly, or at a higher percentage rate, than food away from home prices did. So, in this last year we saw that food away from home- our food at home actually grew by 11.4 percent. In contrast, all food only increased by 9.9 percent, and this is because food away from home grew more slowly.

Thanks, Matt. Our next question is: does ERS have other information on food prices?

I'll pass this one over to Megan and see if I can add to it at the end.

All right, thanks Matt. Yeah, in addition to the Food Price Outlook data product, ERS does have other data and analysis related to food prices and expenditures, including a few other data products. We have the- the Price Spreads from Farm to Consumer data product shows how prices paid by consumers for food compared to the price of farmers receive for their corresponding commodities and there's actually a data- a data training webinar on that data product as well if you want to check it out. We also have a brand new ERS product, The Purchase to Plate, which provides prices for food we eat where most retail price data sets are typically only available for foods that we purchase. And then related to prices, ERS also has a few sources of food expenditure data including the food expenditure series, the weekly retail food sales data set, and the food dollar that I mentioned earlier.

That was terrifically comprehensive, I've got nothing to add.

Great. Thanks Matt and Megan. Our next question is: how closely are commodity prices and food prices related?

Yeah, I can take a first shot at that one and then pass it over to Megan. So, ag commodity prices and retail food prices tend to be different in their patterns. While farm level food prices are- and ag prices are related in that ag products are purchased to make food- a whole lot of other things go into food prices, including all the things that are captured by the USDA Food Dollars Industry Group breakdown. So, we see a relatively weak relationship between these- these two goods but are between these two points of sales. And to compare these two points of sales, we oftentimes will look to our food price spreads, these are provided both at for meat products alone and our meat price spread products, and then we have a food price spread product as well that shows both price series. For predictive person- purposes, which is the main focus of this presentation, we oftentimes can't necessarily get enough information out of those farm level prices where they help us with the predictions. There are certainly exceptions, but for the most part that that relationship is not quite strong enough. Megan, do you have a addition to make to that response?

Nope, that was great thanks.

Thank you both. We have time for a few more questions but for our next one, excuse me: do you have any geographic components to your forecast?

That's a great question. We forecast at the national aggregate level, however, our data visualizations, which Megan pointed to during her segment of the presentation, do provide historical information of how food prices have changed by metropolitan area. This is typically how BLS provides the data is by metro area, they also have some additional regional information in terms of census divisions and things. And those sorts of breakdowns but in terms of just answering the question, no we do not provide forecasts at the regional level. Megan, do you have anything to add to that?

Nope, thanks.

Thanks, Matt. For our next question: how accurate are the Food Price Outlook forecasts? Which has been more accurate the new version or legacy?

This is a great question. The to answer the last part first, the new method has certainly been more accurate than the legacy approach. We provided statistical comparisons in our ERS report between the two approaches and the new approaches across all those metrics performs better in terms of precision and accuracy. We also changed how we represented uncertainty and we found that the new representation of uncertainty more intuitively captures the uncertainty around forecast. We're looking at something that's close to a 90 percent confidence interval, in short terms the legacy approach didn't look necessarily like that. And this is for a year out, when we get closer to the actual end of the year of that percentage typically goes up. In terms of which one is- is more accurate, we used a Mean Squared Error estimate, which is not shown here, to show a measure of accuracy and precision. And the Mean Squared Error, smaller is better, was much smaller for the new approach than for the previous approach.

Thanks, Matt. It looks like we have time for one more question and that is: when looking at the food price changes, is there any way to identify what percentage comes from supply shock and what percentage comes from demand shock?

This is a great question and an area of active research for several folks at ERS, as well as, within the academic community. There are historical decompositions that some folks are doing to look backwards to think about contributions of price changes. This is better reflected in our food dollar series, and I'll pass over to Megan to expand on that then it would be in real time in our Food Price Outlook. So, for quantitative contributions of each price change from- from different sectors, we typically aren't able to do that in real time, but our retrospective products are that do that in a very comprehensive way. Megan, do you have additions to that?

Just an example from very recent history, I can't speak to long-term trends necessarily, but over the past few years, the food dollar has shown that the contribution of cost for the food processing sector increased relative to the other sectors, particularly around, you know all of the impacts on the food processing sector from the pandemic. Yeah, and I'll leave it at that.

Great, thank you both and thank you Matt and Megan for your presentation.

Thank you.

And thank you to our listeners for taking time out of your day to join, us we hope that this has been helpful. Before closing, I would like to take a minute to mention the ERS Annual Report for Fiscal Year 2022, which was released earlier this month. This year's theme is providing data and expert analyzes to support evidence-based policy making and highlights ERS research in the following areas: agricultural economy, food nutrition and food safety, global markets and trade, resource and environment, and the rural economy. You can learn more about our annual report on the ERS website.

I would also like to highlight the upcoming *Data Training Webinar: Poverty Area Measures*, which is scheduled for Thursday April 27th at 1 pm Eastern Time. To learn more about this webinar and to register, please visit ers.usda.gov/data-training-webinars. Finally, I'd like to share a few ways to stay up to date on ERS research. In addition to our website, we also have our Chart of Note mobile app which delivers digital snapshots of ERS research delivered straight to your mobile device. ERS is also on social media and you can follow our account on LinkedIn and Twitter. Thank you again for joining us today and this concludes our webinar.