

Research Topic : Global Recovery in Various Fields
Field : The Recovery Rate of Financial Sector
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Published by : Malaysian Actuarial Student Association (MASA)
Date of Publication: 21st September 2020

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1 ABSTRACT

In this research, we are going to discuss the recovery rate of the financial sector after encountering an economic hit, such as the Covid-19 pandemic. With doubt, we use market capitalization to evaluate the recovery rate of the financial sector.

Here, we are considering different countries from all over the world, including the USA, the UK, Italy, China, Hong Kong, South Korea, Singapore and Malaysia. As the economy has been hit drastically especially since the beginning of the Covid-19 pandemic, we analyse the average return relative to the market capitalization of several financial companies from different countries starting from October 2019 until September 2020. We also analyse the volatility of the average return during the recovery period.

2 INTRODUCTION AND STATEMENT OF PROBLEM

2.1 Introduction

The financial sector plays an essential role in the global economy. With sound financial systems, economic growth and development can be achieved, and the World Bank Group can alleviate poverty and boost shared prosperity within the global community. Besides, capital markets are required to attract sources to achieve global development goals, which are projected to demand “trillions of dollars” in financing.

Financial stability creates jobs and enhances work productivity. As the economy is stable, people have the confidence to make investments and savings. Solid banking systems and capital markets will allow a much more efficient flow of funds toward their most productive uses, help raise investment capital for governments, ensure financial safety nets are in place and make payments securely across borders.

A country’s overall welfare will be improved with great access to financing because it allows people to expand opportunities and improve their standards of living. As they are financially included, it’s easier to manage consumption, payments and savings, access better housing, healthcare and education, start a small business, and use insurance products to protect themselves from shocks. Finance also helps level the playing field like making significant wealth and connections less relevant.

Capital markets are becoming essential to financing infrastructure such as roads, power plants, schools, hospitals and houses plus helping to manage unforeseeable risk. They are increasingly relevant for the Sustainable Development Goals (SDG) as reaching many of them will require long-term financing that traditional funding sources won’t be able to cover. Attracting private sector finance and investment to help cover the huge financing gaps is necessary to help the world achieve these global goals.

2.2 Problem Statement

The COVID-19 crisis is an extraordinary supply and demand shock to the global economy with far-reaching and uncertain ramifications. Emerging Markets and Developing Economies (EMDEs) are highly exposed, and capital markets are one of the main transmission channels of this on-going, global, systemic shock. This note identifies the impact of this evolving crisis on EMDE capital markets to date, assesses the different policy actions that policymakers have taken in response, and outlines some aspects of the assistance that the World Bank can provide to help alleviate the financial

and economic damage from the coronavirus pandemic. Countries with the high public- and private debt levels, high foreign-investor participation, as well as less-developed domestic capital markets are most vulnerable. The private sector is highly exposed to the current crisis, especially small- and medium-sized firms, BBB-rated corporates and firms with heavy reliance on foreign exchange debt. (2020)

Hence, by mining the average return in the market capitalization of the financial sector in a specific country from the pre-COVID period, we will be able to discover the recovery rates of the financial sector in different countries. This shows how quickly the financial sector responds to the pandemic the financial sector continues to provide its function to the global community. In addition, this research will be focusing on visualizing the pattern of the financial sector in terms of average return relative to market capitalization to identify the difference in recovery rate among several different countries.

3 LIMITATIONS OF STUDY

3.1 Dataset

All dataset used in this research paper is collected from the internet. For every country, at least 10 companies in the financial sector will be considered throughout the whole research. In addition, the market capitalization data has been collected on a daily basis from Oct 2019 to Sep 2019 (8/9/2020). In this research, we considered Oct 2019 to Dec 2019 to be the pre-COVID level and the following 6 months is the period where the disease runs rampant. After July 2020, we assume to be the post-COVID period.

3.1.1 Market Capitalization

The market capitalization is highly influenced by quite a number of factors. For instance, the behavior of investors, fundamental strength of a company, any market-sensitive or company-specific news and factors extraneous to the company such as macroeconomics and geopolitics. In addition, the number of outstanding shares also depends on the issue of new shares and buyback of shares and they vary between companies and even countries. Hence, it may not reflect the recovery of the companies in the financial sector effectively.

4 METHODOLOGY

4.1 Data Mining Method

Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes (ori.hhs.gov, 2020). In this project, the data type will be numeric type as the data source is collected from Yahoo Finance and Ychart, where the site has rich data.

4.1.1 Dataset

Dataset is a collection of data that can be used by the computer for statistical and inference purposes (Anderson et al.,2017). In this project, the dataset will be the market capitalization that has been collected via Yahoo Finance and Ychart. A large quantity of datasets is used for data visualization on the average return of market capitalization and the rate of change of daily market capitalization for every country to perform analysis.

The dataset will be stored as a comma-separated file (csv) when it is scrapped. The comma-separated file is being chosen to store the data because R can read csv files easily compared to the other file types. In R, we are using the 3 built-in packages in R to plot the graph, which is tidyverse, lubridate and scales.

4.1.2 Data Pre-Processing

Data Preprocessing is a technique used to convert the raw data into a clean data set. As data is collected from different sources, the data is in raw format. Hence, it is not feasible for analysis. (GeeksforGeeks, 2020) In this project, the data that will be used is numeric data, hence string change to numeric preprocess is needed.

5 LITERATURE REVIEW

5.1 Impact of the pandemic on the financial sector

Financial markets entered a risk-off phase with significantly increased volatility across markets at the end of February 2020. Equity markets began declining rapidly with the speed of the selloff exceeding that of the global financial crisis of 2008-2009 (GFC), losing around 30% of market value in a matter of weeks.

Short-term funding markets and international US dollar funding markets started to show signs of stress and there were signs of illiquidity in the US Treasury market in early March. These stresses carried through into credit markets which make it difficult for firms and governments to borrow funds at any tenure.

Central banks reacted quickly to the emerging signs of stress, applying lessons learned during the GFC. Participants from across the financial system noted that the US Federal Reserve and other central banks began addressing funding market impairment. In doing so, they prevented stresses in underlying funding markets from propagating into market-wide disruptions. At the same time, central banks announced plans to expand asset purchase programmes with the goal of reintroducing liquidity into key asset classes.

Equity markets began to rebound following announcements of substantial fiscal support packages by large advanced economies in late March. According to market participants, this rebound reflects expectations that the size and targeting of the fiscal packages, averaging 10% of GDP across the United States and Europe with a focus on supporting small businesses and hard-hit industries, will effectively address the macroeconomic slowdown.

Moreover, equity market infrastructure remained remarkably resilient, which enabled markets to remain fully functional and begin to rebound. Exchanges utilized tools like market-wide circuit breakers, stock-specific guardrails and dynamic restrictions on short selling to maintain orderly functioning and market liquidity. Post-trade infrastructures remained fully operational at record high volumes and volatility, in addition to effectively managing margin requirements to prevent potential settlement failures from spilling over.

The direction of developments is generally encouraging in credit markets. Whereas primary bond markets had effectively closed in early March, by early April investment banks reported strong demand for new credit issuance by investment-grade borrowers. Participants attributed the re-opening of primary credit markets to central bank action as well as a somewhat improved macroeconomic outlook. On the other hand, high-yield markets and secondary bond markets remained largely closed.

