How does corporate performance affect supply chain finance? Evidence from logistics sector

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C H R O N I C L E	A B S T R A C T
	The paper investigates the impact of corporate performance on supply chain finance with the data collected from logistics sector in Vietnam. Particularly, supply chain finance is measured by cash conversion cycle (CCC). By using the generalized method of moment (GMM), the results show that corporate performance (CP) exerts a negative impact on cash conversion cycle (CCC). Alternatively, corporate performance positively affects supply chain finance, which is an interesting finding of this paper. Further, supply chain finance is also significantly influenced by some control variables, namely capital structure (CS), firm size (FS) and firm growth (FG). The results are essential for the management of supply chain, especially those working in logistics sector.

1. Introduction

After further integration to the global economy, Vietnam has been signing a number of free trade agreements with some countries and areas. Among them, Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) signed in Chile on March 8, 2018 should be highlighted. Thanks to this, goods originated from different countries have been able to enter Vietnam's market. Also, Vietnamese products are more exported to other markets. Together with this, demands in logistics services have significantly increased, which requires logistics companies to develop continuously as well as improve their competitive capacity in order to meet their customers' needs, thereby greatly contributing in supporting the import and export activities locally. As a characteristics of logistics sector, it is hard for an individual firm to perform all steps in delivery, so it is vital for logistics firms to corporate in a supply chain. Especially in Vietnam, where most of the firms are small and medium-sized, this participation in supply chain becomes more necessary. Indeed, in the current time, there is an intense competition between not only enterprises but also supply chains (Deng & Sen, 2017). In supply chain management, the improvements in supply chain finance is a target which most firms aim to (Marak & Pillai, 2019). It is because supply chain finance is an important element in supply chain, allowing the firms to optimize their working capital (Raghavan & Mishra, 2011), raise their capital access (Marak & Pillai, 2019), and more notably, optimize their financial flows (Pfohl & Gomm, 2009). Beside supply chain finance, corporate performance is paid a lot attention by the managers when being

the goal of the firm as well as a foundation for their developments in the future. More than that, corporate performance allows firms to raise their financial resources (either from remaining profit or by external financing) which then greatly contributes towards the improvements in the performance of the whole supply chain finance. These are just our subjective inferences. In fact, there is a limited number of empirical studies analyzing the impact of corporate performance on supply chain finance. This paper is carried out with the expectation to fill the current literature. Moreover, the results are expected to give first empirical evidence in logistics. Hence, the results are essential for the management in the improvements of supply chain finance.

2. Literature review

Logistics is a commercial activity which includes the implementation of one or complex operation, involving receiving goods, transportation, storage, customs procedures, packaging, coding, delivery, or other goods-related services as required by a customer. Regarding supply chain finance, it was first considered in empirical research in the early 21st century (Pfohl & Gomm, 2009; Marak & Pillai, 2019) which highlighted its role in the enterprises. In fact, supply chain finance allows the optimization in working capital of its participants (Bui, 2020c). Further, it speeds cash conversion rate up and stimulates financial link among its participants (Wuttke et al., 2013). More specially, it helps stabilize the supply chain (Bui, 2020c). Therefore, supply chain finance is an essential key in supply chain management (Farris & Hutchison, 2002). About the measurement, cash conversion cycle (CCC) (Chang, 2018; Zhang et al., 2019, Bui, 2020c; Doan & Bui, 2020) which is defined as the period starting from the cash outlay to cash recovery is frequently adopted as a proxy for supply chain finance. To shorten CCC means that the time for cash recovery becomes shorter and companies can increase their working capital, which in turn shows the good performance of supply chain finance. In other words, a short cash conversion cycle reflects that supply chain finance performs well and vice versa. Corporate performance of its participants plays a key role in boosting this performance. Its importance has been explored in analyses of Wang (2002), Chiou et al. (2006), Bates et al. (2009), and Baños-Caballero et al. (2010). Accordingly, corporate performance enhances financial resources of the participants, thereby probably shortening cash conversion cycle (CCC) which means that supply chain finance performs better. In another study, Caniato et al. (2016) reported that corporate financial strength are vital for the improvements in supply chain finance. Thus, there have been a few studies mentioning the role of corporate performance in supply chain finance and most of them have devoted little attention on the detailed influence of corporate performance in supply chain finance, which is a gap in the current literature. Hence, this is an interesting and necessary topic, most notably, for logistics enterprises.

3. Methodology

We adopt data of 32 logistics firms in Vietnam in the 2014-2018 period. Due to the fact that logistics sector in Vietnam is quite nascent, a large majority are small and medium-sized firms. We estimate the model by adopting panel data regressions which are Pooled regression (Pooled OLS), Fixed effects model (FEM) and Random effects model (REM). Also, F and Hausman tests are employed to select the most appropriate model among the three models. Then, we conduct hypothesis testing in regression analysis, including multicollinearity, heteroscedasticity and autocorrelation. If the assumptions are violated, the authors will adopt the generalized method of moment estimation to fix rejected hypotheses and obtain the optimal results, following what Doytch and Uctum (2011), Bui (2020a), Bui (2020b), Bui (2020c), Doan and Bui (2020) have performed. Moreover, the GMM has its superiority in analyzing movements of financial determinants (Driffill et al., 1998). Following the previous scholars, we adopt cash conversion cycle (CCC) as a proxy for supply chain finance. A short cash conversion cycle (CCC) means a good performance of supply chain finance and vice versa. Corporate performance (CP) is measured by ROA ratio (net income / total assets). Beside, based on the actual context in Vietnam and what have been found by Caniato et al. (2016), Chang (2018), some control variables are adopted as indicators of firm characteristics, including capital structure (CS), firm size (FS), and firm growth (FG).

