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LONGITUDINAL DATA SET In the GREEK EQUITY MARKET

**Based on a data set of the Composite Index
and the Transaction Volumes
of the ATHENS STOCK EXCHANGE**

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What has been presented in Part 1:

Presentation of Basic Statistics and Analysis of each of the Two Variables

Based upon the Presented Statistics

What will be presented in Part 2:

Graphical Presentation of the Two Variables in terms of Frequency Distribution,

Correlation (Relation between the Two Variables)

and Selected Smoothing Techniques (the 'Best Shots')

Selected Variables

1. 'Daily Closes of the Athens Stock Exchange Composite Index' (1980=100)

2. 'Daily Transaction Volumes' (drachma million)

(Variable 2 will be considered as the outcome of Variable 1)

	Index Closes ('x')	Volumes ('y')
mean	934.88 (X)	5,157.45 (Y)
stdev	103.11 (Sx)	3,384.25 (Sy)
min	806.67	1,867.00
1 st Q	846.06	3,106.03
median	883.21	4,148.08
3 rd Q	1,019.55	5,777.15
max	1,194.58	20,457.00

PEARSON CORRELATION r: 0.7092

REGRESSION LINE:

SLOPE: b = 23.28

(calculated as: $b = r (Sy / Sx) = 0.7092 (3,384.25 / 103.11) = 23.28$)

INTERCEPT: a = -16,604.54

(calculated as: $a = Y - b X = 5,157.45 - 23.28 \times 934.88 = -16,604.54$)

Regression Equation : $y = -16,604.54 + 23.28 x$

Correlation Graph

Summary

As Pearson Correlation of **+0.7092** indicates, the relation between the two variables is strong and positive. That means, the higher the Composite Index, the higher the transaction volume (in other words, sessions in which the Composite Index closed at higher levels, were characterized of strong transaction volumes and vice versa).

Thus, we can see that the point 'A' in the Correlation Graph, corresponds to the session with the maximum levels of both Composite Index (1,194.58 points) and Transaction Volume (20,457 drachma mil.). The Index reached its **maximum value** on January 18th. That came as a result of expectations about an exaggerated positive outlook of the Greek economy. These expectations led the Composite Index and the Transaction Volume to their highest values. Likewise, the points 'B' (Transaction Volume: 1,867 drachma mil.) and 'C' (Composite Index: 806,67 points) in the Zoom Correlation Graph correspond to the two sessions with the **minimum** Transaction Volume and Composite Index respectively.

At the Zoom Correlation Graph, we can observe a considerable congregation of values taking place at the lower levels of the examined two variables. By that, we also become able to understand why the distributions of the two variables are skewed towards the low end of their scales (as was earlier presented and summarized).

The relationship that is resulting from the regression equation ($y = -16,604.54 + 23.28 x$), enforces one of the most frequently observed **functions** in a Stock Market. When investors feel optimistic they buy more stocks, leading to more transactions and to higher levels of the stock market index. By contrast, when investors feel pessimistic they sell stocks leading the index to lower levels with lower transaction volumes.

Conclusively, the positive and quite strong correlation of this relationship shows that the examined two variables **tend to go together**. High values of the variable 'Closes of Composite Index' tend to go with high values of the variable 'Transaction Volumes' and vice versa.

**Smoothing and Regression for each Variable
(‘The Best Shots’)**

WHAT WILL BE PRESENTED FOR EACH VARIABLE:

1. A graph showing the performance of the variable over time,
along with the 30-Day ARIMA and the Regression Line
2. Comments on the graph and the revealed picture
3. A graph showing the performance of the variable over time,
along with the 30-Day ARIMA,
30-Day Moving Maximum and 30-Day Moving Minimum

Graph of the Composite Index with the 30-Day ARIMA and the Regression Line

Summary

As the graph shows, the Composite Index is characterized of considerably **many abrupt movements** during the examined 10-month period (January - October 1994). Such movements are the increase of the index from point '1' to point '2', or its very sudden decrease from point '5' to point '6', that took place in just a few weeks.

