RESEARCH ARTICLE

FINTECH RETURNS - COVID-19 AND ECONOMIC POLICY UNCERTAINTY

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ABSTRACT— This study investigates the impact of COVID-19 on fintech return in the context of economic policy uncertainty. The findings show that (1) no evidence of the difference between the return and abnormal return of the fintech stock in the period of COVID-19; (2) the fintech return will be higher in the case of economic policy uncertainty increase; and (3) the increase of the number of confirmed COVID-19 cases and deaths is negatively associated with fintech return. In contrast, the ratio of deaths on confirmed cases is optimistic concerning fintech return.

Keywords— Fintech, Covid-19, Economic Policy Uncertainty, Return, Abnormal Return.

I. INTRODUCTION

Since the first appearance of COVID-19 cases in December 2019 in Wuhan, China, the COVID-19 pandemic has changed its socio-economic aspects. In the finance sector, [1] highlighted COVID-19 is causing direct and indirect economic factors, which impact financial markets and institutions, such as costs of capital, pension planning, financial systems, social trust, and political stability. [2] indicated that the global financial markets are risking because of the rapid spread of COVID-19. Fintech is the emerging segment of the finance industry, which is also impacted by the COVID-19 factor. [3] stated that COVID-19 might be both the positive and negative factors of the growth of fintech. However, [4] indicated that the download rate of mobile financial applications increases from 24 to 32 percent from 74 countries in the time of lockdown. Furthermore, [5], [6] provided that the COVID-19 pandemic is the chance for fintech growth.

On the other hand, fintech performance has been strongly associated with the factors of economic uncertainty [7], [8]. [9] and [10] indicated that Economic Policy Uncertainty (EPU) is the crucial factor of the financial institution's performance and the financial market.

In the volatility analysis of the association between stock market risk and the outbreak of COVID-19, [2] stated that the COVID-19 pandemic is the reason for increased risk levels, leading to uncertainty in the financial markets. [11] agreed that the inception of COVID-19 increases risks for the stock market. Besides that, the authors argued that the change in volatility is sensitive to the number of COVID-19. The study by [12] indicated that the figure of COVID-19 official announcement enhanced the US financial volatility. In the context of COVID-19, [3] discussed that fintech faces both opportunities and threats. Extensive lockdowns and social distancing lead to increasing unemployment and losing revenue; it might negatively affect the current customers of the fintech companies. However, on the other hand, it makes to extend the customers' demand, especially regarding payment in e-commerce. Additionally, the funding round for business scale-ups during and post-time COVID-19 is the fintech company's challenge. When the pandemic is going on, the impact of COVID-19 on fintech is different, which is a positive factor [4], a negative factor [13], or it is either a positive factor or a negative factor [3], [14].

Since the global financial crisis 2008-2009, reducing operation costs and increasing efficiency have been the mandatory requirements of financial institutions, which is the milestone of formulating fintech 3.0, which has been going on [15]. Fintech has been rapidly growing, and it is penetrating the market of traditional financial institutions from the gap market of non-bank users [16]. Because fintech is the new segment of the finance industry, it faces some difficulties from the economic uncertainty environment. [7] demonstrated the ecosystem, business models, investment decisions, risk, technology, regulatory, customer behavior, and security are the challenges of fintech. [8] found an association between fintech and the component of EPU, such as the impact of social communication media, regulatory, and risk on the fintech company.

The impact of EPU on the financial institution is found by [9], [10], [17]–[19]. EPU is positively related to bank earnings opacity and is negatively linked to the level of accounting conservatism [10]. There is a negative association between EPU and financial stability [9]. The impact of international EPU on China's financial stocks' volatility is negative [17]. Furthermore, [18] demonstrated that the highest impact of EPU on banks' business activities, and [19] revealed that the volatility of Bitcoin and Litecoin was negatively associated with EPU. Since the Chinese government's regulation of crypto-trading has been issued, this association has been insignificant.

Overall, there are some debates on the impact of COVID-19 on fintech companies and the impact of EPU on fintech performance. The combination of two issues is interesting research, which is a research gap and needs to

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be fulfilled. Based on that, the impact of COVID-19 and EPU on fintech, toward fintech stock return is investigated. For conducting the study, the data of 27 fintech companies in the USA, Germany, Brazil, and China are employed. Furthermore, the experimental results will provide new evidence about the relationship between fintech return, COVID-19, and EPU in the pandemic period, which might be meaningful for the next studies, the policymaker, and chief of fintech companies.