Therefore, the research model is proposed with the following equation:

$$CCC = f (CP, CS, FS, FG)$$

or:

$$CCC_{it} = \beta_0 + \beta_1\,CP_{it} + \beta_2\,CS_{it} + \beta_3\,FS_{it} + \beta_4\,FG_{it} + \varepsilon_{it}$$
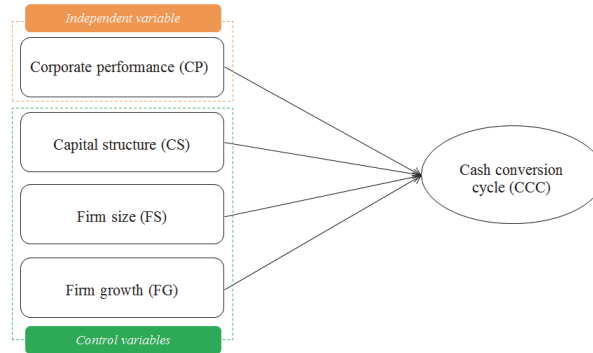
Source: Proposed by the authors.

Fig. 1. Suggested research model

where:
Dependent variable: Cash conversion cycle (CCC).
Independent variable: Corporate performance (CP).
Control variables: Capital structure (CS), firm size (FS), and firm growth (FG).
The symbols β_1, β_2, β_3, and β_4 are regression coefficients, while β_0 is a regression constant.
The symbol ε is the model error term.

Table 1
Summary of variables

Variable name	Code	Measurement
Dependent variable		
Cash conversion cycle	CCC	Logarithm of cash conversion cycle
Independent variable		
Corporate performance	CP	Net income / Total assets
Control variables		
Capital Structure	CS	Total debt / Total assets
Firm size	FS	Logarithm of total assets
Firm growth	FG	$(Sales_t - Sales_{t-1}) / Sales_{t-1}$

Note: Cash conversion cycle (CCC) = Days receivable + Days inventories - Days payable = (trade receivable / sales) × 365 + (total inventories / cost of goods sold) × 365 - (trades payable / cost of goods sold) × 365.
Source: Computed by the authors.

4. Results

The correlation among variables are shown in Table 2, which reveals that the independent and control variables are negatively associated with cash conversion cycle (CCC). Next, the Pooled Regression model (Pooled OLS), Fixed effects model (FEM) and Random effects model (REM) are adopted to estimate the model.

Table 2
Variable correlations

	CCC	CP	CS	FS	FG
CCC	1.000				
CP	-0.181	1.000			
CS	-0.185	-0.187	1.000		
FS	-0.120	0.196	0.065	1.000	
FG	-0.041	0.008	-0.104	-0.084	1.000

Source: Computed by the authors.

Table 3
Regression results

CCC	Pooled Regression model		Fixed effects model		Random effects model	
	Coef.	P>|z|	Coef.	P>|z|	Coef.	P>|z|
Constant	9.721***	0.000	27.268***	0.000	23.662***	0.000
Corporate performance (CP)	-0.048***	0.009	-0.035***	0.001	-0.040***	0.000
Capital Structure (CS)	-0.015***	0.005	0.009	0.118	0.004	0.454
Firm size (FS)	-0.072	0.375	-0.789***	0.000	-0.641***	0.000
Firm growth (FG)	-0.001	0.376	-0.001**	0.037	-0.001**	0.042
R-squared	9.11%		56.88%		56.21%	
Significance level	F(4, 155) = 3.88 Prob > F = 0.005***		F(4, 124) = 40.89 Prob > F = 0.000***		Wald chi2(4) = 119.55 Prob > chi2 = 0.000***	
F test	F(31, 124) = 21.24 Prob > F = 0.000***					
Hausman test	chi2(4) = 159.47 Prob > chi2 = 0.000***					

Note: ** and *** indicate significance at the 5% and 1% level, respectively.
Source: Computed by the authors.

Table 3 shows the estimated results using the basic panel data regression analyses, including Pooled Regression model (Pooled OLS), Fixed effects model (FEM) and Random effects model (REM). Accordingly, the Fixed effects model (FEM) is superior when the F-test is significant at the 1% level (F(31, 124) = 21.24) and Hausman test shows 1% level of significance (chi2(4) = 159.47). Consequently, the Fixed effects model is chosen for the estimation.