A key difference between the GFC and this crisis has been the role of banks. Unlike the GFC, this crisis is fundamentally a public health emergency that has become an economic downturn as governments have taken measures to stop the spread of the disease.

The post-crisis regulatory framework has led to substantial increases in capital held by large advanced economy banks, in addition to more liquid assets and more stable sources of funding. Not only are banks relatively stable, but they are also serving as the primary transmission mechanism for much of the business support components of many countries' fiscal packages. Participants advocate that the focus of regulatory and central bank policy should be on maintaining this stability while enabling banks to meet the needs of the real economy, which may be a difficult balance to achieve.

Both private-sector participants and policymakers remain concerned about the range of risks presented by weaknesses in many emerging markets and developing countries. Most importantly, there will be risks of a true human tragedy if countries are unable to contain the spread and deadliness of COVID-19.

Whereas most advanced economies are addressing emerging recessions with large fiscal packages, many emerging market and developing economies lack the fiscal space to adequately respond. Since the beginning of the crisis, investors have fled from emerging markets, with portfolio outflows exceeding those during the GFC and other periods of major stress.

While some emerging markets are better positioned to withstand and address these shocks, many are seeking various forms of liquidity support from advanced economies. There has been recorded demand for emergency programmes from the International Monetary Fund (IMF) and multilateral development banks, which these institutions have met by expanding the size and breadth of the support offered.

Despite the increase in support to many countries, deep crises across emerging markets could prevent governments from being able to protect vulnerable populations, in addition to presenting significant losses to investors and lenders that could hurt balance sheets globally (2020).

5.2 Summary

The key ingredient to driving economic recovery and getting back to normal will be confidence. People will need to feel confident that they can spend, save and invest in a way that lets them fully engage with their day-to-day lives, jobs, and society at large. We can expect a slow-paced, uneven economic recovery from COVID-19 with varying rates of growth for sectors and geographies, and periods of acceleration offset by setbacks. It is clear that surviving the prolonged downturn ahead will require significant support. Banks have an opportunity to step up and lead this recovery, through

encouraging financial well-being and using innovation to help businesses get back on track. In doing so, banks can not only play their part in driving our economic recovery but also restore trust in the sector and help build a better working world. With a prolonged period of recovery ahead, banks are significant in getting customers and the economy back on track. Supporting individuals through personalized, flexible products and services can boost confidence and improve customer loyalty. Helping businesses, particularly those in heavily impacted sectors, return to growth will require more innovative assistance including building networks and using data to uncover insights. Banks that take the lead now can drive economic recovery while building their own resilience and restoring trust in the financial sector (How banks can lead the post-COVID-19 recovery for consumers, 2020).

6 MAIN BODY OF ARTICLE

6.1 Malaysia

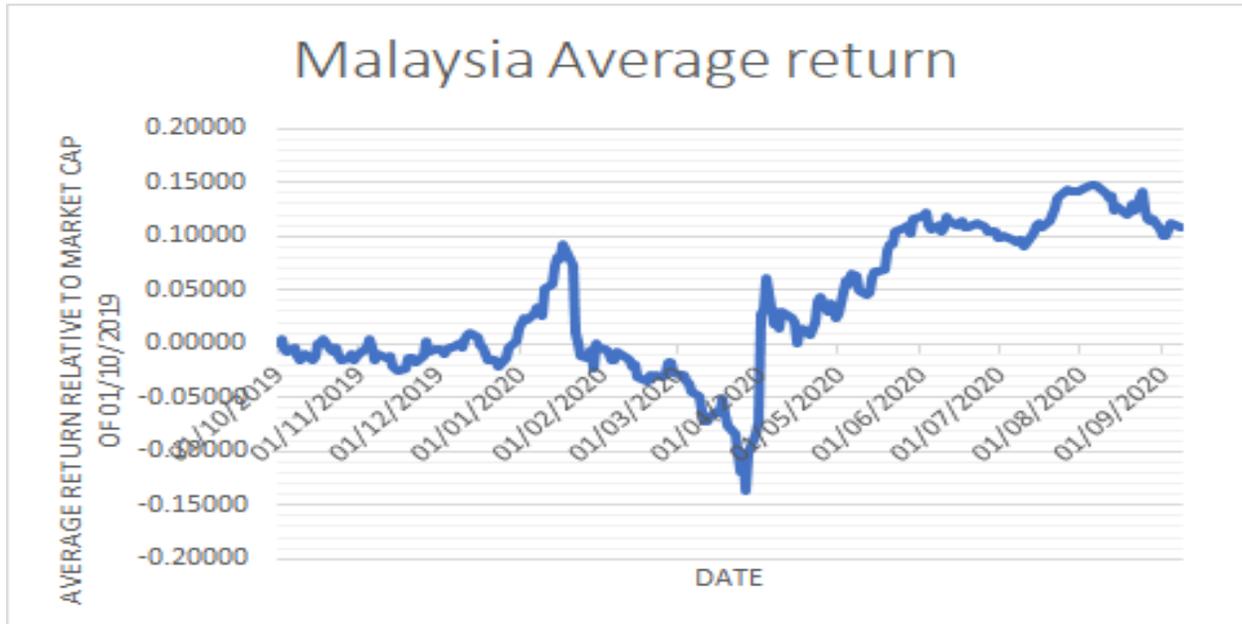


Figure 1.1 - Average return relative to market capitalization of 01/10/2019 in Malaysia

The average return in market capitalization was decreasing during the Covid-19 pandemic, when the number of Covid-19 cases was increasing. Then, it started to rebound in May 2020 and moved in an upward trend. In the 2nd quarter of 2020, it is obvious that the average return is far higher than that in the pre-Covid level (Oct 2019 - Dec 2019). Hence, we can assume that the companies in the financial sector have recovered from the pandemic.

