

WORKING CAPITAL MANAGEMENT AND PROFITABILITY OF FISHERIES ENTERPRISES BY APPLYING GMM

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ABSTRACT

This article uses the Generalized Method of Moment (GMM) to analyze the impacts of working capital management on the profitability of fisheries enterprises in Vietnam. Not only that, the author also considers the role of the supply chain finance in this impact, which is new to this study compared to the previous studies. The study data is collected from 20 fishery enterprises listed on Vietnam's stock market, for the period of 2010-2018. The study results show that the profitability (ROA) of the enterprises is negatively affected by accounts receivable period (AR), inventory period (INV), accounts payable period (AP) and cash conversion cycle (CCC). In addition, this study has found significant impacts of enterprise size (SIZE), leverage (LEV), economic growth (GDP) and inflation (INF) on profitability (ROA) of the enterprise. The study results are a reliable basis to help managers at the fisheries enterprises to better understand the impact of working capital management and especially the supply chain finance on the profitability of the enterprise.

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1 INTRODUCTION

The trend of international integration will create a significant thrust for seafood export activities in Vietnam. However, this thrust also brings significant challenges to the management of fisheries enterprises. In order to overcome these challenges, the fisheries enterprises must adjust their competitiveness and management ability in conformity with the new trend. In particular, the working capital management and especially completion of the supply chain finance is an issue that the fisheries enterprises are very interested in. The working capital management is the management of short-term financial resources of the enterprise. Furthermore, the working capital management helps maintain an optimal balance between the components of working capital, including receivables, inventories, payables and cash conversion cycle (Kandpal, 2015). In particular, the cash conversion cycle reflects the effectiveness of the supply chain finance (Zhang et al., 2019), i.e. the financial linkage among the enterprises in the supply chain (Wuttke et al., 2013). Therefore, when

the cash conversion cycle decreases, the supply chain finance will operate more efficiently, the enterprises in the supply chain finance will take advantage of short-term credit capital at low cost, thereby, it will improve the profitability of enterprises (Bui, 2020). Not only that but managing the components of working capital is also a daily activity of enterprises and significantly affects the liquidity of enterprises (Deloof, 2003). Therefore, the impact of working capital management on the profitability has been found in many empirical studies, such as Mathuva (2010), Gill et al. (2010), Afeef (2011), Mumtaz et al. (2011), Napompech (2012), Arunkumar and Radharamanan (2013), Gul et al. (2013), Azeez et al. (2016), Bagh et al. (2016), Iqbal and Wang (2018). However, there has been virtually no empirical study detailing the role of the supply chain finance in this impact, which is a big gap in the previous studies. Therefore, with this article, the author will overcome the limitations in the previous studies by examining the role of supply chain finance when analyzing the impact of working capital management on the profitability of the enterprise. Moreover, the data is collected from the fisheries sector in Vietnam, which is facing many high growth opportunities but is also facing difficulties in working capital management as well as improving the supply chain finance. Therefore, this study result will have important implications for managers in fisheries enterprises.

2 LITERATURE REVIEW

Working capital is the difference between current assets and short-term liabilities. In a broad sense, the working capital is the value of all current assets, which are tied to the business cycle of the enterprise. In each business cycle, these current assets are transformed into all forms, namely: existing from cash to inventories, receivables and return to the original form of cash. As a result, working capital management (Figure 1) is usually represented through four indicators: accounts receivable period (AR), inventory period (INV), accounts payable period (AP), and cash conversion cycle (CCC).

The studies on the impact of working capital management on profitability of the enterprise have been done by many authors in many different economies and regions, a summary of the contents of some previous studies is mentioned in Table 1.