Table 4
Results of tests on multicollinearity, heteroscedasticity and autocorrelation

Multicollinearity test		Modified Wald test	Wooldridge test
Variable	VIF		
Corporate performance (CP)	1.09		
Capital Structure (CS)	1.06	chi2 (32) = 21,057.02 Prob > chi2 = 0.000***	F(1, 31) = 18.539 Prob > F = 0.000***
Firm size (FS)	1.06		
Firm growth (FG)	1.02		
Mean VIF = 1.05			

Note: *** indicates significance at the 1% level.
Source: Computed by the authors.

Table 4 demonstrates the results of testing the assumptions including multicollinearity, heteroscedasticity and autocorrelation by using VIF, Modified Wald test and Wooldridge test, respectively. The results indicate that there are no serious issues of multicollinearity (Mean VIF < 10). However, heteroscedasticity and autocorrelation really exist at the 1%. Thus, the authors choose the generalized method of moment (GMM) for the analysis in order to avoid heteroscedasticity and autocorrelation issues. Also, GMM can allow the authors to address potential endogeneity (Doytch & Uctum, 2011).

Table 5
GMM estimation results

CCC	Coef.	P>|z|
Constant	12.578***	0.000
Corporate performance (CP)	-0.169***	0.006
Capital Structure (CS)	-0.022***	0.000
Firm size (FS)	-0.154***	0.008
Firm growth (FG)	-0.001***	0.004
Significance level	Wald chi2(3) = 63.18 Prob > chi2 = 0.000***	
Number of instruments	10	
Number of groups	32	
Arellano-Bond test for AR(1) in first differences	z = -2.13 Pr > z = 0.034**	
Arellano-Bond test for AR(2) in first differences	z = -0.81 Pr > z = 0.417	
Sargan test	chi2(5) = 7.66 Prob > chi2 = 0.176	

Note: ** and *** indicate significance at the 5% and 1% level, respectively.
Source: Computed by the authors.

Table 5 shows that results of GMM estimator is appropriate at the 1% level of significance. Also, both Sargan test and Arellano-Bond test for AR(2) in first differences are suitable. It can thus be concluded that he results are valid. The results reveal that cash conversion cycle (CCC) is negatively ($\beta = -0.169$) influenced by corporate performance (CP) at the 1% significance level. Further, the results confirm that cash conversion cycle (CCC) suffers from a negative impact by the control variables which are capital structure (CS), firm size (FS), and firm growth (FG) at the 1% level of significance.
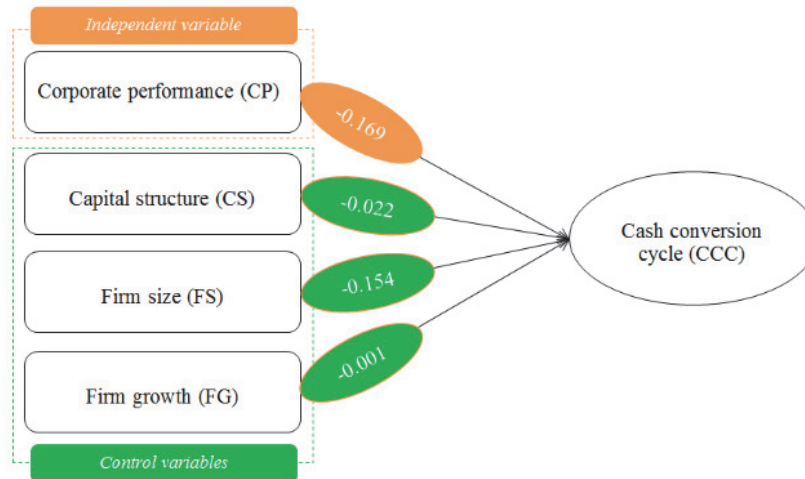
Source: Computed by the authors.

Figure 2. Results of the research model

Thus, corporate performance (CP) exerts a negative impact on cash conversion cycle (CCC). Alternatively, corporate performance (CP) is essential in stimulating supply chain finance, enhancing financial links among the participants. This fits the characteristics of logistics sector when the improvements in corporate performance facilitate the expansion of external financial resources (either from remaining profit or by external financing), which aims a better supply chain finance. This is also in line with what have been found by Caniato et al. (2016). Nevertheless, this is first empirical evidence found in logistics sector. Therefore, this is meaningful for managers in supply chain, especially those working in logistics sector.

5. Conclusion

The paper greatly succeeds in achieving its objectives by giving first empirical evidence on the causal relationship between corporate performance and supply chain finance in logistics sector of Vietnam. The results confirm the negative impact of corporate performance on cash conversion cycle. In other words, corporate performance exerts a positive influence on supply chain finance. Thus, corporate performance plays a key role in improving logistics firms' financial resources, enhancing financial link among the participants and, more importantly, boosting a better performance of supply chain finance. Therefore, it is necessary for logistics' supply chain finance to propose practical solutions for enhancing corporate performance of its participants. Also, to attract more participants, especially those with great financial potential, is a need. These will help supply chain finance perform more efficiently. Despite its success, the paper has its limitations when not considering some macroeconomic control variables which may influence supply chain finance, namely economic growth, inflation, exchange rates. Further, as another limitation, the samples obtained are relatively limited due to the fact of a nascent Vietnam's logistics sector.

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