

An Excel Software System for Predicting Your Dairy Operation's Mailbox Price

Software Developed by

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I. Introduction

This Excel spreadsheet system can be used to predict your farm’s mailbox price based on your operation’s recent mailbox price history, component values of your milk, historical Announced Class III and IV prices and the most current milk futures settlement prices. Our prediction model is based on the statistical relationship between your history of mailbox prices and observed Federal Milk Marketing Order (FMMO) class prices. This system also automatically accounts for any seasonality in the basis relationship between your mailbox price and Announced class prices.

With futures markets existing for Class III and IV milk we hypothesize that your operation’s mailbox price is positively related to the Announced Class III and IV milk prices. We also hypothesize that this relationship changes during the course of the year. An example of the type of prediction that can be undertaken once this relationship is established can be obtained from a similar system that is currently being maintained within on the UW Understanding Dairy Markets website (http://future.aae.wisc.edu/predicted_mailbox/) where we predict average regional and state mailbox milk prices. On this webpage, the system automatically generates the most up-to-date statistical model showing the relationship between state and regional average mailbox prices and the USDA Announced Class III and Class IV prices. Figure 1 is a snapshot of a typical prediction page.

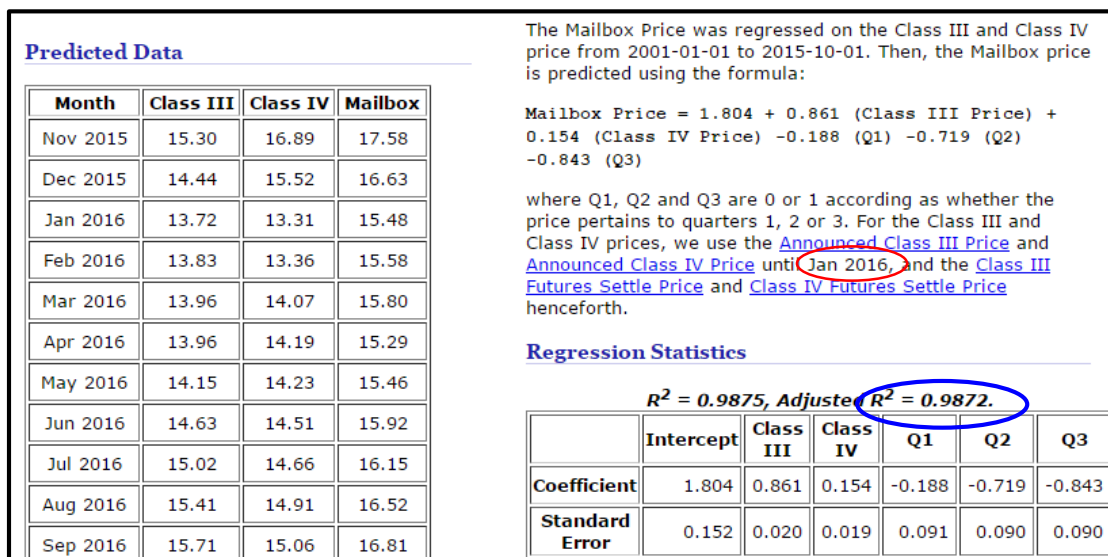


Figure 1: The *Understanding Dairy Markets* Mailbox Prediction System

The data shown in Figure 1 was obtained on January 8, 2016 and shows the relationship between the Class III and Class IV milk and average Wisconsin mailbox price. On that day, the last published mailbox price for Wisconsin was for October 2015. Monthly historical data from Jan. 2001 – Oct 2015 were used to estimate the parameters of the prediction model. From this historical data we obtained the prediction equation shown in Figure 1:

$$\text{WI Mailbox} = \mathbf{1.804} + (\mathbf{0.861} * \text{Class III Price}) + (\mathbf{0.154} * \text{Class IV Price}) - (\mathbf{0.188} * \text{Quarter \#1}) - (\mathbf{0.719} * \text{Quarter \#2}) - (\mathbf{0.843} * \text{Quarter \#3})$$

The structure of this model is such that mailbox prices are predicted using the 4th quarter as the base of comparison. The estimated relationship shown above explains 98.72% of the variation in monthly average Wisconsin mailbox. Our results show that after controlling for the variability in Class III and Class IV prices, the average Wisconsin mailbox price was 19¢/cwt lower in the 1st Quarter (Jan-Mar) relative to the 4th Quarter (Oct-Dec). The 2nd Quarter's mailbox price on average was 72¢ lower and the 3rd Quarter was 84¢ lower.

