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MASTER'S THESIS

Valuation in electronic commerce market within the comparison of different economy system

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Declaration of Authorship

1. I hereby declare that I have compiled this thesis using the listed literature and resources only.
2. I hereby declare that my thesis has not been used to gain any other academic title.
3. I fully agree to my work being used for study and scientific purposes.

In Prague 20.December 2020 Fan Zhang

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Abstract

In 2019 e-commerce market become one of the most important part to push the global economic growth especially in China and US. In 2020 Covid-19 has widely spread around the world which caused a severe economic crisis, but e-commerce market has gained benefit from it. In this study will discuss how e-commerce will perform in future and how e-commerce reacts and defend in this crisis. This study used method of discounted cash flow to track the fundamental information of EC market as representative of Alibaba and Amazon, also used event study method to test influence of COVID-19 in the whole industry.

Keywords

e-commerce, DCF, abnormal return, CAPM, Market return, Covid-19, Cumulative abnormal return, Cumulative average abnormal return

Content

Acronyms

DCF: Discounted cash flow
EC: E-commerce market
FFCF: Free cash flow to firm
FFCFE: Free cash flow to equity
D/E: Debt to equity ratio
B2B: Business to business
B2C: Business to customer
WACC: Weighted average cost of capital
FC: Fixed cost
P.P&E: Plan, property and equipment
GDP: Gross domestic product
EBITA: Earning before interest, tax, depreciation and amortization
Rf: risk free rate
EV: Enterprise value
GMV: Gross Merchandise Value
AR: Abnormal return
CAR: Cumulative abnormal return
CAPM: Capital asset pricing model
WMT: Wal-Mart
AAR: Average abnormal return
CAAR: Cumulative average abnormal return

Introduction

In recent years, electronic market appears more and more active around the world. According to eMarketer forecast the global E-commerce business is expected to double from 1.3$ trillion in 2014 to 4.9$ US trillion expected in 2021. More interestingly, global E-commerce market has been keep eroding the retail market, in 2021 E-commerce market sales are expected to account for 17.5% of retail sales.

E-commerce first appeared in the United States then in Europe. As a new entrant to e-commerce, Asia become the most competitive region in E-commerce market. They have the most considerable trading volume in E-commerce also they have the stronger potential growth rate around the world. Although e-commerce has started in the U.S. and Europe, it booms in Asia. Meanwhile, with capital deepen and improvement in China, it jumps to biggest E-commerce market around the world in 2014. The average annual growth rate of online retail in China has exceeding 20%, but in recent, with slow down the economy the growth rate has decreased to 17%. Among the top ten e-commerce companies around the world, China occupied 4 of them. JD.com is behind Amazon and eBay. Xiaomi and Suning are also among the top 10. E-commerce market in US has accounted for the second biggest market around the world. Compared with China, the potential growth rate in US is stronger than China. Lots of the preferred policy and tax policy helps E-commerce market in US keeps stronger growth in sales. During period of 2017-2019 E-commerce market has increasing growth rate and the sales account for retail improved a lot. In contrary, China has slowed down their growth rate year by year.

In this dissertation will discuss the potential growth rate in E-commerce market in US and China and whether there is a possibility that US will surpass China. In total there are four topics discussed in this thesis, the general structure of the thesis is as follow:

Chapter 1 literature review: summarized the general situation of electric market around the world. Also, the characteristic of China and US.

Chapter 2 New strength in to develop EC market. By collecting the newest data among the institutions, I find there some new trend of E-commerce market in China and US. For example, in China E-commerce market are already into a mutual stage, but the growth rate in 2019 is still higher than other country (17.4%), after analysis it states that the reason behind the high growth rate were complicated, there are lots of derivates under E-commerce market in China has happened, also the whole industry begins to do both horizontal and vertical consolidation. The same situation also appeared in US market.

Chapter 3 valuation in E-commerce market: Under this method, in dissertation Amazon and Alibaba has been choose to represent the E-commerce market in US and China, and both companies have occupied around 60% market share in the industry. As the fundamental overview of these two companies to forecast the whole industry future trend.

Chapter 4 Event study: in 2019 Covid-19 has hit every corner of the financial market around the world especially for the retail industry. This dissertation used event study to test the influence of the E-commerce market when burst in Covid-19.

1.Literature review

1.1E-commerce market

E-commerce market refers to all business activities carried out through networks, which include but not limited to production organization, production services, financial services, logistics services, information flow services, and online sales that carried out using techniques such as the Internet. In general, E-commerce is an activity of electronically buying or selling products on online services or over the Internet. In the academic research field, they find there exist a high substitution between e-commerce and traditional market (Bakos, 1997) due to e-commerce has reduced high transaction cost and information cost.

In recent days, in stand of give up the traditional model or keep the original one, they prefer to have traditional ones and e-commerce together like parallel (chinag&chhajed,2004). In the research of (chinag&chhajed,2004) they provided empirical evidence for this hypothesis. However, in this market, there are traditional goods producers, production service providers, and final consumers who are conducive to the transformation of the mode of substitution. There is also an emerging service provide group of electronic business activities. Therefore, to further clarify my research object, to prevent the concept from being blurred and confused. The idea of the "e-commerce market" in this thesis is mainly referred to as existing in the traditional business model. In the Internet era, only network technology is used to replace the conventional transaction model with the producers, service providers, and end consumers. Emerging e-commerce service providers, as a new group, is also the main research object of this article, which is subdivided from the traditional e-commerce market. Therefore, the research object of this article is the e-commerce market which focused on the e-commerce service providers represented by Alibaba Group and Amazon, or service providers that provide small business platforms on the Internet. According to the data (China E-Commerce Research Center, 2019), the total transaction

size of China's e-commerce market in 2019 reached 30 trillion yuan, compared with 2018, it has increased 16.2% year-on-year. For US e- market the trading volume has reached to 605 billion in 2019 which is 13.6% higher when compared to 2018.

1.2 E-commerce market around the world

E-commerce appeared in the United States at first and then in Europe, which became the world's leading e-commerce region. As a new entrant to e-commerce, Asia is also developing very well, and has a large potential market. Amazon and eBay were established in the United States in 1995. Since then, this new economic activity that relies on the Internet for goods and services transactions has rapidly spread worldwide. The latest round of scientific and technological revolution and industrial revolution have produced e-commerce, at the same time, greatly improved the quality and efficiency of economic operations, also changed the human lifestyle. In 2016, the global e-commerce market size exceeded 25 trillion U.S. dollars, becoming a new growth point for the world economy (Handong Wu,2014). Following are some characteristics of e-commerce worldwide:

Firstly, the scale of the e-commerce market continues to expand. According to E-MARKET, the global online retail transaction volume increased from 0.86 trillion U.S. dollars to 1.92 trillion U.S. dollars from 2011 to 2016, with an average annual growth rate 17.4%. In the next five years, with the continuous increase in the number of mobile phones held globally and continued expansion in Internet usage as well as the rapid rise of emerging markets, global online retail will maintain double-digit growth. It is estimated that in 2020, the global online retail transaction value will exceed the U.S. $ 4 trillion, and the proportion of total global retail sales will increase from 7.4% in 2016 to 14.6%. Cross-border e-commerce, especially cross-border B2C (business-to-person), is becoming increasingly active. According to global cross-border B2C market survey (2019) the average annual growth rate of global cross-border B2C from 2015 to 2020 is about 27%, and the market size will reach to 994 billion U.S. dollars in 2020.

Secondly, regional disparities have gradually narrowed. Because of the early started in e-commerce in Europe and America, it has been widely used. In 2016, U.S. online retail transaction value reached 371.9 billion U.S. dollars, 8.5% higher than 2015, and it is accounted for 8% of total in U.S. retail sales. Currently, 80% of U.S. manufacturers have their websites, 60% of small businesses, 80% of medium-sized enterprises, and 90% of large enterprises have launched e-commerce applications. In 2015, E.U. 28 e-commerce B2C transaction volume was 407.4 billion euros, an increase of 13.4%. Among them, UK, France, Germany, Spain, Italy, and the other five countries have the most significant market shares, accounting for 77.5% of the total E.U. e-commerce market. The UK, Denmark, Luxembourg, Germany, and the Netherlands have the highest penetration rates of online shopping users; in total, they exceed 70%. (Ecommerce Europe: E-commerce research report, 2018)

Asia has the most considerable trading amount of E-commerce and also has the highest increasing rate around the world. Although e-commerce has started in the U.S. and Europe, it booms in Asia. In 2013 China's online transaction volume has steadily ranked first place around the world. Online retail transactions in Asia have accounted for 46% of the global market. The average annual growth rate of online retail in China, India, and Malaysia is exceeding 20%. Following tables ranked top 10 countries trading volume in E-commerce market

Table 1.1 Top 10 trading volume in e-commerce market

Billion & % Change	2018	2019	%Change
China	$1,520.10	$1,934.78	27.30%
US	$514.84	$586.92	14%
UK	$127.98	$141.93	10.90%
Japan	$110.96	$115.40	4.00%
South Korea	$87.60	$103.48	18.10%
Germany	$75.93	$81.85	7.80%
France	$62.27	$69.43	11.50%
Canada	$41.12	$49.80	21.10%
India	$34.91	$46.05	31.90%
Russia	$22.68	$26.92	18.70%

Source: eMarket

In stand of top 10 E-commerce countries around the world the top ten e-commerce companies also attract people`s attention among them China has occupied 4 biggest companies among them. In big four of E-commerce companies, Alibaba has ranked first place around the world, with a market share of 26.6%. JD.com is behind Amazon and eBay. Xiaomi and Suning are also among the top 10. The Indian e-commerce market has maintained a rapid growth of about 35% in the past year (Iresearch 2017). The number of Internet users in China and India accounts for 28% of the total number of Internet users in the world. An additional 100 million people will be added each year, and the vast netizen dividend will continue to support the development of the Asian market. The scale of e-commerce in Latin America, the Middle East, and North Africa is relatively small, but the potential is enormous. Latin America is the fastest-growing region in the world for B2C e-commerce. In the past five years, the transaction volume has maintained an increasing rate above 10%. In 2015 it reached 59 billion U.S. dollars. Africa has a vast region, an uneven population distribution, a small number of physical stores, and inconvenient online shopping for residents. This rigid demand exists in the development of e-commerce. In recent years, African countries have paid more attention to e-commerce development and increased their e-commerce infrastructure. Research institutions have estimated that e-commerce transactions in major African countries will account for 10% of their total retail sales by 2025.

1.3 E-commerce in China

Nowadays, the growth of e-commerce in China has begun to enter into a new stage which is intensive innovation and rapid expansion, which has become an essential part that drives China`s consumer demand, promoting the upgrading of traditional industries, and developing modern service industries. China's e-commerce market has the following characteristics:

1. E-commerce in China maintains a rapid growth and a huge potential

Recently, the growth rate of e-commerce trading volume in China has been continuously increasing. In particular, the online retail market is developing rapidly. In

2018, the total e-commerce trading volume has reached to 31.36 trillion yuan, a year-on-year increase of 8.5% (China Electronic Commerce Report, 2018), which has increased tenfold from 2008 to 2018. Online retail sales were 9.01 trillion yuan, which increased by 23.9% compared with the previous year. The total amount of cross-border e-commerce import and export goods that passed the customs system inspections reached 13.4 billion yuan, a year-on-year increase of 50%. In 2019, the transaction volume of Alipay in the "11.11" shopping carnival of China's Tmall reached 268.4 billion yuan, a year-on-year increase of 25.7%. It can be seen that the development of China's online retail market has great potential. E-commerce has also become a vital driving force to ensure the sustainable growth of the national economy. In 2016, the scale of the Internet economy's revenue reached 1,470.7 billion yuan, an increase of 28.5% year-on-year. (China E-commerce Development Report 2018-2019,2019). After years of rapid growth, the development of the network economy has entered a stable period, and the growth rate has slowed slightly. Still, the overall growth has maintained a steady growth trend and will continue in the future. Increase. Among them, the scale of e-commerce revenue was 894.62 billion yuan. It accounts for more than 60% and is the main force driving the growth of the Internet economy.

2. The rapid development of corporate and industry information provides a solid foundation for accelerating the e-commerce market. In recent years, under the background of China's vigorous promotion of the integration of information technology and industrialization, China's service industry and enterprises have accelerated the pace of information technology construction, and the demand for e-commerce applications has become increasingly influential. Many traditional industries have achieved excellent results in e-commerce applications, and traditional retail companies have continued to join the e-commerce market.

3. The e-commerce service industry has developed rapidly, and a fully functional system has been initially formed. From the perspective of e-commerce transactions, some new development trends have emerged in recent years. The mode of consciousness development is continuously evolving. In the last years, B2B and B2C have accelerated their integration and transformed from information platforms to

trading platforms. The trend of retail e-commerce platforms is becoming increasingly apparent. There are three specific situations: a comprehensive platform that covers all products, a vertical platform that focuses on market segments, and a large-scale company's proprietary website that is gradually changing to a third-party platform. The competition between platforms is fierce, and the market is increasingly concentrated. With Alibaba and J.D. Mall as the first echelon, it has opened up the gap with other small and medium-sized e-commerce companies. From the perspective of the supporting e-commerce service industry, many significant changes have occurred in recent years. For example, functions in various aspects have become increasingly independent, showing a high degree of division of labor. The new generation of information technology has been rapidly applied in e-commerce services. In addition to the Internet of goods technology, big data is gradually letting data mining play its precise marketing function. E-commerce, The features of the platform, are becoming increasingly versatile. From the perspective of supplementary e-commerce services, some new service industries have been derived around online transactions, such as a network, online store operation services, and outsourcing.

4.The rapid development of cross-border electronic transactions.

In the context of the continued weakening of the international economy, China's small and medium-sized foreign trade companies still face adversity in cross-border e-commerce, maintaining an average annual growth rate of 30% in recent years. Relevant departments are stepping up and improving supporting policies and measures to promote cross-border online trading platforms, logistics, payment, and settlement, etc., and encourage continuous innovation of transnational e-commerce models. One-stop promotion, platform operation, and online shopping business combined with the exhibition and other models, allowing more made in China products entering foreign markets through online international trade platforms, which has effectively promoted the development of cross-border e-commerce (Gong Baihua, 2016). Also, the environment for e-commerce development is continually improving. The society's awareness of e-commerce applications has been continuously enhanced, and its application skills have been adequately developed. Relevant departments collaborated

to promote the preliminary resume of the working mechanism of e-commerce development. Around the topics of electronic certification and online shopping, a series of policies, regulations, and standards were issued to actively explore the establishment of a suitable environment for e-commerce development.

Issues:

There still have some problems when developing e-commerce. First of all, Incomplete in basic website construction. Website construction in China again hardly meets current needs. When consumers shopping online, they always facing a big issue for finding the items that they want on websites and buy them at the lowest price. The search engine looks pretty simply: the user enters a query keyword, and the search engine searches the database according to the keyword and returns the most appropriate WEB link. However, according to a recent study by the NEC Institute and INKTMI, at least one billion web pages on the Internet need to have the connection between each other, but they're only 500 million web pages could be linked, and half of them still cannot be indexed (Tong Zhiyuan,2018). This is not mainly due to technical reasons. Because online merchants want to protect the privacy of product prices. Therefore, when users are shopping online, they have to search for one site at a time until they find a product at a satisfactory price.

Secondly, Incomplete online security certification system. The security of e-commerce is still the main factor affecting the development of e-commerce (Lin Yifu 2019). The survey company has conducted an online survey on the application prospects of e-commerce. When asked why they are unwilling to shop online, the problem for most people is to worry about being hacked and losing credit card information. Therefore, some people or enterprises are reluctant to use e-commerce because of concerns about security issues. Security has always been the biggest obstacle to the development of e-commerce. Such as a secure and reliable communication network, adequate protection of information systems connected to the network; effective prevention of data theft or misappropriation; training of e-commerce personnel to understand how to protect the security of their information systems and data.

Thirdly, poor management in the e-commerce market. The variety of e-commerce has brought new business rules and methods to the world. This requires more standardized management. The concept of management should cover business management, technical management, and service management. These aspects reach a relatively satisfactory degree of standardization, which cannot be achieved in a short time. It is also essential that the front-end and back-end of the other e-commerce platforms are consistent. The front-end WEB platform is directly oriented to consumer responsibilities and is the facade of e-commerce. The back-end internal operation management system is a necessary condition for the completion of e-commerce, and it is related to whether the business undertaken by the front-end can be well realized. A perfect back-end system can better reflect the comprehensive strength of an e-commerce company.

Fourthly, online payment. E-commerce requires payment and settlement, and transactions on the Internet need the assistance of third-party payments. As a third-party secured transaction platform, Alipay undoubtedly provides online buyers with the security of funds. However, the method and timeliness of dealing with transaction dispute There are still unavoidable disadvantages. How to solve the after-sale protection of payment has a major driving force for improving the confidence of netizens in online shopping. New regulations for third-party payments now increase the security of online payments to some extent. Last but not least, the trading market needs to be sounded.

