



# The Effect of Covid-19 on the E-commerce Luxury Goods Industry in 2020

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**Abstract.** The Covid-19 pandemic led to an economic depression in 2020 and affected consumer behavior, that resulted two opposite effects on E-commerce markets. This paper studies on the impact of the pandemic on companies in E-commerce luxury goods industry, by analyzing financial statements of selected companies (Kering and Farfetch) and fluctuations of their stock prices. The first analysis computes the deviation of sales growth, EBITDA growth and operating margin in 2020 from historical trend. The second analysis uses multiple linear regression to find the correlation between severity of the pandemic and rate of return to shares of Kering, and Farfetch. F-state is used to test the statistical significance of the correlation. Results indicate that the Covid-19 facilitates the developments and operations of E-commerce luxury goods industry, there is a small impact of the pandemic on stock prices of E-commerce luxury companies. Specifically, on average, stock price of these companies increases, if the number of new Covid deaths domestic or in high-income countries on the current day increases; the growth of new deaths in lower income countries increases stock prices of these companies more than in higher income countries, but with higher magnitude of increases, the volatility is higher.

**Keywords:** Covid · E-commerce · Luxury Goods · Kering · Farfetch

## 1 Introduction

The Covid-19 (coronavirus disease 2019) is a life-threatening epidemic disease. It was first found from the fourth quarter of 2019 and started to worldwide spread in the end of the first quarter of 2020. The pandemic led to an economic depression in 2020 and changed consumer behavior, that resulted two opposite effects on E-commerce markets. This paper studies on the impact of the Covid-19 pandemic on the E-commerce luxury goods industry.

Due to the exacerbation of the Covid-19 cases, countries around the world implemented the lockdown policy, which required residents to stay at home unless essential activities, and severely restricted physical economic activities. Besides, due to the risk of viral transmission, many people engaged in social distancing spontaneously. 52% of consumers refuse to shop in crowded areas, and 36% of consumers avoid physical shopping before being vaccinated [3]. Because of these factors, as a substitution of physical

transaction, E-commerce became an important way to against the Covid-19, and the marketplace of E-commerce grew rapidly during the pandemic. On the other hand, the Covid-19 in 2020 caused the annual real GDP of the U.S. to decrease by 3.5% from 2019 [16]. Specifically, the COVID-19 pandemic has a significantly negative impact on aggregate consumption demand. In 2020, consumption on services and apparel decreased by 23.8%; transportation expenditures fell 17.4%; as well as food consumption declined by 10.4%; even healthcare spending was down 0.3% [17]. Moreover, the pandemic and the lockdown policy created uncertainty of supply chain of physical products [7]. The negative income effect on demand and the uncertainty on supply conspired the situation of E-commerce during the pandemic to be challengeable. Accordingly, the net effect of the pandemic on the E-commerce trend is ambiguous, that can only be figured out by statistical analyses.

Some studies with similar topics focused on how the pandemic affected large global E-commerce companies, and some focused on the E-commerce market for essential goods and medical products, etc. Many results showed significant or insignificant positive effects. However, there is few studies on the impact of the Covid-19 on E-commerce companies in luxury goods industry. Empirically, both the income elasticity and the absolute value of price elasticity for luxury goods are higher than necessity goods. That means, when consumer incomes or goods prices change, the reaction of luxury goods consumption is more sensitive than consumptions of other goods [4, 13]. According to the 2.9% decline of average U.S. household income in 2020 from 2019 [15], it's reasonable to infer that the recession has a larger negative effect on luxury goods industry than other industry. Thus, the net effect on E-commerce luxury goods companies might be inconsistent to typical E-commerce companies, and the study on this topic is necessary. This study mainly focuses on the online shop sectors of Kering, one of the largest global luxury goods companies in 2020 [5], and the financial performance of Farfetch, a luxury retail company that owns a large global e-commerce platform. Through financial analysis and multiple linear regression model, the results find that Covid-19 has positive effects on e-commerce sales of Kering and rate of return to shares of Farfetch. This study aims to help firm managers with strategies making. It also provides information to help investors make rational investments on E-commerce firms in luxury goods industry.

