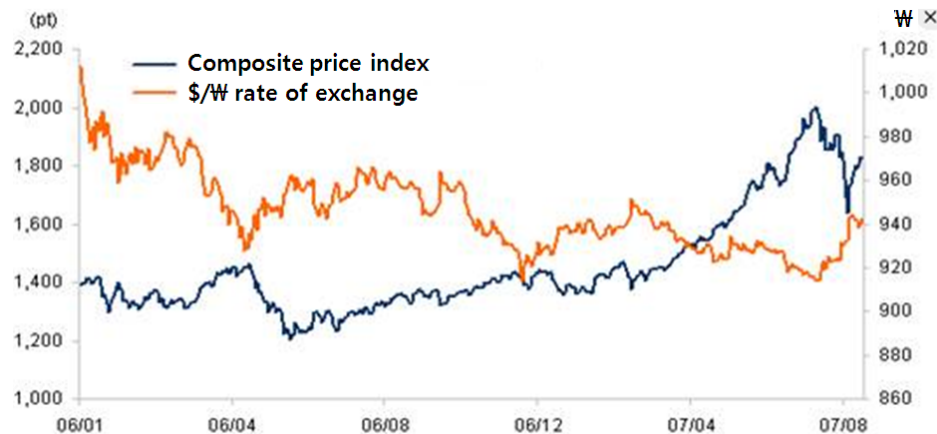


Midterm Exam Prep (II)

1. Plot & analysis of the data : Composite price index vs \$/₩ rate of exchange

- (a) Owing to the economic crisis, the trends of the composite price index and the currency exchange rate draw the people's attention nowadays. The lower plot shows the time dependence of the composite price index and the rate of exchange. By digitizing process, prepare the ascii files¹ and reproduce the graphs for the excel, origin, open office, and the google docs. (You can post the screen capture of those results.)
- (b) You can notice the correlation between the composite price index and the current exchange rate. Estimate the slope of the decrease of the composite price index by the rate of exchange in (pt/₩) units. (Use the origin or excel for the calculation. Or you can use other software) (http://www.judong.co.kr/?mid=marketKnowhow&page=16&document_srl=35452)



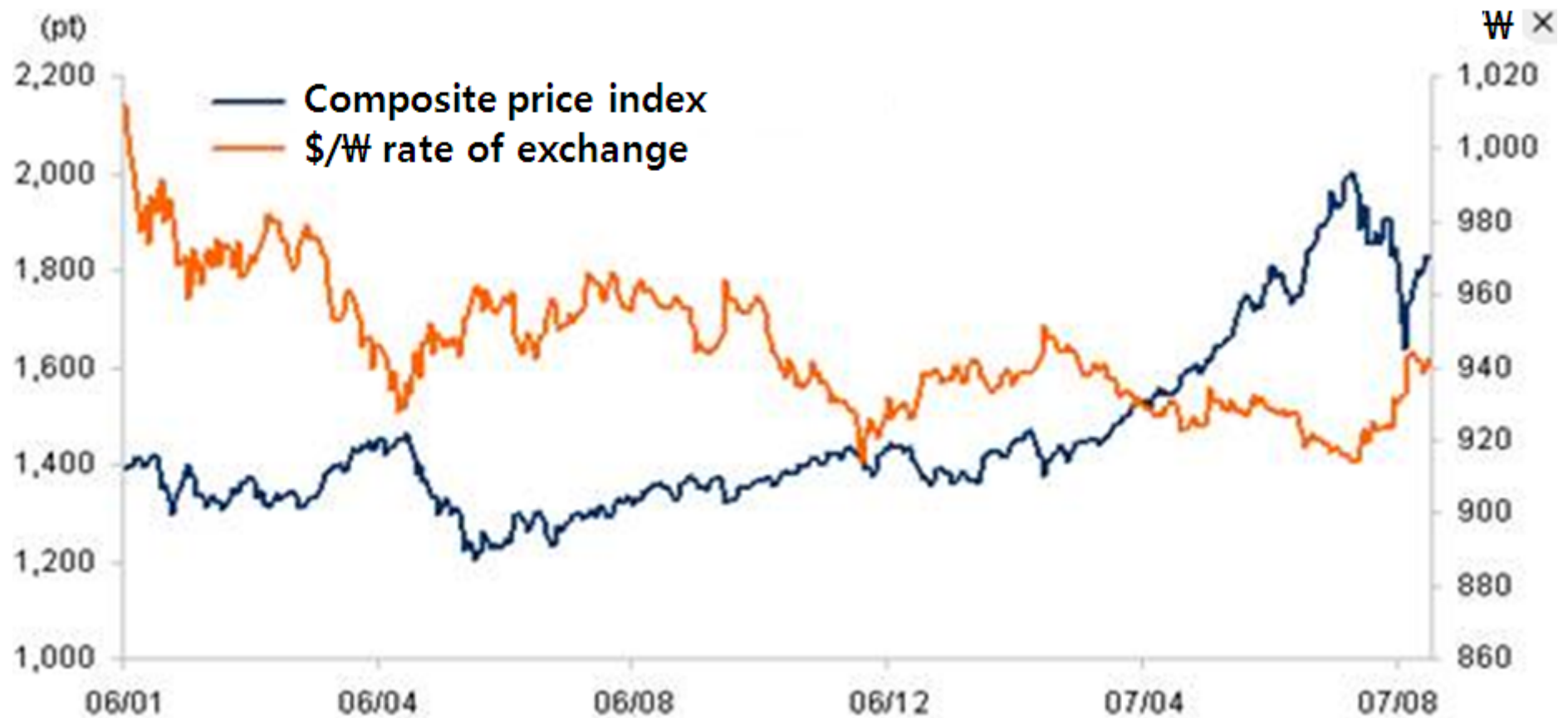
Count	Minutes	Seconds
0	0	6
10	0	26.4
20	0	46.6
30	1	7.6
40	1	27.3
50	1	47.5
60	2	7.8
70	2	28.1
80	2	48.2
90	3	8.5
100	3	28.7
110	3	49.3
120	4	9.2
130	4	29.5
140	4	49.8
150	5	10.1
160	5	30.2
170	5	50.2
180	6	10.8

2. Preparing the datasheet by extracting the numerical data from the image and the analysis : Estimation of the gravity constant

- (a) We can calculate the gravity constant by measuring the time depending on the oscillation of the pendulum as shown in the right table. By using the OCR program, prepare the ascii file for the further analysis². Attach the screenshot of the workflow in the solution.
- (b) The length of wire (l) were measured as 98.55, 98.60, 98.58, 98.55, 98.52 cm. And the diameter ($2r$) of the pendulum were measured as 5.250, 5.235, 5.240, 5.245, 5.235 cm. Calculate the average value of these data by using excel, open office or excel.
- (c) From the gravity equation, g value was estimated to be $973\text{cm}^2/\text{s}$. By using the wxmaxima or octave, obtain the T value from the right equation. Compare with the period value (T : time/count) obtained from the table.

$$g = \frac{4\pi^2}{T^2} \left\{ (l + r) + \frac{2}{5} \frac{r^2}{(l + r)} \right\}$$

The composite price index of stocks vs the rate of exchange



Gravity constant

Count	Minutes	Seconds
0	0	6
10	0	26.4
20	0	46.6
30	1	7.6
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60	2	7.8
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