The form of e-commerce will be diversified in near future, and there will be more than one corporate like Taobao in the future. In a period of time, Taobao has earned majority recognition in public eyes from e-commerce. Also people are wiliness to trust producers who opened their business in Taobao. However, in the future, the form of e-business will be diverse, the public will have more choice to choose the platforms when they were shopping online. The platform-based model has begun to explain the opportunity from e-commerce. There will be a variety of competitors enter in this industry. From another aspect, not only more competitors enter into the industry, but also e-commerce has expended into another element. For example, in recent days, Baidu also launched life navigation, which belongs to business needs from emerging consumption.

The relationship between search and e-commerce will be much closer. In case of Internet information consultation is exceptionally complicated if you want to find your needs accurately, search tools are the most convenient way to achieve your goal, which is why Taobao cooperates with Sogou. In the era of pan-e-commerce, our needs are not only shopping but also our living habits and consumption habits are beginning to affect by Internet. In this context, we will seek the help of searching for accurate information.

1.4 E-commerce in the U.S.

E-commerce in the U.S. has accounted for a large share of the overall retail market and increased year by year. In 2013, the total amount of trading in e-commerce was the U.S. $ 263 billion, and the growth rate of e-commerce market reached 16.6%. From the perspective of the category share of e-commerce, electronic digital, clothing accessories, automobiles, and accessories are the most significant categories in the e-commerce market. Online retail had a 14.3% share of total retail sales in 2018, up from 12.9% in 2017 and 11.6% in 2016 (Cross-border e-commerce | 2018 U.S. e-commerce industry status and development report) In this respect, the U.S. is the third most advanced e-commerce market worldwide, with the U.K. and Germany in first and second place.

The U.S. has well-developed e-commerce not only for e-commerce are first appeared in this country, but also, they give e-commerce lots of support from the policy side. The government in the U.S. delivered a welcome and tolerance atmosphere for e-commerce grown up. From tax policy, government promotes to have zero tax for goods and services transactions when they exchange it via the Internet. They advocate no taxes on e-commerce and believe that the Internet should be a global medium, and all countries should benefit from this barrier to trade. As for existing taxes applicable to e-commerce should be consistent across the country and easy to understand and manage. Based on existing tax principles, state and local governments should cooperate to specify a unified, simple e-commerce tax approach. Also, they proposed that the government should develop a set of internationally unified trade rules to promote e-commerce (Zhang Handong,2017). Such provisions should encourage government recognition of electronic contracts, promote universal acceptance of electronic signatures and other similar authorization procedures, and promote the development of alternatives for international trade activities the dispute settlement mechanism and the formulation of predictable fundamental principles are clear powers and responsibilities, and rationalize and simplify the use of electronic registration.

They also protect intellectual property. Because business activities on the Internet often involve the sale and certification of intellectual property. So, the government begins to study and solicit public suggestions on methods to protect databases to promote global joint efforts to provide useful and adequate protection for related patents, establish standards that can determine the effectiveness of patent claims, work globally, and address issues that may arise as a result of For disputes caused by different processing methods of Internet-related trademarks, the establishment of a domain name distribution system to create a more competitive, market-based system and promote the Internet's bottom-up management model.

Chapter 2: New strength to develop in EC

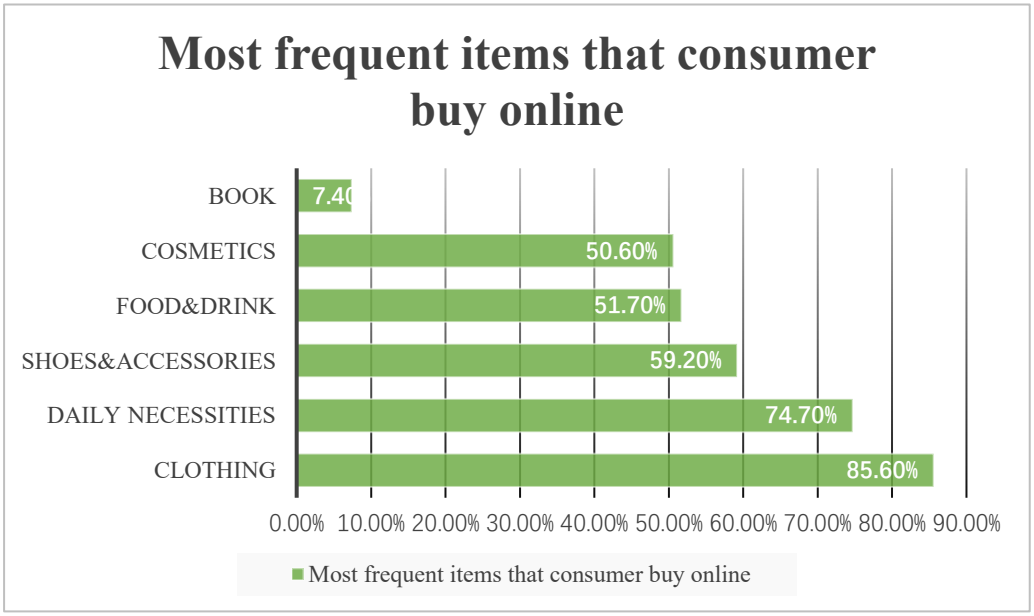
2.1 E-commerce in China: Industrial consolidation

With widely popularization of smart phones and development in electronic communication services, (like upcoming new technology of 5G has increased speed when people surfing.) E-commerce market has gradually facing a new stage of booming. The scale of mobile shopping and user penetration has rapidly growth in past one year. The scale of user has increased to 783 million, user penetration has growth over 10%. Meanwhile, economic growth also provided strong supportive to e-commerce market, the indictor of total retail sales and total online retail has reflected the growth momentum of e-commerce market in China. According to China bureau of statistics, total retail sales in 2018 maintained a steady growth around 9%, at the same time in the situation of gradually increased in overall level of consumer spending, rural residents has becoming a new growth point which has increased 9.8% year on year. At the same time, online retail sales have continued to explode. In 2018 the annual growth rate of online sales has reached to 30% year on year, it is expected that in 2023 the retail sales will increase to 50%. It is undoubtedly a great news for potential growth in e-commerce market.

With the rapid development of the e-commerce market in China, consumers are gradually diversified, when more and more consumers are getting involved in e-commerce market their variety demand and needs stimulate this industry and forced the market to developed or formed some new features. In terms of online shopping categories in 2019, 85.6% of consumers bought clothing in online retail. In another word, clothing is most frequent products that consumer will buy. And daily necessities ranked in the second position which is 74.7%, shoes or other accessories accounted for 59.2%. snake or other soft drinks account for 51.7%, cosmetics (50.6%), books (47.4%), and electronics (42.1%).

Following graph statistically shows the proportion of consumers consumed product.

Figure 2.1 Most frequent items that consumer buy online

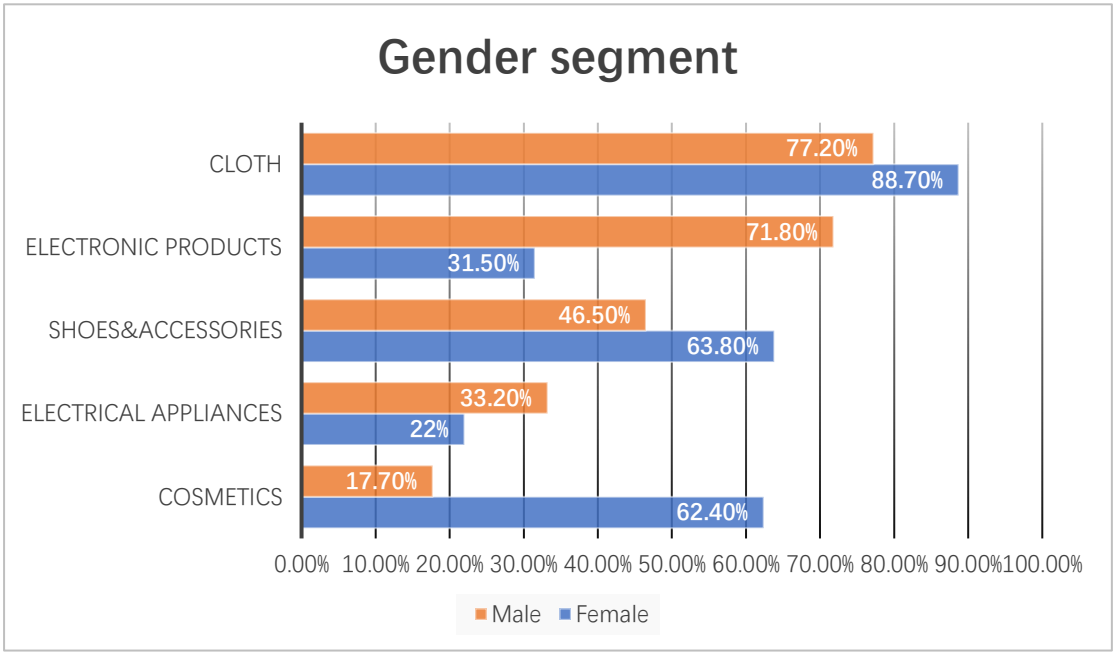


Source: E-commerce market investment analysis and forecast report in China

From the figure above, it shows that consumers have highest demand in online shopping for clothing. Meanwhile, food &soft drinking are growth in a certain scale. (especially in recent year, fresh food delivery stands up and will introduced in next chapter)

Figure 2.2 below shows the gender segment in e-commerce. It explains that the most popular items that bought by female or male when considering different gender. From the figure 2.2 in below, males are more intensive to electronic products like self-phone, PC, earphone etc. In contrast females have low interest in electronic products, they are chasing cosmetics, but both groups have high demand in cloth.

Figure 2.2 Gender segment in e-commerce in China

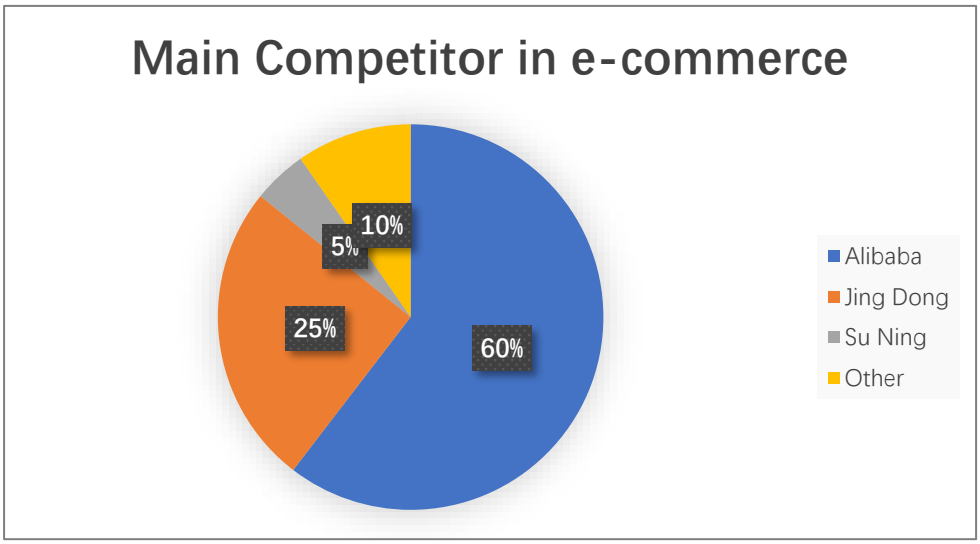


Source: Data analysis of the development scale of China's e-commerce industry in 2018

E-commerce already has 20 years history with the help of economic prosperity in China, since it established in 1999. Till 2019 China has already exceed US to become the largest e-commerce market with advanced experience management skill. Now the developing stages in e-commerce in China has slowly enters into maturity stages. In the whole industry due to the fierce competition it begun to accelerate integration, some of small platform or small APPs has been merger by medium size company others are goes to bankrupt. Many medium-size companies are slowly acquired by large corporation which has abandon experience and sufficient funds. Finally, in total there only one big corporation occupied 60% of market shares named Alibaba, and 35% of market share are occupied by Tencent group.

Following figure 2.3 shows the main competitor in China`s e-commerce market. It shows that in Alibaba group is still a biggest platform to provide e-commerce service maintained the first place in industry. There 25% of market share occupied by Jing Dong (Which belongs to Tencent Group). During the biggest sales promotion Double Eleven event，2018, the order volume of Alibaba Group increased 27% year-on-year, Suning Tesco increased by 132% year-on-year. The amount of orders placed by JD.com increased by 25.7% year-on-year, and Piuoduo orders increased by 300%.

Figure 2.3 Main competitor in e-commerce, China



Source: E-commerce market investment analysis and forecast report in China

Industry consolidation is not only performed in medium-sized company merger small size and large corporation acquired medium company, but also it stimulates lots of new service to satisfy consumers` need. For example, in 2020 Alibaba group has invested and controlled 314 upstream or downstream companies, the items are including social platforms, takeaways (67% of market shares in takeaways are controlled by Alibaba group.) online ride-hailing, logistic, fresh delivery market, navigation map, weather forecast, online payments, travel apps, photo editing software, bike sharing, browsers and car retail platforms. Those industry platforms, as well as economies such as sharing economy are closely related to e-commerce industry. They are closely connected with each other and expand the scope of services in e-commerce industry, e-commerce market has become prosperity. Since the e-commerce has been widely expended it is not only limited to online shopping, they also permeate into consumer`s daily life, like consumer`s traveling, social media, daily necessities. Here is a typical example to illustrate how to stimulate and develop the new business arear by merger downstream and upstream corporation. Since Alibaba acquitted his upstream logistics companies, they injected a lump sum of capital, with their excellent management capabilities, which helped this companies developed rapidly. When consumers go Alibaba platform for shopping, their developed and convenient logistics shortened the time of products delivery. Which also increased the loyalty of consumers which helps Alibaba move to

a new arear called fresh delivery, when consumer order fresh vegetables, meat, fruit or even live cab, they could delivery to consumers` side within 3 hours. This is also the birth of Fresh Hippo, a new platform of Alibaba Group.

2.2 New platform in e-commerce market in China

China's e-commerce market has passed the start-up period and entered a prosperous phase since 1999. At the same time, industry integration and innovation have begun, the consolidation has brought new fresh blood into the industry. Industry integration is not only reflected in the merger of large and small enterprises, but also in e-commerce innovation in the market, they provide more convenience life for consumer and dig out consumer`s need. Some emerging sectors have begun to appear to expand the scope of e-commerce services, allowing e-commerce to participate in people's daily lives.

Fresh delivery market

According to China`s bureau statistics, the total food expenditure in urban area in first two quarters of 2019 has reached to 3 trillion Yuan, behind this huge number it represents that the life condition in China has been improved a lot, thus consumers gradually increased the quality in stand of quantity of their meal and chasing better life quality. Also, with development of internet society consumer are more willing to place orders through internet than shopping in the mall or supermarket, thus fresh market has launched. Till April 2019, monthly activity user has reached to 40million, a year-on-year increased 27.5%, first and second-tier cities are the main market for fresh delivery in e-commerce, users from large and more developed cities are occupied 80%. Fresh delivery market has been existence since 2012. In total there are 40000 of companies exists in the market but only 1% of them are gained, 4% of companies are in breaking point, 88% of enterprise are in losses, 7% of them are in huge losses (Insights: fresh delivery E-commerce market, 2019). After entering into 2016, consolidation in fresh delivery market began to start, more and more company are acquired by Alibaba and Tencent group brings out more opportunity to the industry.

Since 2017, the market has begun to segment. Different fresh delivery e-commerce companies have their own business model. The mainstream business model is divided into "front warehouses" (set up warehouses in residential buildings for storage and distribution) ,“to shop + to your home” model (user could both place order online and in directly buy in shop) and “community shop” (online retail opened store near community, consumer will place their order online and online retail could delivery it within 1 hour to provide fresh products. Following figures 2.2.1 reflect the characteristics of the fresh food e-commerce industry from the market scale, the unit is 100 million yuan, and the operating model of the fresh food market. China's fresh food e-commerce industry still has a lot of potential for development and will show a rapid growth trend in the future.