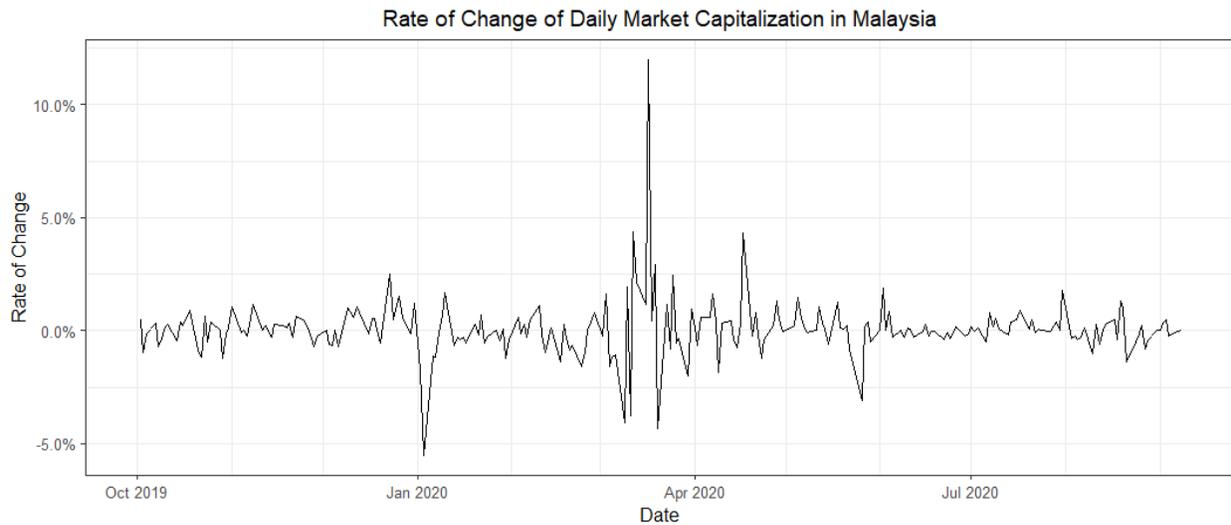


Figure 1.2 - Rate of change of daily market capitalization in Malaysia

As shown in Figure 1.2, the average rate of change in the market capitalization looks volatile from Oct 2019 to Dec 2019, where the rate is ranging from -1.75% to 2.5% over the period. In the early of Jan 2020, the market capitalization of the companies in the financial sector has slumped by at least 5%. This may be a result of the announcement of the first Covid-19 in Wuhan City. In relation to this, Malaysia's economy is likely to be affected due to the rapid slowdown of China's, resulting in a decline of average rate of change in the financial sector. In addition, the increase of Covid-19 cases in Malaysia since 25th January 2020 has also aggravated the slowdown in the economy, causing the rate of change in market capitalization to remain negative most of the time in the first quarter of 2020. Furthermore, the market capitalization had once shot up by more than 10% in mid-Mar 2020. Overall, the range of rate of change in market capitalization starting from Jun 2020 is almost the same as the pre-Covid level. Hence, we can conclude that the market capitalization of companies in the financial sector in Malaysia has recovered to the pre-Covid level.

6.2 China



Figure 2.1 - Average return relative to market capitalization of 01/10/2019 in China

From figure 2.1, we can see that there is an upward trend in the average return of market capitalization since Oct 2019 and it reached its peak with the average return of 0.09 in mid-Jan 2020. However, the average return of these companies decreased sharply in the next 2 months and remained negative since mid-Mar 2020.

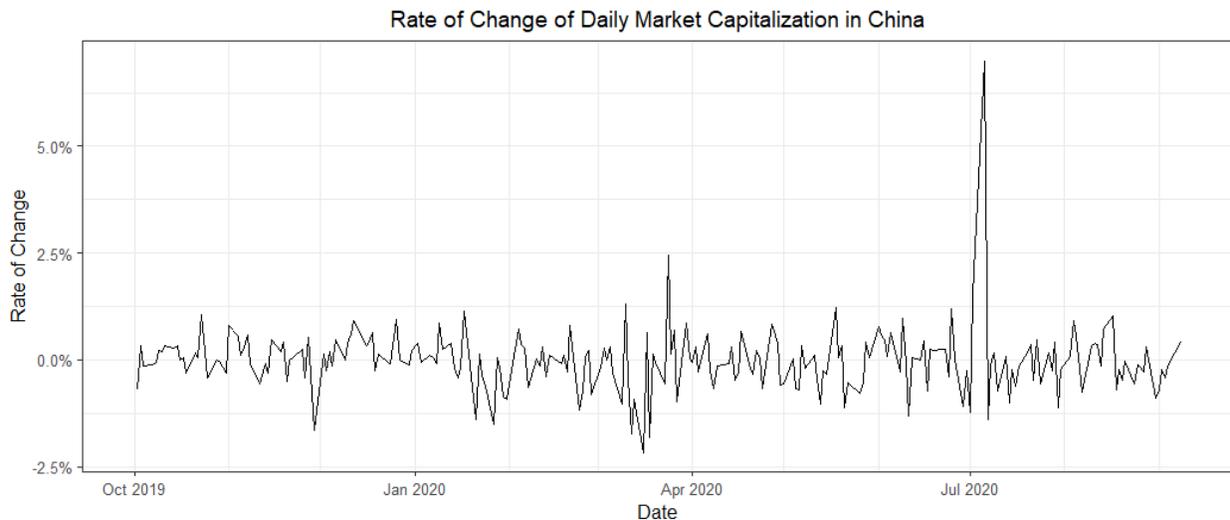


Figure 2.2 - Rate of change of daily market capitalization in China

As the Covid-19 virus has hit China badly since the end of Dec 2019, there is a fall by more than 1.25% in market capitalization for companies in the financial industry at the end of Jan 2020. Since

then, companies have experienced a negative rate of return most of the time in the first quarter of 2020. The market capitalization even dropped by approximately 2% in mid-Mar 2020 but also increased by 2.5% at the end of the month. This is because as of the end of March, over 76% of SMEs and 98.6% of national industrial companies have resumed production after the Chinese government put the economy on hold to control the outbreak. As China has successfully flatten the curve since Mar 2020, we can observe that the market capitalization of companies in the financial industry has surged by at least 7.5% in the early of July 2020. Since then, the rate of change in market capitalization remains in the range of -1.25% to 1.25%, which is slightly wider than the pre-Covid level.

6.3 Singapore

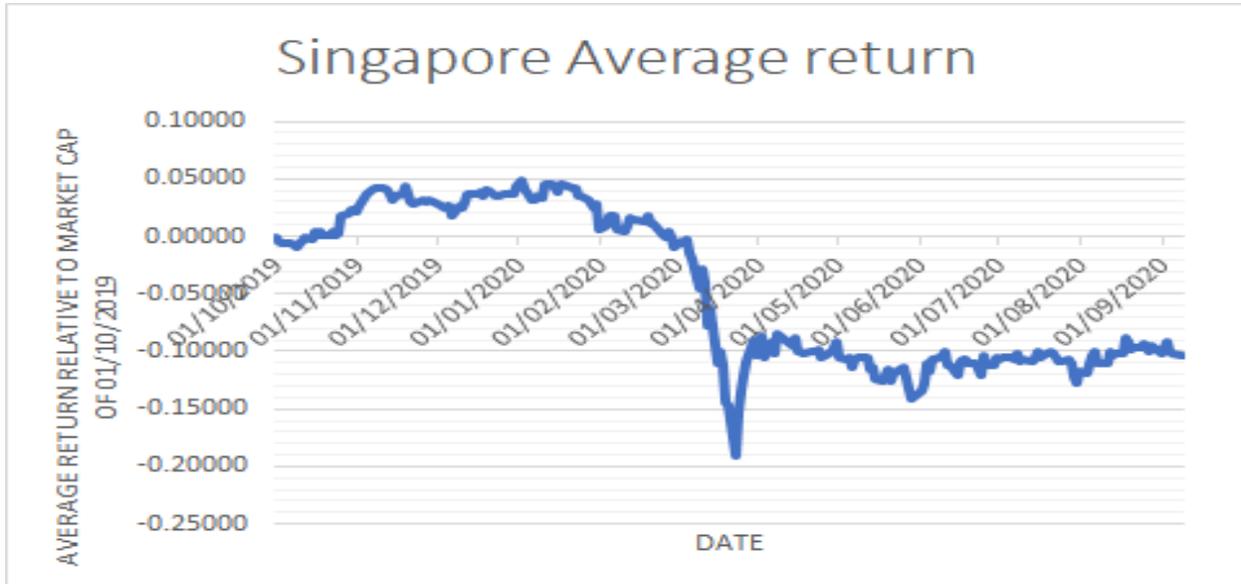


Figure 3.1 - Average return relative to market capitalization of 01/10/2019 in Singapore

As shown in Figure 3.1, the average return of market capitalization was positive from 01/10/2019 to 29/02/2020. As the number of Covid-19 cases started to surge since Mar 2020, the average return of market capitalization has decreased sharply and reached a point where the average return is approximately -0.19. Although the market capitalization rebounded slightly, the average return still remains in negative until 08/09/2020.