As an example of how we can use the above to predict a mailbox price, the January 2016 Announced Class III price was \$13.72/cwt and Announced Class IV price was \$13.31/cwt. With the month January being in the 1st quarter of the year, the predicted January Wisconsin mailbox price is estimated via the following:

$$\text{January WI Mailbox} = 1.804 + (0.861 * 13.72) + (0.154 * 13.31) - (0.118 * 1) - (0.719 * 0) - (0.843 * 0) = \$15.48$$

On the left-side of Figure 1 is shown the predicted mailbox prices for November 2015 – January 2017. For the Nov 2015 - January 2016 predicted mailbox prices the already announced Class III and Class IV prices for these months (at the time the analysis was undertaken) were placed in the columns labeled *Class III Price* and *Class IV Price* appears in the above equation. For the months of February 2016 – January 2017 the previous day's Class III and Class IV futures settlement prices were used as the markets best guess as to what the Class III and Class IV will be for these upcoming months. If the month for which a prediction was being generated was in the 1st quarter of the calendar year, then the variable Quarter#1 had a value of 1 while the variables Quarter#2 and Quarter#3 each are set to 0. A similar relationship holds if the prediction month falls in Quarter#2 or Quarter #3, respectively.

The statistical model used in our Excel software system has a similar structure as the one just described except for 2 major differences. First, instead of trying to predict the average WI mailbox price, you will enter *your own* personal history of monthly mailbox prices which will be to estimate a statistical model from which you will obtain your mailbox price predictions. A 2nd difference is that the statistical model used to predict your mailbox price not only uses the USDA Announced Class III price and Class IV prices, but also you have the *option* to include your personal history of each month's average milk component Butterfat and Protein percentages. This added feature increases the accuracy of the prediction because the extra fat and protein above (and below) that of standard milk (i.e., 3.5% fat, 2.99% true protein) determines the price paid by your processing plant for your milk. If you do not have these component values, this is **not a problem**. Just don't include them as explanatory variables in your statistical model.

That is the following statistical model is used to predict your mailbox price:

$$\text{Your Mailbox} = \beta_0 + (\beta_1 * \text{Class III Price}) + (\beta_2 * \text{Class IV Price}) + (\beta_3 * \text{Quarter\#1}) \\ + (\beta_4 * \text{Quarter\#2}) + (\beta_5 * \text{Quarter\#3}) + (\beta_6 * \text{Butterfat \%}) + (\beta_7 * \text{Protein \%})$$

The estimated coefficients, i.e., the β 's, are estimated using data specific to your dairy operation as outlined above.¹

II. Getting Started

In developing this forecasting tool we have attempted to make data input and analysis relatively easy. However, in order to run this program, you will need to:

1. [Enable Macros](#) to be run using your Excel system;
2. Have your computer linked to the internet; and
3. Have the [Analysis ToolPak](#) add-in enabled within your Excel system.

By enabling macros, you are allowing your computer to run the code this in this application. The [Analysis ToolPak](#) contains tools used to run a regression analysis and calculate the estimated coefficients needed for calculating the prediction. By being connected to the internet, the most recent price data is allowed to be

¹ Note that β_6 and β_7 are not estimated if you do not include your milk components in the statistical model.

downloaded from the University of Wisconsin *Understanding Dairy Markets* website. These prices are used in the estimation of possible future mailbox prices.

NOTE: This system will not work on a Mac computer. Also the current version will not work on a system using a 64-bit version of Excel which very few users have. Most users have a 32-bit version of Excel. We are working on a solution to this last limitation.



Figure 2: Main Page of Application

III. How to Enter Your Data

You will note that upon opening, the Main Page of the spreadsheet has 4 buttons: (i) *Input Mailbox Data*, (ii) *Input Components Data*, (iii) *Generate New Report*, and (iv) *Go to Report Page*. These buttons are the primary mode of interaction with this software.

The *Input Mailbox Data* button will direct you to the worksheet displayed in Figure 3. This worksheet is where you will enter your farm information as to your

mailbox price. When this page is first accessed there is some pre-existing data already entered into the data table. Specifically, we have inserted the average WI mailbox prices. The pre-existing data starts in 2001, but you can start entering data for which your farm possesses. To clear the existing data, simply click the **Clear Table** button on the left of the page. This will not clear any saved data and the data that is cleared can still be retrieved by clicking the **Retrieve Saved Data** button. However, once you click the **Save Mailbox Data** button that will overwrite the existing saved data and replace it with what is currently in the data table.