Figure 2.4 Characteristics of fresh delivery in e-commerce market

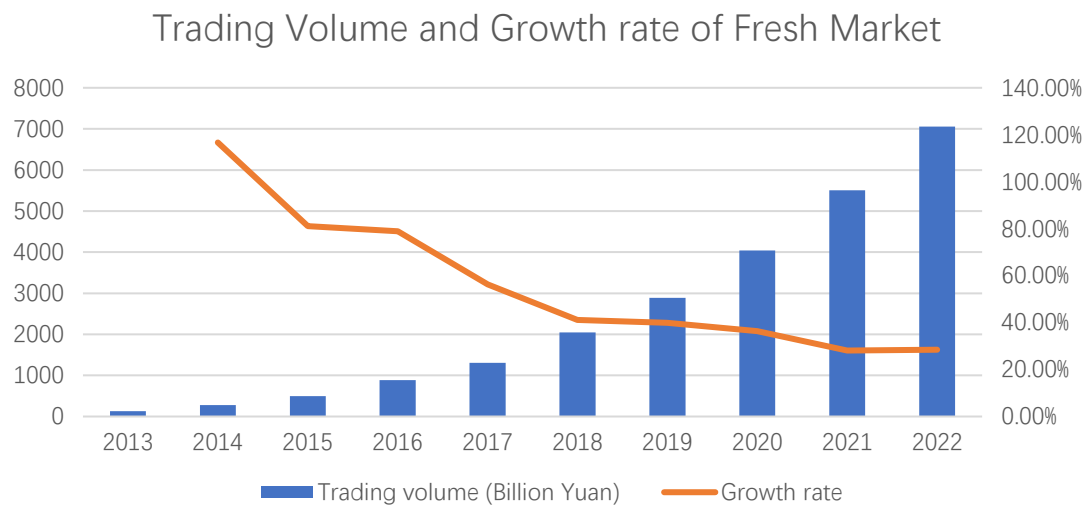
Characteristics	Traditional EC	Platform Mode	To store +To home	**Community mode**
Introduction of mode	Distribute fresh products directly to consumers via self-built logistics or third-party logistics through the Internet	Corporate with the off-line retail to provide the delivery service	To consume in store + consume online+ immediate delivery, they provide the online and offline service	Platform only provide the supply chain and after sale services, consumer take their goods in community
Layout City	Whole Country	Main city	Main city	Small city
Range	>10 Kilometers	1-3 Kilometers	0.5-1 kilometers	0.5-1 kilometers
Time of Delivery	1-2Days	1-2 Hours	30mins	1-2 days
Pros	Because the user habits cultivated early, it is easy to get consumer at a lowest price, has	Located in Residential building that improved the	They provide online and off line services, reduced the loss rate and	Low costs, easy to run,

	strong advantages in brand	efficiency and reduced the loss rate of the products	improve the quality of the goods	
Cons	Time for delivery is long, the loss rate of the products is high and strongly relied on capital chain	Comparing to the traditional mode it invests more in supply chain and Warehouse	High capital requirements and human resources	The products are limited by this mode and lack of management experience
Representative	Jing Dong 、Hungry、Meituan	Daily fresh、Ding-Dong	Fresh daily、7 Fresh	Food-sharing、Priority Food

According to statistics from (Insights: fresh delivery E-commerce market, 2019) the transaction scale of Chinese e-commerce in 2018 exceeded 200 billion yuan, after Alibaba enters into the market with abandon of investment, fresh delivery has opened online and offline retail model.

The development of the fresh food market in near future depends on a mature development model and the upgrading of the fresh delivery e-commerce supply chain. Following figure 2.2.2 shows the real and expected transaction scale and growth rate of China's fresh e-commerce market from 2013 to 2022. More than 70% of users who use the fresh food e-commerce platform to purchase fresh food are concentrated in second-tier cities, of which Beijing, Chongqing, and Shanghai are the major cities that place orders.

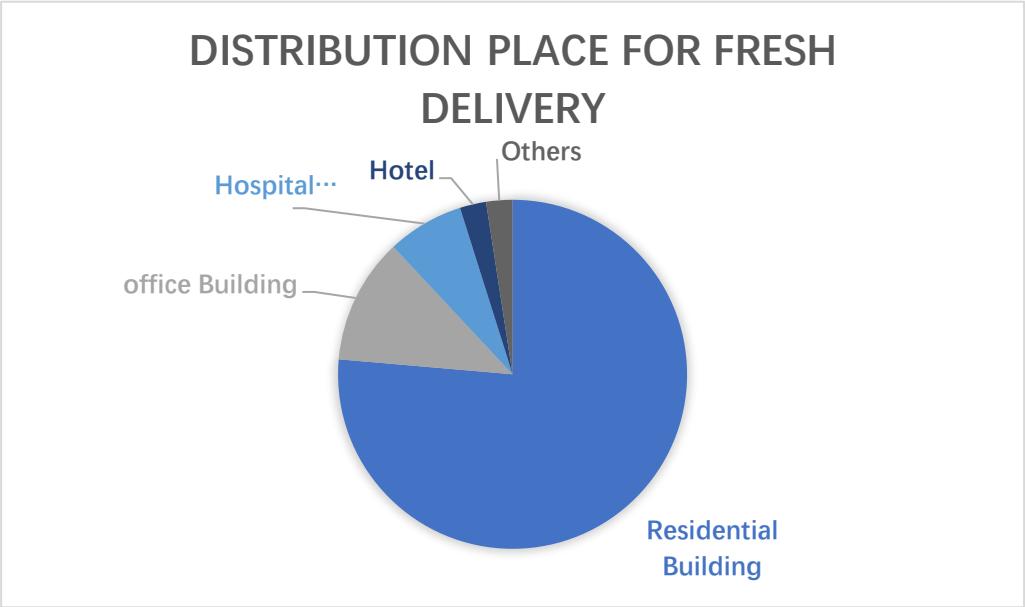
Figure 2.5 Trading volume of fresh market in China and expected growth rate from 2013 to 2022E.



Source: China statistics

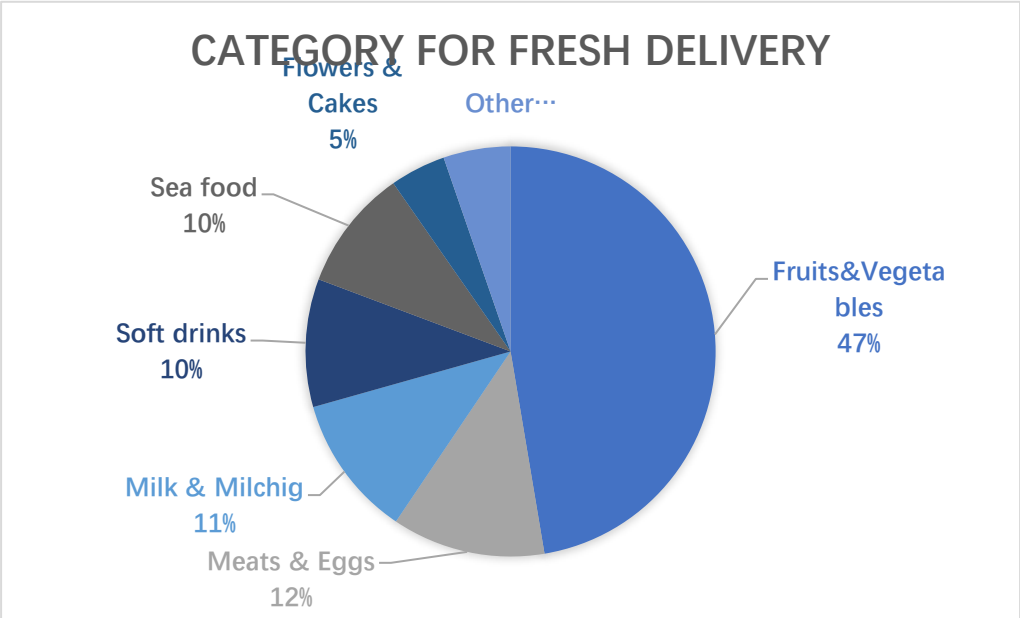
Following figure 2.6 reflects the consumption distribution of consumer products in the fresh market. Among them, 95% of the demand of fresh e-commerce comes from residential areas and office buildings, and more than 50% of the demand belongs to fruits and vegetables. Flower and cakes have become an important fresh category.

Figure 2.6 Distribution place for fresh delivery



Source: China statistics

Figure 2.7 Category for fresh delivery



Source: China statistics

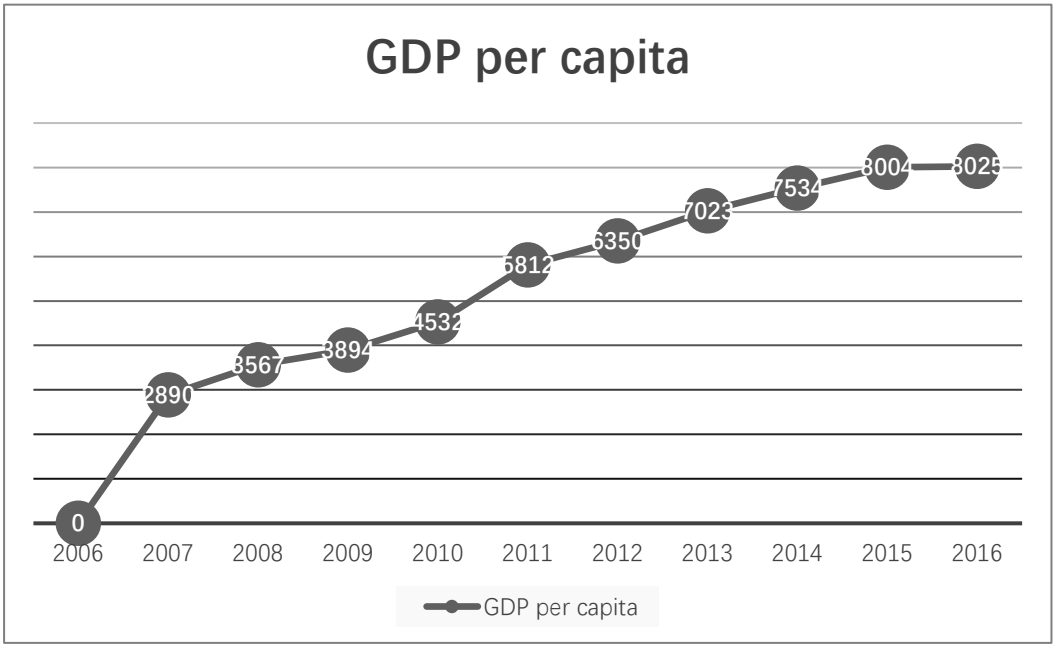
The fresh market is currently in a period of rapid development stage. With more and more giants join into the market, a new operating model has emerged within the industry. Fresh delivery market presents a coexistence of multiple models. Competition will continue to escalate, and it will also promote industry consolidation. At this time, I think that the management of the supply chain will be the most important part of the fresh delivery market to developed, and it is the key

for the enterprise to win the competition. At the same time, in the fresh delivery supply chain should use advanced technologies or management skill, such as big data, artificial intelligence, and the Internet of Things to track user`s behavior, accurately predict market demand, try to provide better quality of fresh products, reduce inventory to ensure freshness, and as much as possible Production-side derivation to shorten the supply chain, meanwhile, reduce operating costs is always an important way to improve supply chain management capabilities.

Second-hand economy

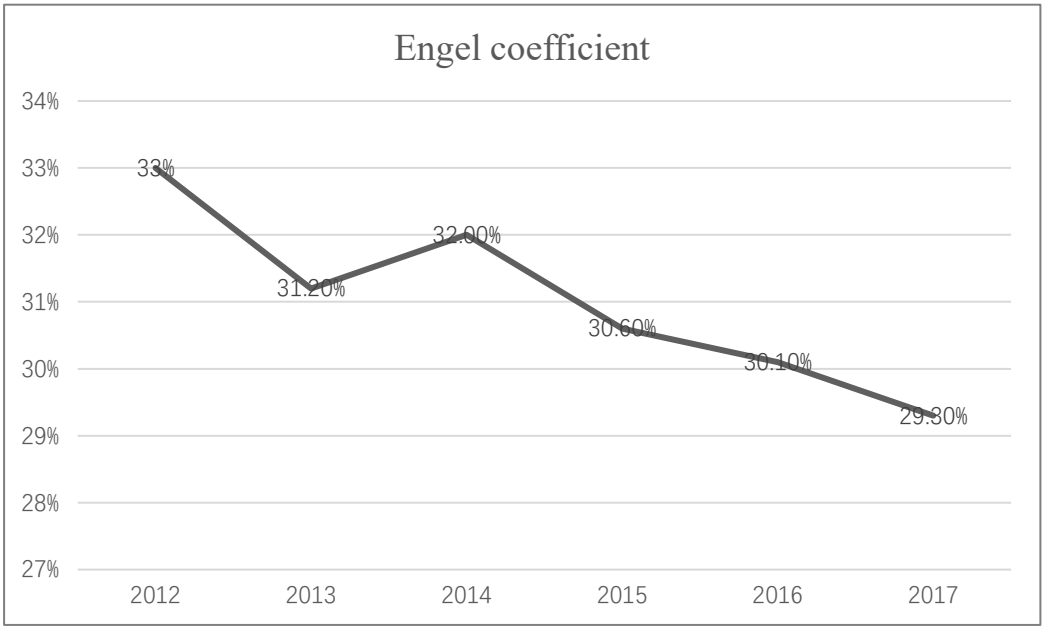
Second-hand economy refers to consumers` income that obtained by browsing the webpage or mobile app using resale, exchange or other transaction methods to dispose idle goods and services. With continues development in economy, abandoned in property people getting more and more idle goods, which led to development in second-hand market. Following figure 2.8 shows GDP per capita、Engel coefficient and the proportion of total retail sales of consumer goods to online retail sales of physical goods.

Figure 2.8 GDP per capita in China



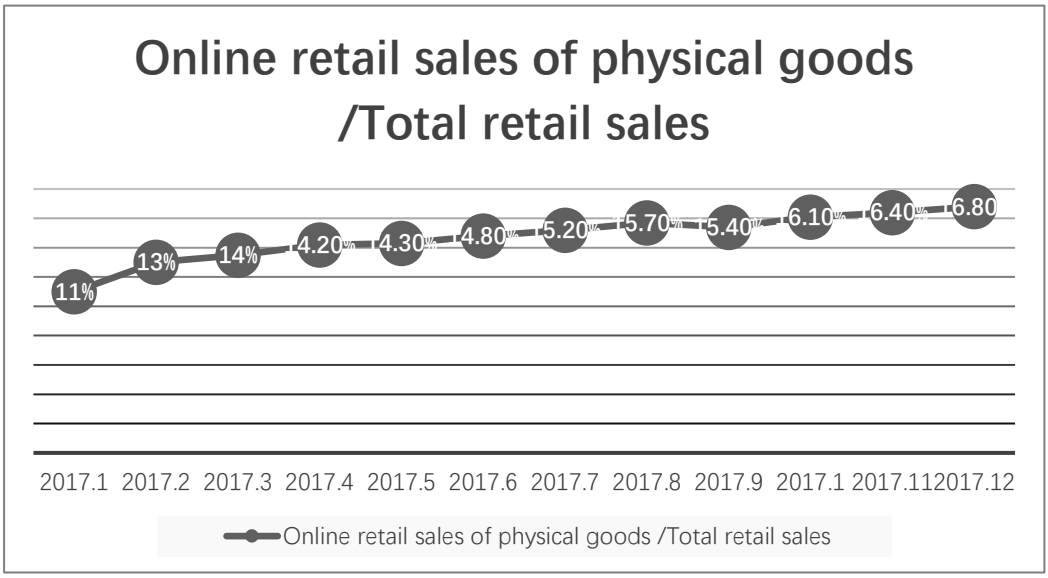
Source: China statistics

Figure 2.9 Engel coefficient in China



Source: China statistics

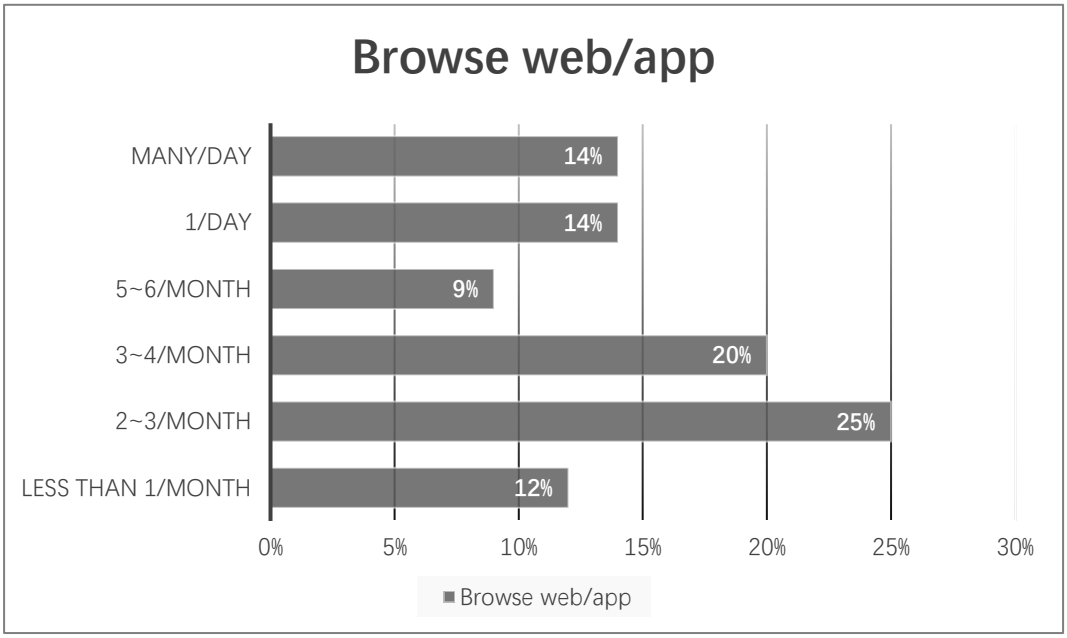
Figure 2.10 Proportion of total retail sales of consumer goods to online retail sales of physical goods.



