# Business and Economics Forecasting
Econ 3342
Fall, 2019
Diego Escobari

Assignment 2

- Due Tuesday October 8 (before the beginning of the class).
- You can work in groups of up to three students.
- Send your PDF responses by email and make sure you copy all members when submitting your PDF file.
- Make sure your PDF file shows your work on EViews.

Is it a day to be happy? Facebook data team (www.facebook.com/data) decided to construct an index of happiness, and they call it The Facebook Global Happiness Index (FGHI). It is based on how many times Facebook users use words to covey joy (like "happy," "yay" and "awesome") and unhappiness ("sad," "doubt" and "tragic") in their profile updates. A time series graph of this index from September 9, 2007 to October 7, 2009 is presented below:[1]
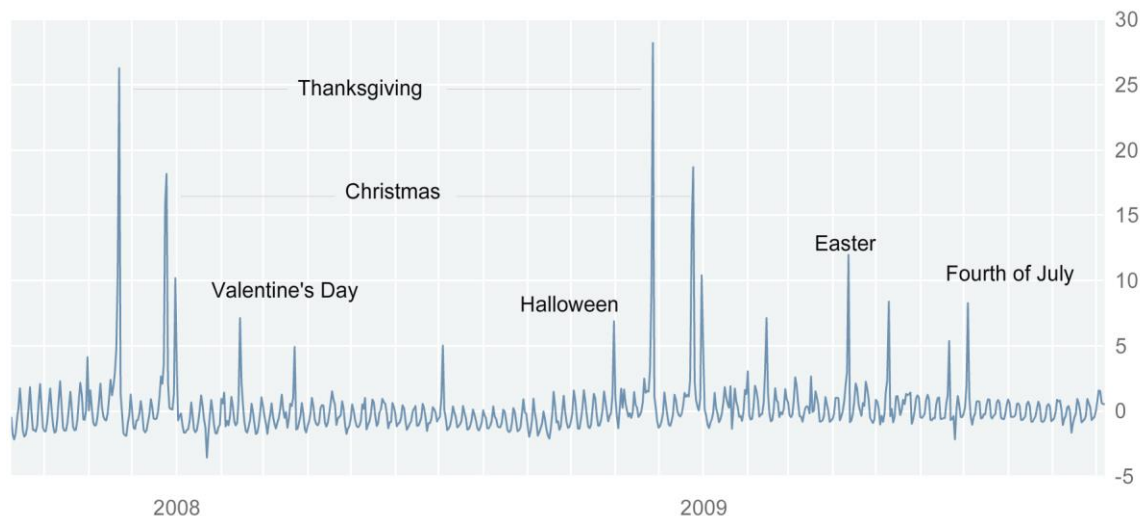
From this graph we can eyeball that people appear to be happier during Thanksgiving, Christmas, Valentine's Day, Halloween, Easter and during the Fourth of July. Can we say these differences are statistically significant? Are there any recognizable seasonal patterns of happiness over the months of the year or over the days of the week? Is this series characterized by a linear trend?

The data set contains the variable 'happy' that is the FGHI over these 760 days. In addition, it has the following variables:

---

[1] The data comes from the article "Is It a Day to Be Happy? Check the Index," by Noam Cohen. October 12, 2009. The New York Times.

happy:	Facebook Global Happiness Index. For simplicity, let this index be measured in units of happiness.
mon:	dummy variable equal to 1 if Monday, zero otherwise.
tue:	dummy variable equal to 1 if Tuesday, zero otherwise.
wed:	dummy variable equal to 1 if Wednesday, zero otherwise.
thu:	dummy variable equal to 1 if Thursday, zero otherwise.
fri:	dummy variable equal to 1 if Friday, zero otherwise.
sat:	dummy variable equal to 1 if Saturday, zero otherwise.
sun:	dummy variable equal to 1 if Sunday, zero otherwise.
easter:	dummy variable equal to 1 if Easter, zero otherwise.
newyear:	dummy variable equal to 1 if New Year, zero otherwise.
thanks:	dummy variable equal to 1 if Thanksgiving, zero otherwise.
hallo:	dummy variable equal to 1 if Halloween, zero otherwise.
vale:	dummy variable equal to 1 if Valentine's Day, zero otherwise.
chris:	dummy variable equal to 1 if Christmas, zero otherwise.

a) Is there any weekly pattern or monthly pattern that you can identify as seasonal just by looking at the time series graph?

b) Do you think the data follows a trend? Estimate a model of 'happy' as a function of a constant and a trend. Use the AIC and the SIC to decide whether you model has no trend, a linear, quadratic, or cubic trend (maybe even to the fourth power). Explain.

c) To characterize the weekly 'seasonal' pattern, estimate the following model:

$$Happy_t = \beta_1 mon_t + \beta_2 tue_t + \beta_3 wed_t + \beta_4 thu_t + \beta_5 fri_t + \beta_6 sat_t + \beta_7 sun_t + \varepsilon_t$$

d) Based on your results, on which day of the week people are the happiest? In which days are the unhappiest?

e) Now, we want our model to capture the effects of particular dates on happiness. Estimate the following model:

$$Happy_t = \beta_1 mon_t + \beta_2 tue_t + \beta_3 wed_t + \beta_4 thu_t + \beta_5 fri_t + \beta_6 sat_t + \beta_7 sun_t + \beta_7 chris_t + \beta_7 easter_t + \beta_7 newyear_t + \beta_7 thanks_t + \beta_7 vale_t + \varepsilon_t$$

f) Which one is the date that brings the most happiness? Is this consistent with the graph presented at the beginning of the assignment?

g) Using the model estimated in part (c), forecast the level of happiness for the following dates: 10/08/2009 10/21/2009. Can you recognize the effect of the day of the week in the forecasted values?

2

h) Estimate the model using monthly seasonal dummies. You have to use the command: ls happy @seas(1) @seas(2) …. Recall that @seas(1) corresponds to January, @seas(2) to February and so on.[2] Is there any particular month of the year where people are happier?

i) Obtain the in-sample forecast of the model estimated in part (h). Can you recognize the patterns of happiness obtained in part (h)?

---

[2] For some versions of EViews the following command can also work: ls happy @expand(@month)