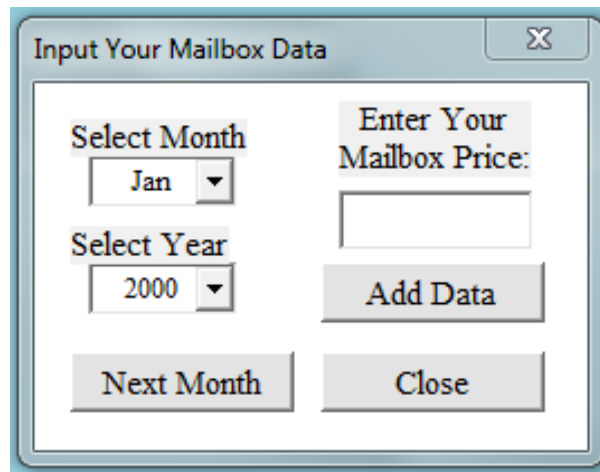
The **Save Mailbox Data** button **does not** actually save the application. If you were to close out of the application without saving, the saved data would be the same as the last time you opened the application. To make sure you save your data correctly, enter a few values and then save the information using the above as a guide. If your data is saved you are ready to enter all of your data. You need not enter all of your data at one sitting. You can enter information at a particular time and then after more data comes in 6 months later for example, you can enter your new information.

<i>Your Mailbox Price Data</i>										
		Month								
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	
Year	2000									
	2001	\$12.38	\$12.52	\$13.55	\$14.12	\$15.36	\$16.05	\$15.96	\$16.22	\$
	2002	\$13.57	\$13.12	\$12.45	\$12.48	\$12.16	\$11.42	\$10.61	\$10.98	\$
	2003	\$11.45	\$11.28	\$10.70	\$10.85	\$11.04	\$10.90	\$12.26	\$13.98	\$
	2004	\$13.34	\$13.80	\$16.13	\$19.89	\$20.39	\$18.04	\$16.11	\$15.23	\$
	2005	\$16.00	\$15.91	\$15.77	\$15.68	\$14.98	\$14.67	\$15.06	\$14.74	\$
	2006	\$14.70	\$13.62	\$12.63	\$12.12	\$11.99	\$12.04	\$11.70	\$11.90	\$
	2007	\$14.79	\$15.31	\$16.03	\$16.84	\$18.17	\$20.17	\$21.26	\$20.62	\$
	2008	\$20.79	\$18.85	\$18.86	\$18.11	\$18.87	\$20.22	\$19.14	\$18.22	\$
	2009	\$12.94	\$11.24	\$11.87	\$12.17	\$11.40	\$11.24	\$11.15	\$12.25	\$
	2010	\$16.05	\$15.78	\$14.39	\$14.31	\$14.71	\$14.78	\$14.97	\$16.18	\$
	2011	\$16.01	\$18.91	\$20.78	\$18.99	\$18.64	\$20.41	\$21.86	\$22.31	\$
	2012	\$19.31	\$18.16	\$17.57	\$17.46	\$16.81	\$16.94	\$17.55	\$18.91	\$
	2013	\$20.33	\$19.52	\$19.22	\$19.65	\$20.16	\$19.67	\$18.90	\$19.55	\$
	2014	\$23.51	\$25.31	\$25.34	\$25.91	\$24.38	\$22.91	\$23.16	\$23.96	\$
2015	\$18.18	\$17.57	\$17.46	\$17.51	\$17.65	\$17.82				
2016										
2017										
2018										
2019										
2020										

Figure 3: Mailbox Input Worksheet Page

To start entering your data either click the **Enter Mailbox Data** button located at the top left of the page or click directly on the data table. By clicking on a cell in the above input form will be able to type in your actual monthly average mailbox price. Give it a try.

When you click the **Enter Mailbox Data** button, the following input form appears:



The screenshot shows a window titled "Input Your Mailbox Data" with a close button in the top right corner. Inside the window, there are two dropdown menus on the left: "Select Month" with "Jan" selected and "Select Year" with "2000" selected. To the right of these is a text input field labeled "Enter Your Mailbox Price:" and an "Add Data" button below it. At the bottom of the window are two buttons: "Next Month" and "Close".