The rest of the study is presented in the following sections. Section 2 is the methodology, where the estimation model, measurement variables, and data collection are proposed. The experimental results are included in section 3, whereas section 4 is the conclusion with the main features of the study.

II. METHODOLOGY

Based on the research model line of [9], [10], and [12], we formulated the equation for investigating the impact of COVID-19 and EPU on the monthly return of 27 fintech companies in the USA, Germany, Brazil, and China in the period Jan 2020 – Sep 2020 as below:

$$Fintech_{it} = \alpha + \beta EPU_t + \gamma COVID_t + \varepsilon_{it} \qquad (1)$$

Where $\propto$ is the constant, β is the coefficients of EPU variable, and γ are COVID-19 variables respectively, and ε_{it} = $\mu_i + \delta_{it}$ is the term with μ_i is the firm effect to cover the specific heterogeneity, and δ_{it} is time-varying across firms and over time.

Table 1. *Descriptive statistics of variables*

Variable	Obs.	Mean	Std. Dev	Min	Max
RETU	243	0.00536(*)	0.19744	-2.3676	0.37814
ABNO	243	0.00553(*)	0.20625	-2.3606	0.4838
EPU	36	363.9652	162.2035	115.9408	742.7182
CASE	36	1358.228	1990.068	0	6777.305
DEATH	36	22.4139	47.4048	0	167.2404
DECA	36	0.053579	0.1474329	0	0.8920027

Source: The Finance Yahoo, The Bloomberg, The Economic Policy Uncertainty, The World Health Organization, and The World Bank

(*) The mean different of RETU and ABNO = 0.0055269 – 0.0053611 = 0.0001658, and the value of t-test = 0.0091

The expectation sign of β (impact of EPU on fintech) and γ (impact of COVID-19 on fintech) are as below:

- Following [10] and the increase of economic uncertainty COVID-19, we expect a positive effect of EPU on fintech stock return or $\beta > 0$.
- As argued above, the spread of COVID-19 is an opportunity for the development of fintech companies; thus, we expect a positive effect of COVID-19 on fintech stock return or $\gamma > 0$.

$Fintech_{it}$ is the fintech performance of stock i at the time t. The fintech variables consist of stock return (RETU) and abnormal stock return (ABNO). Consistent with [4]–[6], in the context of the COVID-19 pandemic, the fintech performance is better than before; thus, we expect that there is a significant difference between stock return and abnormal return of the fintech companies.

RETU is calculated based on the method of Kiymaz and Berument (2003) as below:

$$RETU_{it} = log(P_{it}) - log(P_{i,t-1}) = log \frac{P_{it}}{P_{i,t-1}} \qquad (2)$$

Where P_{it} and $P_{i,t-1}$ are the close monthly price of the stock i at time t and t-1, respectively. The monthly closed price is provided by the Finance Yahoo website (www.finance.yahoo.com).

Based on the method of [21], ABNO is measured as below:

$$ABNO_{it} = RETU_{it} - R_{mt} \qquad (3)$$

R_{mt} is the market return at time t, is calculated by the same equation (2). The Bloomberg website provides the monthly closed market index (www.bloomberg.com).

Table 2. *Correlation matrix and variance inflation factor (VIF)*

Variable	VIF	RETU	ABNO	EPU	CASE	DEATH	DECA
RETU	-	1.0000					
ABNO	1.17	0.9126	1.0000				
EPU	1.33	0.3471	0.3224	1.0000			
CASE	1.06	0.0661	-0.0847	0.1391	1.0000		
DEATH	1.05	-0.1196	-0.1612	-0.0506	0.1011	1.0000	
DECA	1.17	0.1133	0.0101	0.3384	-0.0201	0.1047	1.0000

Based on the approach of [22] and [23], the EPU variable is proxied by the monthly EPU index, which is shown on the Economic Policy Uncertainty website (www.policyuncertainty.com). The EPU index's increase negatively foreshadows macroeconomic conditions [22].

The number of confirmed cases and death regarding COVID-19 are collected from the World Health Organization website (www.who.int). The population in 2019 is collected from the World Bank website (www.data.worldbank.org). Based on [12], [24] about COVID-19 measurement, in this study, COVID-19 variables are proxied the ratio of death on confirmed cases (DECA), the ratio of deaths on million people (DEATH), and the ratio of confirmed cases on million people (CASE).