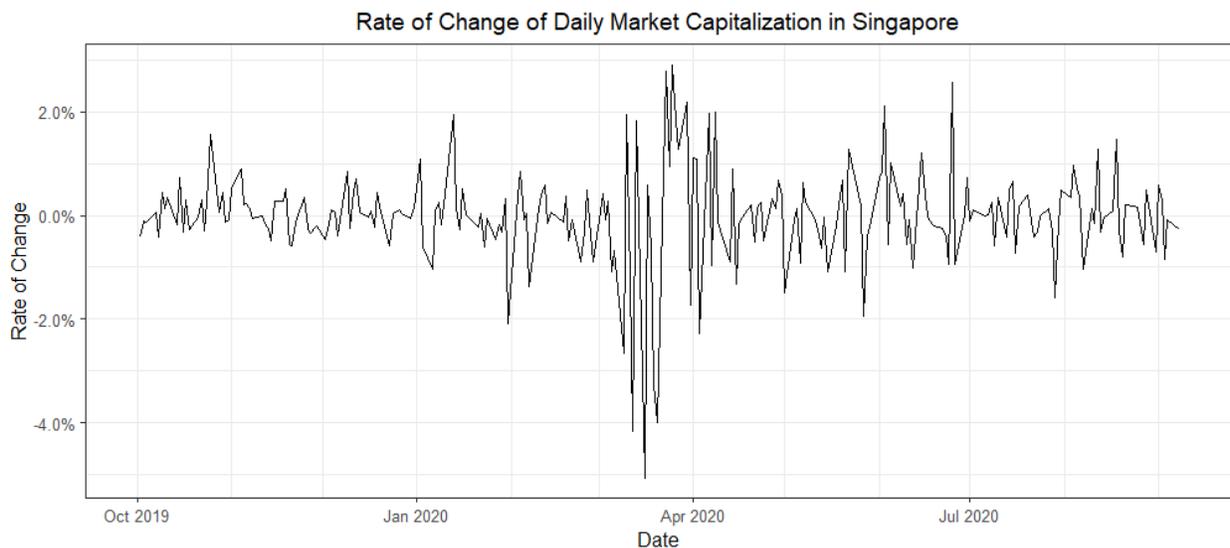


Figure 3.2 - Rate of change of daily market capitalization in Singapore

During the pre-Covid level from Oct 2019 to Dec 2019, the rate of change in market capitalization was ranging between -0.5% and 1.5%. After the first Covid-19 case was reported in Singapore on 23 Jan 2020, we can observe that there was a shortfall in the market capitalization by 2% at the end of Jan 2020. Due to the sharp increase in Covid-19 cases starting from Mar 2020, the market capitalization of companies in the financial industry has dropped sharply, where the daily rate of change has once reached -5%. In the second quarter of 2020, the companies have experienced the largest negative rate of change of approximately 2% and the largest positive rate of change of 2.5% during the period. Moreover, the range of rate of change during the post-Covid level is larger than in the pre-Covid level. Hence, companies in Singapore are still in the midst of recovery.

6.4 Hong Kong



Figure 4.1 - Average return relative to market capitalization of 01/10/2019 in Hong Kong

As shown in Figure 4.1, the average return was positive and remained below 0.1 from 01/10/2019 to 01/03/2020. Since then, the average return started to fall to -0.2 at the end of Mar 2020 and stayed negative in the next 2 months. Starting from Jun 2020, the average return resume to the positive level and even exceeded the average return during the pre-Covid level.

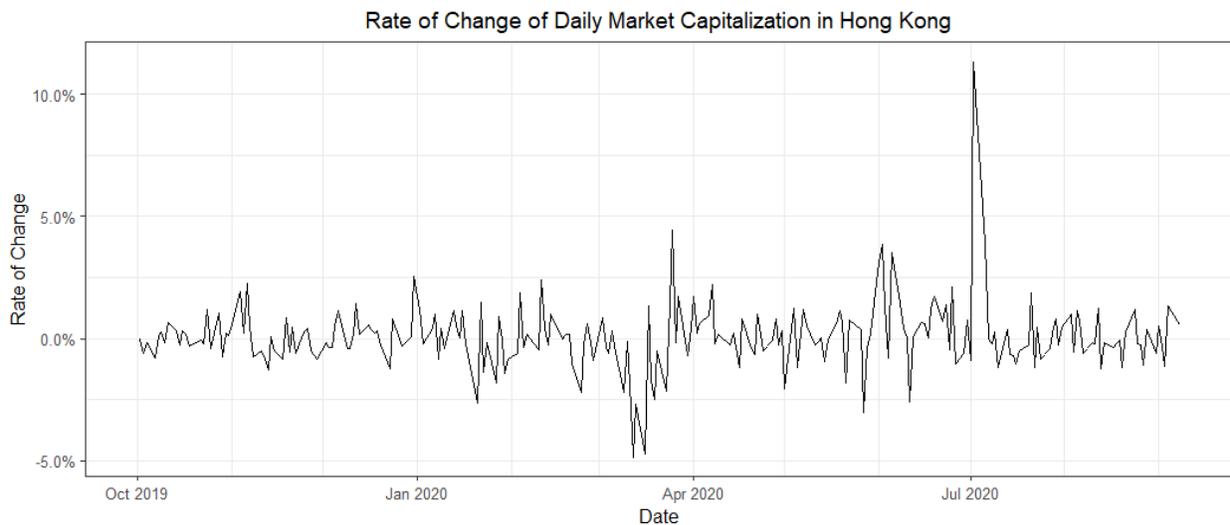


Figure 4.2 - Rate of change of daily market capitalization in Hong Kong

During the pre-Covid level from Oct 2019 to Dec 2019, the rate of change in market capitalization of the companies in the financial industry was ranging from -1.25% to 2.5%. In the start of 2020, the

market capitalization started moving downwards and reached a point where the rate of change in market capitalization hit -5% in the mid of Mar 2020. Furthermore, during the 2nd quarter of 2020, Hong Kong has successfully flattened the curve, giving a much lower infected cases compared to the previous period. Hence, we can see that the market capitalization has increased by at least 10% in the early-July.

