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The Impact of Covid-19 on the Cash Flow of Food and Beverage Industry

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A B S T R A C T

Purpose: The food and beverage industry is one of the industries that has its own specific products in the manufacturing industry, and it is indispensable for a developing economy. Therefore, research on the impact of Covid-19 on the movement of cash flows in food and beverage companies is necessary to better understand the status of manufacturing enterprises.
Design/methodology/approach: To examine the impacts of Covid-19 on cash flow of food and beverage companies, the researchers used financial data from the Fiin Pro database of 33 Vietnamese food and beverage companies over 6 years from 2017 to 2022. The study used the regression model analysis data regression analysis with the Feasible generalized least squares (FGLS) method by using the multi-regression model developed by the previous studies.
Findings: To examine the impacts of Covid-19 on cash flow of food and beverage companies, the researchers used financial data from the Fiin Pro database of 33 Vietnamese food and beverage companies over 6 years from 2017 to 2022. The study used the regression model analysis data regression analysis with the Feasible generalized least squares (FGLS) method by using the multi-regression model developed by the previous studies.
Research limitations/implications: Firstly, the study only utilizes model adjustment through FGLS but does not address the endogeneity phenomenon. Secondly, the study only focuses on developing countries without comparison to developed countries. Therefore, the authors propose some implications for future research. Firstly, studies could continue to expand on examining the endogeneity phenomenon. Secondly, research could broaden its scope to include other developing countries for a deeper comparison.
Originality/value: The research will help food and beverage industry enterprises predict cash flow within the company when a crisis like COVID-19 occurs. This will assist enterprises in better preparing for business operations and enhancing competitive capabilities during crisis periods.

Keywords: COVID-19, Cash flow, Food and beverage, FGLS

I. Introduction

The global impact of the Covid-19 pandemic on

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economies and industries, including the food and beverage sector, has been profound and multi-faceted (Amore et al., 2022; Dananti et al., 2022; Ding et al., 2021; Oh & Yi, 2023). With challenges ranging from supply chain disruptions to decreased consumer demand, government-imposed restrictions, and shifting consumer behaviors, this sector has encountered significant hurdles (Deaton & Deaton, 2020; Moon & Ji, 2023). For food and beverage companies, cash flow is vital—it signifies the flow of money in and out of the business, encompassing revenue from sales, expenses, investments, and financing activities. Effective cash flow management is paramount for sustaining financial well-being and operational continuity (Chowdhury et al., 2022). Throughout the pandemic, the cash flow dynamics of companies in this industry have been severely affected (Goldstein et al. 2021). Restaurants and cafes, for instance, grappled with limitations on dine-in services, resulting in plummeting sales revenues. Disruptions in the supply chain led to challenges in sourcing raw materials and ingredients, impacting production processes and inventory management (Adi & Daryanto, 2021). Moreover, adapting to evolving consumer behaviors and preferences necessitated strategic adjustments in marketing strategies and product offerings, potentially influencing cash flow patterns. Overall, navigating the complexities of cash flow management amid the Covid-19 pandemic has presented formidable obstacles for food and beverage companies, compelling them to innovate and adapt to ensure their resilience and sustainability in a rapidly changing landscape.

Cash flow serves as a vital indicator of a company's financial vitality, encompassing the movement of cash within its operations, investments, and financing activities (Chowdhury et al., 2022; Hamid et al., 2023). Its significance lies in its ability to sustain operational activities by facilitating the payment of suppliers, employees, and other obligations (Aggarwal & Padhan, 2017). Moreover, it provides crucial insights for strategic decision-making, guiding the allocation of funds towards growth initiatives and ensuring timely debt repayments and shareholder dividends. Effective cash flow management not only fosters financial resilience but also enhances stakeholder confidence and trust. In times of economic uncertainty or disruptions, maintaining a positive cash flow becomes imperative for ensuring business continuity and stability (Muzata & Marozva, 2023). Hence, understanding and managing cash flow are essential for achieving long-term profitability and sustainability in today's dynamic business environment. This research article delves into the importance of cash flow analysis and management strategies, highlighting its critical role in driving business success and resilience in Covid-19 context.

