**MGE20101 Operation Research I**

**Group 7**

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1. Research Topic

Korea financial market optimization

1. Motivation

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| Top 10 holding ratio in Kodex200 | |
| Major stocks | Fund weight |
| Samsung Elec. | 27.88% |
| SK Hynix | 5.63% |
| Hyundai Motor | 2.33% |
| Shinhan | 2.32% |
| Naver | 2.28% |
| Celltrion | 2.20% |
| Hyundai Mobis | 2.04% |
| POSCO | 2.03% |
| LG Chemical | 2.02% |
| KB Finance | 2.01% |

“The way to make an investment in stocks is to invest in index fund. Index fund is so called goods favorable to investors.” With this phrase of Warren Buffett, we are having an interest in index fund market. The scale of the world index fund market (including ETF) reached the level of $16trillion in 2017, accounting for 20% of working capital, predicting it reaches $25 trillion. Index fund market is growing rapidly in Korea too. As of the end of last year, net assets were worth 36.27 trillion won, 58.67 percent more than active funds (22.86 trillion won) that fund managers invest in individual stocks.

The founder of the index fund thought that the most effective investment strategy would be to keep up with the average market return, because the probability of an investor making more than the average market return from a long-term perspective is extremely low.

Among the stocks listed on the KOSPI market, 200 of Korea's major stocks are included, and KODEX 200, the largest asset size and the most active trader, currently tracks the KOSPI 200 Index, which is almost the same as the fluctuation rate of the composite stock index. Therefore, our group want to utilize KODEX 200. Currently, the KODEX 200 yield is 6.78% (standard deviation is 0.79%) and the KOSPI annual yield is 2.6% (standard deviation is 0.82%). However, Samsung Electronics’ return, which accounted for 27.88% of the KODEX 200 during the same period is 1.38%, contributed most of the increase. We want to examine whether the holding ratio of KODEX 200 is optimized at present.

1. Goal

* Mathematically prove Modern portfolio theory and risk management   
  (Value at Risk and Expected shortfall measure)
* Utilizing real market data, obtain optimal solution and back testing

1. Expected Contribution to Academia and Related Industries

* In this project, our group used KODEX200 as a representative of the stocks listed on the KOSPI market. By expanding the scope, our group's optimization process can be applied to other stocks (general shares, small and medium-sized shares).
* From the perspective of financial investors, investors can be advised about allocating weights in the way they distribute capital, knowing exactly the advantages of index fund.