6.5 South Korea

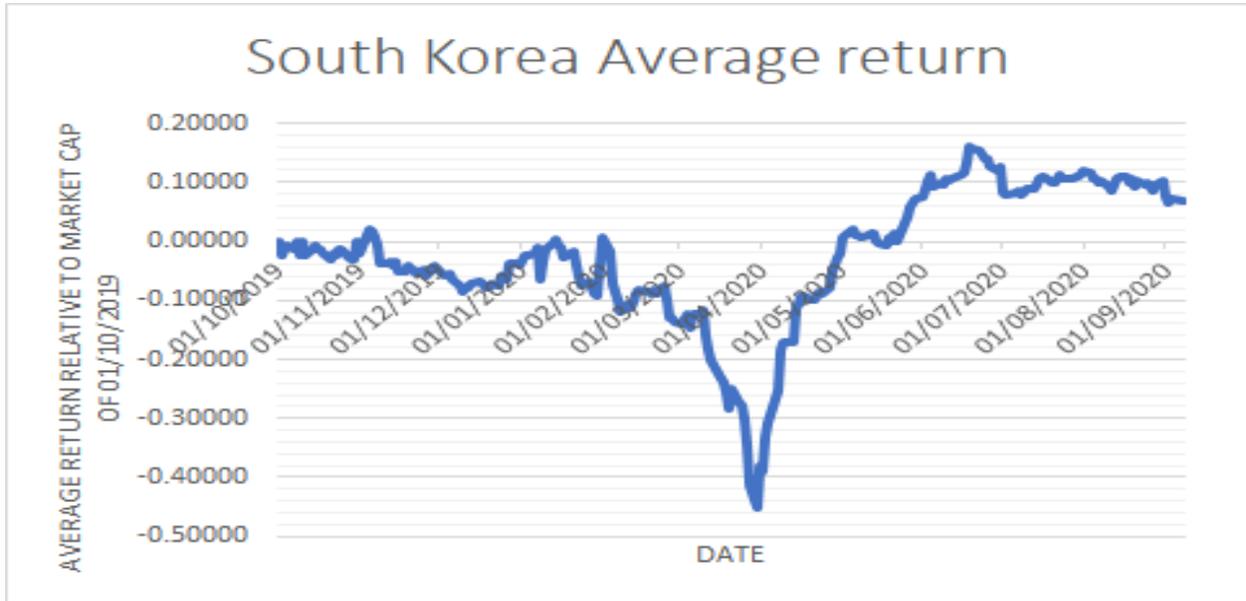


Figure 5.1 - Average return relative to market capitalization of 01/10/2019 in South Korea

Since Oct 2019, the average return of market capitalization was almost negative and declining until the end of Apr 2020. During the period, the average return of market capitalization has once exceeded -0.4 at the end of Mar 2020. Nevertheless, the market capitalization started to show a positive return since the end of May 2020.

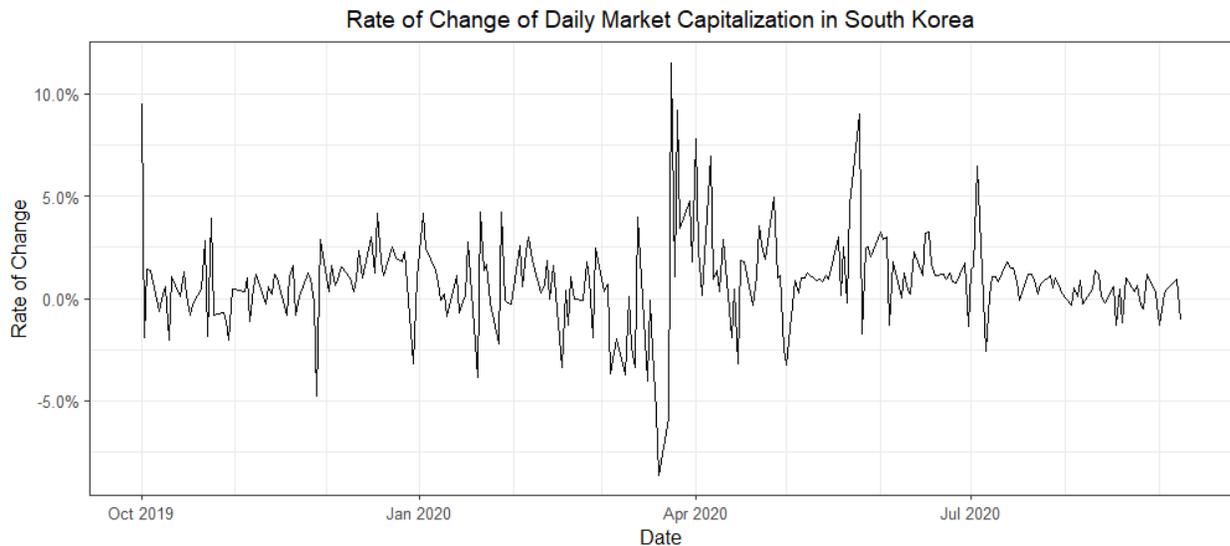


Figure 5.2 - Rate of change of daily market capitalization in South Korea

As shown in Figure 5.2, the rate of change in market capitalization is almost negative since Oct 2019 and it turns to be positive in Dec 2019. However, the market capitalization of companies in the financial industry dropped by almost 2.5% in the end of Dec 2019. Since Feb 2020, the market capitalization has decreased and the negative rate of change has exceeded 7.5% in mid-Mar 2020. For the second quarter of the year, the market capitalization increased most of the time during the period and it continues with the upward trends until early-Sep 2020.

6.6 USA

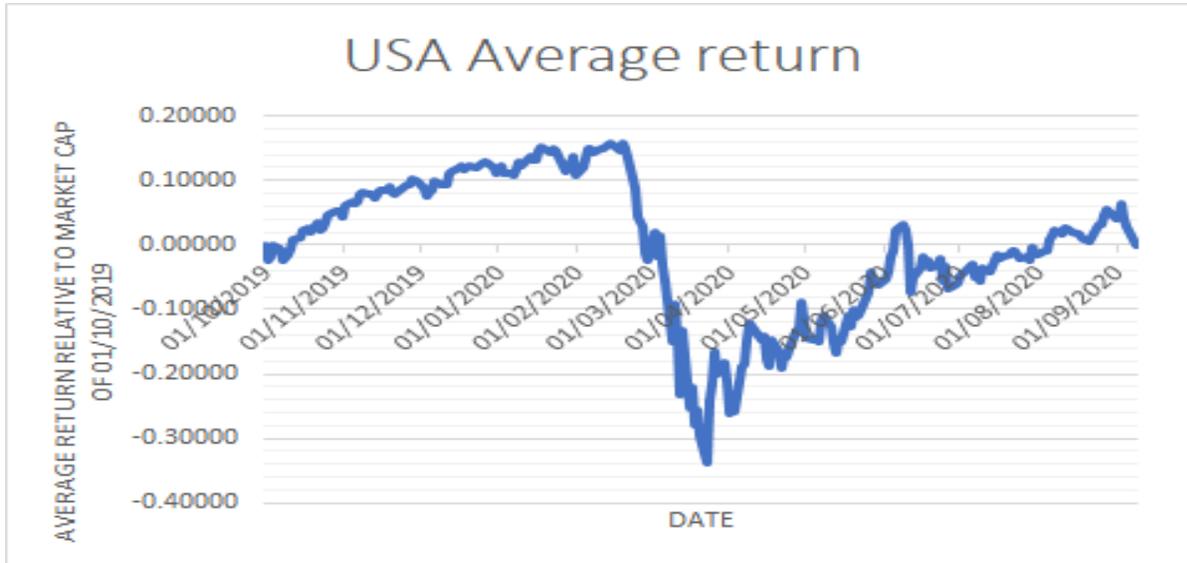


Figure 6.1 - Average return relative to market capitalization of 01/10/2019 in USA

From the figure above, the upward trends happened in 2 different periods, which are Oct 2019 to mid-Feb 2020 and late-Mar 2020 to Sep 2020. For the second period, the average return of market capitalization was moving from negative to positive level. However, the average return of market capitalization also slumped in the end of Feb 2020 and exceeded -0.3 in the end of Apr 2020.