Several studies have assessed the impact of Covid-19 on cash flow in companies (Amore et al., 2022; Ding et al., 2021; Drissi & Lamzaouek, 2022; Vo et al., 2022; Song et al., 2021. Some studies suggest that Covid-19 will decrease cash flow in companies (Drissi & Lamzaouek, 2022). However, other studies indicate a positive impact of Covid-19 on cash flow (Ding et al., 2021; Song et al., 2021). In Vietnam, particularly in the food and beverage industry, there is currently no research on Covid-19 and cash flow. Therefore, this study aims to assess the impact of Covid-19 on operating cash flow, investment cash flow, and cash flow from financing.

II. Literature Review

A. Definitions and Role of Cash Flows

The cash flow, according to (Karas & Reznakova, 2020) is a type of cash index that an enterprise receives and pays out in a certain period. It is considered as a tool which reflects all of company operations clearly. Besides, Wingerard et al (2013) also have the same idea about cash flow with Karas & Reznakoya, the cash flow is the amount of money that a company can get money from customers and amount of cash used in a financial period. Regarding the second group of points, some scientists have explained definitions of cash flow through considering the process of frequent movement of cash flow in

and out. According to (Cooke & Jepson, 1979), cash flow is described as the actual movement of money in and out of a business. Positive cash flow indicates that money is flowing into a business while negative cash flow shows money paid out. And the difference between the positive and negative cash flow is called the net cash flow. As there are different views of cash flow means, cash flow as described by (Cooke & Jepson, 1979) has been conceptualized in this study: "Cash flow of an enterprise is defined as the movement of cash and cash equivalents, inflow as well as outflow of cash from business, it is a clear reflection of how an enterprise receives and pays out through the signs of the cash flows".

B. Types of Cash Flow

1. Cash flow from operating

Cash flow from operating activities is determined as associated with primary business activities and source of revenue for an enterprise. Operating cash flow is considered as an essential indicator to evaluate the fiscal financial health of a business, which is an important tool for evaluating the ability to make earnings to cover its debt, maintain operating activities, payout dividend and conduct new investments with no needed external financing (Nguyen, 2022). Regarding operating cash flow components, according to Livnat & Zarowin, (1990), and (Weygandt et al., 2019), which are described in more detail as follows.

There are two approaches to report operating cash flow, as following (Weygandt et al., 2019). Direct method: Collecting information directly from transactions arising and reporting inflows and outflows in that financial period. Indirect method: This method is converted from balance sheet and income statement, and indirect method is only used for defining cash flow from operating of business. The formular that is used as follow:

The indirect method is popular in many countries in the world as when defining operating cash flow under indirect method, enterprises would understand the relationship among financial statements and reduce identified cash flow cost. However, through analyzing operating cash flow, which is reported under direct method, operating cash flow is likely a better criterion to measure the company's net profit than net profit, because enterprise can repay debt while reporting gain or loss net profit. The difference between net profit and operating cash flow is a tool to help enterprises to assess the quality of their profit. Detail in Table 1.

Table 1. Clarifications of cash flows from operating

Inflows	Outflows
Cash collections from sales Cash receivables from interest and dividends Other receivables operating cash flows	Cash payments to suppliers for inventory Wages to employees Cash payments to tax authority Cash payments to lenders for interest Other payments operating cash flows

2. Cash flow from investing

Cash flow from investing is the type of cash flow associated with activities of acquiring and disposing of investments, property, plant, and equipment, or even lending and collecting loans (Weygandt et al., 2019).

Inflows and outflows for investing cash flow can be more information as following in Table 2.

3. Cash flows from financing

Cash flow from financing includes receiving cash from issuing debt (short-term and long-term) and repaying the amount borrowed, and raising capital from shareholders, repurchasing shares, and paying

Table 2. Clarifications of cash flow from investing

Inflows	Outflows
Sales of fixed asset such as property, plant, and equipment Sale of investments in other entities such as debt, or equity securities	Purchase property, plant, and equipment Investing by purchasing debt or equity securities of other entities Make loans to other organizations.

dividends for shareholders (Weygandt et al., 2019). In general, cash flow from financing is related to activities of restructuring capital.

Some activities would be listed in statement of cash flow from financing. This is the way to classify based on each group of business activities to show the relationship among 3 groups of cash flow from operating, investing, and financing. Detail in Table 3.