Table 3. *Estimation results of the impact of COVID-19 and EPU on Fintech*

Panel A. Impact on fintech return

Variable	FE	RE	FE	RE	FE	RE	FE	RE	FE	RE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
CONS.	-0.024	-0.014	-0.209***	-0.184***	-0.215***	-0.201***	-0.234***	-0.183***	-0.212***	-0.180***
	[-1.16]	[-0.78]	[-5.04]	[-4.89]	[-5.26]	[-5.43]	[-4.55]	[-4.21]	[-4.96]	[-4.75]
DECA	0.377*	0.413**	0.120	0.040	4.944***	5.526***	0.112	0.041	0.125	0.036
	[1.69]	[2.03]	[0.55]	[0.19]	[3.02]	[3.59]	[0.20]	[0.57]	[0.57]	[0.17]
CASE	1.2e-5	8.9e-6	2.5e-6	3.3e-6	-5.8e-7	-8.6e-7	2.3e-5	2.0e-6	2.1e-6	4.5e-6
	[1.39]	[1.30]	[0.29]	[0.50]	[-0.07]	[-0.13]	[0.87]	[0.08]	[0.25]	[0.67]
DEATH	-5.3e-4	-1.3e-3**	-6.4e-4	-9.5e-4*	-0.001*	-0.002***	-8.4e-4	-9.4e-4	-2.0e-4	-0.002
	[-0.65]	[-2.21]	[-0.82]	[-1.74]	[-1.80]	[-3.12]	[-1.03]	[-1.60]	[-0.11]	[-1.28]
EPU			6.4e-4***	5.7e-4***	5.7e-4***	5.3e-4***	7.3e-4***	5.6e-4***	0.001***	0.001***
			[5.05]	[5.10]	[4.56]	[4.85]	[4.30]	[4.09]	[4.88]	[4.73]
EPUxDECA					-0.009***	-0.010***				
					[-2.97]	[-3.60]				
EPUxCASE							-6.7e-8	4.1e-9		
							[-0.83]	[0.06]		
EPUxDEATH									-1.7e-6	3.7e-6
									[-0.27]	[0.69]
N	243	243	243	243	243	243	243	243	243	243
R-Square	0.0222	0.0176	0.1272	0.1251	0.1622	0.1603	0.1299	0.1248	0.1274	0.1222
Value	1.61	9.22**	7.72***	36.18***	8.17***	50.93***	6.30***	36.03***	6.16***	36.58***
Hausman	-		2.95		1.52		4.91		4.91	

Panel B. Impact on fintech abnormal return

Variable	FE	RE	FE	RE	FE	RE	FE	RE	FE	RE
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
CONS.	0.024	0.026	-0.194***	-0.170***	-0.194***	-0.172***	-0.259***	-0.196***	-0.199***	-0.171***
	[1.13]	[1.34]	[-4.49]	[-4.38]	[-4.47]	[-4.38]	[-4.87]	[-4.37]	[-4.49]	[-4.34]
DECA	0.031	0.084	-0.271	-0.349	-0.423	0.226	-0.291	-0.380*	-0.262	-0.349
	[0.13]	[0.39]	[-1.20]	[-1.63]	[-0.24]	[0.14]	[-1.30]	[-1.76]	[-1.15]	[-1.63]
CASE	-7.9e-6	-7.6e-6	-1.9e-5**	-1.4e-5**	-1.9e-5**	-1.5e-5**	2.5e-5	1.3e-5	-2.0e-5**	-1.4e-5**
	[-0.86]	[-1.07]	[-2.19]	[-2.07]	[-2.15]	[-2.09]	[1.26]	[0.53]	[-2.24]	[-2.01]
DEATH	-8.8e-4	-0.001**	-0.001	-1.1e-3	-9.8e-4	-0.001*	-0.002*	-0.001**	-1.3e-4	-9.8e-4
	[-1.02]	[-2.44]	[-1.25]	[-1.95]	[-1.14]	[-1.92]	[-1.82]	[-2.23]	[-0.07]	[-0.64]
EPU			7.5e-4***	6.6e-4***	7.5e-4***	6.6e-4***	9.9e-4***	7.5e-4***	7.7e-4***	6.6e-4***
			[5.70]	[5.71]	[5.62]	[5.63]	[5.65]	[5.29]	[5.58]	[5.51]
EPUxDECA					2.8e-4	-0.001				
					[0.09]	[-0.36]				
EPUxCASE							-1.7e-7**	-8.4e-8		
							[-2.06]	[-1.14]		
EPUxDEATH									-3.3e-6	-4.6e-7
									[-0.51]	[-0.08]
N	243	243	243	243	243	243	243	243	243	243
R-Square	0.0113	0.0108	0.1428	0.1406	0.1428	0.1399	0.1596	0.1530	0.1438	0.1409
Value	0.81	7.73*	8.83***	41.31***	7.03***	41.29***	8.02***	42.65***	7.09***	41.15***
Hausman	-		2.76		2.77		5.88		2.93	

