

Exam #2: Part I

Business Cycles & Forecasting
Economics 392

Date: 11/24/2015
Instructor: Dr. I-Ming Chiu

Instructions:

1. Please answer **All FOUR Question** (15 points/each) from part I in the provided blue book.
2. **Detailed explanations are essential for earning points.** Please present all the required graphs, calculation processes and explanations in your work.
3. I'll collect the following: **exam questions (this one)**, **blue book** and **exam part II (R part)**, after you finish.
4. Maintain the accuracy of your computing outcomes to the **second decimal place**.

Part I (60%)

Q1. Table 1 is a collection of John's GPA in the first 7 semesters at Rutgers Camden.

Table 1

Spring, 2012	Fall, 2012	Spring, 2013	Fall, 2013	Spring, 2014	Fall, 2014	Spring, 2015	Fall, 2015
3.3	3.6	3.4	3.5	3.1	3.2	3.0	?

- a) Please predict his GPA in fall 2015 using the averaging method.
- b) Please predict his GPA in fall 2015 using the moving average of order 3.
- c) Do you think the above two methods are appropriate for doing the forecast job? Explain.

Table 2 shows the monthly stock price of Facebook Inc. from the first trading day of each month between June 2012 and November 2012.

Table 2

Time	Adjusted Close Price (Y _t)
2012-06-01	31.10
2012-07-02	21.71
2012-08-01	18.06
2012-09-04	21.66
2012-10-01	21.11
2012-11-01	21.21

Q2. Please answer the following question using data from Table 2

- a) Apply simple moving average of order 3 to smooth the data and show the outcome.
 - b) Apply centered moving average of order 4 to smooth the data and show the outcome.
- [Instruction: after showing the computing process in your blue book, use a table with four columns; Time, Actual Price, 3 smoother, and 2x4 smoother, to present your results]

Q3. Please answer the following questions using data from Table 2

- a) Please apply single exponential smoothing (SES) method to the stock price data and show the outcome from F_1 to F_6 . Here you need to assume that F_1 equals the first observation \$31.10 since it is not available without the data before June 2012. You also need to assume that the parameter alpha equals 0.2 since the model with this value fits the data best. You can use either one of the formulas below, they're the same.

$$F_{t+1} = F_t + \alpha(Y_t - F_t) \quad \text{or} \quad F_{t+1} = \alpha Y_t + (1 - \alpha)F_t$$

- b) Forecast the stock price in the first trading day in December in 2012 (i.e., F_7).
- c) Please briefly explain why the SES method is actually a “weighted” moving average method that applies to the data. How large is the total of these weights?

Q4. Please explain how to conduct each of the following tasks using the appropriate R codes [you need to write the R codes to answer this question]:

- a) A monthly time series data is called “mydata” and you want to retrieve the data between January 2013 and December 2015. Once you retrieve the data, you would like to examine whether there is a seasonal pattern and the magnitudes of the seasonality in your data.
- b) The following R code read the commuting data for Atlanta City. Column two to four records each commuter’s age, driving distance to work, driving time to work and their gender. First, write a piece of R code to find the average driving time for each gender. Secondly, write a piece of R code to find the number of each gender (i.e., frequency) in the data and the corresponding relative frequency (i.e., proportion).

```
> rm(list=ls())
> da = read.csv("CommuteAtlanta.csv", header = T)
> head(da)
```

	City	Age	Distance	Time	Sex
1	Atlanta	19	10	15	M
2	Atlanta	55	45	60	M
3	Atlanta	48	12	45	M
4	Atlanta	45	4	10	F
5	Atlanta	48	15	30	F
6	Atlanta	43	33	60	M