Table 3. Clarifications of cash flow from financing

Inflows	Outflows
Cash receivables from sale of ordinary shares	Paying dividends to shareholders
Cash from issuing debt (bonds and notes)	Redeem ordinary share (treasury shares)
Cash receivables from capital contributed by the owner	Repaying debt, or bond payments

C. Signaling Theory

Signaling theory (Spence, 1978) proposes to explain the behavior of two different parties in terms of the ability to receive and communicate information (Connelly et al., 2011). In commercials, signaling indicates that the actions are taken by a seller to affect behavior and decision of a buyer (Mavlanova et al., 2016) Moreover, one party as an information provider (financial report provider) has to choose whether to provide or not provide and how to transmit (or signal) that information (Connelly et al., 2011). On the other hand, the other party, those receiving information from the report can be shareholders, investors, and stakeholders, choose to interpret the signals they receive. In research of Tangngisalu et al., (2022) they argued that the information received by the firm's management and relevant parties is information asymmetrical. Therefore, interested parties need to be provided financial statements by the business's management and sometimes, this signal can become a form of promotion or better information to attract investors (Tangngisalu et al., 2022). The core of signaling theory indicates the reading and analysis of information and understanding in each applied - situation (Spence, 2002). Thus, signal strategy means the actions that signal generators take performance to influence the decisions of investors and stakeholders. However, these disclosures may have a positive or negative impact on users, including shareholders and investors, depending on whether they carry a positive or negative signal (Connelly et al., 2010). Reading comprehension theory and related empirical results also show that reading ability also affects readers' perceptions and decisions (Kintsch & Dijk, (1978); Rennekamp, (2012); Shah & Oppenheimer, (1930). If the information in the report is easily read and understood by the recipient, it can be seen as a useful positive signal for the reader's decision-making (Connelly et al., 2011). Complex information requires a more conscious effort from investors and other stakeholders. This weakens the receiver's understanding and ability to judge a company's prospects based on the information and thus may reduce that company's decision-making ability.

III. Method

A. Research model

To measure and assess the effectiveness of cash flow management of the business, the author uses the cash flows to total assets ratio.

From above defined research variables, the authors have built the regression model based on the previous regression model of Aggarwal & Padhan (2017). The variables are presented in Table 4.

$$CFit = \beta 0 + \beta 1COVDEADit + \beta 2LEVit + \beta 3LIDit + \beta 4ROAit + \beta 5ZSit + \varepsilon it$$

Where: i is the enterprise i, and t is the year t

CF: Cash flow, is defined by three alternative proxies for cash flow (CFO to Total Assets ratio, CFI to Total Assets ratio and CFF to Total Assets ratio)

COVDEAD: Natural logarithmic of number of confirmed deaths each year (the authors got the number of confirmed deaths due to Covid-19 from Our World in Data Covid-19 dataset.

ZS: Manufacturing Z-Score is calculated using data in its model for the fiscal period. The Z-score is a multivariate formula that measures the financial health of a company and predicts the probability of bankruptcy within two years. The Z-score combines five common business ratios using a weighting system calculated by Altman to determine the likelihood of bankruptcy. The authors got the Z-score data available from Fiin Pro database.

Dependent Variable:

The dependent variable will be the financial performance of firms in the food and beverage industry, specifically focusing on cash flows. Cash flow measures such as operating cash flow, investing cash flow, and financing cash flow will be considered as dependent variables. In this study, author

Independent Variables:

The independent variable will be the Covid-19 pandemic, represented by relevant indicators such as the number of Covid-19 death cases, government-imposed restrictions, and changes in consumer behavior. Other control variables can include profitability, leverage, liquidity, and industry-specific factors.

B. Data Collection

The data will be collected from multiple sources, including government reports, industry associations, financial databases, and publicly available company reports. The data should cover a specific period before and during the Covid-19 pandemic, ensuring a comprehensive analysis of the impact. The author selects a research sample consisting of companies in the food and beverage industry listed on HOSE and HNX. Selected companies in the simple fully required information for the research. The author chooses a period study from 2017 to year 2022. Thus, the sample includes 33 food and beverage manufacturing enterprises within 6 years, a total of 198 observations.

C. Data Analysis

The regression models will be estimated using appropriate statistical software STATA 14. The statistical significance and coefficients of the independent variables will be assessed to determine the impact of the Covid-19 pandemic on firm cash flows in the food and beverage industry.