Note: *, **, and *** are the significant level at 10%, 5% and 1%, respectively

Table 1 provides the descriptive statistics of variables. The mean of returns and abnormal returns have a slight, small difference (0.00536 compared to 0.00553, respectively). For robustness check, the t-test is used, and the value of the t-test is 0.0091, which means there is no evidence of a difference between the return and abnormal return of fintech stock in the period of COVID-19. It is an interesting finding that is inconsistent with the expectation about the difference between the normal return and abnormal return of fintech stock.

Following the panel data model, in this study, the Fixed-Effect model (FE) and the Random-Effect model (RE) are applied for processing the equation (1), and for choosing the better estimation result between FE and RE, the Hausman test is used [25], [26].

III. EXPERIMENTAL RESULTS

The multicollinearity is tested before equation (1) is processed by FE and RE. Table 2 shows that the maximum correlation coefficient of 0.9126 belongs to the association of RETU and ABNO, which are two dependent variables in the different regression models. The rest of the correlations are under 0.3471, and the VIF_max = 1.33 (less than 2.0). Therefore, all variables are eligible for inclusion in the regression analysis model, and there is no evidence of multicollinearity [27], [28].

Three steps process the equation (1). We, firstly, investigate the effect of COVID-19 on fintech performance, then the EPU is added, and finally, the interaction between EPU and COVID-19 is added too for investigating. The estimation results are shown in Table 3.

Generally, except estimation results are shown in columns 1 and 11 are not significant, the rests of the estimation results are significant at 1% or 5%. All Hausman tests' value is not significant, which means the estimation results by RE is more suitable than FE. R-Square indicates that all explanatory variables in equation (1) express about 15% of the change of fintech return (from 12.22% to 16.22%), except the estimation result of R-Square of column 2 and column 12, which just explain about 1% of the change of dependent variables.

The coefficients of constants are a significant negative sign, which means in the normal condition, when other factors are stable, the return and abnormal return are negative. Although all value of EPU coefficients is small,

all are positive and significant at 1%; this means when the increase of EPU increases the return of fintech stock in the market. It validates the second expectation about the positive effect of EPU on fintech return.

Most CASE and DEATH coefficients are opposing signs and significant at 10% to 1% in difference estimation result models. It means there is a negative association between fintech return and the ratio of confirmed cases and death on population. However, the relationship between fintech return and DECA variable is positive (see column 2-5-6, the coefficients of DECA are significantly positive at 5%, 1%, and 1%, respectively). It can be seen that there is a distinction in the reaction of fintech stock price on the announcement of COVID-19 components. Additionally, the coefficients of EPUxDECA and EPUxCASE are significant negatives at 1% and 5%, respectively (see column 5-6-17). Thus, we argue that the interaction between COVID-19 and the economic uncertainty negatively affects fintech performance. Based on that, it can be concluded that the estimation result does not support the expectation about a positive effect of COVID-19 on fintech return. However, in three measures of COVID-19, the increase of DECA is considered the worst case of COVID-19 in India [29]. Therefore, in the future, if the COVID-19 is going on and worst, it will be a chance for fintech companies.

IV. CONCLUSION

Based on the different views of COVID-19 on fintech, a new segment in the finance industry. We purpose to investigate the impact of COVID-19 on fintech performance in the context of economic uncertainty. 27 fintech companies in the USA, Germany, Brazil, and China in the COVID-19 period, from January 2020 to September 2020. Based on [9] and [10] about the relationship between firm performance and EPU, we formulate the research model consisting of monthly fintech return, EPU COVID-19 variables. FE and RE's estimation results gave that while the relationship of fintech return and economic policy uncertainty is positive, fintech return and the number of COVID-19 confirmed cases and deaths are negative. Besides that, we found that the return and abnormal return of fintech in the period of COVID-19 is the same, and the increase of COVID-19 deaths on confirmed cases raises the fintech return.

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