From figures above shows that GDP per capita in China has climbed from 2099.6$ in 2006 to 8126.7$ in 2016, the wealth available to people is increasing. With scarcity to abandon in property or wealth, the number of property available for second-hand transactions is increasing. With the upgrading of middle-class

consumption, [1]Engel coefficient also has been a downward trend in recent years. Due to continuous improvement of consumption capacity per capita and with accelerated frequency pf item replacement has created a huge market for second-hand items. Meanwhile, in recent years the GDP growth rate has been slow down at the range of 6.5%-7%, government is slowly promoted economic transition. As the economy changes from high-speed development to medium-high-speed development, in order to solve the problem of income pressure impulse on people due to economic downturn, some policy-makers start to encourage to create new forms to stimulate economic growth. At present, with gradual development in this field lots of companies find opportunity in second-hand market as well as e-commerce giants like Alibaba and Tencent group. However, it is still at its development stage there will be lots of changes in the future. Following figure 2.11 shows the frequency that consumer used for trading their goods.

Figure 2.11 Frequency that consumer use apps for trading their goods.



[1] *Engel coefficient: it refers that when income rises, the proportion of income spent on food falls even if absolute expenditure on food rises. In other words, the income elasticity of demand of food is between 0 and 1.*

From figure it shows that 74% of users use the second-hand trading platform or application at least once per week, and 89% of them trading their stock once per month.

Trading form of second-hand goods

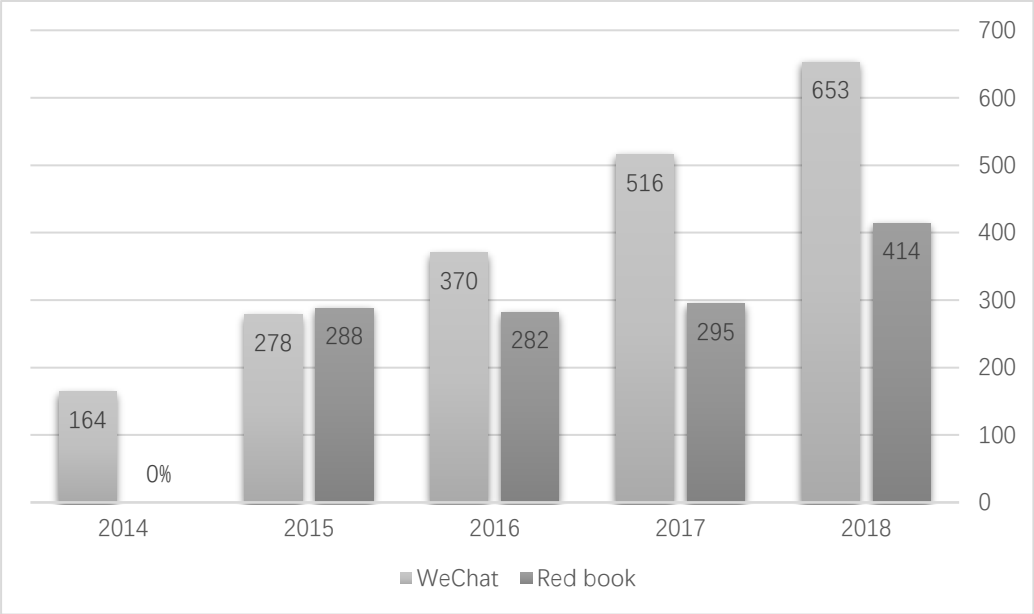
Online second-hand transactions of personal idle items are divided into two main modes, C2C and C2B2C, according to the depth of B-side service access. C2C refers to a platform model that matches the direct connection between individual sellers and individual buyers, and negotiates prices through mutual negotiation. It mainly uses social application like “WeChat” or “red book” to establish idle circulation. C2B2C is a platform of trust endorsement and bridge for second-hand transactions as an intermediary. It provides services such as quality inspection, valuation, auction and consignment to help achieve transactions. The typical representative of the C2C transaction model is “Xianyu”, whose user share has reached 64.1%. The endorser is Ali Group. The secondary trading market is in the market incubation period, and the user base is small, also the user technology has greatly affected the transaction volume. Therefore, second-hand trial production should pay more attention to how to attract more traffic. At the same time, it should also pay attention to after-sales and logistics services in the second-hand market, such as the handling of second-hand furniture items. Whether transaction disputes can be guaranteed will affect users. Motivation for handling used items. Logistics and after-sales will be the focus of efforts to improve the second-hand transaction.

E-commerce in social media

Social e-commerce is the use of social media sites, SNS, WeChat, Weibo, social media, and online media to promote the purchase and sales of goods through social interaction and user-generated content. With continues increasing in net profit in Alibaba the operating cost for merchants on the platform have also increased year by year. Average operating cost per 100 yuan of sales increased to 1.7 times in Alibaba in 2018. At the same time the advertising marketing fees of Taobao and T-mall under Alibaba group has significantly increased during 2015-2018 thus, it forced them to try new way to solve it. Similarly, social e-commerce is monopolized

by two giants, Ali and Tencent. The main app is WeChat (Tencent group) & “the red book” (Ali) The following figure 2.12 reflects the active users and trading volume per person for these two apps.

Figure 2.12 active user and trading volume per person in WeChat



Source: Social Beta

It can be captured from the figure that the active users of WeChat grew rapidly during 2014-2016 and enter into a slow phase during 2017-2018. At the same time, the trading volume per person of WeChat is also increasing rapidly. In “red book” side the active users grow in a rapid rate, the increasing rate is around 78% in 2014-2019 period. After the red book launched e-commerce services on its platform in 2015 years, the average trading volume has doubled. The market's recognition and confidence in social e-commerce are constantly strengthened. In the future, social penetration into the retail industry chain will continue to become an indispensable basic element of online retail, and social e-commerce will continue to mature and develop. Social e-commerce stimulates emotional consensus with consumers through content. His core competitiveness is the continuous output of high-quality content.

With the development of the e-commerce market, consumers are no longer just buying products, they are even more hoping to enjoy the shopping experience,

sharing new experiences with friends, and people are gradually pursuing the feelings in shopping.

The entire social e-commerce ecosystem starts with stimulating consumer`s interest. They use some celebrities or online celebrities to recommend what they worn or what they used products to promote sales of this product to stimulate consumer`s initial shopping desire. Then people will select the products in the special app to browse the products for final purchase. According to the tracking consumer experience and their evaluation, they will selectively share it with friends, and the whole process can be replicated.

New trends in E-commerce in US

Taxation policy

As second largest e-commerce market around the world, compare to China, United State is lost some diversifications to satisfied consumers` need, but still US is always be the largest competitor for China is due to their developed taxation、preferential policy or judicial system. Efficient government management and intervention methods strongly support the continuous development and improvement of enterprises. Compared with China, the US government has created a very good atmosphere for the development of enterprises. In the early days of establishing the US e-commerce market, in 1993, the US government vigorously developed the Internet business. By exempting tariffs on virtual products, US e-commerce companies have a great advantage in taxation to maintain continuous growth. As a result, the e-commerce market in the United States ushered in a peak period of development, and the total amount of e-commerce market developed accounted for 3.77% of US GDP, thus becoming the world's most developed e-commerce market. In 1995, the United States established a special working group to start research on e-commerce tax policy. Next year, the US Treasury Department issued the "Selective Taxation Policy for E-Commerce in the United States", which states that new taxes are continuously levied in the e-commerce taxation process in order to ensure a fair tax environment. From this point of view, the reason why the United States adopted a relatively loose policy on the booming e-commerce market

is because the U.S. government realizes that e-commerce is fast and convenient for consumers, and for businesses, the increase in tax exemption policies has increased Market competitiveness, boosting turnover and economic growth. Through this policy, government has promoted merchants and manufacturers to improve their product quality and reputation, thereby it drives economic growth and increased government fiscal revenue. The U.S. House of Representatives introduced the "Market Fairness Act" to Congress in 2011, which requires online and retailers to compete in a level playing field, although it did not pass but received widespread support. It can be seen that the e-commerce market in the United States has developed and prospered under the protection of the United States government, and ultimately affected the development of the retail industry. Since then, the US government has begun to tax the e-commerce market in order to reduce the unfairness of social competition. From the national government's series of policies on taxation, the US government has always kept a close eye on the e-commerce market and adjusted the e-commerce market to suit local conditions under different circumstances. Although the US e-commerce market does not have the diversification and intensification like the China`s e-commerce market has, the policies of the US government can be said to have created a good development environment for the US e-commerce market. Generally speaking, from tax exemption to taxation in the United States, tax policies on e-commerce have also been constantly improved in controversy and practice. Various policies and regulations have been repeatedly implemented, and eventually become a relatively complete tax policy. While implementing appropriate tax preferences, it also reflects the principle of tax fairness and implements a scientific management system.

Chapter 3: Valuation in E-commerce Market

After comparing with the e-commerce market in China and US, the reason could be added for both of them to became the most developed e-commerce is they are all have the advantages that others cannot copy. In US they possess the most developed and advanced tax system and policy makers gives preferential policy to e-commerce at the beginning stages to promote the prosperity of the e-commerce market. At the same time, in face of huge consumer groups, demographic dividends, and consumption habits, the strong competitiveness has made the entire industry continuously promoted to develop in a more convenient and advanced direction. At the early beginning those corporate has abandon funds and experience merger the small size enterprise, when there are only big and strong corporation left in the market, in order to gain the loyalty and dependence of consumers also attract new clients to enjoy their service they begins to abandon their services, and more wide services as well as more advanced payment way to snatch customers base. In this chapter will calculate the intrinsic value of the main corporation in e-commerce market. From the company's future growth rate, investors' confidence in the company's future development point of view to reflects the future development space of the entire industry. In this section will discuss the potential space for both US and China in e-commerce market. From China side, there are Alibaba group and some subsidiaries from Tencent group exist in e-commerce market. Among them, Alibaba occupies 60% of the entire market share and the remaining share is controlled by the subsidiaries under Tencent Group. Due to complexity in main operating business such as online social tools, cloud computing and online games etc. in Tencent group. In this paragraph will only focus on Alibaba group who is totally focus on e-commerce market. Similarly, the main corporations in US are Amazon and Wal-Mart. Due to the main operating business in Wal-Mart are concentrated on offline retail business for example they have large supermarket

chains and widely distributed around the world, and they only occupied a small market share in e-commerce field in this section only Amazon group is discussed.

3.1 Methodology

Above all is the primary situation for the e-commerce market in the U.S. and China, also, from global point of view e-commerce has been more and more essential and contributes a lot to economy. Although e-commerce appeared firstly in the U.S., it is a boom in China. In this dissertation, will use the methodology of discounted cash flow and event study to check the potential growth rate in both country as representative by the company of Alibaba and Amazon group. And according to the current situation for COVID-19, in this dissertation will also use event study to test how the influence will take place in both EC market. And how they will affect the later on growth rate.

The reason for using the DCF method

1. Many companies do not pay or pay a relatively small amount of cash dividends which restricted to use dividend discounted model
2. Dividends may be controlled by the company's managers; the number of dividends may be related to the company's long-term profitability. Some companies pay dividends even in the case of losses. This is the reason that the result calculated by using the discounted dividend model is inaccurate (Zhang, G. 2000).
3. Free cash flow is related to long term profitability, and it is showing the potential dividend ability for a company.
4. The free cash flow model is aimed at controlling shareholders. When the company is regarded as the acquisition target, the free cash flow model is more suitable because the new owner has absolute control over the company.

The procedure to form of free cash flow

When the company paid all operating expenses (including taxes) after deducted necessary investments in short-term working capital and long-term fixed assets, which is to maintain the company's current level of scale, which means that free cash flow to firm belongs to all investors that invest the company, Shareholders and bondholders also included (Zhang, G. 2000). When using FCFF to repay the debt, the remaining cash is vested in the shareholders (Free cash flow to equity). The amount refunded to the creditor by the company should include interest and principal. Still, in addition to repaying the debt, the company will also borrow new debt; we could calculate by combine principal of the loan and the newly borrowed principal to get the net inflow and net outflow of debt, which also called net borrowing.

After calculating FCFF and FCFE, we need to choose one of them for discounted valuation.

It is more straightforward and more direct by using the FCFE model to drives out the equity value, but there also have two aspect need to be considered.

1. For company capital structure, each company has its optimal capital structure, but in real life, there are various reasons for a company to achieve its optimal capital structure. For example, it is more difficult for small enterprise financing when compared with a large size of company. Therefore, the proportion of equity for those small-size companies is greater. However, when this small and medium-sized enterprise gradually expands and matures, it will have more opportunities to finance through debts. At this time, the company's capital structure will have more significant fluctuations. If the capital structure of a company is particularly volatile, the leverage ratio of the company will fluctuate significantly, which will affect the cost of equity financing and then affect the shareholders' equity (Lo, K., & Lys, T. 2000). Therefore, for companies with unusually large fluctuations in the capital structure, if they use FCFE to discount, the results that drive out by using this method will also have very sharp volatility. At this time, discounting equity cash flow is not appropriate, and the company should choose free cash flow.

2. If company's free cash flow to equity is affiliated or the company has a lot of external debt, FCFE cannot be used for discounts at this time, it would be better to use free cash flow to firm. Although the FCFF model finds the value of the company, not the value of the equity, we can get the value of the equity by subtracting the value of the company from the value of the debt:

   Equity value = firm value - market value of debts

   Discount factor on free cash flow

   The intrinsic value of company is to use future cash flow of company to discount back at present time by using weighted average cost of capital from the perspective of the company, we should treat weighted average cost of capital as the discount factor. The reason for use it is because weighted average cost of capital represent the required rate of return on the entire company's assets, including the required rate of return of shareholders and the cost of bonds after-tax, and the company's free cash flow belongs to all investors of the company, including shareholders and creditors (James R. Hitchner,2017). According to gold growth model, it is assuming that there is N period of cash flow (N tends to infinite) and FCFF is increased with a stable g; the enterprise value could be:

   $EV = FCFF_1 / (WACC-G) = FCFF_0 (1+G) / (WACC-G)$

   FCFF calculation

   FCFF could be driven out by EBT, FCFF=EBIT(1-T) +Dep-WC-FC

   Here we are looking for the company's free cash flow, so the profit before interest and tax is deducted from income tax, the company owns the rest, and the debt is not deducted because it belongs to the company's operating capital. To convert the income statement data into the concept of cash flow, non-cash flow expenditure (DEP) must be added. Also, to maintain the daily operation of the enterprise, there are some necessary expenditures (including working capital investment and fixed capital investment). So, we need to deduct these two parts, and the rest is the company's spare money.

   Some special items also need to be adjusted, the first one is non-cash outflow/inflow, when transform cash flow statement by using income statement, there some items

need to have special treatment, for instance, non-cash outflow, and intangible asset and amortization these two elements need to be added back. Because of reconstructed, the increase in non-cash flows caused by the consolidation of financial statements needs to be deducted from the net profit, and the decrease in non-cash flows generated must be added back from the net profit. The second item is fixed asset investment, and fixed asset investment is a long-term investment. You can use P.P. & E purchased over a period of time to maintain the company's current and future operations. You can also sell equipment to obtain cash flow to offset the fixed asset investment. Therefore, fixed asset investment equals to the difference between capital outflow and revenue by selling fix asset. Last but not least, free cash flow for preferred shareholders: because the part of net profit belongs to the shareholders of the common shares, and the other part belongs to the shareholders of the preferred shares. In calculating free cash flow of shareholders for the common shares, the shareholders of the preferred shares need to be deducted.

Steps for calculating DCF model:

Step 1: Calculate free cash flow during high growth stages.

Step 2: Use the one-stage free cash flow model to find the terminal value at the end of the high-growth stage.

Step 3: Free cash flow needs to discount back to zero time to calculate the intrinsic value of the stock. And the total value of the company needs to be discount at WACC

3.2 Alibaba group valuation

Alibaba is a global wholesale trade market founded in Hangzhou in 1999. It includes Internet retail and bulk transactions, cloud computing, technical services, financial services, maps, music, weather, online car rental, social networking and takeout. Till 2019 Alibaba group has 314 subsidiaries and covering all aspects of consumer entertainment, office, social networking and business travelling. In recent

years, driven by the factor of international retail business, rapid growth in Alibaba cloud business and new acquisitions, in 2018 Alibaba has increased their revenue to 37.352 billion US dollars and 58% higher than previous year. And the growth in 2015-2017 are 45%, 32.7% and 50%. In 2018 the core business of cross-border retail market, acquisition on business and fresh daily delivery are booms in Alibaba, they have increased 60% of their revenue on year-on year basis. Among them, the new retail is a new operation mode is inspired by e-commerce market in China. They use big data, cloud computing, internet of things, artificial intelligence and other technologies to form a consumer-based services which upgrades the production, circulation, display, sales and after-sales of commodities.

