Covid-19: Corporate diversification and post-crash returns

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Abstract

This study applies regression and survival analyses on the UK firm-level data to examine the impact of corporate diversification on stock returns after the market crash caused by the Covid-19 crisis. We find that diversified firms experience worse returns and slower improvement in stock prices than focused firms. However, firms trading at diversification premium have better returns and recover faster to compare to firms trading at discount.

Introduction

We examine the value of corporate diversification in the context of Covid-19 pandemic, an exogenous shock to the world economy and stock markets, with the latter collapsing by a third in early 2020 and remaining volatile despite the recent recovery (Ding et al., 2021). Given the nature of the pandemic, there are both winners and losers with some industries suffering more than others (ONS, 2020). Firms with segments operating in sectors most exposed to the crisis might suffer significant losses, while those with segments operating in sectors that are positively affected are likely to fare better. But with their internal capital markets, diversified firms suffering from sudden decrease in revenue in one or more segments can rely on funds

from segments that are less affected[1]. This was the case in the most recent global financial crisis. Kuppuswamy and Villalonga (2016) attribute increase in value of diversified firms compared to focused firms to more efficient internal capital allocation during the crisis[2]. However, unlike the global financial crisis, the Covid-19 crisis started outside of financial sector and had immediate and far more dramatic real effects on the economy. The collapse in global trade and nationwide restrictions affected firms' ability to generate revenue resulting in varying levels of decrease and recovery in stock prices across firms.

We calculate abnormal returns associated with the arrival of Covid-19 during and after the stock market crash. Studies focusing on short-term returns report that diversified firms in the US did better during the crash period February-March 2020 than focused firms (Fahlenbrach et al., 2020; Onali and Mascia, 2020). However, such performance gap might disappear as investor perceptions change with the changing expectations of how the crisis will develop, e.g. the impact of further restrictions on different industries (ONS, 2020)[3]. This is the case for internationally diversified firms, initially being punished in the short-term by the markets for the risk exposure associated with 9/11 terrorist attacks, and later experiencing positive long-term abnormal returns (Li and Tallman, 2011). Moreover, the arrival of the Covid-19 significantly increased economic anxiety and weakened investor sentiment (Fetzer et al., 2020). Thus, the impact of any factor on the short-term returns may be overshadowed by panic or overreaction during the crash period, i.e. investors sell-off any stocks.

[1] See "Cash hoarders and conglomerates have their day in the sun". https://www.ft.com/content/5682a2d7-725d-49f3-ad3c-f270cc0deb21

[2] A substantial body of literature has examined the benefits and costs of corporate diversification in the context of its firm value implications but has not reached an empirical consensus. Early studies provide evidence consistent with value destruction, while more recent ones suggest it creates or at least does not destroy value (see Maksimovic and Philips, 2013 for a review).

[3] See "Why the chances for a 'V'-shaped economic recovery are getting less likely by the day". https://www.cnbc.com/2020/04/06/coronavirus-update-a-v-shaped-economic-recovery-getting-less-likely.html

We contribute to the existing literature by presenting novel evidence on: i) the impact of diversification on both short and long-term abnormal returns after the stock market crash and ii) which firms survive the stock price crash better and experience faster improvement afterwards using survival analysis. Using two different methods, we gain a better insight into the performance of diversified firms. To investigate the impact of diversification on abnormal returns further, we calculate excess value for diversified firms. Finally, our analysis based on the UK data adds to the current studies, which, to the best our knowledge, are all carried out in the US context.

Theory

Among the various theories developed to explain the reasons for why firms pursue diversification strategy and benefits and costs associated with it, the main ones are market power, resource based and agency theories. Market power view suggests that the main benefit of diversification is gaining conglomerate power which is used to improve performance by reducing competition (Hill, 1985). Resource based view suggests that excess resources in one segment should be utilised in others to generate more profit given lower production costs because of economies of scope. This use of internal capital markets is even more important during financial crises when it becomes more difficult to obtain funds in external capital markets (Teece, 1982). Moreover, due to imperfectly correlated cash flows coming from different segments, diversified firms have lower default probability (Singhal and Zhu, 2013) and systematic market risk (Hann et al., 2013) which allow them to increase their debt capacity as external providers will be more willing to lend to less-risky firms (Lewellen, 1971).