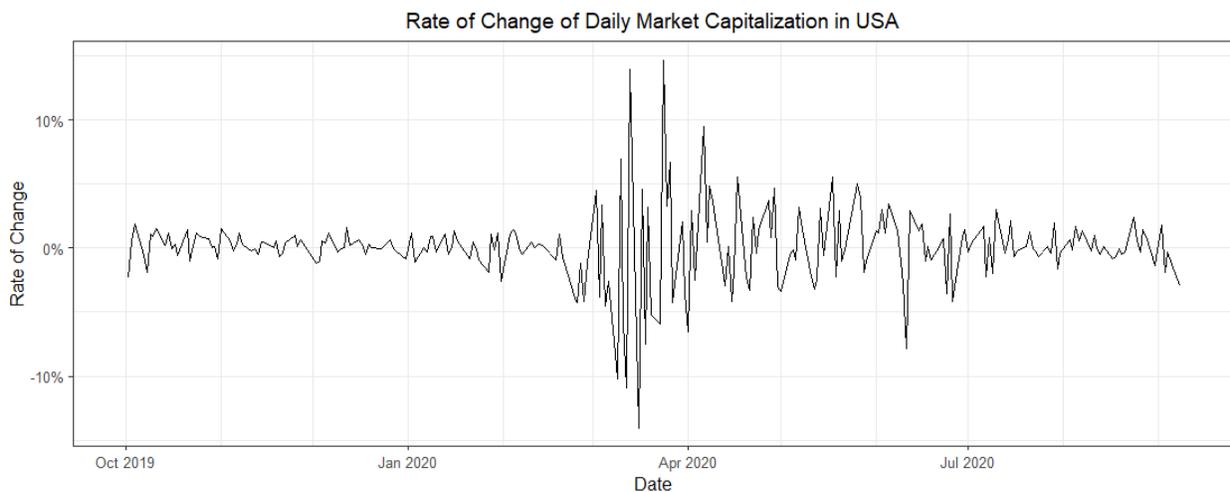


Figure 6.2 - Rate of change of daily market capitalization in USA

As shown in Figure 6.2, the rate of change in market capitalization of the companies in the financial industry was ranging between -2.5% and 2.5%. Due the Covid-19 cases started to soar, Mr. Trump began advising citizens at the end of Mar 2020 to stay home and by the end of March, 32 out of 50 states had locked down. Hence, these quarantines and lockdowns are freezing the economy, with unprecedented force and speed. Therefore, the largest decrease in market capitalization happened in the mid of Mar 2020, where the rate of change is approximately -14%.

6.7 UK

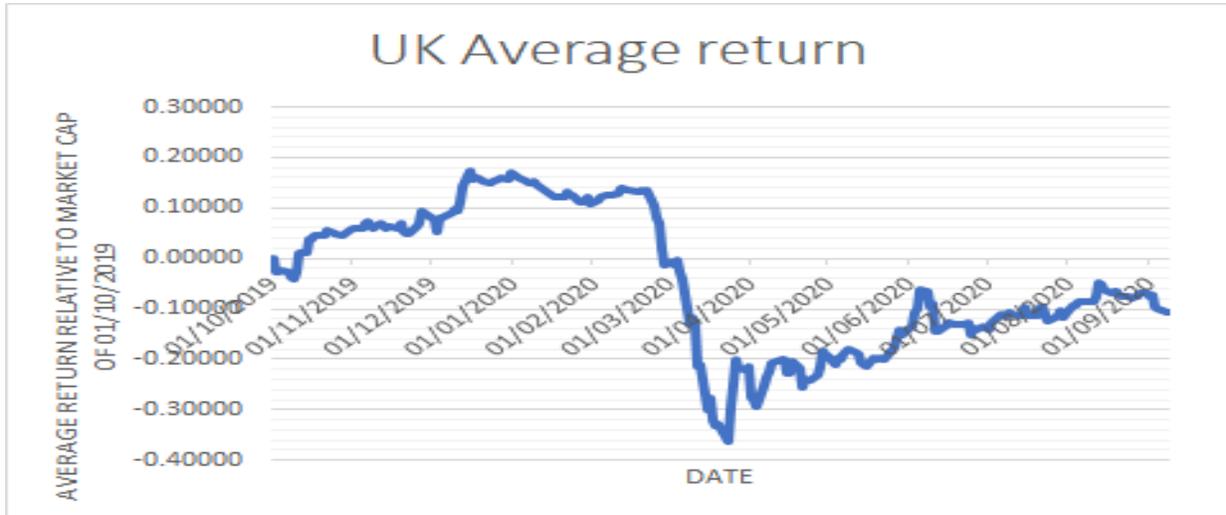


Figure 7.1 - Average return relative to market capitalization of 01/10/2019 in UK

As shown in Figure 7.1, the average return of market capitalization was positive from the pre-Covid period to 29/02/2020. As the number of Covid-19 cases started to surge since Mar 2020, the average return of market capitalization has decreased sharply and reached a point where the average return is approximately -0.35. Although the market capitalization rebounded slightly, the average return still remains in negative until 08/09/2020.

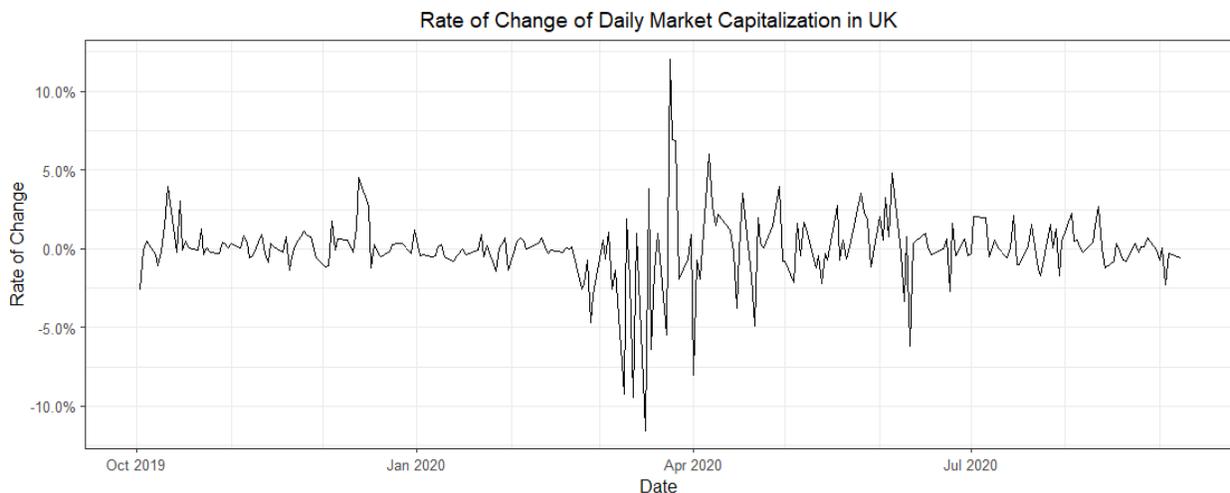


Figure 7.2 - Rate of change of daily market capitalization in USA

In the UK, the Covid-19 cases were first reported on 1st Feb 2020 and the cases increased sharply in Mar and Apr 2020. So, the market capitalization of the companies in the financial sector has dropped dramatically during the period. The largest negative rate of change happened in the mid of Mar 2020, which is approximately -11%. Since Jul 2020, the movement of the market capitalization looks quite stable as the rate of change is moving between -2.5% and 2.5%.