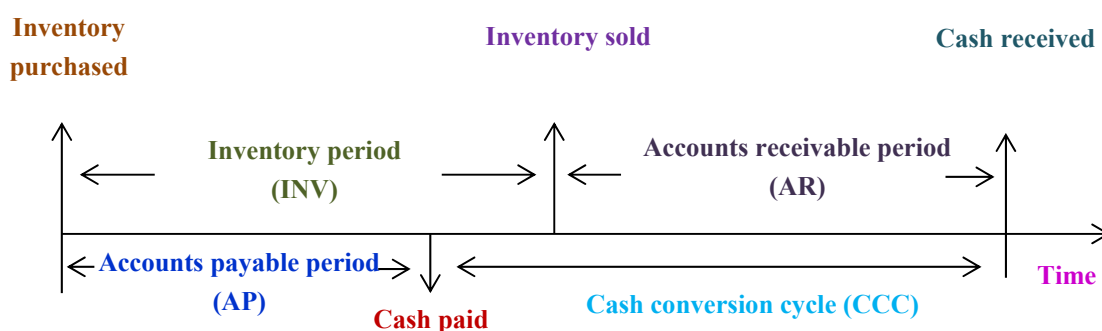


Figure 1: Working capital management at the enterprise.

In the previous studies, the corporate's profitability was often measured by the after-tax profit-to-assets (ROA). For the working capital management, it is usually measured through four indicators: accounts receivable period (AR), inventory period (INV), accounts payable period (AP), and cash conversion cycle (CCC). In particular, the cash conversion cycle (CCC) also reflects the effectiveness of supply chain finance (Zhang et al., 2019). Zhang et al. (2019) and Bui (2020) have

Table 1: Summary of previous studies.

Author	Data	Variables	Results
Gill et al. (2010)	<i>Study period:</i> 2005-2007. <i>Study data:</i> 88 companies listed on the New York Stock Exchange.	<i>Independent variables:</i> Components of working capital (AR, INV, AP, and CCC). <i>Control variables:</i> Enterprise size, leverage ratio.	Profitability is negatively affected by AR and positively affected by CCC.
Mathuva (2010)	<i>Study period:</i> 1993-2008. <i>Study data:</i> 30 companies listed on the Nairobi stock exchange (NSE).	<i>Independent variables:</i> Components of working capital (AR, INV, AP and CCC). <i>Control variables:</i> Enterprise size, leverage, economic growth.	Profitability is positively affected by AP, INV and enterprise size. And also, AR, CCC and leverage negatively impact profitability.
Afeef (2011)	<i>Study period:</i> 2003-2008. <i>Study data:</i> 40 small and medium enterprises listed on the Karachi Stock Exchange (KSE).	<i>Independent variables:</i> Components of working capital (AR, INV, AP and CCC).	INV and AR negatively impact profitability.
Mumtaz et al. (2011)	<i>Study period:</i> 2005-2010. <i>Study data:</i> 22 chemical companies listed on the Karachi Stock Exchange (KSE).	<i>Independent variables:</i> Components of working capital (AR, INV, AP and CCC). <i>Control variables:</i> Enterprise size, leverage ratio.	INV, AR and leverage negatively impact profitability. In addition, profitability is also positively affected by enterprise size.
Sharma and Kumar (2011)	<i>Study period:</i> 2000-2008. <i>Study data:</i> 263 companies listed on the Bombay Stock Exchange (BSE).	<i>Independent variables:</i> Components of working capital (AR, INV, AP and CCC). <i>Control variables:</i> Enterprise size, leverage ratio.	Profitability is positively affected by AR, and negatively affected by enterprise size.
Napompech (2012)	<i>Study period:</i> 2007-2009 <i>Study data:</i> 255 companies listed on the Thailand Stock Exchange.	<i>Independent variables:</i> Components of working capital (AR, INV, AP and CCC). <i>Control variables:</i> Leverage ratio.	<i>Profitability</i> is negatively affected by AR, INV and CCC.
Arunkumar and Radharamanan (2013)	<i>Study period:</i> 2005-2010. <i>Study data:</i> 1198 manufacturing companies in India.	<i>Independent variables:</i> Components of working capital (AR, INV, AP and CCC). <i>Control variables:</i> Enterprise size.	Profitability is negatively affected by AR, INV, AP and CCC. In addition, profitability is also positively affected by enterprise size.
Gul et al. (2013)	<i>Study period:</i> 2006-2012. <i>Study data:</i> SMEs in Pakistan.	<i>Independent variables:</i> Components of working capital (AR, INV, AP and CCC). <i>Control variables:</i> Enterprise size, leverage ratio.	Profitability is positively impacted by AP and enterprise size. And also, AR, INV, CCC and leverage negatively impact profitability.
Azeez et al. (2016)	<i>Study period:</i> 2003-2014. <i>Study data:</i> 5 groups listed in Nigeria.	<i>Independent variables:</i> Components of working capital (AR, INV, AP and CCC). <i>Control variables:</i> Enterprise size, leverage ratio.	AR has a negative impact on profitability. And also, profitability is positively affected by AP.
Bagh et al. (2016)	<i>Study period:</i> 2005-2014. <i>Study data:</i> 50 non-financial companies listed on the Pakistani stock market.	<i>Independent variables:</i> Components of working capital (AR, INV, AP and CCC). <i>Control variables:</i> Enterprise size, leverage ratio.	AR has a positive impact on profitability. Also, profitability is negatively affected by AP, INV and CCC.
Iqbal and Wang (2018)	<i>Study period:</i> 2008-2014. <i>Study data:</i> 60 companies listed on the Karachi Stock Exchange (KSE).	<i>Independent variables:</i> Components of working capital (AR, INV, AP and CCC).	AR, INV and CCC negatively impact on profitability