Figure 4: Form Used to Enter Your Mailbox Price

There are three pieces of information that are entered using this form: (i) *year* of analysis, (ii) *month* of analysis and (iii) that month's *mailbox price*. The year and month consist of pull-down menus with the Year range being from 2000 to 2020 and the month range being January – December. Select the date you would like and, in the "Enter Your Mailbox Price" box, enter your mailbox price (\$/cwt).

There are three buttons located within the form. After you select the month and year for which you would like to start and have entered the corresponding mailbox price, either hit the Tab key on your keyboard to select the **Add Data** button and hit enter or just click directly on the **Add Data** button. This will automatically place the input mailbox price in the correct row and column in the data table. To quickly enter more data hit the Tab key again to select the **Next Month** button and hit enter. This will change the selected month to the following month. By hitting enter again, the mailbox price entry box will be selected and you can enter the corresponding price for that month/year. Once you have entered all of your desired information, simply click the **Close** button to exit the entry form. **NOTE:** You do

not have to enter your data all in one sitting – you can update your database as you receive additional months of payments.

As an *optional* feature, you may also enter your data for Butterfat content and Protein content. The current version of our software is shipped with the average Wisconsin mailbox prices and component percentages (if desired to be included). The components input page operates identically to the mailbox input page and are shown in Figure 5 and Figure 6.

NOTE: When you wish to estimate the model, there *cannot* be any gaps in the data range in your data is to be used in estimation. There can be gaps in your data, but no gaps in the data used in estimation. This includes both mailbox and components data. If there is any gaps in your data, either enter your best approximation of the value or select a range of dates that excludes the gap. Also when you want to include your component data, the range of data to be used must be the same number of months of price data used.

Butterfat Content (%)														
		Month												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Return to Main Page Show Butterfat Show Protein Show Mailbox	Year	2000	3.81%	3.78%	3.76%	3.76%	3.67%	3.64%	3.59%	3.59%	3.68%	3.78%	3.83%	3.85%
		2001	3.81%	3.79%	3.77%	3.73%	3.66%	3.61%	3.55%	3.55%	3.66%	3.79%	3.82%	3.82%
		2002	3.80%	3.78%	3.78%	3.74%	3.71%	3.64%	3.55%	3.58%	3.65%	3.82%	3.84%	3.80%
		2003	3.77%	3.76%	3.74%	3.71%	3.66%	3.60%	3.53%	3.53%	3.63%	3.76%	3.85%	3.83%
		2004	3.82%	3.81%	3.75%	3.71%	3.66%	3.64%	3.61%	3.65%	3.67%	3.80%	3.82%	3.80%
		2005	3.79%	3.74%	3.76%	3.69%	3.68%	3.58%	3.55%	3.56%	3.64%	3.76%	3.84%	3.86%
		2006	3.78%	3.78%	3.76%	3.72%	3.68%	3.61%	3.57%	3.56%	3.70%	3.82%	3.84%	3.81%
		2007	3.78%	3.80%	3.75%	3.72%	3.64%	3.59%	3.56%	3.56%	3.65%	3.75%	3.83%	3.84%
		2008	3.81%	3.79%	3.77%	3.73%	3.67%	3.61%	3.58%	3.59%	3.67%	3.77%	3.82%	3.83%
		2009	3.81%	3.76%	3.73%	3.72%	3.66%	3.62%	3.57%	3.60%	3.66%	3.78%	3.77%	3.78%
		2010	3.77%	3.73%	3.69%	3.64%	3.61%	3.56%	3.53%	3.54%	3.65%	3.75%	3.83%	3.85%
		2011	3.82%	3.79%	3.76%	3.73%	3.69%	3.61%	3.59%	3.59%	3.69%	3.79%	3.87%	3.86%
		2012	3.84%	3.82%	3.77%	3.75%	3.70%	3.63%	3.58%	3.63%	3.74%	3.89%	3.91%	3.89%
		2013	3.89%	3.88%	3.87%	3.84%	3.77%	3.71%	3.66%	3.70%	3.73%	3.86%	3.93%	3.92%
		2014	3.89%	3.87%	3.86%	3.79%	3.74%	3.67%	3.68%	3.71%	3.77%	3.86%	3.90%	3.88%
		2015	3.87%	3.88%	3.84%	3.77%	3.72%	3.66%						
2016														

[Enter Butterfat Data](#)

[Save Butterfat Data](#)

[Retrieve Saved Butterfat Data](#)

[Clear Table](#)