Table 4. Description of all variables

Variables	Symbols	Concepts	Prior studies	Expected sign
Cash flows from Operating	CFO	Cash flows from Operating activities / Total Assets	Shaharuddin et al., (2021) Azhar Farooq & Ahmed Sheikh, (2021)	
Cash flows from Investing	CFI	Cash flows from Investing activities / Total Assets	Calculated according to CFO	
Cash flows from Financing	CFF	Cash flows from Financing activities / Total Assets	Calculated according to CFO	
Covid-19	COV	Natural logarithm of deaths recorded	Bollyky et al., (2023)	-
Leverage	LEV	Debt to Equity ratio	Shaharuddin et al., (2021)	+
Liquidity	LID	Current Assets / Current Liabilities	Dirman, (2020)	+
Return on Assets	ROA	Profit after tax/ Total Asset	Shaharuddin et al., (2021)	+
Z-Score	ZS	Z-Score is defined by using data in its model for the fiscal period.	Huang et al., (2022); Almamy et al., (2016)	+

Source: Author's compilation

Descriptive statistics will be used to summarize the key variables and provide an overview of the data. Measures such as mean, median, standard deviation, and distribution plots will be utilized to understand the characteristics and trends in the data.

For economic research, panel-data have a serious advantage over cross-section and time-series data. The benefits of panel-data are exalting time-variant correlations between independent and dependent variables, which solves multi-collinearity, estimate biases, and heterogeneity issues (Baltagi, 2008). Therefore, before importing the data into STATA 14, the researcher collected it as an Excel file, and transferred it into panel data by using STATA 14.

The study sample includes 33 listed food and beverage firms. All steps are performed to assess the data as follows: (1) We used descriptive statistics analysis to understand the data property; (2) we implemented a table of Pearson correlation; and (3) we performed a test run for regression model analysis. By an application of some theoretical tests such as F-test, Breuch-Pagan Lagrange multiplier test and Hausman test to identify the best-suit model among Ordinary least square model (OLS), Fixed effect model (FEM) and Random effect model (REM). Specifically, F-test inspection is applied to determine better model between FEM and OLS, the Breuch-Pagan LM test which chooses more suitable model between OLS and REM (Pareek et al., 2023) and Hausman (1978) suggested that his Hausman test can be used to select which is better for investigation, comparing FEM and REM. Moreover, after determining the best-fit model, we evaluate the research model flaws, autocorrelation is assessed with Wooldridge test (2010), and heteroscedastic testing by applying White test. Finally, we conducted a test run again for the best model after removing flaws.

Sensitivity analyses and robustness checks will be conducted to ensure the robustness of the findings. This can include alternative model specifications, different control variables, or sub-sample analyses to validate the results.

IV. Results

A. Descriptive Statistic

With a representative sample of 198 observations from 33 Vietnamese food and beverage firms in HOSE, HNX over 6 years from 2017 to 2022, from Fiin Pro database the summary of descriptive statistics will be conducted in two stages, including before and during COVID-19. The detail in tables 5, 6.

Overview, all three cash flows have both negative and positive value. The table demonstrates the significant changes in value of CFO, before Covid-19 the lowest value was -0.227, and when Covid-19 occurred, the lowest value was reduced to -0.666. The minimum negative value of CFO declines about 3 times, indicating that F&B firms cannot cover their expenses from sales alone during Covid-19. While the highest value of CFO increased by nearly 2 times, indicating that a lot of food and beverage can gain

Table 5. Summary of descriptive statistics of variables before Covid-19

Variable	Mean	SD	Min	Max
CFO	0.086	0.131	-0.227	0.456
CFI	-0.054	0.126	-0.455	0.599
CFF	-0.036	0.154	-0.797	0.436
LEV	0.247	0.196	0.000	0.618
LID	0.022	1.337	-2.830	11.649
ROA	0.092	0.087	-0.189	0.321
ZS	3.937	3.233	0.315	16.726

Table 6. Summary of descriptive statistics of all variables during Covid-19

Variable	Mean	SD	Min	Max
CFO	0.066	0.176	-0.667	0.815
CFI	-0.034	0.106	-0.324	0.667
CFF	-0.024	0.146	-0.749	0.498
COV	7.742	3.010	3.555	10.385
LEV	0.229	0.193	0.000	0.733
LID	-0.018	1.548	-11.539	8.220
ROA	0.071	0.075	-0.267	0.241
ZS	3.730	2.413	-1.063	12.496

benefits from Covid-19 because of their essential goods.