The agency theory is not consistent with profit maximisation. It suggests that in perfect capital markets there is no value to diversification as shareholders can diversify their own portfolios. Thus, diversification is a result of the problem of separation of ownership and control (Fama

and Jensen, 1983). Self-interested managers may use it to increase the size of the firm motivated by empire-building (Jensen, 1986), entrenchment (Shleifer and Vishny, 1989) or higher pay (Jensen and Murphy, 1990) at the expense of shareholders. Managers may also use diversification when they are over-confident about their ability to manage a complex diversified firm (Roll, 1986). Moreover, internal capital markets in diversified firms provide a great opportunity for such managers to over-invest (Martin and Sayrak, 2003). Others argue that diversified firms could suffer more from inefficient allocation of resources than agency problem because of information asymmetry between management at headquarters and division levels (Wulf, 2009). Thus the value of corporate diversification, especially during crisis times, depends on how efficiently internal capital markets are used.

Regression analysis

We use the population of non-investment trust companies listed in the London Stock Exchange as at 1 January 2020. All data were obtained from Datastream. Following Ding et al. (2021), we use weekly share prices to calculate abnormal returns. Our dependent variable is *CAR_1,* which is abnormal returns cumulated over the crash period of four weeks between 24 February and 23 March 2020. Abnormal returns are calculated using the market model event-study methodology with an estimation window of 52 weeks ending ten weeks before the event window:

$$AR_{i,t} = R_{i,t} - (\alpha_i + \beta_i R_{m,t})$$

We next calculate buy-and-hold abnormal returns (*BHARs)* for 3, 6 and 12 months to measure long-term post-crash period performance starting from 24 March 2020 using the following formula:

$$BHAR_i = \prod_{t=T_1+1}^{T_2} (1 + R_{i,t}) - \prod_{t=T_1+1}^{T_2} (1 + (\alpha_i + \beta_i R_{m,t}))$$

Following previous studies, we calculate diversification variables using SIC codes and segment-level sales data. *Diversified_Firm* is a dummy variable equal to 1 if a firm reports more than one 4-digit SIC business segment, 0 otherwise. Following Berger and Ofek (1995), we measure *Excess_Value* as the natural log of the ratio of the diversified firm's actual value and the sum of the imputed values of its segments as stand-alone firms. Actual value is measured as book value of total debt plus market value of equity, and the imputed value of each segment is equal to the segment's sales multiplied by the median ratio of capital to sales of focused firms in the segment. We require at least five focused firms in industry at least at 2-digit SIC code level to calculate this. Positive/negative values indicate that diversified firms are valued at more/less than their focused counterparts, i.e. trading at premium/discount. We control for *ROA*, *Size*, *Liquidity* and *Leverage* as firm characteristics as suggested by existing studies (Ramelli and Wagner, 2020).

Table 1 reports results of the regressions. The positive relationship between *CAR_1* and diversification is consistent with the findings in the US context (Fahlenbrach et al., 2020; Onali and Mascia, 2020) but statistically insignificant[4]. However, we find that diversified firms experience significantly lower returns during one year following the crash[5]. We also find a positive relationship between *Excess_Value* and post-crash abnormal returns. This is consistent with excess value providing longer-term perspective on the impact of diversification on market valuation.

Table 1. Diversification and abnormal returns

	All_firms				Diversified_firms			
	CAR_1	*BHAR_3*	*BHAR_6*	*BHAR_12*	*CAR_1*	*BHAR_3*	*BHAR_6*	*BHAR_12*
Diversified_Firm	0.013	-0.090**	-0.113*	-0.227***				
	(0.025)	*(0.036)*	*(0.058)*	*(0.077)*				
Excess_Value					0.010	0.017	0.054***	0.063*
					(0.010)	*(0.011)*	*(0.021)*	*(0.033)*
ROA	-0.010	-0.085*	-0.089	-0.165	0.195	-0.038	-0.260	-1.134**
	(0.022)	*(0.049)*	*(0.070)*	*(0.123)*	*(0.175)*	*(0.171)*	*(0.301)*	*(0.481)*
Size	0.035***	-0.043***	-0.063***	-0.071***	0.039***	-0.033***	-0.038***	-0.015

[4] Results are similar when we use *BHAR_1*.

[5] Alternatively, we use *Number_Segments* count variable, *Entropy* and *Herfindahl* measures, which use both number of segments and segment sales. The impact of these measures is more statistically significant.