## 2 Literature Review

Guthrie, Fosso-Wamba and Arnaud [8] collected multiple sources of French country-level data to analyze the Covid-19 trend and the variation of e-commerce activity. The change of consumer behavior during the pandemic considerably increased the online consumption of fast moving consumer goods, pharmacy and health goods and home goods. This paper also related events in France during the pandemic and consumer sentiment to illustrate that emotion of consumers during the pandemic followed the react-cope-adapt periodization. The evolution of consumer sentiment psychologically explained the raise of E-commerce sales in 2020.

Hayakawa, Mukunoki and Urata [9] used data from Nint, Inc. And eMarketer to show that in Japan, the total sales of Rakuten, Amazon and Yahoo (the three largest digital platforms in Japan) increased by 7%–14% in each month in the first quarter of 2020

from the same month in 2019. Global E-commerce retail sales in 2020 were expected to boost by 28%, while the total global retail sales were predicted to decline by 3%. In addition, this paper used the UNCTAD B2C E-commerce Index (the EC index) to find that wealthier countries have smaller negative impact of the pandemic on E-commerce market, and the marginal negative effects diminish for countries with lower average income.

Abdelrhim and Elsayed [1] used multiple regression model to study on the effect of Covid-19 on the stock market of the top five global E-commerce companies (Amazon, Alibaba, Rakuten, Zalando, and ASOS), and used f-stats to test the statistical significance of the results. The study concluded that the Covid-19 had negative effects on the returns to stock prices of E-commerce companies. Specifically, the strength of correlation and the most influential independent variable for each firm were different, that depended on which country the firm belong.

Achille and Zipser [2] provided important information about the situation of luxury goods industry during the Covid-19 pandemic. About 20% to 30% of luxury goods revenues were generated by foreign consumers, suggesting that global market is indispensable for this industry. Italian factories produced more than 40% of global luxury products, but they were temporarily shut down during the pandemic, that affected the supply of luxury goods industry in 2020.

### 3 Methodology

#### 3.1 Introduction of Luxury Company Kering

Kering is a global luxury group, that was founded in 1963 in Paris, France. The group engages in two markets: Luxury and Sports & Lifestyle. The operation of the luxury segment includes designing, producing and retailing luxury goods. In 2012, Kering established a venture company with an Italian luxury E-commerce company, Yoox SpA, to enter the E-commerce luxury market [12]. Kering went public in 1988 in Euronext Paris and was listed on the U.S. market in 2011 (PPRUY).

Farfetch Limited was founded in 2007 in the U.K., as an E-commerce marketplace for global luxury boutiques. Different from Kering, Farfetch is an online intermediary, that doesn't own products that were sold on the platform, and mainly gain revenue from sales commission. Additional businesses of this company include providing a digital platform for the development of global luxury brands, and servicing enterprise clients with technology and E-commerce support [6]. It sold stocks to public in 2018 through the New York Stock Exchange (FTCH).

#### 3.2 Data and Statistical Model

This paper studies the effects of the pandemic on the Kering and Farfetch through two perspectives.

The data are collected from financial statements of each company to analyze the deviations of each financial index in 2020 from historical trend. Indices include sales growth, EBITDA and operating margin of the company E-commerce operation. Usually, this information was directed posted on companies' financial statement or annual

financial report. For index that are not shown on these documents, an analysis for them is necessary. The model used in this paper is calculating the average percentage change of each index in the previous five years before 2020 as the historical trend. Then calculate the percentage change of each index in 2020 to find the magnitude of deviation in 2020 and estimate the effects of the pandemic on each index. The function used in this model is:

$$dX = (X_{2020} - X_{2019}) / X_{2019} - E[(X_t - X_{t-1}) / X_t - 1] \tag{1}$$

$$dM = M_{2020} - E[M_t] \tag{2}$$

(dX is the deviation of the variable in 2020; X is the variable of interest (except operating margin); M is operating margin; t is year between 2015 and 2019).