The highest CFI value increased from before Covid-19 to during Covid-19, from 0.599 to 0.66 respectively, showing that they are selling more assets or securities to recoup the big drop in cash inflow in CFO. The CFF does not have too much change. The table shows the all-means value of firm's specific variables declined after occurring Covid-19, in which LID (current ratio) has changed from positive to negative value during Covid-19, demonstrating that Vietnamese food and beverage firms are carrying too much debt, cash balance is running out or not well controlled in account receivables. Regarding Z-score, Vietnamese food and beverage companies are considered in safe-zone because the Z-score value is in the range from 3 to 4.

B. Regression for OLS, FEM, REM

As mentioned in the previous part, the FEM model is accepted to become the optimal model for results associated with CFO and CFF, while OLS is the best-suit model for CFI regression. However, the authors still compile the results of three approaches for each alternative proxy of Cash flow.

Table 7 is the summary of regression results for OLS, FEM and REM associated with Cash flow from Operating of 33 Vietnamese food and beverage enterprises with 198 observations. Results following both three approaches show that there is a negative correlation between Covid-19 and CFO, with significance levels in the range from 10% to 1%. However, the coefficient value of Covid-19 (-0.006) in the FEM model is assessed to be the smallest value compared to other independent variables.

Regarding other independent variables, all variables have a strong influence on CFO, except for the variable named Z-scope, although Z-score has a negative effect on CFO, it is not significant. However, the best-fit method which we choose for this regression model related to CFO is FEM. There are only two independent variables, liquidity, and leverage, that have strong negative impacts on CFO with significance level of 1%, while ROA is out of expectation, it has no significant relationship with CFO. The indicator R-squared of the model is 0.235, indicating that the model with all these variables can explain 23.56% for dependent variable-CFO.

In conclusion, all independent variables have a negative impact on CFO, however there are only three independent variables, consisting of COVDEAD, LEV and LID, which have statistically significant levels less than 1%.

Table 8 is the summary of regression results for OLS, FEM and REM associated with Cash flow from Investing with 198 observations from 33 listed food and beverage companies in Vietnam. Results following both three methods show that there is a positive correlation between Covid-19 and CFI, but not significant and the coefficient value of Covid-19 (0.002) of OLS model, the best suit model for this regression, is assessed to be the smallest value compared to other independent variables.

Regarding other independent variables, all variables have a strong influence on CFI, except for the variable named Z-scope. In the results of OLS related to CFI,

Table 7. Regression results for OLS, FEM, REM model of CFO

CFO	OLS	FEM	REM
COV	-0.004* [-1.86]	-0.006*** [-2.90]	-0.004* [-1.86]
LEV	-0.2269*** [-3.82]	-0.7093*** [-5.87]	-0.226*** [-3.82]
LID	-0.0201*** [-3.00]	-0.02*** [-3.19]	-0.020** [-3.00]
ROA	0.489*** [-0.02]	-0.132 [-0.52]	0.489*** [2.86]
ZS	-0.0001 [3.59]	-0.008 [-0.82]	-0.0001 [-0.02]
_cons	0.106	0.311	0.106
N	198	198	198
R-sq	0.247	0.235	0.135
Autocorrelation test		0.197	
Heteroscedasticity test		0.000	

Note(s): The numbers in parentheses are standard errors. *, **, *** indicate significance levels at 10%, 5%, 1%

Table 8. Regression results for OLS, FEM, REM model of CFI

CFI	OLS	FEM	REM
COV	0.002 [1.20]	0.001 [1.00]	0.002 [1.20]
LEV	-0.100*** [-2.24]	-0.169* [-1.72]	-0.10*** [-2.24]
LID	0.030*** [5.90]	0.030*** [5.51]	0.030*** [5.90]
ROA	-0.479*** [-3.71]	-0.516*** [-2.52]	-0.48*** [-3.71]
ZS	0.002 [0.63]	-0.001 [-0.14]	0.002 [0.63]
_Cons	0.001	0.035	0.001
N	198	198	198
R-sq	0.239	0.224	0.221
Autocorrelation test		0.7717	
Heteroscedasticity test		0.000	

Note(s): The numbers in parentheses are standard errors. *, **, *** indicate significance levels at 10%, 5%, 1%