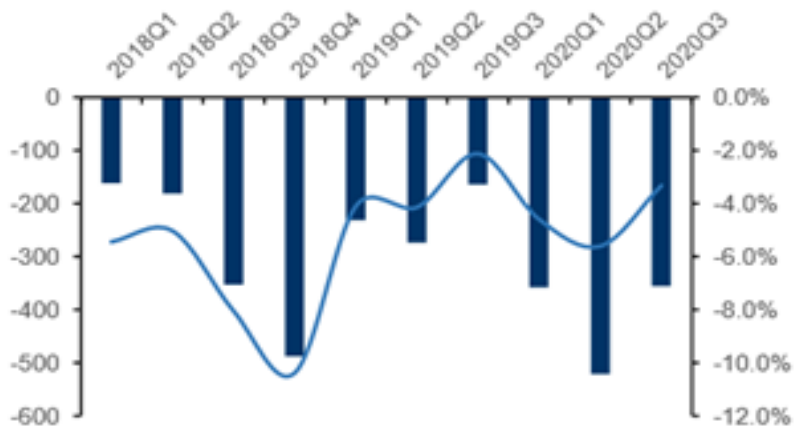
Revenue Forecasting

Forecasting of financial statements will first start from income statement. The initial item for income statement to estimate are mainly for revenue, cost of goods sales, selling, general and administrative expense, non-operating cost etc. In total, from empirical point of view there are two method used by majority of company to estimate the revenue: top down analysis and bottom-up analysis. For top-down analysis it is widely used in practice, which is forecast sales by analyze the macroeconomic. Under this method, there are two possible paths: forecasted revenue based on GDP growth (Revenue growth rate = GDP growth rate +/- x%) and forecasted revenue by market growth and market size. And for bottom-up analysis it refers to use time series, return on capital and capacity-based measure to estimate revenue, it mainly focusses on companies itself. (CFA II Equity Valuation: Applications and Processes,2020) in this dissertation it focusses on top-down analysis.

From the total procedure of the valuation, the economic driver that influenced the growth rate in sales are the growth rate of GDP in China, the potential growth rate of the company, the potential growth rate of the industry and the increasing rate in total social retail. According the third quarter financial statement in Alibaba, they achieved 161.456 billion Yuan in revenue and increased 38% in year-on year basis. And exceeding market expectations of 1.4%, and net profit growth of 58%, of which

core e-commerce business adjusted EBITA increased by 26%. However, other business still has negative profit for example the cloud business in Alibaba is still in loss but it is smaller (3% in loss) compare to previous years. Following figure 3.1 shows the loss rate from cloud business from first quarter of 2018 to the third quarter of 2020. From the figure the loss from cloud business is gradually narrowing.

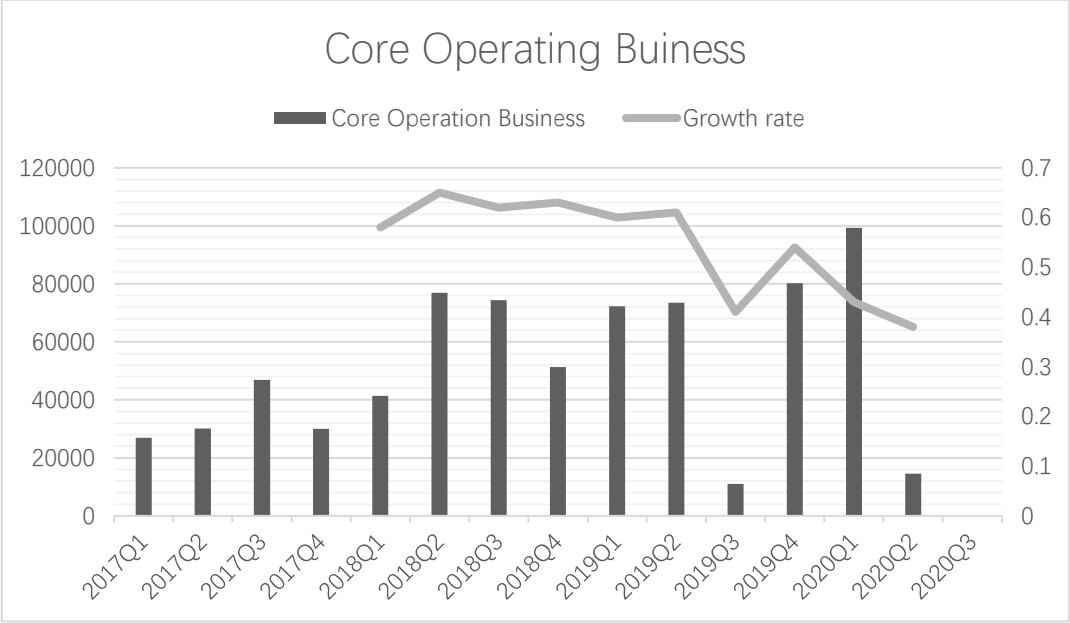
Figure 3.1 2018Q1-Q3 loss rate of cloud business in Alibaba



Source: Financial report

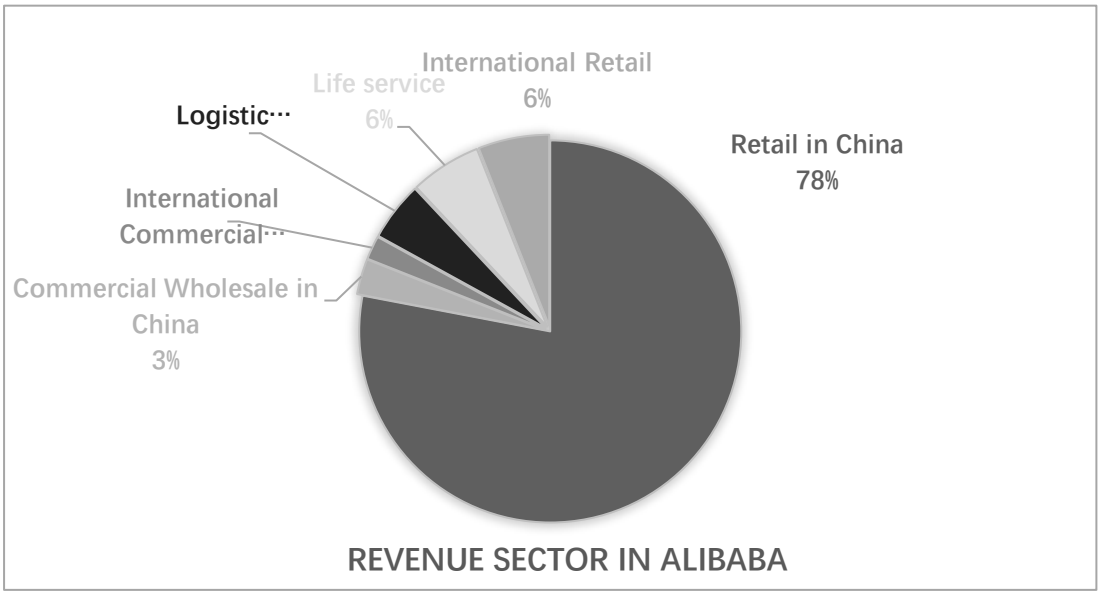
From overall revenue although Alibaba has already exceeded the market expectation, they still have a large upside space to develop. Especially the core business still keeps its strong potential growth. Following figure 3.2 shows the quarterly growth rate of core business from 2017 to 2020.

Figure 3.2 Core operating business



Source: Financial report

Figure 3.2 (b) Revenue segnment in Alibaba



Source: Financial report

Figure 3.2 shows the structure of core business for the third quarter, from the figure it shows the retail is accounted 78% of the revenue. Standard &Poor mentioned in 2020 that due to influence of COVID-19 around the world, economic growth rate of China will slow down to 2.9%. which means based on the situation every industry will suffer a small growth even a negative growth rate. However, considered e-commerce is an industry that are highly rely on Internet, the influence will narrow a little bit when compare to other industry. For Alibaba in order to help medium and small size company

to get over from the virus. They provide lots of help mainly through funds and property aids. They reduce the cost for each seller and also the advisement fee made by the seller. In total there will be a decrease in advertisement income and revenues from clothing and electronic for the first half of the 2020. There will be a negative influence in short run due to burst in the virus, but in another way, it laid a foundation for Alibaba to create digital service because of changing lifestyle and work way during the virus. In life style, people willing to buy daily necessities online typically the services of fresh daily delivery are in a huge demand. From work way, people are forced to stay at home and lots of company has to have home office to support the operating. The application developed by Alibaba gains a great opportunity to increase their reputation. In total, the revenue in 2020 may be slow down but the future potential growth for Alibaba will not get any negative influence, I assume 37% of increase for their growth. Following table 3.3 shows the forecasting operating business segment for Alibaba in 2020, the total revenue is based on weighted historical revenue record, GDP growth rate forecasted in near future as well as the potential growth rate around the whole industry, and the business segment were estimated by the historical percentage of total revenue. Considering impact of COVID-19 on E-commerce market were complicated. For example, consumers have more wiliness to buy daily necessaries online, they prefer to stay at home to avoid virus in stand of going to supermarket but for non-durable goods, such as cosmetics, clothes have suffered a serious loss during this special periods. Different wights are used to measure the impact of different economic driver when estimate the revenue of Alibaba. In this dissertation economic driver are selected as follow: historical growth rate, GDP growth rate (2.9% in 2020), E-commerce market growth rate (19.8% in 2020) and total retail sales of consumer goods (8% in 2020, China statistic). Assume the weights for economic driver are 0.5,0.1,0.2,0.2 respectively.

Table 3.3 Business segment forecasting in Alibaba 2020.

Core business segment	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021	FY2022
Total Revenue	10143	158273	250266	376844	477724	67120	841779
Total revenueYoY		56%	58%	51%	27%	40%	25%
Core Business Revenue	92335	133880	214020	323400	405624	572348	706906
YoY		45%	60%	51%	25%	41%	24%
Commercial Retail in Chin	80033	114109	176559	247615	302666	435284	530760
User management	52396	77530	114385	145684	161959	229590	274581
YoY		48%	47%	27%	11%	42%	20%
Commission Income	25829	34066	46525	61847	68756	97467	116567
YoY		32%	37%	33%	11%	42%	20%
Others	**1808**	**2513**	**15749**	**40084**	**72151**	**108227**	**139613**
YoY		39%	527%	155%	80%	50%	29%
Wholesale	4288	5679	7164	9988	11986	15342	19330
YoY		32%	26%	39%	20%	28%	26%
International Retail	2204	7336	14216	19558	25817	36401	50234
YoY		233%	94%	38%	32%	41%	38%
International Wholesale	5425	6001	6625	8167	9555	11466	13645
YoY		11%	10%	23%	17%	20%	19%
Logistic			6759	14885	23072	28378	34054
YoY				120%	55%	23%R	20%
Life Service				18058	24378	33154	44095
YoY					35%	36%	33%
Others	385	755	2697	5129	7950	12322	14787
YoY		96%	257%	90%	55%	55%	20%
Cloud computing	3019	6663	13390	24702	40017	62387	93580
YoY		121%	101%	84%	62%	56%	50%
Entertainment	3972	14733	19564	24077	26485	29633	33222
YoY			33%	23%	10%	12%	12%
Inovation business	1817	2997	3292	4665	5598	6722	8071
YoY			10%	42%	20%	20%	20%

Source: Own calculation

SOTP valuation method

In Alibaba group, except the main business, non-operating business also occupied a large amount in their profit. Till 2019 Alibaba group has already merger and invested 314 companies in to their group. If use DCF method only to access the main business of Alibaba will undervalue their intrinsic value. For this situation SOTP method will be optimal one. The logic behind SOTP method is the overall value of the company is provided by each subsidiary. To sum up all of the value of their subsidiary as well as the residual asset and liability value would be the intrinsic value of the company. Due to the shareholders in Alibaba is unavailable to share whole benefit of their subsidiary, multiplier factor can solve this problem.

Discounted free cash flow method for operating business

Following table 3.4 shows the basic financial situation in Alibaba Following financial ratio are calculated from the forecasted financial statements.

Table 3.4 Operating financial ratio for Alibaba group

Unit	FY2019	FY2020E	FY2021	FY2022	FY2023	FY2024
Revenue ratio (%)						
Gross Margin	45.10%	46.20%	45.50%	45.50%	45.30%	45.50%
Selling Expense ratio	11%	10%	10%	10%	10%	10%
Management Fee ratio	7%	6%	5%	5%	5%	5%
Other ratio(%)						
Effective Tax rate	17%	17%	17%	17%	17%	17%
Comprehensive income ratio	8%	8%	7%	6%	6%	5%
Comprehensive interest rate	4%	4%	4%	4%	4%	4%
Operating Capital Assumption(Days)						
Days of Account Paybale turnover	13	13	15	18	19	21
Days of Account Recceviable turnover	12	13	16	18	19	20
Inventory turnover	15	15	17	19	20	20
Days Payable Outstanding	90	95	89	85	83	82
Days Receviable Outstanding	29	29	27	25	25	5
Fixed Asset Assumption						
Fixed Asset Investment	103696	82957	89593	96761	104502	112862
Depreciation Rate	15%	14%	14%	14%	14%	14%

Source: Own calculation

According to the estimation of growth rate in revenue in next 5 years and forecasted financial statements in next five years. Following table 3.5 shows the calculating procedure in FCF.

Table 3.5 Procedure for free cash flow

line	2020	2021	2022	2023	2024
EBIT*(1-T)	6209.42	9239.65	12057.32	15724.62	20126.81
depreciation	3308.86	3604.11	3827.57	4516.53	4618.91
change in fixed assets	2831.31	1476.26	3243.70	3827.57	5700.87
change in net working capital	-4916.19	794.13	937.07	5008.92	2007.35
FCF	11603.16	10573.37	11704.12	11404.67	17037.50
CA-CL	9328.00	4411.81	5205.94	6143.01	11151.93

Source: Financial report

From the table it could be observed that the free cash flow in Alibaba growth in a stable speed, it shows in future operating it will enter into a stable stage. Discounted free cash flow method can be applied. Following table are the key parameters in discounted free cash flow (DCF) method.

Table 3.6 Key parameter for discounted free cash flow model

line	2020	2021	2022	2023	2024	in finite
Rf	2.38%	2.38%	2.38%	2.38%	2.38%	2.68%
Rm	14.44%	14.44%	14.44%	14.44%	14.44%	14.44%
beta	1.19	1.19	1.19	1.19	1.19	1.19
cost of equity	16.73%	16.73%	16.73%	16.73%	16.73%	16.67%
Debt/equity ratio	0.47	0.47	0.47	0.423	0.43	
E/D+E	0.68	0.68	0.68	0.7	0.7	
D/D+E	0.32	0.32	0.32	0.3	0.3	
cost of debt	3.88%	3.88%	3.88%	3.88%	3.88%	
TAX RATE	17%	17%	17%	17%	17%	17%
WACC	12.41%	12.41%	12.41%	12.68%	12.68%	

Source: Own calculation

From bellow, risk free rate is used by the 5-year and 10-year T-bonds, market return is used the daily closing price of Alibaba since 2014 till 2020. Beta coefficient are used from Bloomberg. D/D+E and E/D+E are calculated based on the forecasted financial statements. Supposed tax rate is stable in near future. WACC is calculated by using cost of equity (dives out by CAPM) and cost of debt. The final result by using DCF is 223 US dollar per share.

Clouding Business

EV/sales is applied for this business, with comparing the average level of EV/sales of the international cloud computing giant, the EV/revenue multiplier is judged according to the comparison of growth rate. AW`s compound growth rate is 44%， which is 5.4 times the industry average, and EV/revenue is 6.5. Cloud computing in Alibaba used the same way to calculated. When calculated the value of Alibaba could it is assumed there is no liability in this part. Following table 3.7 summaries the result for cloud computing in Alibaba.

Table 3.7 Peer group comparison

Cloud Computing Company	2018 EV/Sales	15-18 CAGRin Sales
Citrix Systems	3.8x	-3%
Oracle	4.3x	0%
Slaesforce. Com	5.5x	24%
SAP	4.2x	7%
Vmware	4.0x	5%
Akamai	4.1x	10%
Red Hat	4.9x	15%
Average	4.4x	8%
Median	4.2x	7%
AWS	6.5x	44%
Premium to Com Average	48%	5.4x
Alicloud	9.3x	102%
Premium to Comp Average	112%	12.6x

Table 3.8 listed below shows the SOTP value in total of the Alibaba group. the final results that drives out by this method is 263 US dollar per share. It is assumed in 2020, 2021 and 2022 the revenue will increase 31.4%, 39.8% and 33.1%. Among them the net profit attributable to the parent company increased 41.1%, 37.8% and 25.3% year-on-year, PE is 33.2x, 24.1x, 19.2x respectively. The result shows the company is undervalued and it has strong investment value.