found significant impacts of supply chain finance on corporate profitability. However, almost no

studies have examined the role of supply chain finance when analyzing the impact of working capital management on corporate profitability.

In addition, the previous studies show that corporate profitability is significantly affected by control variables such as the enterprise size, leverage ratio, and economic growth. Based on this basis, the author will set up a study model in the next section.

3 DATA AND METHODOLOGY

3.1 DATA

The study data is collected from the financial statements of 20 fisheries enterprises listed on Vietnam's stock market, for the period of 2010-2018. The study has only looked at companies listed before 2010 and still listed at the end of 2018. In addition, the author uses the economic growth (GDP) and inflation (INF) data of the World Bank.

3.2 METHODOLOGY

Based on the results of previous studies, the author uses the after-tax profit to assets (ROA) as the dependent variables in the study model. For the independent variables representing working capital management, the author uses the accounts receivable period (AR), inventory period (INV), accounts payable period (AP) and cash conversion cycle (CCC). In addition, the author uses enterprise size variables (SIZE), leverage ratio (LEV), economic growth (GDP) and inflation (INF) as control variables in the study model. The variables such as enterprise size (SIZE), leverage ratio (LEV) and economic growth (GDP) have been used in many previous studies. In this article, the author adds the control variable such as inflation (INF) to the study model. Because Vietnam has just experienced an economic crisis, inflation is a macroeconomic factor that is expected by the author to have a significant impact on the activities of fisheries enterprises.

Thus, the expected study models are

$$\text{Model 1: } ROA_{it} = \beta_0 + \beta_1 AR_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 GDP_t + \beta_5 INF_t + \epsilon_{it} \quad (1),$$

$$\text{Model 2: } ROA_{it} = \beta_0 + \beta_1 INV_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 GDP_t + \beta_5 INF_t + \epsilon_{it} \quad (2),$$

$$\text{Model 3: } ROA_{it} = \beta_0 + \beta_1 AP_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 GDP_t + \beta_5 INF_t + \epsilon_{it} \quad (3),$$

$$\text{Model 4: } ROA_{it} = \beta_0 + \beta_1 CCC_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 GDP_t + \beta_5 INF_t + \epsilon_{it} \quad (4).$$

Table 2: Summary of variables in the study model.

No	Variable		Method of calculation
Dependent variable			
1	ROA	Profitability	After-tax profit/total assets
Independent variables			
1	AR	Accounts receivable period	(Average receivables/net revenues)*365
2	INV	Inventory period	(Average inventories/Cost of goods sold)*365
3	AP	Accounts payable period	(Average payables to sellers/ Cost of goods sold)*365
4	CCC	Cash conversion cycle	CCC = INV + AR - AP
Control variables			
1	SIZE	Enterprise size	The logarithm of total assets
2	LEV	Leverage ratio	Total liabilities/total capital sources
3	GDP	Economic growth ratio	Annual growth of the total gross domestic product
4	INF	Inflation ratio	Annual growth in the consumer price index

For the purpose of analyzing the impact of working capital management on profitability, the author will conduct estimates of the study models according to the Generalized Method of Moment (GMM). The GMM has great advantages when it is very suitable for tabular data and can overcome the regression hypotheses that are violated and control the potential endogenous (Doytch & Uctum, 2011).

4 RESULT AND DISCUSSION

The correlation coefficients between variables in the study model are described in Table 3 as follows:

Table 3: Correlation analysis.