The second analysis studies on the correlation of each company’s stock return and the spread of the pandemic. The study used multiple linear regression model to find the correlation. The dependent variable is the daily rate of return to stock, calculated by using each company’s daily stock price data from the beginning to the end of 2020. The assumption is that the dependent variable has significant correlation with new cases per million, confirmed cases per million, and new deaths per million. The estimation uses per million data instead of number of cases and deaths, because per million data indicates the densities, that can nullify the bias caused by population difference in each country. Since companies of study all have worldwide business, considering the impact of regions, the model uses the pandemic data in the country where the company is located, in countries with high-income level, upper-middle-income level, lower-middle-income level, and low-income level to estimate the correlation of data respectively to compare the significance of influence in each region. F-state is used to test the statistical significance of each coefficient, with 95% confidence interval. The function used in this model is:

$$Y_t = (P_t - P_{t-1}) / P_{t-1} \tag{3}$$

$$Y_t = B_0 + B_1 * ConfCase_{jt} + B_2 * NewCase_{jt} + B_3 * NewDeath_{jt} \tag{4}$$

(Yt is the stock rate of return to stock in day t; P is stock price; t is the date in 2020; B0 is the intercept of the regression; Bi is the coefficient of each variable; Xi\_j is country variable, where i is the category of independent variables, and j is the category of countries).

Financial information is sources from companies’ financial statements, which can be found from their official websites. Datasets of stock prices are collected from Yahoo finance [18], and the analysis only uses public shares of companies on the U.S. stock market, to avoid confounding variables. The data of Covid-19 cases and deaths is from Our World in Data [14]. Due to the lack of Covid-19 data in low-income countries before February 29, 2020, and the stock market opened on Monday from March 2, 2020, to ceteris paribus, the result of study only presents the correlation after March 2, 2020. Data cleaning and arrangement is through Excel; all computations are used by STATA/MP 16.0, and F-tests are tested by Excel.

## 4 Results

### 4.1 Financial Performances of Kering and Farfetch in 2020

According to information collected from Kering 2020 annual reports [10, 11], based on the massive shutdown of its retail stores and the recession of tourism, the retail sales in 2020 decrease by 15.9% from 2019, and its 2020 annual revenue is €13,100 million, which declines by 17.5% compared with 2019 annual revenue of €15,884 million. However, the online sales in 2020 grow by 67.5% over the year, that accounted for 13% of total retail sales in Kering. By computation, historical trend of sales growth from 2014 to 2019 is 17.96% each year, and the deviation in 2020 is -35.46%. Historical trend of annually online sales growth is around 55.28%, and the excess growth in 2020 is 12.22%. EBITDA of Kering in 2020 (€4,574.2 million) declines by 24.1% over the year, compared with the trend of 24.3% growth each year, EBITDA in 2020 deviates by -48.4%. In 2020, the operating margin is 23.9%, which is 2.42% higher than trend.

As an E-commerce company, almost all of businesses of Farfetch are online, so the results are consistent regardless analyze the financial index of its online sector and other sectors separately or together. Farfetch's sales growth in 2020 is 63.56%, that compared with the trend of 67.54%, decreases by 3.98%. Farfetch is still at a loss, that its EBITDA is negative in every year, thus the annual growth rates of EBITDA are transformed to their opposite numbers. Its EBITDA in 2020 is \$-47,432 thousand, with a growth of 60.92% from 2019. The trend of EBITDA growth is -28.3%, which indicates a huge increase on EBITDA in 2020. In 2020, the operating margin of -228.18% is significantly lower than trend, because due to the pandemic, Farfetch increased its liabilities in 2020.

### 4.2 Effect of the Severity of Covid-19 on Rate of Return to Shares in Kering and Farfetch

From Table 1, Bs of independent variables are small, regardless companies and countries, which indicate that the correlation between the rate of return to shares for each company and the severity of the pandemic is weak. Same for each company, that the coefficient for confirmed cases is the smallest, means that the growth of total confirmed Covid-19 cases has little effect on stock prices.

Through horizontal comparison, the coefficient for the variable of new deaths presents a negative correlation with income level countries. It suggests that per unit increase on new deaths in countries with lower income level affects the rate of stock return more than per unit increase on new deaths in higher income countries. Hypothesis test based on F-state is used to test the significance of variables in each model, that:

H0: all independent variables have no significant effect on stock return,  $B_1 = B_2 = B_3$ ,  
 Ha: one or more of independent variables have significant effect on stock return, at least one of B's  $\neq 0$ .