Table 3.8 results of SOTP

SOTP Valution	Valuation Resu	Value in $	$/share
Main business except Cloud Computin	4178925	596989	223
Cloud Computing Business	387791	55399	21
Mayi Financial service	350000	50000	19
SOPT	4916716	702388	263

Source: Financial report

3.3 Amazon

Amazon was established in 1995, that the beginning, the main business was online bookstores. With the development of the business they gradually expand its main business into online e-commerce field and they began to operating computers, software, video games, electronic products, clothes, furniture, etc. Comparing to traditional retailer Amazon has an excellent software service system. 20% of the employees in Amazon are working for software development, which helps them to save a lump sum

of costs, such as store and marketing. Meanwhile Amazon begin more and more popular among Canada, British, Spain, France, Italy, Germany, China and Netherland. Compare to Alibaba, Amazon has wider international trade and served for multicultural people. In another hand, cross-border trade suffered different regulations in different countries which means some part of business in Amazon will no longer be able to have the preferential policies that covered by US government. With increasing in labor cost, and transaction cost, e-commerce will face the risk of rising costs. Meanwhile with the expansion of e-commerce in China, Amazon is faxing fierce of competitive environment, especially in China`s market. Comparing to Alibaba, Amazon has his own advantages. Majority products that sold by Amazon are their own storage in stand of Amazon, Alibaba only provide platform for merchants to open their own online shop. Compare to this Amazon will have more control capabilities than Alibaba. They can more accurately to formulate sales pricing strategies and can comprehensively analyze customer data. Meanwhile, Amazon has a self-built logistics system model, not only in Beijing, but also Shanghai and Guangzhou they have their own warehouses and independent express delivery system. In terms of R&D capabilities, Amazon has pioneered cloud computing, which has an absolute advantage over Alibaba group. In marketing strategies, in order to attract more consumers, Amazon has set a low price to attract consumers eyes, to encourage online consuming. From financial ability, marketing revenue of Amazon is not directly proportional to net profit. For instance, in 2017 the operating income has increased 30.7% year-on-year. But net profit increased -1.72% in 2017. The main reason to address this problem is Amazon has decreased 50% of their price especially cloud services every three years. At the same time the debt to total assets ratio is relatively high in Amazon services. Among them 76% cost are in R&D service in year of 2017, which cause weak in long-term repayment in this year. In the second quarter of 2019, the operating profit increased 3.4% and net profit has increase 3.6%. which is lower than the market expectation. The revenue in online store in second quarter of 2019 has increased 14%. And account receivables for physical store has increased 0.4%. In 2019 Amazon has launched “one-day delivery” which helps the growth rate of revenue back to 20% and the prime business keeps high growth

rate. One-day shipping is bearing fruit with efficiency closely watched. Concerns over the additional costs associated with Amazon's one-day Prime shipping initiative were temporarily relieved with the margin beat in 2019 financial year. Meanwhile, the faster shipping service also contributed to the highest-ever quarterly net add of Prime members, as announced by management, reaching a total of 150mn globally. While continuing expansion, management saw room of efficiency improvement for such services in terms of package density and scale effect of fulfillment centers. However, a series of announcements regarding expansion in India during Jan 2020 suggest a new potential source of pressure for operating margin.

Valuation

From the financial performance in 2019, the reason for the growth rate lower than market expectation is because traditional retail has expanded their business in e-commerce market has squeezed amount of market share in Amazon. Traditional retail giants such as Wal-Mart and Target became more and more active in e-commerce market. They have adopted some preferential policies to adjust the minimum consumption level for free delivery. At the advantages of physical store, they expand the intra-day delivery. Those business attracted consumers attention compare to Amazon. Also, the growth rate in Wal-Malt has always keeps 30% growth in every year which squeeze market share of Amazon. Meanwhile, the active acquisition of other companies in international e-commerce market has also affect Amazon. Advertising business always keeps high growth margin in Amazon, in 2019 the growth rate of this segments has slowed down, but when it compares to FB or Microsoft, they still have strong advantage. As the COVID-19 are widely spread in US, it is expected that the overall economic environment of the US will be greatly affected in 2020. And as labor cost is increasing, competition intensifies, and the trade was affects Amazon`s international business. Till now Amazon do not have any marketing strategy to defense this crisis like fresh delivery in Alibaba or social e-commerce. The growth rate of the revenue is expected to slow down in near future. Following tables 3.2.1 and 3.2.2 predicts the growth rate of net profit and comparable valuation of peer group based on SOTP method in Amazon.

Before the estimation there are several assumptions need to hold. Firstly, going-concern assumption. It assumes that Amazon will continuously generate cash flow and have infinite life. Secondly, the financial statements are qualified earnings, which means in income statement the revenue do not record in advance and the cost do not deferred to recognize. Revenue estimation for Amazon group were the same procedure as Alibaba, in this dissertation it is assumes that GDP growth rate (it is estimated by IMF in 2020 GDP growth rate in US will be -5.9%, weighted at 10%), E-commerce market growth rate (18.9% forecasted by eMarketer, 2020, weighted at 20%), historical growth rate (average growth rate 28% from 2015-2019,weighted at 60%), total retail sales of consumers goods (2.8%, assumed by eMarketer,2020, weighted at 10%) will effect on Amazon`s revenue generate in 2020.

Table 3.9 Revenue Forecast

Fiscal year-end Dec	2019A	2020E	2021E
Revenue(MM)($)	280522	337919	401241
EBITDA(MM)($)	43193	50792	62998
EPS($)	3665	4349	5857
EV/Sales	3.2x	2.7x	2.3x
EV/EBITDA	23x	19x	15x

Table 3.10 Financial Statement Forecast

(a): Balance sheet forecast

Item(M $)	2017	2018	2019	2020E	2021E
Cash	20522	31570	44237	75120	118690
Account Receviable	10464	9500	14015	14054	15819
Inventory	7411	8299	10689	11624	13414
Fixed Asset	48866	61797	77262	89530	108331
Total Asset	131310	162648	206875	245837	305002
Account Payable	34616	38192	46017	52512	61595
Accured Expense	18170	23663	26804	34204	49642
Long-term Debt	24743	23495	24203	23402	24628
Total Liability	103601	119099	130008	145008	160230
Paid in Capital	21389	26791	26791	26791	26791
Retained Earning	8636	19625	22008	25034	30008
Sharehoder Equity	27709	43549	48794	51830	98332
Liability and Equity	131310	162648	206875	245837	305002

Source: Financial report

Note: Balance sheet were assumed by historical growth rate from 2017- 2019, all items were used the percentage of total asset.

(b) Income Statement Forecast

Item(M $)	2017	2018	2019	2020E	2021E
Operating Income	177866	232887	273168	321582	376251
Operating Cost	111934	139156	159803	186518	216344
Operating Expense	10069	13814	16390	22511	30100
Management Expense	3674	4336	8195	12863	18436
Finance Expense	848	1417	2811	3191	3335
Operating Income	3258	11004	13320	17028	22341
Gross Profit	3258	11004	13320	17028	22341
Net Profit	2709	9864	12255	15496	20107
Profit Available for Shareholder Distribu	2709	9864	12255	15496	20107

(c) Cash Flow Statement

Item(M $)	2017	2018	2019	2020E	2021E
CFO	18434	30723	35946	42057	49206
CFI	-27819	-12369	-12369	-12369	-12369
CFF	9860	-7686	5000	5000	5000
Net Cash Flow	475	10668	28577	34688	41837

(d) Main Indicator

Growth Rate	2017	2018	2019	2020E	2021E
Revenue Growth	30.80%	30.93%	17.30%	17.72%	17%
Net Profit	15.40%	264.09%	24.24%	26.24%	29.76%
EBIT	-11.99%	237.75%	21.77%	26.90%	28.88%
Gross Profit Margin	37.07%	40.25%	40.70%	40%	40%
Net Profit Margin	1.52%	4.24%	4.49%	4.82%	5.34%
EPS	5.48	19.94	24.53	31.01	40.24
Operating Cash Flow Per Share	1.71	2.86	-2.68	31.49	38.52
P/E	354.78	97.44	79.22	62.65	48.28

Source: Financial report

EV/sales is applied in Amazon, following table 3.11 presents the result of the valuation.

Table 3.11 Result from SOTP method

SOTP (M $)	Income	Valuation	EV
E-commerce Business	200099	3.0x	600296
Prime Business	19643	8.0x	157144
AWS Business	32259	7.0x	2261377
Physical Ratil Business	11690	0.55x	6477
Other Income	13467	3.0x	40939
Total EV	277158	3.7x	1030992
+cash and cash equivlant			29765
-debt			-43910
Market Cap			1019847
Target Price			2030
Present Price			1755

From the results that generate above it shows the target price for Amazon group is 2030 $ per share and the present price (till 28.02.2020) reached to 1755 $ per share.

The target price from Alibaba group is 263 $ per share, present price (till 28.02.2020) is 163.35 $ per share. Both of the company are undervalued, based on the shares of outstanding and the market price, the market size of Amazon is three times of Alibaba. When it compares to revenue, Amazon has four times bigger than Alibaba in 2019. Also, Amazon presents more international than its competitor, they extended their business in every corner of the world and obtained consumer`s loyalty in Europe, Asia, Oceania and south America. From the third-quarter financial report in 2019 it shows international business has reached to 18.348 billion US dollars accounts 26% in total revenue. From my point of view, it is true that no matter from market size or revenue Amazon is more mature and developed but Alibaba has better fundamental situation which create a better environment to develop. From financial statements in both companies in 2019 it shows Alibaba has gained 132.5$ billion for operating income and 145.4 $ billion in Amazon. Also, in same year, Alibaba has bigger GMV (Gross Merchandise Value) than Amazon. From market propitiation, the competitor from Amazon such as Microsoft, Google, they have almost the same market share as Amazon has. In stand of that Alibaba always keeps its leading position in Chinese market. From macroeconomic, total retail sales has increased 8% in China 2019, which stimulate 19.8% increase in online sales and accounts for 20% in total retail sales. In US it accounts 10%.

Chapter 4: Event study

4.1 COVID-19 changed in daily life

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus (World Health Organization, 2020). It is a respiratory illness with pneumonia-like symptoms. The first case has confirmed by China`s government at 1st Dec 2019. At 4th of Jan 2020, the first case confirmed by Singapore. In 9th of Jan 2020, Chinese Ministry of Health reported the new pathogen is coronavirus. The Chinese Center for Disease Control and Prevention (Chinese CDC) has uploaded five novel coronavirus genome sequences to its website and shared data around world. 11th of Jan 2020, the first death case has been reported in China. 22th of Jan, 2020 Chinese CDC announced COVID-19 began to mutated also the novel coronavirus is contagious, and it can spread person-to-person. 23th of Jan 2020, Chinese government announced to closed the Wuhan city. At same day, COVID-19 first appear in Europe. 22th April 2020, the confirmed cases in China has reached to 83868. In 28th of Feb. World Health Organization (WHO) announced that COVID-19 has spread 110 countries around the world. Meanwhile, 62 countries, territories and regions have local transmission. More than 118,000 cases have been diagnosed globally and 4,291 people have died. WHO announced that the outbreak has constituted a pandemic. It is recommended postponing all but essential travel around the world. Nevertheless, it is highly recommended to wearing mask outside (WHO March, 2020). All public service such as school, shopping center are shut down. People are voluntarily or involuntarily limited their time to spent on public places thus consumer spending are decreased. Industry of tourism and restaurant has suffered a serve loss.

4.2 COVID-19 influenced economic

There is a great reduction in whole economic market around the world it challenges the stability of economic system, typically for industry of tourism, restaurant, retail, as well

as hotel. Due to this severe distress event the first quarter`s economic growth in US has reached -5% of growth (CNBC, 25 Jun 2020). The forecast for second GDP growth rate in US will reach to -27%. In China the first quarter of GDP growth rate achieved -6.8%, due to effective of controlling the growth rate in second quarter of GDP will gradually recover. Since US government has announced state of emergency, the stock market of US has triggered five times of circuit breaker. The key indicator NASDAQ suffered a huge loss in following days. The figure presents below shows the performance of NASDAQ index in 6 months. From the figure is shows that at the date of state of emergency 13th of March 2020. index has falls to its lowest position, recovered with the better condition of COVID-19. The same situation comes to Shanghai index composite.

Figure 4.2.1 Historical index of NASDAQ

Source: Investing.com

Fresh data from first quarter economic performance of China, total fixed asset investment declined by 16.1%, total real estate investment decreased by 7.7%, the growth of industrial added values dropped by 8.4%, the total retail sales of consumer goods reduced by 19%, imports and exports fells by 6.4%. From financial statement in first quarter of Alibaba, revenue generate from cloth has decreased 40%.

4.3 The impact of COVID-19 outbreak on China and US E-commerce performance

4.3.1Methodology

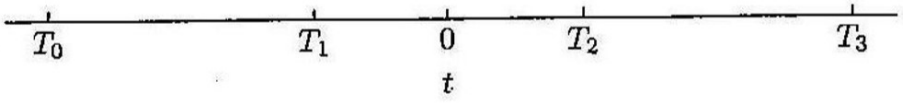
Event study method (ESM) is widely applied to estimate a particular event on corporate performance in field of accounting and financing. ESM is a quantitative analysis method to measure the impact of an event based on the statistical data before and after the occurrence of an event (MacKinlay,1997). In stand of accounting measure could magnitude by changes in accounting rule, ESM used stock price to measure value of a firm. ESM assumes that investors evaluate the effect of an event on a firm based on the changes of trading activities in the stock market (Nicolau,2002). Under this assumption of market efficiency above, ESM is able to capture abnormal changes in the market value of a firm created by an event beyond average market returns (Hsu & Jang, 2007; Lee & Connolly, 2010). It is mainly used to analyze whether an event does have an impact on social and economic life. Some useful assumption based on event study method are as follow: in a rational market, the impact of an event will be quickly reflected by asset prices. Therefore, the asset prices could be observed over a relatively short period and can be used to measure the economic impact of the event which avoid direct measurement of this economic impact (a direct measurement of an event may cost months or years data). From the perspective of application scope, event analysis method is widely used in economy, finance and other fields. For example, in the field of corporate finance or accounting, it is often used to analyze the impact of the company`s value when they doing mergers and acquisitions, new share issuance and trade deficits, etc. The original idea is come up by Dolley (Dolley,1993) he published an article to analysis the impact of stock split by using event study method. Since last century from early of 1930s till at the end of 1960s, there lots of represents scholars like Bakay(1948), Austin Barkey(1956)，John (1962)，and Fama(1969) are dedicated into event study analysis and finally event study is updated and improved. To be more in detail event study could be divided into two scope traditional one and non-standard

event studies. Traditional event study needs to define the time period during which the event occurs, that is, the event window, and then measure the impact of the event by the size of the "abnormal return" in the event window (in this case, the abnormal return refers to the actual return). (Dyckman,1984) The difference between the expected return and the assumption that the event did not occur, and the expected return is measured by the econometric model). On this basis, non-standard event analysis expands the variable from "excess return" to "trading volume" and "operating performance" to discuss the impact of events on variables. This paper adopted the traditional event study method to discuss the influence of COVID-19 to E-commerce market.

Define event

The first step in conducting an event study is to define distress events and determine the period of inspection of the company's securities prices involved in the event. This period is called the "event window". In empirical event window is often extended in two days, the day of the announcement and the day after the announcement. The purpose is to obtain the impact of the announcement on the price after the closing of the stock market on the announcement day. The period before and after the event are also important, it should be included into analysis separately. (Binder,1969) The abnormal return of the event window is defined as a measure of the degree of the impact of the event on the company's value (or its share capital), this method assumes that the change of the stock price relative to distress event is exogenous, which means the change in the value of the company was caused by an incident.

After determining the event, also need to define the event window as well as divide the time axis according to the occurrence of the event. The general time axis is divided into three windows, the estimation window, the event window and the post-event window. Following figure shows the time axis.



In figure, t=0 refers to the event day, which means the event has happened on t day. T $\in[T_1, T_2]$ refers to event window. It is used to measure the period that the influence of the event. If the impact of the event only occurs on the time day, the event window is considered as the event day. However, in practical applications, due to factors such as early leakage of information and investor expectations, the impact of the event may have occurred before the event release date. At this time, it is necessary to include some trading days before the event date into the event window. When $t\in[T_1, 0]$ is defined as estimate event window. The estimation window needs to be as unaffected by the event as possible. In addition, the estimation window should not be too short, nor too long or too far away from the event day. Too short to get accurate and effective parameter estimates, too long or too far away from the event day may be affected by other events. When $t \in[T_2, T_3]$ it refers post event window, It could be used to estimate the measurement model, which plays the same role as the estimation window, but more often to test the robustness of event research. Therefore, its duration selection is the same as the estimation window.

Criteria selection

After determining important events, next step is to select sample companies for event research and obtain stock price data before and after the event. The most important thing is to select clear event data, which means there is no other event to disturb the aim event happen. Thus, we could accurately determine the impact of the event we are interested in. Other factors also should be considered in the event research sampling are: the purpose of the study, the availability of data, the company's market value, and industry representativeness.