	ROA	AR	INV	AP	CCC	SIZE	LEV	GDP	INF
ROA	1.000								
AR	-0.304	1.000							
INV	-0.095	0.344	1.000						
AP	-0.530	0.294	0.407	1.000					
CCC	-0.086	0.778	0.788	0.145	1.000				
SIZE	0.296	-0.443	-0.279	-0.268	-0.389	1.000			
LEV	-0.525	0.625	0.082	0.439	0.310	-0.220	1.000		
GDP	0.004	0.055	0.115	0.191	0.053	-0.027	0.091	1.000	
INF	0.183	-0.174	-0.238	-0.252	-0.195	0.073	-0.217	-0.238	1.000

Table 3 shows that the independent variables such as AR, INV, AP and CCC are negatively correlated with ROA. For control variables, the LEV variable is negatively correlated with the ROA. Meanwhile, the remaining control variables are positively correlated with ROA. Next is to test on multicollinearity, heteroscedasticity and autocorrelation in study models.

Table 4: Results of tests on multicollinearity, heteroscedasticity and autocorrelation (Model 1)

Variable	VIF	Heteroscedasticity test	Autocorrelation test
AR	1.96	chi2 (20) = 17500.14 Prob>chi2 = 0.000***	F(1, 19) = 0.145 Prob > F = 0.708
SIZE	1.25		
LEV	1.69		
GDP	1.06		
INF	1.11		
Mean VIF = 1.41			

Note: *** indicates significance at the 1% level.

Table 5: Results of tests on multicollinearity, heteroscedasticity and autocorrelation (Model 2)

Variable	VIF	Heteroscedasticity test	Autocorrelation test
INV	1.15	chibar2(01) = 3.12 Prob > chibar2 = 0.038**	F(1, 19) = 1.034 Prob > F = 0.321
SIZE	1.14		
LEV	1.10		
GDP	1.07		
INF	1.16		
Mean VIF = 1.12			

Note: ** indicates significance at the 5% level.

Table 6. Results of tests on multicollinearity, heteroscedasticity and autocorrelation (Model 3)

Variable	VIF	Heteroscedasticity test	Autocorrelation test
AP	1.36	chibar2(01) = 0.06 Prob > chibar2 = 0.406	F(1, 19) = 0.365 Prob > F = 0.552
SIZE	1.09		
LEV	1.28		
GDP	1.08		
INF	1.13		
Mean VIF = 1.19			

Table 7: Results of tests on multicollinearity, heteroscedasticity and autocorrelation (Model 4)

Variable	VIF	Heteroscedasticity test	Autocorrelation test
CCC	1.28	chibar2(01) = 4.40 Prob > chibar2 = 0.018**	F(1, 19) = 0.851 Prob > F = 0.367
SIZE	1.20		
LEV	1.16		
GDP	1.06		
INF	1.13		
Mean VIF = 1.16			

Note: ** indicates significance at the 5% level.

Thus, in all four study models, the multicollinearity is considered to be not serious (mean VIF <10), and there is no autocorrelation between errors. However, Model 1, Model 2 and Model 4 have heteroscedasticity. Therefore, the author will estimate the study models according to GMM to overcome the heteroscedasticity and control the potential endogenous.

Table 8: Regression result.

ROA	Model 1	Model 2	Model 3	Model 4
Constant	-0.11475***	-0.06134***	-0.10680***	-0.10247***
AR	-0.00002***			
INV		-0.00009***		
AP			-0.00021***	
CCC				-0.00003***
SIZE	0.00690***	0.00302***	0.00462***	0.00617***
LEV	-0.01596***	-0.01504***	-0.01150***	-0.01298***
GDP	0.52860***	0.76778***	1.04369***	0.51889***
INF	0.10578***	0.02745**	0.02754***	0.09153***
Significance level	Wald chi2(4) = 4362.67 Prob > chi2 = 0.000***	Wald chi2(4) = 4301.95 Prob > chi2 = 0.000***	Wald chi2(4) = 2094.26 Prob > chi2 = 0.000***	Wald chi2(4) = 855.12 Prob > chi2 = 0.000***
Arellano-Bond test for AR(2) in first differences	z = 1.34 Pr > z = 0.179	z = 1.50 Pr > z = 0.134	z = 1.54 Pr > z = 0.124	z = 1.37 Pr > z = 0.171
Sargan test	chi2(17) = 15.27 Prob > chi2 = 0.576	chi2(17) = 13.84 Prob > chi2 = 0.679	chi2(17) = 16.77 Prob > chi2 = 0.470	chi2(17) = 13.31 Prob > chi2 = 0.716

Note: ** and *** indicate significance at the 5% and 1% level, respectively.