Figure 5: Butterfat Content Input Page

Protein Content (%)

		Month											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year	2000	3.05%	3.02%	3.00%	3.00%	2.93%	2.95%	2.91%	2.93%	3.02%	3.07%	3.09%	3.10%
	2001	3.05%	3.05%	3.03%	2.99%	2.97%	2.95%	2.90%	2.92%	3.03%	3.11%	3.10%	3.08%
	2002	3.05%	3.03%	3.04%	3.01%	2.98%	2.95%	2.89%	2.95%	3.01%	3.09%	3.10%	3.07%
	2003	3.04%	3.04%	3.02%	2.99%	2.97%	2.95%	2.91%	2.91%	3.01%	3.09%	3.12%	3.09%
	2004	3.08%	3.06%	3.02%	3.01%	2.99%	2.96%	2.95%	2.98%	3.02%	3.12%	3.11%	3.11%
	2005	3.08%	3.05%	3.03%	3.00%	2.98%	2.92%	2.89%	2.94%	3.02%	3.11%	3.14%	3.13%
	2006	3.06%	3.08%	3.05%	3.02%	3.00%	2.96%	2.92%	2.95%	3.06%	3.12%	3.12%	3.10%
	2007	3.07%	3.08%	3.04%	3.02%	2.98%	2.94%	2.92%	2.94%	3.02%	3.08%	3.17%	3.13%
	2008	3.10%	3.10%	3.06%	3.02%	3.00%	2.97%	2.93%	2.95%	3.02%	3.09%	3.12%	3.11%
	2009	3.09%	3.06%	3.04%	3.03%	3.00%	2.96%	2.95%	2.97%	3.02%	3.11%	3.09%	3.10%
	2010	3.09%	3.06%	3.02%	2.99%	2.98%	2.94%	2.91%	2.92%	3.03%	3.11%	3.14%	3.13%
	2011	3.11%	3.09%	3.07%	3.05%	3.03%	2.98%	2.92%	2.97%	3.06%	3.14%	3.17%	3.15%
	2012	3.13%	3.12%	3.07%	3.07%	3.04%	3.00%	2.94%	3.01%	3.09%	3.17%	3.18%	3.15%
	2013	3.14%	3.14%	3.14%	3.12%	3.09%	3.04%	2.98%	3.01%	3.06%	3.16%	3.21%	3.21%
	2014	3.18%	3.16%	3.15%	3.10%	3.07%	3.02%	3.01%	3.04%	3.10%	3.15%	3.19%	3.18%
	2015	3.16%	3.15%	3.11%	3.09%	3.05%	3.02%						
2016													

Return to Main Page

Show Butterfat

Show Protein

Show Mailbox

Enter Protein Data

Save Protein Data

Retrieve Saved Protein Data

Clear Table

Figure 6: Protein Content Input page

IV. How Do You Undertake Your Analysis and Generate a New Report

Once you have entered your data, you are now ready to undertake the analysis of the relationship between your mailbox price and the USDA Announced Class III/IV milk prices. Before you begin, save your data and save your worksheet file. To undertake this analysis, navigate to the Main Page and click the **Generate New Report** button highlighted in Figure 7.

Funding Provided By:

The James W. Crowley Management and Extension Fund
 The Department of Agricultural and Applied Economics
 The Renk Agribusiness Institute

Input Mailbox Data

Input Components Data

Generate New Report

Go To Report Page

Figure 7: The Generate New Report button on the Main Page

After asking if you would like to continue, you will be directed to a set up window as shown in Figure 8. You have the option of using all your data or just a portion of it in your analysis. To identify the time period over which you would like to estimate the parameters for your prediction, you need to select the starting and ending months and years. The window will automatically select a range from the first month/year that you have entered until the last month without a gap in between. It is important to remember that there *cannot* be gap in your data when creating a report.

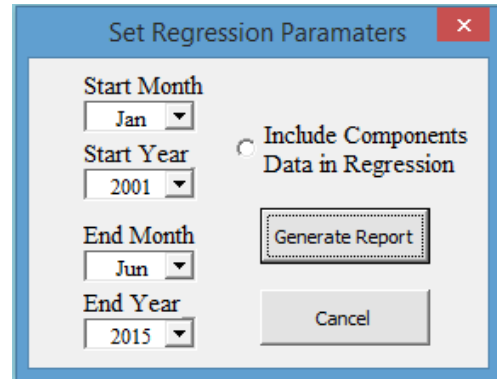


Figure 8: *Generate New Report* Set Up Window

V. Analyzing Your Report

After you generate a new report you will be redirected to the Mailbox Analysis Page depicted in figure 9. There are several features to help you analyze your results. This section will walk you through what each feature does and how to interpret it.