6.8 Italy

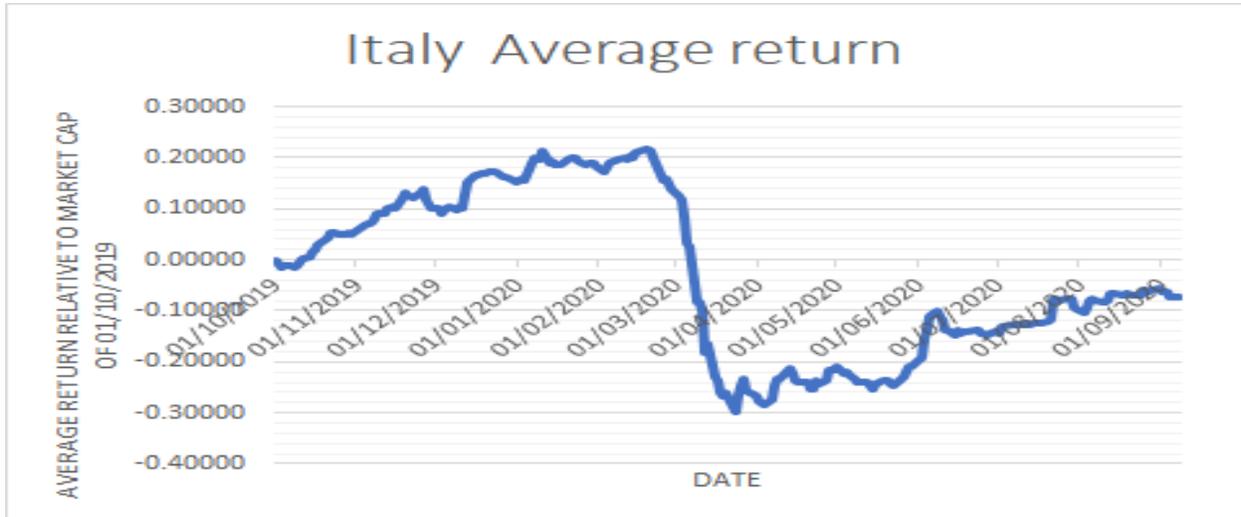


Figure 8.1 - Average return relative to market capitalization of 01/10/2019 in Italy

From the graph above, the average return of market capitalization was moving upwards Oct 2019 to mid-Feb 2020. As the number of Covid-19 cases increased sharply since Mar 2020, there is a slump in the average return of market capitalization to -0.3 in the following month. Although the market capitalization has rebounded slightly, the average return still remains in negative until 08/09/2020.

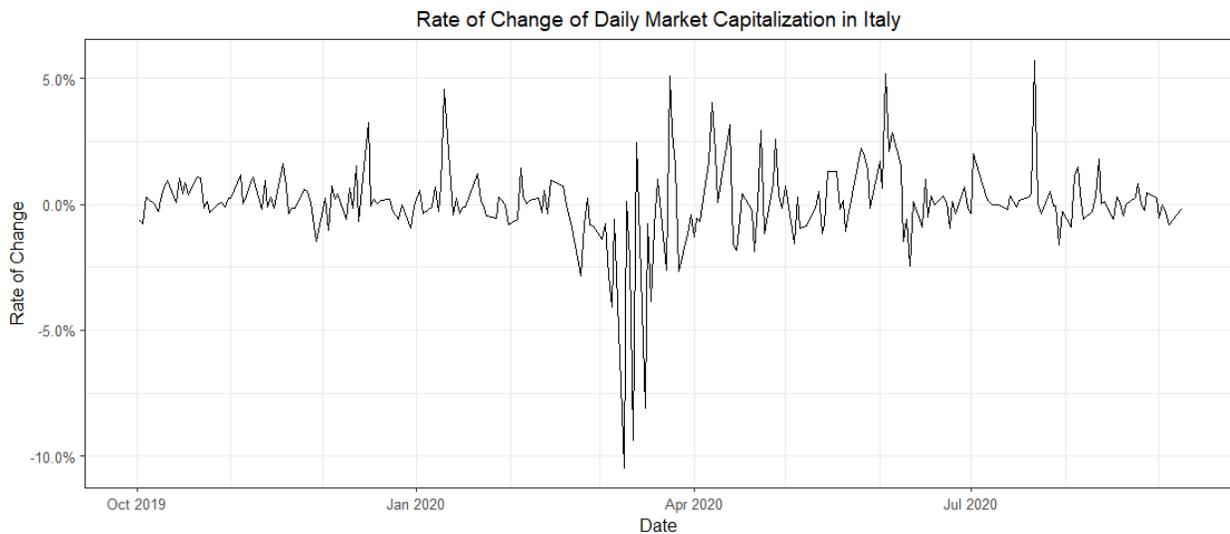


Figure 8.2 - Rate of change of daily market capitalization in Italy

In Italy, the rate of change in market capitalization of the companies in the financial industry was between -2.5% to 5% from Oct 2019 to Feb 2020. Then starting from Mar 2020, there was a huge fall in market capitalization as Italy reached a peak in the number of new cases of Covid-19 since Jan 2020. In the 2nd quarter of 2020, the market capitalization of the companies is moving in the upward trend. The reason might be the lockdown measures put in place a few weeks earlier have successfully diminished the number of new cases at the end of March and early April. The total new daily cases have also started to shrink and Italy is in the period of flattening the curve. Hence, we can observe that the rate of change in market capitalization is moving between -2.5% to 6% since April 2020.