	(0.007)	*(0.010)*	*(0.016)*	*(0.019)*	*(0.009)*	*(0.010)*	*(0.014)*	*(0.017)*
Liquidity	0.196	0.240	0.050	0.402	-0.115	0.237	0.380	0.256
	(0.126)	*(0.213)*	*(0.347)*	*(0.347)*	*(0.179)*	*(0.183)*	*(0.329)*	*(0.472)*
Leverage	-0.103	0.060	-0.116	-0.366*	0.047	-0.162	-0.309	-0.550**
	(0.068)	*(0.122)*	*(0.182)*	*(0.192)*	*(0.095)*	*(0.117)*	*(0.219)*	*(0.264)*
Constant	-0.685***	0.607***	1.094***	2.669***	-1.099***	0.619**	0.560	0.958*
	(0.142)	*(0.215)*	*(0.293)*	*(0.552)*	*(0.220)*	*(0.280)*	*(0.401)*	*(0.508)*
Observations	803	803	803	803	365	365	365	365
R-squared	0.051	0.094	0.061	0.108	0.112	0.115	0.133	0.130

Note: Industry dummies using Fama-French_12 groups are included but not reported. Robust standard errors are in parentheses. *, ** and *** denote statistical significance at 10%, 5% and 1%, respectively.

Survival analysis

We next use survival or time-to-event analysis. The event of interest is a 35% decrease in stock prices during the market crash and recovery of stock prices from the lowest point during the crash to the levels immediately preceding it, 21 February 2020[6]. We use the non-parametric Kaplan-Meier estimator to obtain cumulative probabilities of survival, or not experiencing the event, at a particular point in time, while considering time in daily intervals:

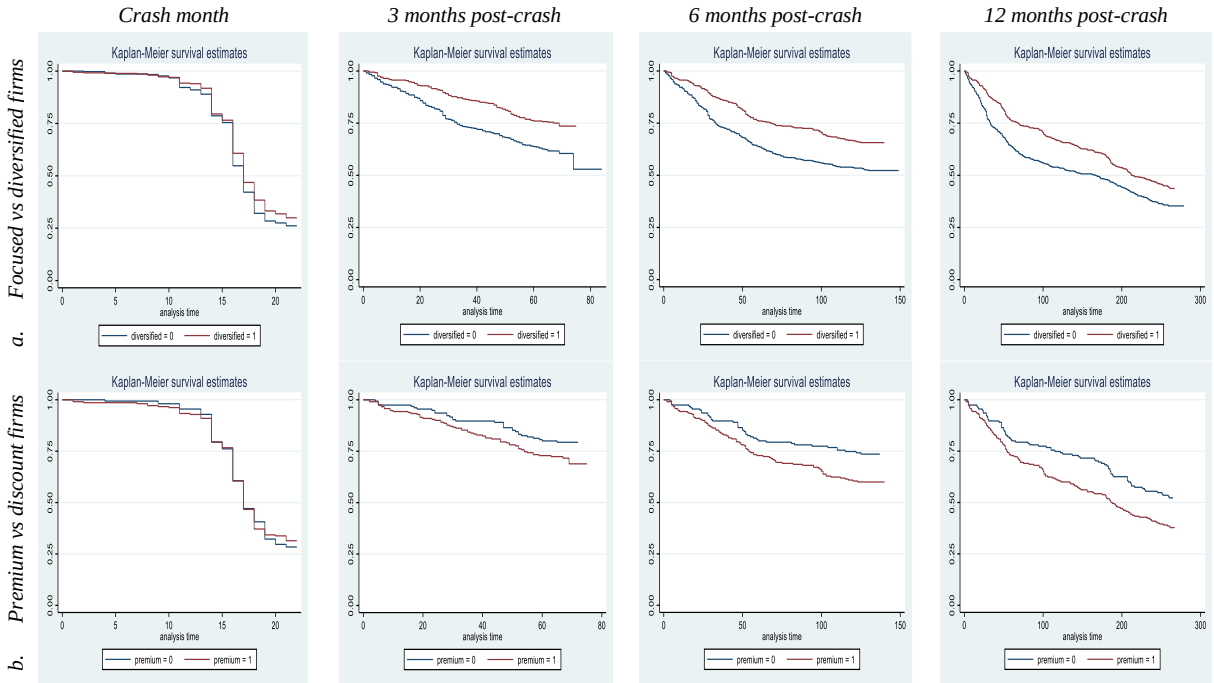
$$S_{t_i} = \prod \frac{n_i - d_i}{n_i}$$

Where n_i is the number of firms at the risk of event happening and d_i is the number of firms which experience the event at time t_i. Figure 1 provides Kaplan-Meier survival estimates of focused *vs* diversified firms and diversified firms trading at premium *vs* discount. Diversified firms are associated with higher and those that trade at premium with lower survival rates. Surviving means not experiencing the event, i.e. stocks not crashing by 35% during the crash month and not recovering to pre-crash level 3, 6, and 12 months after the crash. The difference between survival functions is only statistically significant for post-crash period using the log-rank test for equality of survivor functions. This means it will take diversified firms more time

[6] FTSE All Share index fell by 34% during the crash. We also use 25% and 50% as alternative thresholds both during and a year after the crash. Results remain similar.

to reach pre-crash stock prices after the crash than focused firms. However, diversified firms trading at premium will recover in stock prices faster than those trading at discount.

