Technische Universität Wien
Department of Informatics

Interdisciplinary Project Outline

Performance of Directors' Dealings transactions in shares of NYSE Composite Companies pre vs during Covid 19 Pandemic – 2018 - 2022

by

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1 General Information

Topic: Performance of Directors' Dealings transactions in shares of NYSE Composite Companies pre vs during Covid 19 Pandemic – 2018 - 2022
Student: Thomas Niedermayer, Matrikelnr. 01600968
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Supervisor: a.o. Univ.-Prof. Dr. Wolfgang Aussenegg
Co-Supervisor: Associate Prof. Dipl.-Inform. Dr.rer.nat. Sascha Hunold
Corresponding interdisciplinary lecture: 330.214 Project and Enterprise Financing (2022SS)
Lecture already done or in parallel: in parallel

2 Abstract

Insider trading is the act of illegally making use of information gathered at the workplace by so called insiders, to the insider's own financial gain. In this project, we will investigate the extent to which insiders of New York Stock Exchange (NYSE) composite companies are involved in insider trading and if this has changed in times of the pandemic.

3 Motivation, Problem Statement and Hypotheses

Stock market fluctuations can have a significant impact on our society. Any additional market knowledge might drastically alter the outcome of trades. As a result, a great deal of work is expended to ensure that no one has an unfair edge. An insider is someone who works for a firm and is likely to have access to information that is not available to the general public and making use of this knowledge can result in unfair gains on the capital market or avoid losses by selling shares before negative news are made public. The following three hypotheses will be considered to measure to which extent insiders are able to make favorable deals.

1. **Hypothesis 1:** Insiders are able to earn significant abnormal returns in the first weeks after disclosure of relevant information.
2. **Hypothesis 2:** Insiders are significantly good at avoiding risk indicated by market downturns after insiders selling shares.
3. **Hypothesis 3:** Directors have changed behaviour during the times of covid: Hypotheses 1 and 2 can be answered with significantly different confidence before and during the pandemic.

These hypotheses will be compared using cross sectional analyses, and for Hypothesis 3, we will use the following time frames for a comparison:

1. all purchases from 2018 until December 2021 (overall),
2. all sales from 2018 until December 2021 (overall),
3. all purchases from 2018 until February 2020 (pre-pandemic),
4. all sales from 2018 until February 2020 (pre-pandemic),
5. all purchases from March 2020 until December 2021 (pandemic), and
6. all sales from March 2020 until December 2021 (pandemic).

4 Methods

Our experiment design will largely revolve around measuring the extent of advantage an insider has and observing the change when the time frame is varied. We will ensure the usage of apt statistical tools for the task and quantitatively report the confidence we have in the correctness of the hypotheses. To measure the extent of abnormal returns generated by director's dealings, we assume no abnormal returns at all as a null hypothesis. In this case, we would expect similar day to day returns to the NYSE composite index. If the returns follow a different distribution, a t-test or Wilcoxon signed-rank test will return low p-values, indicating abnormal returns.

5 Tasks/Milestones

For this project, we have defined which steps are to be taken, and we have grouped them into relevant milestones. Mr. Gunnar Sjúrðarson Knudsen will carry out a similar project with a different data set (Nasdaw Composite companies) and we will profit from sharing code. To ensure both parties, Mr. Knudsen (GSK) and I (TN), split the work relevant for both projects in equal parts, in the following list, the bulletpoints that are reused between the projects are marked with the person responsible for the work.

1. **Gather Data**
   - Collect Relevant Company Tickers
   - Collect Directors dealings for company (GSK)
2. **Preprocess & Exploratory analysis**
   - Cleanse data and handle datatypes (GSK)
   - Combine results (GSK)
   - Group transactions for each directory/transaction day (GSK)
   - Explore the data to get a basic understanding of it, as well as checking data quality (GSK)
3. **Calculate Metrics**
   - Calculate daily Abnormal Returns (3) (TN)
   - Calculate Cumulative Abnormal Returns (4) (TN)
4. **Cross sectional Analysis (5) and Hypothesis/statistical tests**

- Calculate important distribution parameters of the CARs for `mean`, `median`, `standard deviation`, `minimum`, and `maximum` (TN)
- Significance test for each group for the following null hypothesis:
  - `Car-mean = 0` (*t-Test*) (TN)
  - `Car-Median = 0` (*Wilcoxon signed-rank test*) (TN)
- Compare result for various groups

5. **Finalize Deliverables**
   - Create visualizations
   - Document and push code
   - Write report
   - Create Poster

References

[1] Dr. Wolfgang Aussenegg. Lecture notes in 330.214 project and enterprise finance, lecture 6-7, 06 2021.

[2] Dr. Wolfgang Aussenegg. Lecture notes in 330.214 project and enterprise finance, lecture 8, 06 2021.

[3] Dr. Wolfgang Aussenegg, Ranko Jelic, and Robert Ranzi. Corporate insider trading in Europe. *Journal of International Financial Markets, Institutions and Money*, 54:27–42, 2018.

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[5] Jana P. Fidrmuc, Adriana Korczak, and Piotr Korczak. Why does shareholder protection matter for abnormal returns after reported insider purchases and sales? *Journal of Banking & Finance*, 37(6):1915–1935, 2013.

[6] A. Craig MacKinlay. Event studies in economics and finance. *Journal of Economic Literature*, 35(1):13–39, 1997.