Table 9. Regression results for OLS, FEM, REM model of CFF

CFF	OLS	FEM	REM
COVID-19	0.003 [1.57]	0.005*** [2.78]	0.003 [1.57]
LEV	0.296*** [4.93]	0.825*** [6.90]	0.296*** [4.93]
LID	-0.008 [-1.26]	-0.009 [-1.39]	-0.008 [-1.26]
ROA	0.135 [0.78]	0.747*** [2.99]	0.135 [0.433]
ZS	-0.002 [-0.54]	0.013 [1.34]	-0.002 [0.587]
_Cons	-0.113	-0.360	-0.113
N	198	198	198
R-sq	0.1693	0.2673	0.1833
Autocorrelation test		0.0097	
Heteroscedasticity test		0.000	

Note(s): The numbers in parentheses are standard errors. *, **, *** indicate significance levels at 10%, 5%, 1%

three independent variables, including leverage, liquidity, and ROA, demonstrated a clear relationship with CFI. In details, both three ones have significance level less than 1%, leverage and ROA negatively affect CFI and liquidity affects positively CFI,

The indicator R-squared of the model is 0.2391, indicating that the model with all these variables can explain 23.91% for dependent variable-CFI.

In conclusion, for the OLS model, the variable of Covid-19 has a positive relation with CFI but is not significant. However, three variables are LEV, LID, ROA, which have statistically significant levels less than 1% with CFI.

Table 9 is the summary of regression results for OLS, FEM and REM associated with Cash flow from Financing of 33 listed food and beverage companies in Vietnam with 198 observations. Three models show a positive correlation between Covid-19 and CFI, especially only the accepted method-FEM model-has the significant level of Covid-19 on CFF at 1%. However, the coefficient of Covid-19 equals 0.0059 and is still evaluated to be much smaller than other independent variables. The remaining variables including liquidity and Z-score have negative and positive effects on CFF, respectively, but are not significant.

The indicator R-squared of the model is 0.2637, indicating that the model with all these variables can explain 26.37% for dependent variable-CFF.

In conclusion, for the FEM model, the variable of COVD-19 has a positive relation with CFF with a significant level at 1%. However, there are only two other independent variables out of 4 that have 1% statistically significant impact on CFF.

C. Regression for FGLS

The previous part showed that there are many flaws in OLS, FEM, REM results, consisting of autocorrelation and heteroscedasticity. Therefore, the research applied the feasible generalized least squares (FGLS) approach to overcome the defects of the model.

Table 10 demonstrates the regression results for CFO by using the FGLS method. There are few changes in the regression results. In general, Covid-19 is still having negative effects on CFO with the

significance level at 1%. Regarding other independent variables, ROA has become a statistical-variable, and has positive relation with CFO at statistically significant at the 1% level, this result completely consistent with the findings of Shaharuddin et al. (2021). Leverage has a negative effect on CFO at the significance level of 1%, this outcome is opposite with Shenoy & Kock (1996). LID is found to have negative impacts on CFO, but statistical significance is too weak, this statement is not consistent with Tangngisalu et al. (2022). The final variable, ZS has a result that matches with Huang et al. (2022), positive relation, but its statistical significance is too weak.

The results of rest variables, consisting of LID and ZS, are not consistent with previous studies of Tangngisalu et al. (2022) and there is only ZS have positive effect on CFO; however, both two variables of LID and ZS are not statistically significant.

Table 11 demonstrates the regression results for CFI by using the FGLS method. There are few benefit mutations in the regression results. In detail, the appearance of Covid-19 positively impacted on the CFI at 1% statistically significant. Regarding other independent variables, LID and ROA still have significant impacts on CFI.

Table 12 shows the regression results for CFF by using the FGLS method. There are few significant mutations in the regression results of this model.