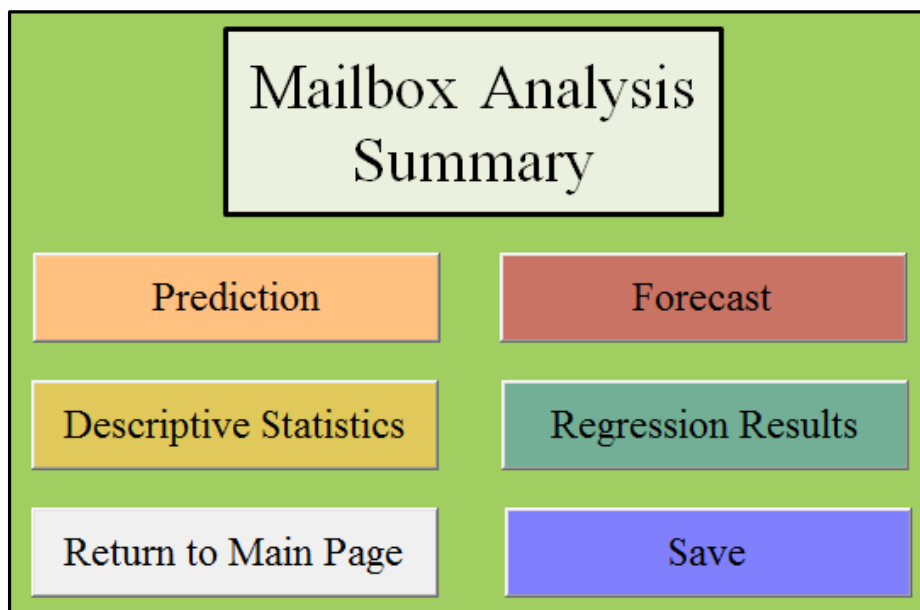


Figure 9: The Report Page Menu

The top four buttons will direct you to different worksheets. Here is a brief synopsis of the function of each:

- **Prediction** –Compares the Mailbox prices predicted by your model to the actual prices
- **Forecast** – Calculates your likely Mailbox prices for the next 12 months using the latest regression results
- **Descriptive Statistics** – Provides general statistical measures of your data (i.e., mean, minimum value, maximum value, variance)
- **Regression Results** – Presents the results of the most recent statistical analysis

If you would like to enter more data and/or generate a new report, use the **Return to Main Page** button. It will redirect you to the Main Page, the same one displayed when the program opens, and you can then navigate from there. If you would like to save the program, click the **Save** button. It will bring up the save menu and allow you to name your file whatever you like and save it where you would like as well.

V.1 Predicting Your Historical Mailbox Price

By choosing the **Prediction** button, you will be directed to a worksheet that compares the actual Mailbox prices, the prices you entered in the data table on the Mailbox Input page, and the “Predicted” Mailbox prices. The predicted mailbox prices are the prices that are calculated using the results of the statistical analysis and for the historical time period used to estimate your statistical model. Your actual and predicted mailbox values are plotted automatically in a single line-graph, an example of which is shown in Figure 12.

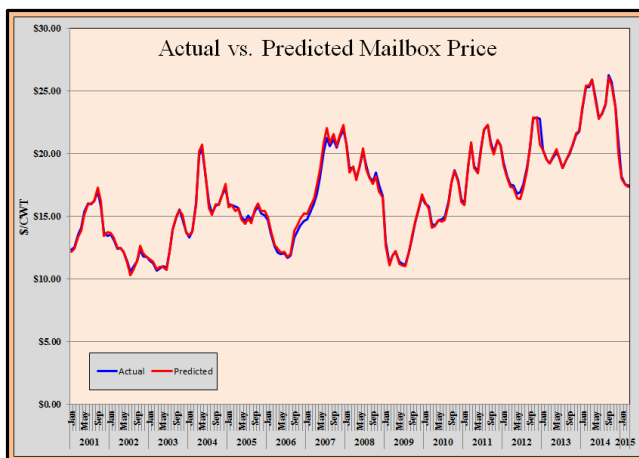


Figure 12: The Actual vs. Predicted Mailbox Prices

The red line depicts the predicted price and the blue line depicts the actual price. Given that the predicted price line tracks the actual price line very closely (i.e., it is differentiated

the two series), it is safe to assume our statistical model is quite accurate with respect to explaining the variability of your operation's historical mailbox price. To be specific, the results shown in Figure 12 were obtained from an analysis of the monthly average Wisconsin mailbox prices. Over 99% of the historical variation in Wisconsin mailbox prices are accounted for by the estimated statistical model. To read more about this, refer to Section V.4 – *Regression Results*.