Figure 1. Non-parametric estimation of survival functions



Note: This figure presents the results of log-rank tests for equality of survival functions for diversified *vs* focused firms in section A and for diversified firms trading at premium *vs* discount in section B. ***, **, * denote statistical significance at 10, 5 and 1%, respectively.

Since different factors could affect survival rates, we also apply Cox (1972) semiparametric hazards model. If T is a random variable representing the time to event, the hazard rate $\lambda(t)$ represents the instantaneous rate of decrease/increase in stock prices at time t given the event does not take place up to that point:

$$\lambda(t) = \lim_{\Delta t \to 0} \frac{pr(t \leq T < t + \Delta t \mid t \leq T)}{\Delta t}$$

Dividing the conditional probability of the event happening within the interval by the interval's width, and taking the limit as the width moves to zero, we obtain the instantaneous rate or the probability of the event happening. The Cox model allows including explanatory variables with the hazard rate defined as:

$$\lambda(t|x_i) = \lambda_0(t) \exp(x_i \beta_x)$$

Where x_i are explanatory variables, $\lambda_0(t)$ is a baseline hazard function, β are regression coefficients. The model is semiparametric in that the impact of variables is parametrised and no assumption is made about the distribution of time. Thus, the baseline hazard function is unestimated.

Table 2 presents the results of Cox model estimations. We report the hazard ratios instead of regression coefficients. Hazard rates for diversified firms are 14.3% lower (1-0.857) during the crash, i.e. stock prices are less likely to decrease during the crash, and 22.6% lower (1-0.774) six months after the crash, e.g. stock prices are less likely to recover to pre-crash levels during the six months post-crash. However, diversified firms with higher excess value are more likely to recover their stock prices with hazard rates being 10.2% higher (1.102-1).

Table 2. Cox semiparametric hazards model estimations

	Crash_ month	*3_months post-crash*	*6_months post-crash*	*12_months post-crash*	*Crash_ month*	*3_months post-crash*	*6_months post-crash*	*12_months post-crash*
Diversified_Firm	0.857*	0.748**	0.774**	0.867				
	(0.075)	*(0.101)*	*(0.091)*	*(0.083)*				
Excess_Value					1.131***	1.071	1.088	1.102**
					(0.050)	*(0.072)*	*(0.064)*	*(0.051)*
ROA	1.023	0.919	0.902*	0.879***	1.021	1.720	1.277	1.459
	(0.077)	*(0.052)*	*(0.048)*	*(0.044)*	*(0.031)*	*(1.338)*	*(0.852)*	*(0.811)*
Size	1.028	0.865***	0.877***	0.909**	0.473*	0.900*	0.917*	.929**
	(0.021)	*(0.030)*	*(0.027)*	*(0.022)*	*(0.211)*	*(0.051)*	*(0.044)*	*(0.034)*
Liquidity	0.861	3.112***	3.024***	3.254***	1.139	1.195	2.287	3.441*
	(0.267)	*(1.210)*	*(1.086)*	*(1.042)*	*(0.734)*	*(1.138)*	*(1.835)*	*(2.250)*
Leverage	0.748	1.041	1.043	0.821	0.689	0.727	0.957	0.714
	(0.176)	*(0.358)*	*(0.326)*	*(0.227)*	*(0.294)*	*(0.504)*	*(0.560)*	*(0.335)*
Observations	803	803	803	803	365	365	365	365
Failures	579	261	334	488	255	92	125	204
χ^2	30.94**	122.35***	138.43***	144.29***	24.72*	30.90**	45.42***	62.74***

Note: Industry dummies using Fama-French_12 groups are included but not reported. Robust standard errors are in parentheses. *, ** and *** denote statistical significance at 10%, 5% and 1%, respectively.

Conclusion

We present the first evidence on the performance of diversified firms in the year after the Covid-19 stock market crash. Our findings suggest that diversified firms experience worse returns and slower improvement in stock prices than focused firms consistent with agency and asymmetric information problems. However, we find that diversified firms trading at premium experience better returns and faster stock price recovery. This suggests that diversified firms with efficient allocation of resources in internal capital markets weather the crisis better. As the uncertainty continues with the crisis evolving, it is possible that these relationships change in the longer perspective. Therefore, future work might focus on both longer-term market and accounting performance of diversified firms after the crisis. It would also be interesting to examine if there are any changes in the segments reported by diversified firms and excess value resulting from the impact of the Covid-19 crisis.

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