Expected return and abnormal return in E-commerce market

Abnormal return is actual post-event return of securities during the event window period minus the expected return of the company. In order to measure the abnormal return in E-commerce market, expected return need to be estimated at first. Fama French (FF)model and CAPM model can be applied to measure expected return. The FF model is the extended market model with economic equilibrium, which includes two additional risk factors (Ting, 2017). Following equation shows the market model:

$$R_{it} = \alpha_{it} + \beta R_{mt} + \varepsilon_{it} \quad (1)$$

$$R_{it} = \alpha_{it} + R_{ft} + \beta(R_{mt} - R_{ft}) + \gamma SMB_t + \delta HML_t + \varepsilon_{it} \quad (2)$$

Once the market model was selected, expected return should be estimate in a proper time period. In general, the day or the period that the event take place should not include in the estimation period because it would be better to prevent the event from affecting the parameter estimation of the normal performance model. In this paper during the time of calculation the factor of Fama French model was not updated on time. Then S&P 500 was applied as benchmark model to calculate the expected return.

When the expected return was estimated, the abnormal return can be calculated:

$$AR_{it} = R_{it} - \mathrm{e}(R_{it}) \quad (3)$$

$$CAR_{ij} = \sum_{t=0}^{j} AR_{it} \quad (4)$$

T-tests were applied to ARs and CARs in order to examine the effect of epidemic disease outbreaks on restaurant firms' value (Brown & Warner, 1985). The hypothesis needs to set up by T-test, null hypothesis should be abnormal return should not be significant from 0. In contrast, alternative hypothesis should be abnormal return should significantly deviate from 0.

4.3.2 Data sample

The impact of COVID-19 was measured by the stock price of 5 companies in e-commerce market which represents 60% market share in US market and 56% of market share in China. Before employing event study method to capture the influence of COVID-19 on e-commerce, abnormal return was calculated. Which is the difference between actual return and expected return. During the survey expected return was analyzed by applying CPAM model, S&P 500 has been used as a benchmark model to drives the expected return. The sample has been collected by the daily stock close price of Amazon, Alibaba, PDD, Wal-Mart as well as eBay since 2019.01.01 till 2020.01.04. Here I choose 20 days as event window which is -10,0,10 of the event day. The event

day was chosen by announcement of state of emergency of US which is 13th of March 2020 and 23rd of Jan 2020 in China. Following chart shows the abnormal return of aim companies.

Table 4.1 Abnormal return for Alibaba, Amazon, Wal-Mart, PDD, eBay.

Days	Alibaba	PDD	eBay	Amazon	WMT
-10	0.025184	-0.02648	0.002696	0.008301	-0.02039
-9	-0.04701	-0.03294	-0.0131	-0.01258	0.0497
-8	0.020149	-0.02751	0.053154	0.006978	-0.01021
-7	-0.03431	0.011474	0.001372	-0.0107	0.009941
-6	0.042427	-0.03229	0.00544	0.01003	0.011398
-5	-0.00985	0.012928	-0.00295	0.006162	0.020534
-4	0.066484	0.006658	0.061695	0.028666	0.041792
-3	-0.02163	-0.00953	-0.04048	-0.00281	-0.00591
-2	0.028381	0.001133	0.021611	0.014831	-0.01762
-1	0.056571	-0.0155	0.055192	0.02291	-0.03746
0	-0.07541	-0.01377	-0.07437	-0.03562	0.043758
1	0.080726	-0.01271	0.083097	0.075058	0.002772
2	-0.04649	0.005265	-0.0346	0.005436	0.082836
3	0.042528	-0.00778	-0.00114	0.067787	0.056645
4	-0.0016	-0.00553	-0.05891	0.022485	-0.02434
5	0.059634	-0.02834	-0.01938	0.027886	-0.02184
6	0.011286	0.008903	-0.01169	0.061999	0.01873
7	-0.0714	0.002985	-0.05426	-0.08172	-0.04674
8	-0.00042	-0.00604	0.012576	-0.04066	-0.05596
9	-0.04722	-0.04154	-0.00635	-0.03055	-0.03177
10	0.010018	0.011867	0.038794	0.007669	0.016349

Sauce: Own calculation

From table above, at the date of announcement emergency except for WMT gained 4.2% the other companies have suffered a loss. Alibaba has -1.43% decrease, PDD has gain of -1.4%, and the most severe loss comes from eBay which has decreased -7.7% in their stock price. In general,10 days before announcing state of emergency, Alibaba has quite stable volatility of abnormal return in equity price. eBay and WMT generate higher volatility compare with others especially in 5 days before announcement. -4%, 2.2% and 5.9% of abnormal return for eBay in -3, -2 and -1 day before announcement. For

WMT it is 4.1%, -1.3%, -1.9% and 3.8% in -4, -3, -2 and -1 day before announcement. After 5 days announcement of emergency, compare with others Amazon presents a huge gain on abnormal return. which is 7.8%, 1.9%, 5.9%, 3.1% and 2.8% for 1, 2, 3, 4, 5 day after announcement. WMT also shows the same trend but only in 1, 2, 3 day after state of emergency. For PDD it keeps 6 days negative number after announcement, especially for 6^{th} day it turns to -8.3% negative in abnormal return.

As the methodology described and abnormal return calculated above, a t-test could be employed to test the influence of COVID-19 on e-commerce companies. Here the assumption for confident level is at 5% level. Before test hypothesis were made in advance:

H_0: COVID-19 has no impact on e-commerce stock price.

H_1: COVID-19 has impact on e-commerce stock price.

Following results were calculate from t-test:

Table 4.2 Abnormal return for each company

Days	t-value_PDD	p-value_PDD	t_value_AMZN	p_value_AMZN	t_value_EBA	p_value_EBAY
-10	-7.2243	***	1.0356	0.3127	0.2986	0.7684
-9	-8.9843	***	-1.5695	0.1322	-1.4506	0.1624
-8	-7.5042	***	0.8704	0.3944	5.8861	***
-7	3.1299	***	-1.3352	0.1967	0.1519	*
-6	-8.8087	***	1.2512	0.2252	0.6023	0.8807
-5	3.5256	***	0.7687	0.4511	-0.3264	0.5536
-4	1.8162	***	3.5614	***	6.8319	0.7474
-3	-2.6008	0.017	-0.3576	0.7298	-4.4825	***
-2	0.3091	0.7604	1.8601	**	2.3931	***
-1	-4.2276	***	2.8581	***	6.1117	***
0	3.7571	***	-4.444	***	-8.2349	***
1	-3.4673	***	9.3636	***	9.2019	***
2	1.4363	0.1663	0.6781	0.5054	-3.8314	***
3	-2.1227	**	8.4566	***	-0.1262	0.9007
4	-1.5086	0.1471	2.805	**	-6.524	***
5	-7.7297	***	3.4787	***	-2.1465	***
6	2.4286	***	7.7345	***	-1.2939	**
7	0.8142	0.4251	-10.1941	***	-6.0081	***
8	-1.6474	0.1151	-5.0729	***	1.3925	0.1791
9	-11.3314	***	-3.8105	***	-0.7027	0.4903
10	3.2373	***	0.9567	*	4.2959	***

Days	t-_value_WMT	p_value_WMT	t_value_BABA	p_value_BABA
-10	-2.5516	***	2.5143	**
-9	6.2195	***	-4.693	***
-8	-1.2773	0.2161	2.0115	*
-7	1.2439	0.2279	-3.4254	***
-6	1.4264	0.1691	-3.4254	***
-5	2.5697	**	-0.9837	0.3369
-4	5.2299	***	6.6375	***
-3	-0.739	0.4685	-2.1592	**
-2	-2.2052	**	2.8334	***
-1	-4.6878	***	5.6478	***
0	5.476	***	-7.529	***
1	0.3468	0.7323	8.0594	***
2	10.3663	***	-4.6408	***
3	7.0887	***	4.2458	***
4	-3.0455	***	-0.1592	0.8751
5	-2.7329	***	5.9536	***
6	2.3439	***	1.1267	0.2736
7	-5.8466	***	-7.1285	***
8	-7.0027	***	-0.0416	0.9672
9	-3.9755	***	-4.7145	***
10	2.0459	*	1.0001	*

Source: own calculation

Above results present the t-test results on abnormal return during event window days. From the results at 5% of confident level, it could reject the null hypothesis if the t value is above 2 or P-value is less than 0.05. Following of table is the summary of the date that should fail to reject the null hypothesis.

Table 4.3 Decision result for specific company during event window.

Days	PDD	AMZN	EBAY	WMT	BABA
-10	R	F	F	R	R
-9	R	F	F	R	R
-8	R	F	R	F	R
-7	R	F	F	F	R
-6	R	F	F	F	R
-5	R	F	F	R	F
-4	F	R	R	R	R
-3	R	F	R	F	R
-2	F	F	R	R	R
-1	R	R	R	R	R
0	R	R	R	R	R
1	R	R	R	F	R
2	F	F	R	R	R
3	R	R	F	R	R
4	F	R	R	R	F
5	R	R	R	R	R

6	R	R	F	R	F
7	F	R	R	R	R
8	F	R	F	R	F
9	R	R	F	R	R
10	R	F	R	R	F

Source: Own calculation

Note: above table generated from t-test results, if p-value is less than 0.05 or the absolute value of t-value is higher than 2 null hypotheses could be rejected (refer to R). on the other hand, it is failed to reject null hypothesis and referred to F

From the summary above, it shows that all of the company has suffered a significant influence at -1, 0, 1 which is the day before, the day after and the day at announcing state of emergency. (expect WMT shows insignificant at the date after announcement). From the statistics, Wal-Mart and Alibaba has 16 days out of 20 days significant results which means COVID-19 has influenced more days than other companies. Especially, Wal-Mart has more influenced on days after announcement which is 9 days. While Alibaba suffered 9 days influence before announcing state of emergency. Amazon has lowest day that influenced by COVID-19 which is 11 days (2 days before announcing and 8 days after announcing).

Table above shows whether COVID-19 has significant influence on specific days, in order to have more confidence to show the impact of COVID-19, AAR is employed to test the significance on event date. Table below shows the result of t-test for AAR.

Table 4.4 AAR t-test

days	AAR	t_value	p_value
-10	-0.0021	-0.5448	**
-9	-0.0112	-2.8504	***
-8	0.0085	2.1692	***
-7	-0.0045	-1.1328	***
-6	-0.0074	1.8859	***
-5	0.0054	1.3669	0.3371
-4	0.0411	10.4624	**
-3	-0.0161	-4.0951	**
-2	0.0097	2.4633	*
-1	0.0163	4.1645	***
0	-0.0311	-7.9206	***
1	0.0458	11.6676	***
2	0.0025	0.6346	***
3	0.0316	8.0541	0.396
4	-0.0136	-3.4600	0.875
5	0.0036	0.9153	***
6	0.0178	4.5476	0.273
7	-0.0523	-12.7980	***
8	-18101.0000	-4.6123	0.967
9	-0.0315	-8.0226	***
10	0.0169	4.3165	0.329

Source: Own calculation

Table above shows that results from abnormal return t-test is correct. COVID-19 has significant influence on all 5 companies at event date as well as the -4, -3, -2, -1, 1, 3, 4 days.

In order to observe the overall influence of Covid-19 on e-commerce it is better to check cumulative abnormal return. Following chat shows the cumulative abnormal return of e-commerce gained during covid-19 time.

Table 4.5 (a) CAR t-test for PDD, AMZN, EBAY, WMT and ALIBABA

Days	t_vallue_PDD	p_value_PDD	t_value_Amazon	p_value_Amazon	t_value_eBay	p_value_eBay
-10	-1.3241	0.2003	0.2807	0.7818	0.0858	0.9324
-9	-2.1008	**	-0.1023	0.9195	-0.2342	0.817
-8	-2.5094	*	0.0526	0.9585	0.7863	0.4409
-7	-1.8863	*	-0.1353	0.8936	0.7028	0.4902
-6	-2.4093	**	0.0306	0.9758	0.7061	0.4883
-5	-1.9354	*	0.1131	0.9115	0.6062	0.5511
-4	-1.666	0.1112	0.4709	0.6427	1.3041	0.2069
-3	-1.7271	*	0.407	0.6883	0.7529	0.4537
-2	-1.6661	0.1232	0.5508	0.5878	0.9497	0.3535
-1	-1.7718	*	0.7676	0.4516	1.457	0.1606
0	-1.897	*	0.3686	0.7162	0.6749	0.5074
1	-1.9997	*	1.0856	0.2905	1.4104	0.1737
2	-1.8482	*	1.094	0.2869	1.0493	0.3065
3	-1.885	*	1.6668	0.1113	1.0015	0.3285
4	-1.8924	*	1.8066	0.08589	0.4829	0.6343
5	-2.1866	**	1.9849	*	0.3131	0.7573
6	-2.0133	*	2.4341	*	0.2135	0.833
7	-1.9214	*	1.7143	0.1019	-0.1998	0.8436
8	-1.9394	*	1.3531	0.1911	-0.1026	0.9192
9	-2.3548	**	1.0879	0.2895	-0.1452	0.8859
10	-2.1685	**	1.1183	0.2766	0.1279	0.8994

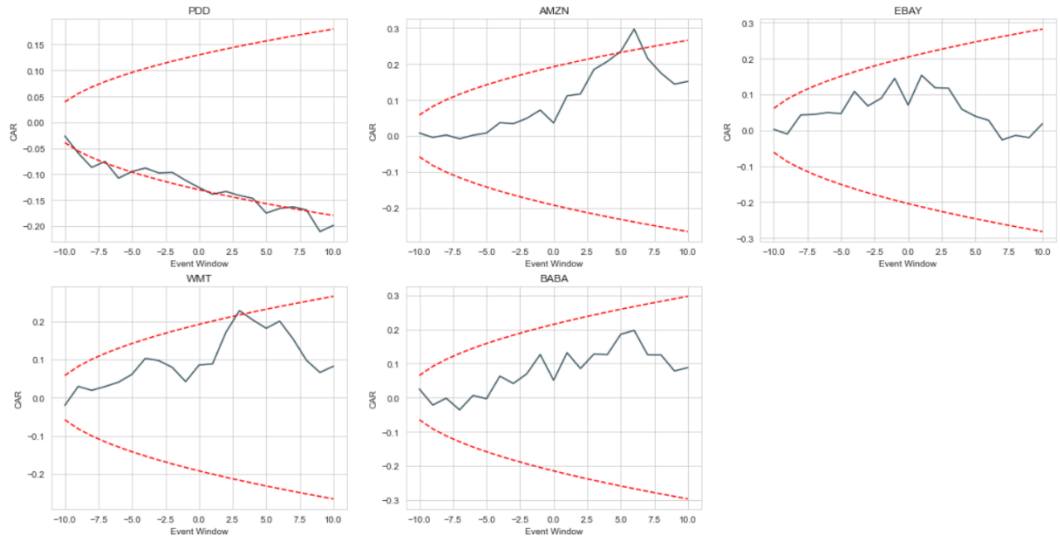
Table 4.5 (b) CAR t-test for PDD, AMZN, EBAY, WMT and ALIBABA

Days	t_value_WMT	p_value_WMT	t_value_Ali	p_value_Ali
-10	-0.6905	0.4977	0.7617	0.4550
-9	0.7019	0.4908	-0.4669	0.6456
-8	0.3735	0.7126	-0.0293	0.9868
-7	0.4918	0.6282	-0.5443	0.5922
-6	0.6125	0.5471	0.0878	0.9314
-5	0.8431	0.4092	-0.04219	0.9667
-4	1.3154	0.2032	0.7210	0.4792
-3	1.1598	0.2597	0.4431	0.6623
-2	0.8945	0.3816	0.7039	0.4895
-1	0.4474	0.6539	1.209	0.2407
0	0.8734	0.3927	0.4643	0.647
1	0.8633	0.1236	1.1500	0.2636
2	1.6075	*	0.7149	0.4829
3	2.0618	*	1.0327	0.3140
4	1.779	0.1397	0.9852	0.3362
5	1.5376	0.1154	1.4049	0.1753
6	1.6456	0.1154	1.4458	0.1637
7	1.2262	0.2343	0.8959	0.3809
8	0.7587	0.4568	0.8691	0.3951
9	0.4989	0.6232	0.5277	0.6035
10	0.6077	0.5501	0.5811	0.5676

Sauce: Own calculation

In order to make clearer conclusion, following figure presents the results of CAR listed above.

Figure 4.6 Graphical illustration of CAR on listed companies.



Sauce: Own calculation

From the result that presents graphically, it shows that each company react differently about outbreak of Covid-19 due to their operating performance. Among them Alibaba and eBay in general do not have significant effect about Covid-19 as their abnormal return do not exceed the red line which represents cumulative confident level. However, company PDD and Amazon were influenced by Covid-19 as their abnormal return has exceed the cumulative confident level. In order to find overall performance of the whole industry CAAR was prepared as following. From the results it shows that Covid-19 does not have significant influence about the industry. Even though Covid-19 has triggered financial crisis around the world but e-commerce industry in general shows positive influence about it. The reason for that is the development of EC market was unstoppable. The convenient of online shopping, the intelligent way of their payment method, the fast way of delivery as well as more efficient in fast-paced life. EC market is not only a new way for shopping, it is also a new life style. Especially with development of 5G technology, a smart life has just started. Also, during this special time, online purchase was more safety and popular which helped them promote their business in industry and widely accepted by people. In order to capture the influence of Covid-19 more clearly, table (b) shows the CAAR result by narrowing event window from -2 days to 5 days. From the results after announcement cumulated average abnormal return has sharply increased especially from day 1 to day 3. At the date of announcement both e-commerce market in US and China has admitted the bad influence of the event, but immediately modified the expectation of the event. Which has proved that e-commerce has gained from the distress event.