Table 10. Regression results with FGLS method for CFO alternative proxy

CFO	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
COV	-0.0040468	0.0009671	-4.18	0.000	-0.0059424	-0.0021513
LEV	-0.1542154	0.0323383	-4.77	0.000	-0.2175973	-0.0908334
LID	-0.0020867	0.0074574	-0.28	0.780	-0.016703	0.0125295
ROA	0.5862292	0.0901988	6.50	0.000	0.4094428	0.7630157
ZS	0.0001419	0.0014952	0.09	0.924	-0.0027888	0.0030725
_cons	0.0804445	0.0172491	4.66	0.000	0.046637	0.1142521

Table 11. Regression results with FGLS method for CFI alternative proxy

CFI	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
COV	0.0027625	0.0009207	3.00	0.003	0.000958	0.004567
LEV	-0.0516603	0.0294412	-1.75	0.079	-0.109364	0.0060434
LID	0.0252054	0.0064444	3.91	0.000	0.0125746	0.0378362
ROA	-0.3705834	0.0759737	-4.88	0.000	-0.5194891	-0.2216777
ZS	0.0027877	0.0023377	1.19	0.233	-0.0017941	0.0073696
_cons	-0.0253894	0.0143966	-1.76	0.078	-0.0536062	0.0028274

Table 12. Regression results with FGLS method for CFF alternative proxy

CFF	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
COV	0.0022738	0.0012302	1.85	0.065	-0.0001373	0.0046849
LEV	0.2493423	0.0451356	5.52	0.000	0.1608781	0.3378065
LID	-0.0040574	0.004386	-0.93	0.355	-0.0126539	0.004539
ROA	-0.0553222	0.110246	-0.50	0.616	-0.2714005	0.160756
ZS	-0.0038013	0.0024578	-1.55	0.122	-0.0086185	0.0010159
_cons	-0.0686017	0.0210155	-3.26	0.001	-0.1097914	-0.027412

Overall, the appearance of Covid-19 still positively impacted on the CFF, however, the level of significance changed from 1% to 10%. Moreover, there is only one variable of LEV that has statistical meaning with CFF.

D. Discussion

1. Regarding cash flow from operating (CFO)

According to the regression results under the FGLS methods, the emergence of Covid-19 pandemic has negative impacts on the CFO of Vietnamese food and beverage companies. This result is completely consistent with the previous findings of Vo and Tran (2021), and is might be explained by some of following reasons:

Firstly, the appearance of Covid-19 has changed the consumers' shopping habits. When the pandemic appears, people tend to pay more attention to healthy foods, which provide many nutrients and resistance to their health. In addition, due to the impact of the Covid-19 pandemic, many industries were forced to temporarily close their operations. Many employees have already been laid off or furloughed because their companies did not have enough money to cover wages expenses. Consumers' incomes have also been drastically reduced, so consumers tend to cut spending on unnecessary and unhealthy foods, such as fast food, wine, and beer. In addition, the trend of cooking at home is also responding to save money and meet the needs of delicious- nutritious-cheap. Therefore, the shopping behavior transformation caused the significant decrease in revenue from operating activities of food and beverage firms.

Secondly, social distancing disrupted supply and demand in the market. The most important cash inflows of food and beverage companies in the domestic market come from distributing goods to restaurants and retail channels. However, implementing social distancing, all people responded by staying at home and limiting going out without necessity, leading to the general situation of empty restaurants. In fact, there were periods with the peak of disease, restaurants and retail stores were closed temporarily to avoid gatherings, hence, they tended to reduce their input purchasing. Thus, the decline in market demand made the cash flow from operating food and beverage companies also drop.

Finally, food and beverage firms cannot be manufactured because of a lack of input raw materials. During covid-19 pandemic, the government has taken some important precautions to prevent the spread of the disease. Unfortunately, those precautions also directly conflicted with business operations, in detail, it caused difficulties for producers to meet consumers' demand. Moreover, the transportation being shut down led to limited freedom of movement, meaning that farmers could not sell their products to manufacturing enterprises and workers could not get to work and exporters could not make their shipments. All this led to significant delays in both production, shipping, and delivery. Moreover, the social distancing due to Covid-19 pandemic led to difficulty in supply chain and transportation, which caused the export of food and beverage manufacturing industry to fluctuate strongly, especially the seafood industry, the price of most types of seafood have decreased. This has resulted in a massive reduction in their cash inflows from operating.