V.2 Forecasting Future Unknown Mailbox Prices

The **Forecast** function is perhaps the most useful feature available from the Report page. By clicking the **Forecast** button, you will be directed to a worksheet that displays a graph and the corresponding data used to generate this forecast graph. An example of forecast output is in Figures 10 and 11. As noted above this software is designed to obtain the latest futures settlement prices for Class III and IV from the UW *Understanding Dairy Markets* website (<http://future.aae.wisc.edu>) to calculate your likely Mailbox prices for the next 12 months, starting in the current month based on the latest statistical model you estimated.

The graph in Figure 10 contains three lines. The red line shows your expected Mailbox prices for the next 12 months were the latest Class III and IV futures settlement prices are used to generate these 12 forecast months. We limit ourselves to 12 months given the thinness of these futures markets when one goes more than 12 months into the future. That is to say, if the settlement prices were the actual announced Class III and IV prices, the red line would represent your expected Mailbox price. However, the futures market is highly volatile and changes frequently. Therefore, we provide a range of high and low prices that we would expect your Mailbox price to fall within as indicated by the green and blue lines respectively.

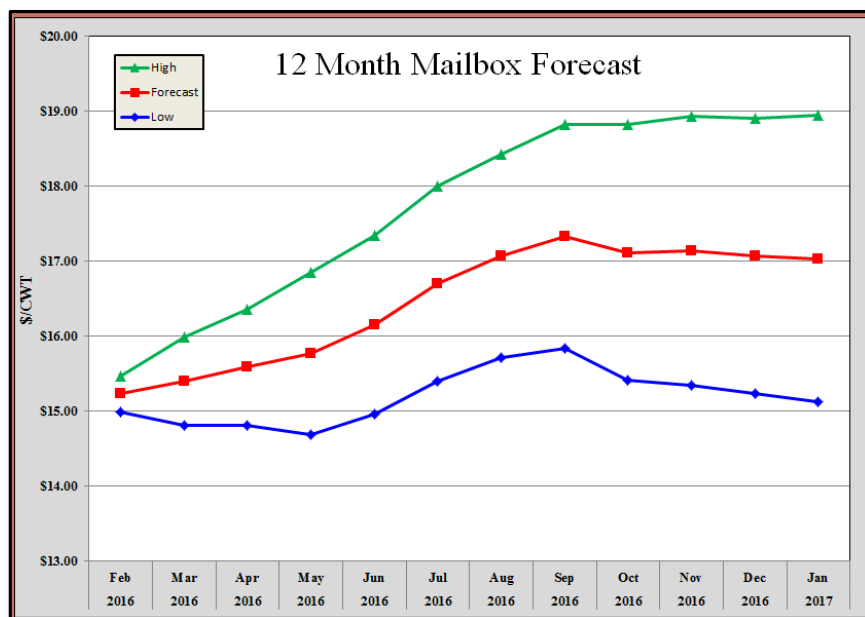


Figure 10: 12-Month Mailbox Price Forecast

The above range is referred to as a **50% confidence interval**, meaning there is a 50% probability that your mailbox price will fall within this range. This probability may seem low, but it is important to recognize that nearly all of the uncertainty comes from the futures market.

You will notice that the range of expected values in Figure 10 are narrower in the months closer to the current date and grow wider the further into the future the settlement price. In February 2016, as seen in Figure 11, the Low Mailbox price is \$14.99 and the High Mailbox price \$15.47. The difference is \$0.48. In January 2017 (11 months later) the Low price is \$15.12 and the High price is \$18.95 resulting in a difference of \$3.83. This is to be expected and is due to the level of uncertainty in the futures market. There is more certainty that the settlement prices of Class III and IV for **next** month will better reflect the actual announced prices with more certainty than settlement prices for a year into the future.