Table 8 shows that the estimated results in all four study models are statistically significant at the 1% level. Moreover, the Sargan test shows that the instrument variables used in the study models are appropriate. Therefore, the estimated results of four GMM study models are appropriate and usable. The study results show that the components of working capital (AR, INV, AP and CCC) have a negative impact on profitability (ROA) with a 1% significance level. In addition, profitability (ROA) is also positively affected by the control variables such as enterprise size (SIZE), economic growth (GDP) and inflation (INF) with a 1% significance level. Not only that, the study has also found the negative impact of the control variable such as leverage ratio (LEV) on profitability (ROA) with a 1% significance level.

- Impact of the accounts receivable period on profitability: The accounts receivable period (AR) has a negative impact (-0.00002) on profitability (ROA). This means that the sooner the company gets the amounts, the more profitable it will be. This result is consistent with the theory and previous studies that a tight credit policy will increase corporate's profitability, as long as the policy does not damage negatively revenues (Gill et al., 2010; Afeef, 2011; Mumtaz et al., 2011; Napompech, 2012; Arunkumar, 2013; Gul et al., 2013; Azeez et al., 2016; Iqbal & Wang, 2018).

- Impact of inventory period on profitability: Inventory period (INV) has a negative impact (-0.00009) on profitability (ROA). This result is also found in most previous studies, for example Afeef (2011), Mumtaz et al. (2011), Napompech (2012), Arunkumar and Radharamanan (2013), Gul et al. (2013), Bagh et al. (2016), Iqbal and Wang (2018). This shows that the shorter the inventory period is, the more profitability will increase because the shorter the inventory period will lead to reduced costs and increased profits. However, the managers in enterprises should also balance the inventories at an adequate level. It means not "too much" but also not "too little". Because, when the inventory period is too short, it will lead to the risk of insufficient inventory, this will seriously affect the production and business activities of the enterprise. Moreover, the insufficient inventories can lead to the risk that fisheries enterprises will lose the customers, these customers will tend to look to other enterprises to provide an adequate and stable amount of products according to their needs. Therefore, the enterprises in the fisheries sector need to develop effective sales policies to shorten the inventory period rather than reduce the number of inventories.

- Impact of the accounts payable period on profitability: The accounts payable period (AP) has a negative impact (-0,00021) on profitability (ROA). This result is also found in the studies of Mathuva (2010), Arunkumar and Radharamanan (2013), Bagh et al. (2016). Accordingly, when extending the payment term for sellers, the enterprises will take advantage of temporary capital to invest. This will contribute significantly to increase the profitability of the enterprise. However, extending the payment term too long can also reduce the reputation of the enterprise, this is also an issue that fisheries enterprises need to be concerned about.

- Impact of cash conversion cycle on profitability: The cash conversion cycle (CCC) has a negative impact (-0.0003) on profitability (ROA). This result is also found in the studies of Mathuva (2010), Napompech (2012), Arunkumar and Radharamanan (2013), Gul et al. (2013), Bagh et al. (2016), Iqbal and Wang (2018). Therefore, fisheries enterprises should shorten the cash conversion cycle to improve profitability. However, fisheries enterprises also need to ensure a reasonable budget to ensure continuous and effective production and business. Moreover, the study results show that supply chain finance plays an important role in the impact of working capital management on the profitability of fishery enterprises. Indeed, as the cash conversion cycle declines, the supply chain finance will become more efficient, it means that the enterprises in the supply chain finance will take advantage of short-term credit at a low cost, thus the profitability will be improved. This is consistent with Zhang et al. (2019) and Bui (2020).

