Course Title

Business Forecasting Using SAS

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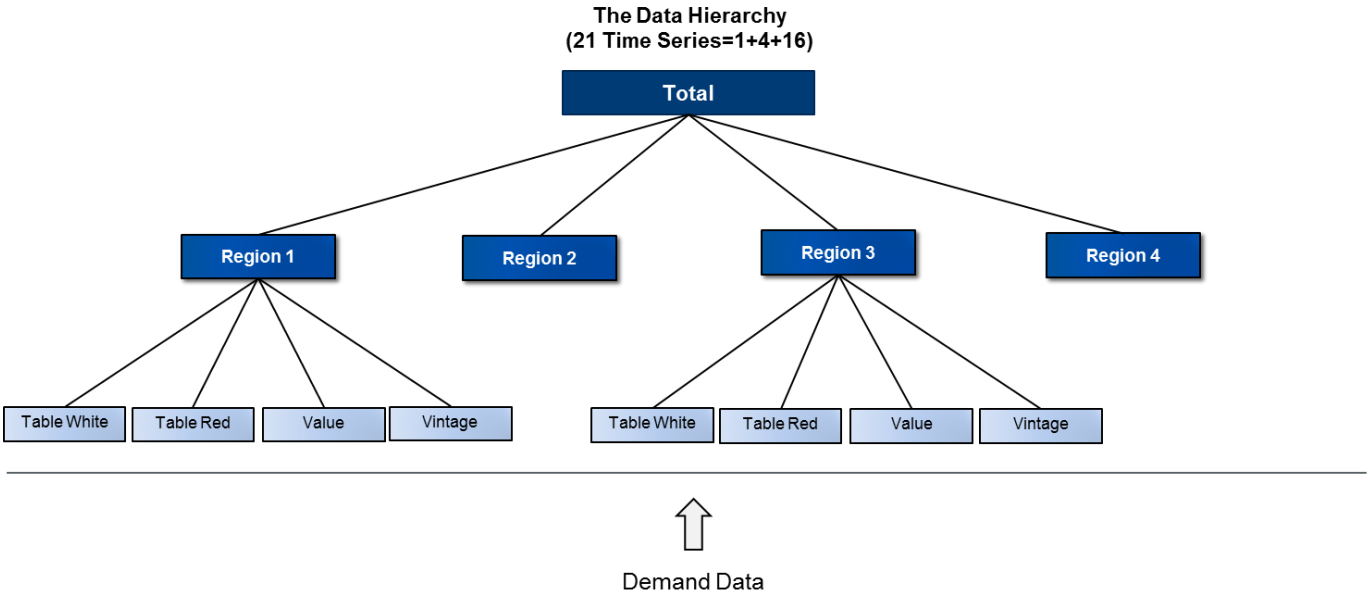
Demand Forecasting Case Study

Best Wine SA is a fictitious wine distribution company based in Athens. The company supplies customers in four regions of the country: reg1, reg2, reg3, reg4. The company distributes four wine types: table white, table red, value wine and vintage wine. Best Wine SA needs to produce demand forecasts to cover the forecasting needs of its various departments such as Marketing, Production, Sales, Logistics etc. The marketing department wants to evaluate scenarios of price fluctuations to study the consequences in future demand. The marketing department wants also to evaluate the impact of promotional activities so as to decide when and where they should take place. The company has weekly historical demand data that cover the period between 2004 and 2007. A sample of the data set where the data are stored is presented in the table below:

Date	Region	Type	Demand	Promotion	Price
Sunday, 22 February 2004	Region 1	Table Red	960	0	$156.19
Sunday, 29 February 2004	Region 1	Table Red	1,098	1	$136.59
Sunday, 07 March 2004	Region 1	Table Red	2,078	0	$72.18
Sunday, 14 March 2004	Region 1	Table Red	1,620	1	$92.51
……..	……..	……..	……..	……..	……..
Sunday, 04 June 2005	Region 4	Value	1,746	0	$85.83
Sunday, 11 June 2005	Region 4	Table White	1,313	1	$114.19

Sunday, 18 June 2005	Region 4	Table White	1,098	1	$136.50
Sunday, 25 June 2005	Region 4	Table White	1,311	0	$114.28

From the case study above, the following hierarchy can be constructed. Please note that due to space limitations the full hierarchy is not shown. More specifically the product nodes stemming from the Region 2 and Region 4 are not included.



You are hired as a demand forecasting analyst to aid the organization in its forecasting processes to support the operational planning. Follow the steps below by using SAS Forecast Server and answer the relevant questions by examining the output of the software. **Write your answers in a form of a management report (with an executive summary) and not simply as the numbered answers of the relevant questions. In your report provide the relevant screenshots from the software to justify your answers.**

[Step 1]: Open SAS Forecast Studio and create a new project (Press the "New" button on the down left corner of the window).

[Step 2]: Select the data set "FS31Hierarchy.sas7bdat" from the "ABA1" library.

[Step 3]: Create the project hierarchy be moving the columns Region and Type on the right hand side window.

[Step 4]: Select the column Date as Time ID variable.

[Step 5]: Set the Sales column as the dependent variable and the BasePrice column as the first independent variable. Set the column Promotion as the second independent variable **and change its aggregation role from "Average of Values" to "Maximum of Values".**

[Step 6]: Skip step 6 (missing values).

[Step 7]: Produce forecasts for the next year (i.e. the next 52 weeks). Press Change Other Forecasting Settings. Select the Model Selection tab. Check the Use Holdout Sample for Model Selection option and input 45 and 25. Press OK.

[Step 8]: Press the "Next" button. Press the "Finish" button.

[Step 9]: Check the Forecast Summary window and write down the characteristics of the series in the bottom level of the hierarchy (Type) e.g. trend, seasonality, outliers, inputs present etc. In order to see the output better double click on the chart in the Model type section.

[Step 10]: Close the Forecast Summary window.

[Step 11]: What is the forecast for the week starting on the 27th of April 2008 and what is the 95% confidence interval for the upper level of the hierarchy (whole company). Interpret the 95% confidence interval and explain how it is related to the safety stock and customer service level. (In order to show the confidence interval in the table go to the menu -- > View -- > Edit Forecasting View Properties and check the option "Selected Model Confidence Intervals").

[Step 12]: Navigate to the scenario analysis view and create a new scenario named Baseline. Create a second scenario named "Demand_Shaping". Select the Promotion row and more specifically the weeks starting from 30th of March 2008 to 18th of May 2008 and set the values of the Promotion variable to 1. (Select the cells mentioned before, press the "Input Table" button above the label "Price", select the button "Set to a Value", write the number 1 in the input box, select "Assign Specified Value to Each Period" and press OK). Select the Price row and more specifically the weeks starting from 30th of March 2008 to 18th of May 2008 and increase the price by 15%. (Select the cells mentioned

before, press the "Input Table" button above the label "Price", set the increase to 15% and press OK). Run the scenario by pressing the "Run Scenario" button on the down left part of the screen. Compare the two scenarios by pressing the "Compare" button on the upper left part of the screen.

[Step 13]: Using the Hierarchy View window on the left of the screen navigate to the Reg3 -- > Vinta level of the hierarchy.

[Step 14]: What is the demand forecast for the week starting on the 4th of May 2008 and what is the 95% confidence interval.

[Step 15]: Navigate to the modelling view window and tell which model family was selected as the optimal model family for the specific series. Go to Tables -- > Parameter Estimates. Write down the equation of the optimal model generated. What is the transfer function relating the baseprice with the sales. Interpret the effect of the transfer function to the sales variable with a table and a graph as it was done in class.