6.9 Overall

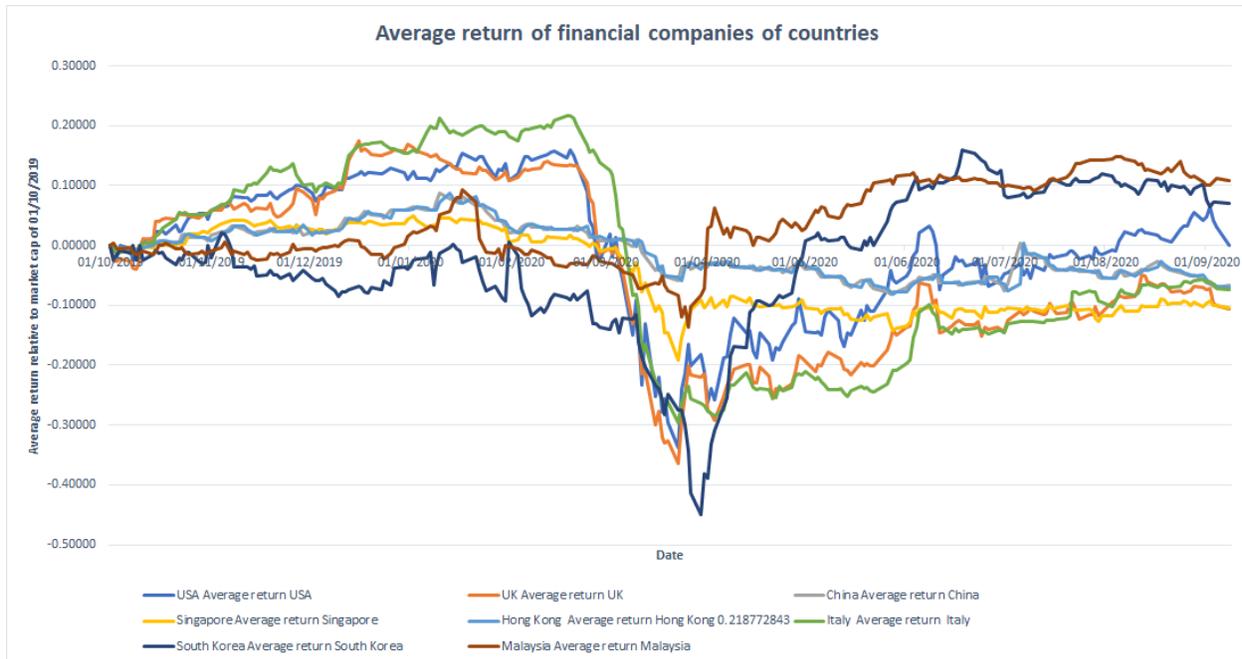


Figure 9.1 - Average return relative to market capitalization of 01/10/2019 in all countries

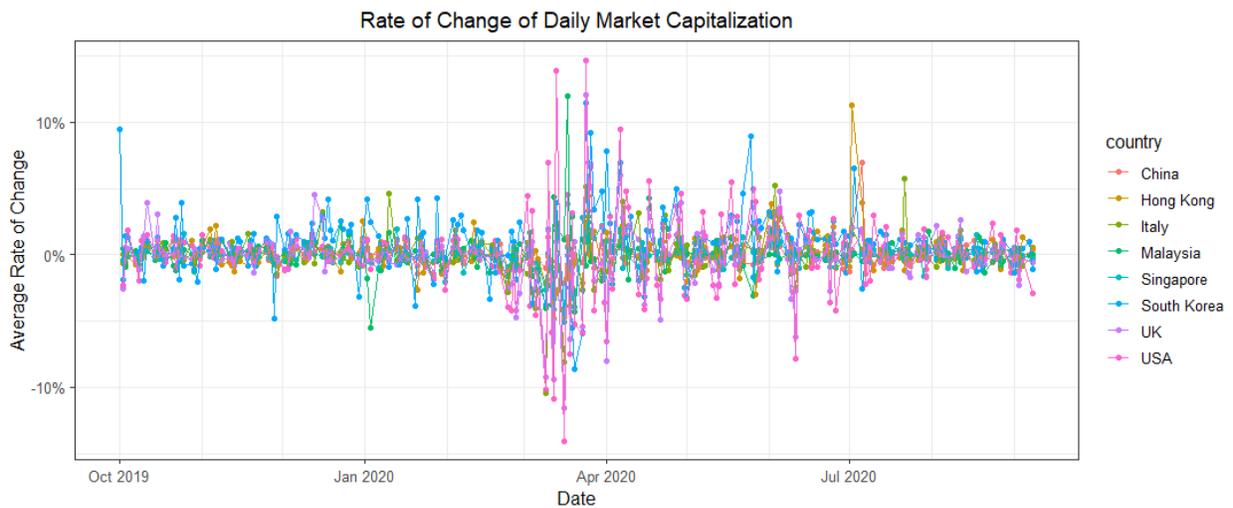


Figure 9.2 - Rate of change of daily market capitalization in all countries

Overall, the countries seem to be fluctuating in the same way as they all have the largest variation in Mar 2020. In particular, the USA has the largest variation in Mar 2020 as compared to other countries, where the rate of change fluctuates between -15% and 15%.

6.10 Correlation

Average return of countries	Correlation with new cases per million
1. Average return USA	-0.331748234
2. Average return UK	-0.722897888
3. Average return China	0.183193682
4. Average return Singapore	-0.595069935
5. Average return Hong Kong	0.487974229
6. Average return Italy	-0.658618271
7. Average return South Korea	-0.062677309
8. Average return Malaysia	-0.168645588

Note: Bold coefficients are significant ($p < 0.05$).

Table 1 - Zero-order correlation coefficients between average return of countries and daily new reported cases per million

Countries	USA	UK	China	Singapore	Hong Kong	Italy	South Korea	Malaysia
Coefficient	-0.33175	-0.72290	0.18319	-0.59507	0.48797	-0.65862	-0.06268	-0.16865
n	237	237	237	237	237	237	237	237
T statistics	5.39090	16.03841	2.85665	11.35068	8.57013	13.41758	0.96272	2.62286
df	235	235	235	235	235	235	235	235
p value	0.00000	0.00000	0.00466	0.00000	0.00000	0.00000	0.33668	0.00929

Table 2 - Pearson Correlation Test

7 CONCLUSION

In conclusion, we can observe that the average return in market capitalization in Malaysia is in an increasing manner where the number of Covid-19 cases decreases. In addition, the pandemic is successfully controlled in China where the market capitalization remains in the range of -1.25% to 1.25%. While in the USA, the financial industry was ranging between -2.5% to 2.5%. In a nutshell, we can conclude that the level of positive recovery rate in market capitalization on the financial industry can be classified by the control level of the pandemic. Well-controlled countries tend to have an increasing average return in market capitalization on the financial industry than those under-controlled countries during the Covid-19 pandemic. However, since there are still active cases around the world and all industries are adapting under the new norm, the average return may still be volatile.

8 APPENDICES

```

library(tidyverse)
library(lubridate)
library(scales)

options(max.print=999999)
data=read.csv("C:\\Users\\user\\Desktop\\Data.csv")
names(data)=c("country","date","rate")

data2=data%>%
  mutate(date=dmy(date))%>%
  mutate(rate=as.numeric(rate))

data3=data2%>%
  filter(country=="Malaysia")

data4=data3%>%
  group_by(date)%>%
  summarise(average_rate = mean(rate,na.rm=TRUE),,groups = 'drop')%>%
  mutate(date=dmy(date))%>%
  arrange(date)

p=ggplot(data4, aes(x=date,y=average_rate))+
  geom_line()+
  labs(title = "Rate of Change of Daily Market Capitalization in Malaysia",
       y = "Rate of Change",
       x = "Date") + theme_bw(base_size = 12) +
  theme(plot.title = element_text(hjust = 0.5))

x= p + scale_y_continuous(labels = percent) + scale_x_date(date_minor_breaks = "1 month")
x

#####

data5=data2%>%
  group_by(country,date)%>%

```

```
summarise(average_rate = mean(rate,na.rm=TRUE),.groups = 'drop')%>%  
mutate(date=dmy(date))%>%  
arrange(date)
```

```
p=ggplot(data5, aes(x=date,y=average_rate,col=country))+  
  geom_point()+  
  geom_line(aes(group = country))+  
  labs(title = "Rate of Change of Daily Market Capitalization",  
        y = "Average Rate of Change",  
        x = "Date") + theme_bw(base_size = 12) +  
  theme(plot.title = element_text(hjust = 0.5))
```

```
x= p + scale_y_continuous(labels = percent) + scale_x_date(date_minor_breaks = "1 month")  
x
```

9 REFERENCES

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