Project Proposal

Istanbul Stock Exchange Data

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Goals

In the global era of commerce and trade, stock markets are integral to everyday life. They are integrated into millions of people's retirement accounts. They are also where millions of people place their spare money in the hopes that it will grow in value. In analyzing the Istanbul Stock Exchange Data, I hope to be able to do a few things with this data. Research goals for this project are as follows:

- What trends can we see by looking at multiple stock indices in given time intervals? And how can we use this to predict future trends?
- What, if it exists, are the optimal times to place money into the market for the maximum return?
- Is there an optimal index? Do any of the indices stand out from the others with greater returns on investment?

I am interested in this data because I have always been fond of the stock market and analyzing different stocks. I think taking a statistical approach will give me more analytical tools. Currently I do everything by hand or through Yahoo Finance.

The data to be used can be found at this link: https://archive.ics.uci.edu/ml/datasets/ISTANBUL+STOCK+EXCHANGE

It was collected by Dr. Oguz Akbilgic through imkb.gov.tr and finance.yahoo.com and categorized by working days in Istanbul. All the data is numerical; it is the daily return, in decimal form, of the various global stock exchanges.

It is possible that the data can yield links to certain market trends. If trends are found in the data, this can be applied at large to give investors in a mutual fund or hedge fund the ability to invest at the best time for the greatest return on investment. Most people are in the business of making money and having a way to maximize return is universally applicable.

Data Analysis

We can take a closer look at some of the data in the sets. For now, we can start with simple averages of all the indices' data. What we get is as follows:

```
> mean(ISE)
[1] 0.001628877
> mean(DAX)
[1] 0.0007207977
> mean(SP)
[1] 0.0006432991
```

These are the overall daily average returns of the Istanbul Stock Exchange (ISE), Deutscher Aktienindex (DAX), and the Standard & Poor's (SP). When converted to percentages, we get approximately 0.16% for ISE, 0.07% for DAX, and 0.06% for SP. The period of this data collection ranges from January 2009 to February 2011. Based on this quick review of the data, placing money into a fund tracking the ISE would have yielded the highest daily return. Another thing to consider is that this data is from the period of recovery after the 2008 financial crisis. The data will typically remain positive during these recovery periods.

We can also look at the totals for these three indices to see what the total return of them was over the same period, not just the daily average. When we do this, we see the following:

```
> sum(ISE.USD)
[1] 0.8319928
> sum(DAX)
[1] 0.3863476
> sum(SP)
[1] 0.3448083
>
```

ISE, over this period, has a return of a staggering 83.2%, whereas the DAX and SP return 38.6% and 34.5% respectively.

This small set of data gives us a rough picture of the nature of the indices, specifically during this period of recovery. However the averages and sums do not constitute everything that this data set holds; we can also look at the data on different timescales within this small period of time to see if there is anything interesting.

This is the first chunk of this data. There are about 536 rows of data spanning from January 2009 to February 2011 during the period of recovery after the 2008 financial crisis.

date	TL BASED ISE	USD BASED ISE	SP	DAX	FTSE	imkb_x NIKKEI	BOVESPA	EU	EM
5-Jan-09	0.035754	0.03837619	-0.00468	0.002193	0.003894	0	0.03119	0.012698	0.028524
6-Jan-09	0.025426	0.03181274	0.007787	0.008455	0.012866	0.004162	0.01892	0.011341	0.008773
7-Jan-09	-0.028862	-0.02635297	-0.03047	-0.01783	-0.02873	0.017293	-0.0359	-0.01707	-0.02002
8-Jan-09	-0.062208	-0.0847159	0.003391	-0.01173	-0.00047	-0.04006	0.028283	-0.00556	-0.01942
9-Jan-09	0.00986	0.00965811	-0.02153	-0.01987	-0.01271	-0.00447	-0.00976	-0.01099	-0.0078
12-Jan-09	-0.029191	-0.04236116	-0.02282	-0.01353	-0.00503	-0.04904	-0.05385	-0.01245	-0.02263
13-Jan-09	0.015445	-0.00027218	0.001757	-0.01767	-0.00614	0	0.003572	-0.01222	-0.00483
14-Jan-09	-0.041168	-0.03555248	-0.03403	-0.04738	-0.05095	0.002912	-0.0403	-0.04522	-0.00868
15-Jan-09	0.000662	-0.01726784	0.001328	-0.01955	-0.01433	-0.05045	0.030314	-0.01207	-0.02343
16-Jan-09	0.022037	0.03227803	0.007533	0.006791	0.006289	0.025453	0.004867	0.008561	0.010917
19-Jan-09	-0.022692	-0.04434878	-0.05426	-0.01155	-0.00935	0.003239	-0.01315	-0.01205	-0.00403
20-Jan-09	-0.013709	-0.02966137	0	-0.01783	-0.00417	-0.02341	-0.0409	-0.01509	-0.02411
21-Jan-09	0.000865	0.00152943	0.042572	0.005011	-0.00773	-0.02056	0.033532	-0.00334	-0.00509
22-Jan-09	-0.003815	0.00504316	-0.01528	-0.00984	-0.0019	0.018818	-0.01698	-0.00655	-0.00323
23-Jan-09	0.005661	-0.01000795	0.005363	-0.00964	7.40E-05	-0.03881	0.006261	-0.00362	-0.00808
26-Jan-09	0.046831	0.06170818	0.005538	0.034787	0.037891	-0.00818	0.009838	0.0328	0.01032
27-Jan-09	-0.006635	0.01094866	0.010866	-0.0008	-0.00347	0.048148	0.004922	-0.00264	0.006344
28-Jan-09	0.034567	0.03587086	0.033007	0.044182	0.023748	0.005594	0.038725	0.029974	0.022104
29-Jan-09	-0.020528	-0.02027185	-0.03368	-0.02026	-0.02477	0.017723	-0.01475	-0.02311	0.000409
30-Jan-09	-0.008777	-0.02345826	-0.02305	-0.02048	-0.00971	-0.03167	-0.00854	-0.0072	0.002243
2-Feb-09	-0.025919	-0.03560749	-0.00053	-0.01564	-0.01745	-0.01513	-0.01629	-0.01974	-0.01909
3-Feb-09	0.015279	0.02240282	0.01571	0.02404	0.021039	-0.00617	0.027574	0.017862	0.012719
4-Feb-09	0.018578	0.02323077	-0.00752	0.026577	0.015275	0.026908	0.009565	0.01877	0.015166
5-Feb-09	-0.014133	-0.01457138	0.016233	0.003932	7.09E-05	-0.01117	0.024128	-0.00414	0.002073
6-Feb-09	0.036607	0.04275893	0.026541	0.029306	0.014788	0.015846	0.039282	0.019127	0.032338
9-Feb-09	0.011353	0.02146764	0.001484	0.004766	0.003651	-0.01341	-0.01546	0.005627	0.007895
10-Feb-09	-0.040542	-0.04390687	-0.05037	-0.03517	-0.02218	-0.0029	-0.02144	-0.02439	-0.00214