2. Regarding cash flow from investing (CFI)

Although the regression results of OLS, FEM and REM models for CFI are not statistically significant, FGLS methods have given a positive relation between Covid-19 and CFI at the significance level of 1%. This result is completely consistent with the previous findings of Drissi and Lamzaouek (2022). Before, this study has mentioned the signaling theory, which means that when the market has too many risks, falls into an economic recession, it will give a signal for business parties to consider suspending investment. However, in fact, based on the finding of this research, enterprises have tended to invest more, it may be reasonable because of the following points:

Firstly, Vietnamese food and beverage companies benefit from Covid-19 by restructuring. Before Covid-19, food companies had two types of markets for production and consumption, during the covid period, due to difficulty in import and export problems, many companies have realized development potential in the domestic market with a population of 97 million people, of which up to 60% are young people, the average expenditure is forecasted increase by 10% per household per year. Therefore, many food and beverage companies tend to invest more in machinery and equipment to change their business model, designs of their products and even publish new line products to reach the domestic customer market, in accordance with the epidemic period.

Secondly, food and beverage companies tended to focus on financial investing. During the epidemic period, many food and beverage manufacturing enterprises could not produce due to lack of input materials, workers could not go to work due to social distancing, leading to a significant decrease in revenue from operating activity. Therefore, manufacturing companies have tended to look for another source of extra income such as investing in financial instruments or the most common way of investing during a recession is merger and acquisition.

3. Regarding cash flow from financing (CFF)

From regression results, although the results were not statistically significant, Covid-19 impacted positively on CFF. This result is completely consistent with the previous findings of Vo and Tran (2021). In general, this relation is also understood in a fairly simple way. Because financing cash flow depends on cash flow from operating activities and cash flow from investing activities, therefore, when the cash flow from operating activities is not strong enough to cover while, the business wants to use money for investing activities. Hence, enterprises are forced to increase financing cash flow by selling off fixed assets such as real estate, borrowing or issuing shares to balance other cash flows.

V. Conclusion

The studies the impact of Covid-19 on cash flow in the food and beverage industry in Vietnam from 2017 to 2022. The empirical research is conducted under the FGLS approach by using a panel data regression model to overcome the defects of autocorrelation and heteroskedasticity existing in the model. Regression results with CFO are consistent with some previous studies also in Vietnam. However, for CFI, the results are not consistent with the signaling theory that we assumed before. In fact, food and beverage companies in Vietnam tend to look for investment opportunities rather than reduce as a signaling theory statement. And with a decrease in CFO and an increase in CFI, the CFF must also increase to cover a part of the business as shown in the regression results.

This result of cash flow movements may be explained by some key points. Reducing operating cash flow due to three main problems, including changing shopping habits of consumers, supply chain disruptions leading to production delays and export bottlenecks, and changes in market supply and demand. These lead companies to find a new direction for revenue by investing in financial instruments, or lookout for ways to turn a problem into an opportunity by investing in restructuring production to reach the potential domestic market. Following the decrease of the CFO and the increase in the investment cash flow, companies have to find alternative sources of fundings.

This research has explored the impact of the Covid-19 pandemic on the movement of cash flows during the recession period. Indeed, we study the effect of Covid-19 on three alternative proxies of cash flow (CFO, CFI, CFF) which is different from previous studies that only studied cash flow in general or free cash flow (FCF). contributing to the research literature on cash flow before and during the Covid-19 pandemic. However, the paper still has several limitations that need to be further considered and improved. The first limitation of this study is the

research sample size is small, only including 33 Vietnamese companies listed in the food and beverage industry. The variables used in the regression model include only financial variables, but not macroeconomics variables, or a variety of other variables to make the model become more reliable.

VI. Implications

This study has found results that show that food and beverage manufacturing companies are severely affected by the Covid-19 pandemic. In which the cash flow from business activities is considered the lifeblood of the whole business, but it is the operating cash flow negatively affected by the pandemic. We also find some mixed results for investing cash flows. As stated before, from one side, investment in operating assets may expose some hesitations or in some cases, some F&B firms approfit the stand-by time to restructure operating assets. On the other side, some firms increase the investment in financial assets and try to gain some interest from temporary unused cash flow. In general, we believe that this research will benefit food and beverage manufacturing firms in Vietnam. Specifically, the managers need to pay attention to this issue in order to take early measures to overcome and improve cash flow from operating activities.

Conflicts of Interest

The authors state that they have no financial interest or a competitive personal relationship that has in this article.

Author Contributions

Nam Huong Dau: Writing- Original draft preparation, Visualization, Investigation. Duy Van Nguyen: Data curation, Data analysis, Writing- Reviewing and Editing. Hai Thi Thanh Diem: Conceptualization, Data collection, Methodology. Nhung Thi Hong Nguyen: Writing- Original draft preparation.

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