5 CONCLUSION

This article analyzes the impact of working capital management on the profitability of 20 fisheries enterprises listed on Vietnam's stock market, for the period of 2010-2018. The author has applied the GMM to ensure the reliable results of estimating the study model. The study results show that profitability (ROA) is negatively affected by the accounts receivable period (AR), inventory period (INV), accounts payable period (AP), and cash conversion cycle (CCC). And also, the results of this study also show that supply chain finance plays an important role in improving the profitability of enterprises. In addition, the author has found a significant impact of control variables such as enterprise size (SIZE), leverage ratio (LEV), economic growth (GDP) and

inflation (INF) on profitability (ROA). Therefore, managers at fisheries enterprises need to pay more attention to working capital management, especially the role of the supply chain finance in order to improve profitability effectively and sustainably. This result is empirical evidence for the fishery sector in Vietnam. Therefore, this study result is extremely important for enterprises in the fisheries sector.

6 AVAILABILITY OF DATA AND MATERIAL

Data can be made available by contacting the corresponding authors

7 REFERENCES

- Afeef, M. (2011). Analyzing the Impact of Working Capital Management on the Profitability of SME's in Pakistan. *Journal of Business and Social Science*, 2(22), 173–183.
- Arunkumar, O. N., & Radharamanan, T. (2013). Working Capital Management and Profitability: An Empirical Analysis of Indian Manufacturing Firms. *International Journal of Management*, 4(1), 121–129.
- Azeez, O. T., Abubakar, M. A., & Olamide, F. T. (2016). Analysis of the effects of working capital management on profitability of listed Nigerian conglomerate companies. *FWU Journal of School Sciences*, 10(1), 10–20.
- Bagh, T., Nazir, M. I., Khan, M. A., Muhammad Atif Khan, M. A., & Razzaq, S. (2016). The Impact of Working Capital Management on Firms Financial Performance: Evidence from Pakistan. *International Journal of Economics and Financial Issues*, 6(3), 1097–1105.
- Bui, T.N. (2020). Supply chain finance, financial development and profitability of real estate firms in Vietnam. *Uncertain Supply Chain Management*, 8(1), 37–42.
- Deloof, M. (2003). Does Working Capital Management Affects Profitability of Belgian Firms?. *Journal of Business Finance & Accounting*, 30(3&4), 573–587.
- Doytch, N., & Uctum, M. (2011). Does the worldwide shift of FDI from manufacturing to services accelerate economic growth? A GMM estimation study. *Journal of International Money and Finance*, 30(3), 410–427.
- Gill, A., Biger, N., & Mathur, N. (2010). The Relationship Between Working Capital Management and Profitability: Evidence from The United States. *Business and Economics Journal*, 10, 1–9.
- Gul, S., Khan, M. B., Rehman, S. U., Khan, M. T., Khan, M., & Khan, W. (2013). Working Capital Management and Performance of SME Sector. *European Journal of Business and Management*, 5(1), 60–68.
- Iqbal, A., & Wang, Z. (2018). Effect of Working Capital Management on Profitability. *KEMCS*, 5, 53–59.
- Kandpal, V. (2015). An analysis of working capital management in select construction companies. *Journal of Commerce & Management Thought*, 6(1), 7–31.
- Mathuva, D. M. (2010). The influence of working capital management components on corporate profitability: A survey on Kenyan listed firms. *Research Journal of Business*, 4(1), 1–11.
- Mumtaz, A., Rehan, M., Rizwan, M., Murtaza, F., Jahanger, A., & Khan, H. A. (2011). Impact of Working Capital Management on firms' performance: Evidence from Chemical sector listed firms in KSE-100 index. *Journal of Business and Management*, 93–100.
- Napompech, K. (2012). Effects of Working Capital Management on the Profitability of Thai Listed Firms. *International Journal of Trade, Economics and Finance*, 3(3), 227–232.

- Sharma, A., & Kumar, S. (2011). Effect of Working Capital Management on Firm Profitability: Empirical Evidence from India. *Global Business Review*, 12(1) 159–173.
- Wuttke, D.A., Blome, C., Foerstl, K., & Henke, M. (2013). Managing the innovation adoption of supply chain finance – empirical evidence from six European case studies. *Journal of Business Logistic*, 34(2), 148–166.
- Zhang, T., Zhang, C.Y., & Pei, Q. (2019). Misconception of Providing Supply Chain Finance: Its Stabilising Role. *International Journal of Production Economics*, 213, 175–184.



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