Apart from trend and stochastic variations, during the examined period we should acknowledge the significant presence of the **specific variation**. In other words, specific events were the ones that dominated the performance of the Composite Index in this 10-month period. Among those events, we should particularly separate **two** of them. The **first event** refers to the expectations regarding an exaggerated positive outlook of the Greek economy, expectations that were created among the investor circles in the beginning of the period. That situation gave the movement of the Index from point '1' to point '2' (January 18). As soon as those expectations realized as fake ones, the Composite Index moved adversely, from point '2' to point '3'. The **second event** refers to the time when the market was anticipating a significant depreciation of the domestic currency. The depreciation would come as a result of the liberalization of the domestic transactions (May 1994). Under that threat, the Composite Index moved downwards, from point '5' to point '6' (May 25).

No **cyclical variation** can be observed. Given the performance of the Composite Index during the last three years, no norm exists that can show that an increase of the Index occurs at the beginning of each year, or that the month of May is the 'black month' of the stock market.

By using the **30-Day Moving Average** - the classical and the most frequently used way for smoothing a stock index performance - the trend of the stock market becomes clearer and more obvious. There are no abrupt movements anymore. Along with the **Regression Line**, the indicating general trend of the market is downward. When the 30-Day ARIMA is below the Stock Index Line, a period in which investors should buy stocks is indicated. Such period exists between the points '1' and '10'. Adversely, when the 30-Day ARIMA is above the Stock Index Line, a period in which investors should sell stocks is indicated. For example, such periods exist between the points '11' and '12' (it's a long-lasting period) and after point '13'.

We can finally observe that during the period June - October 1994, the 30 - Day Moving Average is smoother, reflecting the fact that the Composite Index fluctuates at the more confined range of 800-900 points.

Graph of Daily Transaction Volumes with the 30-Day ARIMA and the Regression Line

Summary

As the graph reveals, the Daily Transaction Volumes are characterized of less abrupt changes over the time, but those changes seem to be **quite similar** to the changes (movements) of the Composite Index. This conclusion can derive through the comparison of the respective graphs. We can see that when the Composite Index was reaching higher levels, transaction volumes were doing so as well, or that when the Index was moving downward, the transaction volume in each session was getting lower. Thus for example, the movement from point 'A' to 'B' in the Transaction Volume Graph, correspond to the movement from point '1' to '2' in the Composite Index Graph.

Apart from trend and stochastic variations, during the examined period we should likewise acknowledge the significant presence of the **specific variation**. Specific events were the ones that also dominated the performance of the Daily Transaction Volumes over the investigated period. As the Index fluctuated at its high levels (January - February 1994), the transaction volume of the stock market similarly remained high, by fluctuating at the range of 7,500 - 21,000 drachma mil.. As soon as the Index moved abruptly to its low levels, the Transaction Volume did so as well. Thus, through all the period of March - October 1994, the Transaction Volume fluctuated at the lower range of 2,500 - 7,500 drachma mil. (with very few exceptions).

No **cyclical variation** can be observed. Given the historical performance of the Transaction Volume of the Stock Market during the last three years, no movement occurred during the examined period, which could be attributable to a cyclical performance or behavior of the market.

By using the **30-Day Moving Average**, along with the **Regression Line**, the general trend of the Daily Transaction Volumes is downward, but less downward than the trend of the Composite Index. The 30-Day Moving Average offers a smooth picture of the trend that took place over the time and moreover shows the decrease of the fluctuation range of the variable, during the period March - October 1994.

It should be noted that the Transaction Volume of the Stock Market always constitutes one of the most important factors determining the investors' decisions. Analysts concentrate on many of the statistics deriving from that variable and base their arguments and advise upon the analysis of those statistics. Subsequently, investors get influenced by what analysts believe for the market performance and act by following their suggestions.

FINAL CONCLUSIONS

A positive and strong relationship exists between the two variables (the Composite Index and the Transaction Volumes)

The performance of the two variables over the time is characterized of abrupt movements and changes of their levels.

The trend of both variables shows clearly downward.

This downward trend could be attributable to specific events and economic situations as was earlier analyzed.

No cyclical or seasonal variation can be observed for both variables.

The 30-Day Moving Average was selected as the most appropriate smoothing technique. The 30-Day ARIMA along with the regression line enforces the fact that the observed trend is downward for both variables.

By the use of the 30-Day Moving Maximum and Minimum, a conclusion, referring to both variables, can derive: The fluctuation range of each variable is being limited over the time.

Finally it is apparent that there is similarity between the performance of the Composite Index and the performance of the Transaction Volumes. In other words, by looking at the two variables, we can acknowledge common movements in their behavior.