Table 4.6 (a) CAAR for whole 5 companies.

Days	CAAR	t_value	p_value
-10	-0.0021	-0.0736	0.9321
-9	-0.0133	-0.3241	0.7492
-8	-0.0048	-0.0955	0.9248
-7	-0.0092	-0.1592	0.8751
-6	-0.0018	-0.0285	0.9775
-5	0.0035	0.0493	0.9611
-4	0.0445	0.5951	0.5687
-3	0.0284	0.3466	0.7325
-2	0.0382	0.4376	0.6633
-1	0.0545	0.5929	0.5598
0	0.0234	0.2429	0.8105
1	0.0692	0.6873	0.4997
2	0.0717	0.6841	0.5017
3	0.1033	0.9498	0.3535
4	0.0897	0.7971	0.4347
5	0.0933	0.8026	0.4316
6	0.1111	0.9275	0.3646
7	0.0609	0.4941	0.6265
8	0.0428	0.3381	0.7838
9	0.0114	0.0874	0.9212
10	0.0283	0.2124	0.8339

Sauce: Own calculation

Table 4.6 (b) CAAR for whole 5 companies at range of (-2,5)

Days	CAAR	t_value	p_value
-2	0.0098	0.091	0.0692
-1	0.0261	0.2463	0.1727
0	-0.0148	-0.1947	0.4234
1	0.0147	0.0944	0.1126
2	0.0483	0.4412	0.1146
3	0.0341	0.2625	0.1958
4	0.018	0.113	0.1927
5	-0.01	-0.1472	0.1257

Sauce: Own calculation

4.3.3 Summary

A negative impact of COVID-19 will consist for a long period, especially global economic will have a downtrend potential during the second outbreak of virus. It is certain to make a conclude that the COVID-19 caused financial crisis around the world. But it does negative impact on e-commerce market in both China and US. All of the sample shows a significant influence on the date of announcing state of emergency. Moreover, the negative results even come earlier than the announcement and it takes few days for market to digest bad news. From the abnormal return generate in this paper it shows high volatility for all five companies. I suggest it is an identical property for e-commerce industry because of e-purchase and delivery service makes shopping more safety and healthy also, after announcing the state of emergency lots of shopping center have to shut down in a certain period, online shopping become the main way to buy necessity. Hence, it can be concluded that e-commerce market suffered negative impact of COVID-19 at the date of announcement. Then due to the special property of the industry e-commerce has positive impact in this event. After the bad news the e-commerce market begins to recovery and the revenue of those companies gains from this event has created the new historical record. It will not have long-run destroy in the market.

CAR results of event study show the huge positive abnormal return for those giant company and some of the giant like WMT even created the highest revenue since they

established. Majority of the e-commerce companies in US and China get benefit from it. During the Covid-19 the advantages of e-commerce has totally discovered. As example of China`s e-commerce market which is presented by PDD and Alibaba. From the diagram of PDD`s CAR results in above, they become the first company that suffered negative influence during this special period. Here is a short discuss about the reason for negative impact in PDD.

At the beginning of the establishment, the platform of PDD was mainly focused on the middle or tail enterprises that Alibaba may not have full energy to take care of. The reason for that is due to large number of homogeneous products provided on Alibaba and there is certain amount of small company excluded from Alibaba because of less competitive strength when it compares to large size of company. PDD has absorbed them fully as their base customers meanwhile they begin to attract price-sensitive customer groups with a population aged around 24-30. According to the needs of price sensitivity customer group PDD begins to help their merchants to increase order by decreasing their products` price. Which reduced the possibility of higher cost by maintain the stable level of volatility in production. Due to gathering enough small sized company PDD had a chance to collect more customers` needs as they wish which also help them to plan their production more efficient. An identical cycle has been created. Since the outbreak of Covid-19, the economics of China has suffered a huge shock which helped unemployment rate reach to a high level. Most of the unemployment people are comes from age 24-30 which is accidentally be the major costumers of PDD. Because of lack of accurate grasp of market demand, the production cost of PDD has risen, such as inventory management, cash flow pressure etc. At the same time because of the impact of epidemic, the logistics system has suffered a stagflation. Business cycle of PDD has been broken which cost a negative impact in this epidemic.

In contrast, from the results of CAR and abnormal return of Alibaba, it shows that they have positive impact during outbreak of Covid-19. Alibaba begins to make acquisition for logistics since 2008. Till now Alibaba group has already owned five major logistic company in China`s market. Also, the range of customers is widely spread in every age

scale, with the effective inventory management and sufficient cash flow helped Alibaba can at least do not suffer any lost during this crisis. During the crisis they has created a new service named fresh daily delivery which gain a huge success during the special time. During spring festival, the trading amount of fresh daily delivery has 3-4 times in previous period. The average order amount per customer has been increased from 90 yuan to 120 yuan and daily supply of vegetables has increased from 500 tons to more than 1,000 tons. Compared with the same period, orders for fresh vegetables has increased 80%. On average, more than 40,000 new users down load the application daily basis. At the same time, the development of Internet medical services also helped Ali's revenue. The services called Ali Health help people to delivery medicine, also system help people for simple diagnosis which is not only realized the pressure of offline medical treatment, but also made it convenient for the masses.

Under the influence of the epidemic, the U.S. e-commerce market has also benefited a lot. According to quarterly data issued by the US Department of Commerce, US e-commerce sales have increased more than 30% between the first quarter and the second quarter in 2020. It is far enough to show that the epidemic has promoted online shopping American consumers' online shopping spending increased by 2.4% year-on-year. After announcement of state of emergency has led to a rapid increase in online shopping. From the results, it can be seen that Amazon and Wal-Mart’s CARs received the highest revenues of 30% and 20%, respectively. Due to the outbreak of online business, Amazon’s net profit even hit a record high in a single season, and online sales increased by 48% year-on-year. At the influence of Covid-19, WMT has created daily delivery, order to door as well as non-touch delivery service which helped them has 79% increase in their revenue. Meanwhile, at 18th of August WMT created their highest stock price 137.64$ per share. Which could prove my results that Covid-19 has positive impact in e-commerce market.

5.Conclusion

With more and more advanced in telecommunication and dependency in online shopping. E-commerce market has played a core position in whole economy. This paper has compared the potential growth in E-commerce market in US and China, how the e-commerce market goes at present and in near future. Analyzed the potential growth in specific company for both countries. Used valuation method to find the intrinsic value of leading companies around the industry. Test how the e-commerce performed at extreme situation (COVID-19) in both countries.

In this dissertation, discounted free cash flow model and event study have been applied to analysis E-commerce market in US and China. Discounted free cash flow has been used to find the potential growth in both E-commerce markets. Also, intrinsic value could be observed (whether the company has been undervalued). Event study analysis is to test when market suffered extreme situation (COVID-19) how do companies performed both at present and in near future. Alibaba and Amazon have been chosen to value as they represent 58% and 52.4% market share in each E-commerce market.

A key finding of the analysis is that at the influence in COVID-19 both companies in China and US at e-commerce has suffered a significance influence. The samples in this paper have selected the daily closing price of PDD and Alibaba which is account 65% of market share in China. eBay, Amazon as well as wall-mart was selected to represent US EC market which is account 85% of market share. In US market at the 95% confident level, the abnormal return of eBay, Wal-Mart, Amazon has suffered a significant influence, the same situation happened in China market. As a result, with the impact of COVID-19, there have significant effect in EC market both US and China when government announced the state of emergency. At the day of -3, -2, -1, 0, all of five companies suffered a significant influence except WMT at day 1. But due to identical property of EC market, from AAR and AR results investor still have confident for industry. In terms of overall economic significance, the analysis of the paper shows

that even though both leading companies in China and US at e-commerce market have been undervalued, Alibaba has more space to grow in future.

The analysis of the paper also detects that with a mutual and fierce competition, companies in E-commerce market in China began to accelerate consolidation and integration. The consolidation is not only for horizontal but also vertical integration. Horizontal consolidation performed more on small platforms that acquired by experienced and well-funded large platforms or eliminated by the market. Till 2020, the main Alibaba and Tencent group become the oligopoly in the market. While the vertical consolidation appeared in upstream and downstream industry as well as supplier chain. For example, till 2020 Alibaba has meagered or acquired 314 companies. Meanwhile, with widespread used in 5G technology, and the development in cloud compute, especially in COVID-19, e-commerce market in China has expanded their business into more board. Alibaba keep the first position of EC market in China.

List of Appendix

Procedure of event study

[1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import statsmodels.api as sm
import statsmodels.formula.api as smf
import scipy.stats as st
fig = plt.figure()
sns.set_palette("GnBu_d")
sns.set_style('whitegrid')
%matplotlib inline
import yfinance as yf
```

[2]:
```
stock_list = ['PDD','AMZN','EBAY','WMT','^GSPC']
prices = pd.DataFrame()
for stock in stock_list:
    symbol = stock
    tickerData = yf.Ticker(symbol)
    price_data = tickerData.history(period='1d', start='2019-1-1', end='2020-4-1')['Close']
    prices[stock] = price_data
return_df = prices.pct_change().dropna()
```

[3]:
```
return_df.tail(10)
```

[3]:

Date	PDD	AMZN	EBAY	WMT	^GSPC
2020-03-18	-0.048518	0.012258	-0.059495	0.027878	-0.051831
2020-03-19	0.063897	0.027831	-0.054313	-0.021223	0.004708
2020-03-20	-0.006805	-0.018523	-0.068243	-0.045877	-0.043360
2020-03-23	0.015788	0.030735	-0.044960	0.002720	-0.029294
2020-03-24	0.057185	0.019587	0.050494	0.006563	0.093828
2020-03-25	0.033564	-0.027968	0.025298	-0.048944	0.011535
2020-03-26	-0.006710	0.036933	0.063095	0.003839	0.062414
2020-03-27	-0.045663	-0.028325	0.000663	-0.002185	-0.033687
2020-03-30	0.008777	0.033603	0.033466	0.051195	0.033516
2020-03-31	0.011226	-0.007246	-0.036230	-0.013630	-0.016013

[4]:
```
date = ['2020-01-23','2020-03-13','2020-03-13','2020-03-13']
date_df = pd.DataFrame(date, index=['PDD','AMZN','EBAY','WMT'],columns=['Date'])
date_df.index.name = 'CompanyName'
```

[5]:
```
firm_list = ['PDD','AMZN','EBAY','WMT']
return_df['RF'] = 0.0065
return_df['Mkt_RF'] = return_df['^GSPC'] - return_df['RF']
```

[6]:
```
def eventstudy(returndata, eventdata, stocklist):
    """
    returndata: is a dataframe with the market returns of the different firms
    eventdata: eventdata for the different firms
    stocklist: a list of the firms involved in the analysis

    Returns:
    abnreturn: a dictionary of the abnormal returns for each firm in their respective eventwindows -/+20
    """
    abnreturn ={}  # abnormal returns on the event window
    returndata = returndata.reset_index()
    Bse = []
    for stock in stocklist:

        eventindex = int(returndata[returndata['Date'] == str(eventdata.at[stock,'Date'])].index.values)
        print(eventindex)
        event_df = returndata.loc[eventindex-10: eventindex+10, ['Date', stock , 'RF', 'Mkt_RF']]
        estimation_df  = returndata.loc[eventindex-260: eventindex-11, ["Date", stock, 'RF', 'Mkt_RF']]
        formula = stock + " - RF ~ Mkt_RF"
        beta_Mkt = sm.OLS.from_formula(formula, data=estimation_df).fit().params["Mkt_RF"]

        alpha = sm.OLS.from_formula(formula, data=estimation_df).fit().params["Intercept"]

        standard_error = sm.OLS.from_formula(formula, data=estimation_df).fit().bse

        Bse.append(standard_error)
        print("{}, beta_Mkt= {},alpha= {}".format(stock, beta_Mkt, alpha))

        #expected returns for each firm in the estimation window
        expectedreturn_eventwindow = ((event_df[['Mkt_RF']].values * beta_Mkt) + alpha)

        #abnormal returns on the event window - AR

        abnormal_return = event_df[stock].values - list(expectedreturn_eventwindow.flatten())
        abnreturn[stock] = abnormal_return


    abnormalreturns_df = pd.DataFrame(abnreturn)
    abnormalreturns_df.index = abnormalreturns_df.index-10
    return abnormalreturns_df
abnormalreturns_df=eventstudy(return_df, date_df, firm_list)
```

```
abnormalreturns_df=eventstudy(return_df, date_df, firm_list)
```

```
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PDD, beta_Mkt= 1.677168449914399,alpha= 0.011933563808846213
301
AMZN, beta_Mkt= 1.0767025681402298,alpha= 0.007275495099770456
301
EBAY, beta_Mkt= 1.1199450953034134,alpha= 0.006884738453472402
301
WMT, beta_Mkt= 0.5643391287381321,alpha= 0.004111993962919424
```

]:
```
plt.figure(figsize=(20,10))
for i in range(1,5):
    plt.subplot(2,2,i)
    abnormalreturns_df[abnormalreturns_df.columns[i-1]].plot()
    plt.xlabel('Event Window')
    plt.ylabel('Return')
    plt.axhline(y=(np.sqrt((abnormalreturns_df.iloc[:,i-1].std()**2/21))*1.96),color='red',linestyle='--')
    plt.axhline(y=(np.sqrt((abnormalreturns_df.iloc[:,i-1].std()**2/21))*-1.96),color='red',linestyle='--')
    plt.title(abnormalreturns_df.columns[i-1])
```

:
```
mean_AAR = abnormalreturns_df.mean(axis = 1)
var_AAR = (abnormalreturns_df.std())**2
var_matrix = pd.DataFrame(var_AAR)
var_matrix = var_matrix.T
var_AAR = sum(var_matrix.iloc[0])/21**2
Std_AAR = np.sqrt(var_AAR)
mean_AAR.plot()
plt.axhline(y=Std_AAR*1.96,color='red',linestyle='--')
plt.axhline(y=Std_AAR*-1.96,color='red',linestyle='--')
```

```
def CAR_se(Abnormal_return, stock_list):
    """
    To get the standard error of Cumulative Abnormal Return for each stock
    Input: the Abnormal Return datafram or matrix, a list of company names
    Output: a dataframe of cumulative standard error for each stock
    """
    residual_sigma_single = pd.DataFrame()
    residual_sigma_cum_single = pd.DataFrame()
    resi_single = []
    d = {}
    for x in stock_list:
        resistd = abnormalreturns_df[x].std()/2
        d.update({x:resistd})

    residual_sigma_single = pd.DataFrame(d,index=Abnormal_return.index)
    residual_sigma_cum_single = np.sqrt(residual_sigma_single.cumsum())
    se_cum_single = np.sqrt(((residual_sigma_cum_single**2)/21))

    return se_cum_single

def CAAR_se(Abnormal_return, stock_list):

    """
    To get the standard error of Cumulative Average Abnormal Return
    Input: the Abnormal Return datafram or matrix, a list of company names
    Output: a list of cumulative standard error
    """
    residual_sigma  = pd.DataFrame()
    resi = []
    d = {}
    for x in stock_list:
        resistd = abnormalreturns_df[x].std()/2
        d.update({x:resistd})

    residual_sigma = pd.DataFrame(d,index=Abnormal_return.index)
    residual_sigma_cum = np.sqrt(residual_sigma.cumsum())
    se_cum = np.sqrt(((residual_sigma_cum**2)/21).mean(axis=1))

    return se_cum
```

```
se_cum_single = CAR_se(abnormalreturns_df, firm_list)
CAR_df = abnormalreturns_df.cumsum()
plt.figure(figsize=(20,10))
for i in range(1,5):
    plt.subplot(2,2,i)
    CAR_df[CAR_df.columns[i-1]].plot()
    plt.plot(se_cum_single.iloc[:,i-1]*1.96, color='red',linestyle='--')
    plt.plot(se_cum_single.iloc[:,i-1]*-1.96, color='red',linestyle='--')
    plt.xlabel('Event Window')
    plt.ylabel('CAR')
    plt.title(CAR_df.columns[i-1])
```

```
se = CAAR_se(abnormalreturns_df, firm_list)
Var_AAR = ((CAR_df.mean(axis=1))**2)/2
Std_AAR = np.sqrt(Var_AAR)
# CAAR
CAAR = mean_AAR.cumsum()
# Plot CAAR
CAAR.plot(figsize=(12,8))
plt.xlabel("Event Window")
plt.plot(se*1.96, color='red',linestyle='--')
plt.plot(se*-1.96, color='red',linestyle='--')
plt.ylabel("Cumulative Return")
plt.title("Cumulative Average Abnormal Return")
```

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