$\alpha = 0.05$

$$\text{Test statistic} = \text{MSR/MSE} = \frac{(\text{SSE}(R) - \text{SSE}(U))/Q}{\text{SSE}(U)/[n - (k + 1)]} \quad (5)$$

**Table 1.** The estimates of multiple linear regression model between Rate of return to shares and the spread of the Covid-19

Company	Independent Variable & Test Statistic	Category of Country				
		Domestic	High-Income	Upper-Middle-Income	Lower-Middle-Income	Low-Income
Kering	B1	-1.22e-07	-2.52e-07	1.76e-06	-8.60e-07	-8.96e-06
	B2	.0000115	.0000285	-.0004918	-.0002466	.0020092
	B3	.000073	-.0005196	.0147017	.0272984	.0347207
	B0	.0009846	.0018455	-.0022595	-.0015072	-.0018657
	SSE (U)	.216021732	.216438218	.215280597	.216050904	.215634346
	SSE (R)	.216613762	.216613762	.216613762	.216613762	.216613762
Farfetch	B1	-1.80e-07	-2.73e-06	-2.95e-06	2.44e-06	.00003
	B2	.0000205	.0002342	.0007454	-.0026592	-.0089013
	B3	.0020469	.003239	-.0117886	.1615864	.213382
	B0	.0018534	.0019595	.006624	-.0010939	.0093212
	SSE (U)	.466822723	.457174918	.478343843	.471370222	.476246395
	SSE (R)	.481122104	.481122104	.481122104	.481122104	.481122104
Q = 3; n - (k + 1) = 207						

Under H0: test statistic ~ F (3, 207).

Reject H0 if test statistic > 2.6482.

Calculate the test statistics and come up with the results.

For each model, the test makes two hypotheses, H0 and Ha. H0 restricts the regression model with number of restrictions  $Q = 3$ . SSE is sum of squares error, with degree of freedom  $n - (k + 1) = 207$ . If the result reject H0 in a model, then H0 and Ha would be modified to determine which variables in the model are statistically significant.

H0 in the analysis of the correlation between Farfetch stock return and the spread of pandemic in high-income countries is rejected. F-test fails to reject H0 in the model of Farfetch stock return and its domestic spread of pandemic with 95% confidence interval, but by further study, it rejects the H0 with 90% confidence interval. The growth of new domestic deaths due to the pandemic significantly increases the return of Farfetch stock, and the number of new deaths in high-income countries positively impacts to the stock return of Farfetch in 0.1 significance level.

### 4.3 Limitation

In the first study, some financial data used in Kering’s analysis does not clearly distinct markets of Luxury and Sports & Lifestyle. What’s more, some factors such as inflation rates, changes of product prices and number of retail stores are omitted. These may lead the results to be biased.

In the second study, the regression model can only find the correlation of each variable but cannot determine the causal effect of the spread of Covid-19 on stock returns. Further studies on the causal effect would be valuable. The LVMH group as the largest global

luxury goods company [8] is an appropriate project of this study. However, due to the lack of its E-commerce financial data, it's hard to do the analysis.

## 5 Conclusion

Although physical retails of Kering is strongly and negatively affected by the pandemic, Kering's E-commerce sector grows rapidly against global economy downtrend. The operating margin in 2020 increases by 2.42%, indicates that the operating efficiency of Kering is still increasing. Congruently, Farfetch online sales growth rate also increases by 3.98%. Despite EBITDAs of Farfetch are negative, the loss before interest, taxes, depreciation, and amortization in 2020 is significantly less than before the pandemic. Due to the change in its equity structure, the operating margin of Farfetch is affected, that make the study be hard to analysis the effect through this index. The conclusions can be generalized. Total sales of companies in luxury goods industry with E-commerce sectors are negatively impacted by the Covid-19, while their online sales are positively affected. For E-commerce luxury goods retail companies, the pandemic caused a positive influence in 2020. To sum up these facts, the Covid-19 facilitates the developments and operations of E-commerce luxury goods industry.

There is no strong correlation between rate of return to shares of both companies. However, Farfetch's rate of return to shares is found to be weakly but significantly related with new Covid deaths in its own country (the U.K.), and in high-income countries. On average, stock prices of E-commerce luxury companies increase, if the number of new Covid deaths domestic or in high-income countries on the current day increases. The result also finds that the strength of influence of new deaths in a country on stock price is negative related with income level of this country. The growth of new deaths in lower income countries increases stock prices of companies in luxury goods industry more than in higher income countries, but with higher magnitude of increases, the volatility is higher.

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