Year	Month	Low	Forecast	High
2016	Feb	\$14.99	\$15.23	\$15.47
2016	Mar	\$14.80	\$15.40	\$15.99
2016	Apr	\$14.81	\$15.59	\$16.36
2016	May	\$14.69	\$15.77	\$16.85
2016	Jun	\$14.97	\$16.15	\$17.34
2016	Jul	\$15.40	\$16.70	\$18.00
2016	Aug	\$15.71	\$17.07	\$18.42
2016	Sep	\$15.83	\$17.33	\$18.82
2016	Oct	\$15.42	\$17.12	\$18.82
2016	Nov	\$15.35	\$17.14	\$18.93
2016	Dec	\$15.24	\$17.07	\$18.90
2017	Jan	\$15.12	\$17.04	\$18.95

Figure 11: Table of Forecasted Mailbox Prices

NOTE: These estimates will change on a daily basis as the daily futures settlement prices change.

V.3 Descriptive Statistics

The **Descriptive Statistics** button will direct you to a worksheet that displays a table of general statistics to aid your analysis. The Average, Standard Deviation, Median, Minimum, and Maximum values for the data you selected to include in your report are calculated for you. For example, in the period selected for this report, the user's average Mailbox price was \$16.77/cwt and had a Standard Deviation of \$3.79/cwt. This standard deviation value means that about two-thirds of your mailbox prices fell within a range that was \$3.79/cwt higher or lower than

the average.

<i>Descriptive Statistics</i>					
	Average	Std Dev	Median	Min	Max
Mailbox (\$/CWT)	\$16.77	\$3.79	\$16.11	\$10.61	\$26.27
Class III (\$/CWT)	\$15.27	\$3.74	\$14.89	\$9.11	\$24.60
Class IV (\$/CWT)	\$14.76	\$3.89	\$13.75	\$9.45	\$23.89
Butterfat	0.23%	0.10%	0.25%	0.03%	0.43%
Protein	0.06%	0.08%	0.06%	-0.10%	0.22%

Figure 13: Descriptive Statistics Table

V.4 Regression Results

By clicking the **Regression Results** button, you will be directed to a worksheet that displays the results of the statistical analysis as shown in Figure 14. There are two sections to the displayed results. The top section identifies how well your statistical model explains the variability of your farm's mailbox price. The statistic circled in red, ***R-Square***, is a key variable to examine. Its value ranges from 0 to 1 and it represents the percentage of the variability of your farm's mailbox price that is explained by movements in Announced Class III and IV prices, the seasons, and (optional) Butterfat and Protein content. In Figure 14 we see that 99.4% of the mailbox variability from the mailbox mean is accounted for by the statistical model.

Mailbox Regression Results

<i>Regression Statistics</i>	
R Square	99.39%
Adjusted R Square	99.37%
Standard Error	0.301
Observations	171

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	0.909	0.222	4.090	0.000	0.470	1.347
III	0.827	0.015	56.202	0.000	0.798	0.857
IV	0.146	0.014	10.522	0.000	0.119	0.174
Q1	0.028	0.072	0.394	0.694	-0.114	0.171
Q2	0.146	0.100	1.463	0.145	-0.051	0.343
Q3	0.310	0.119	2.615	0.010	0.076	0.544
Butterfat	328.057	97.630	3.360	0.001	135.273	520.840
Protein	328.723	126.768	2.593	0.010	78.403	579.042

Figure 14: An Example of the Regression Results

The bottom section is used to explain the statistical importance of the two Announced Prices, four seasons, and component values in helping explaining the variability of your mailbox price. In the column labeled “t-Stat”, circled in blue, any value greater than 2.0 indicates that the associated variable has a significant impact on the value of your mailbox prices. In Figure 14 we see that this farm’s mailbox prices are higher when the Class III and/or Class IV prices are higher. If the Class III price goes up \$1, then the average Wisconsin mailbox increases by \$0.827/cwt, ceteris paribus (i.e., everything else being . When the Class IV price increase by \$1, the average Wisconsin mailbox price increases by \$0.146/cwt. The reason both of these coefficients are less than \$1.00/cwt is due the fact that not all milk in Wisconsin is used for Class III or IV purposes and that producers in a particular order use a blend price.

Given the results of the above regression, we find that fourth quarter mailbox prices tend to be of lesser value after controlling for the effects of Announced Prices.²

² The fourth quarter is the basis for which the effect of a month being in the other quarters is evaluated. The coefficients are the \$/cwt difference in the basis between the announced class prices and your mailbox price when compared to the average fourth quarter basis.