

Original Paper

Research on the Relationship between Cash Holdings and Commercial Credit in Zhejiang Manufacturing Industry: A Supply Chain Perspective

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Abstract

In the manufacturing supply chain, there is a tripartite relationship between upstream suppliers, midstream manufacturing enterprises and downstream customers. The supply chain environment is changing from competition to cooperation. Based on the perspective of supply chain, the study of the impact of cash holdings and business credit of manufacturing enterprises in Zhejiang Province is conducive to a comprehensive review of the relationship between cash holdings and business credit of manufacturing enterprises in Zhejiang Province, and enhance their competitive position in the supply chain. It is found that the cash holding level of manufacturing enterprises in Zhejiang Province is negatively correlated with the occupation of the commercial credit of upstream suppliers, positively correlated with the occupation of the commercial credit of downstream customers, and positively correlated with the occupation of the overall commercial credit of the supply chain.

Keywords

manufacturing enterprises in Zhejiang Province, cash holding level, business credit, supply chain

1. Introduction

Commercial credit refers to the credit relationship between enterprises formed by deferred payment or advance payment in commodity transactions. Specific forms include accounts payable, notes payable, advance receipts, etc. As a substitute for short-term financing, commercial credit plays an increasingly important role. Enterprises use commercial credit to conduct business transactions, which is conducive to reducing the cash holdings of enterprises. In the supply chain of manufacturing enterprises, there is a relationship between upstream suppliers and downstream customers. In order to reduce their cash holdings, manufacturing enterprises often occupy the commercial credit of upstream suppliers and downstream customers according to their competitive position in the supply chain. In the traditional business environment, the supply chain environment is dominated by competition and supplemented by cooperation, with strong buyers and good customer credit. The rapid economic development has made the market competition increasingly fierce, and the intensified industrial competition has led to the slow growth of enterprise performance. At this time, the supply chain environment has changed. All parties in the supply chain expect to achieve long-term development through close cooperation. Suppliers, manufacturers and customers form strategic alliances to obtain more favorable commercial credit financing. The overall cooperation of the supply chain is the trend of the times, this is particularly important in the relationship between manufacturing enterprises and upstream and downstream enterprises in the supply chain.

Most of the existing studies have studied how business credit affects corporate cash holdings from the perspective of influencing factors of cash holdings. Few scholars have analyzed the impact of cash holdings on business credit from a reverse perspective. This paper takes the upstream and downstream of the manufacturing supply chain as the research perspective, takes 2017-2021 as the research period, selects manufacturing enterprises in Zhejiang Province as the research sample, and studies the relationship between the cash holding level of manufacturing enterprises and the commercial credit of upstream suppliers and downstream customers with the help of regression analysis method, in order to make up for the lack of commercial credit influencing factors, so as to provide a reference for the overall development of the manufacturing supply chain.

2. Theoretical Analysis and Research Assumptions

The competitive position of an enterprise in the supply chain determines the duration and scale of obtaining commercial credit. Regardless of whether the upstream supplier has a strong position, the downstream manufacturing enterprises always tend to retain a certain amount of cash reserves. On the one hand, downstream enterprises maintain high cash holdings in order to prevent excessive concentration of suppliers to drive up prices, leading to the rise in raw material prices; On the other hand, enterprises also tend to have certain cash flow reserves in order to cope with the occurrence of environmental uncertainties and pass positive financial signals to maintain close supplier relationships. When the cash holdings of enterprises are high, they will occupy less business credit of upstream

suppliers and tend to provide business credit to upstream suppliers. Therefore, this paper proposes Hypothesis 1.

Hypothesis 1: There is a negative correlation between the cash holding level of manufacturing enterprises and the occupation of business credit of upstream suppliers.

In order to maintain a stable cooperative relationship with upstream manufacturing enterprises, downstream customers will actively provide business credit to manufacturing enterprises, while manufacturing enterprises will take advantage of their own competitive advantages to occupy the business credit of downstream customers and meet their daily production and operation activities through advances from customers. Therefore, this paper proposes hypothesis 2.

Hypothesis 2: There is a positive correlation between the cash holding level of manufacturing enterprises and the business credit of downstream customers.

With the increase of cash holdings, the proportion of manufacturing enterprises occupying the commercial credit of downstream customers will exceed that of upstream suppliers. In other words, the proportion of manufacturing enterprises occupying the increase of downstream customers' business credit exceeds the proportion occupying the decrease of upstream suppliers' business credit, that is, the proportion of positive correlation in Hypothesis 2 is greater than the proportion of negative correlation in Hypothesis 1. Therefore, this paper puts forward hypothesis 3.

Hypothesis 3: There is a positive correlation between the cash holding level of manufacturing enterprises and the total commercial credit occupied in the supply chain.

3. Research Design

3.1 Sample Selection and Data Source

This paper intends to select A-share manufacturing enterprises in Zhejiang Province as the research object. The reasons are as follows: (1) Policy support: In the 2021 Evaluation Report on the High Quality Development of Zhejiang Manufacturing Industry, the manufacturing industry in Zhejiang Province has developed steadily, with better operation quality than expected and better than the whole country, playing the role of "stabilizer" and "ballast"; (2) The sample companies belonging to the same industry can enhance the comparability among variables; (3) Manufacturing enterprises account for the highest proportion of listed companies. Taking 2017-2021 as the research period, the following screening was carried out in the sample processing: 1896 observations were obtained after excluding ST, PT and *ST enterprises. The data used in this study are all from CSMAR economic and financial database.

3.2 Variable Definition

3.2.1 Interpreted Variable

In this paper, the business credit of upstream suppliers occupied by enterprises is defined as (accounts payable + notes payable—prepayments)/total assets; The business credit of downstream customers used by enterprises is defined as (advances received—accounts receivable—bills receivable)/total assets;

The total commercial credit of the supply chain is defined as the sum of the above two, namely (accounts payable+bills payable—prepayments + advances from customers—accounts receivable—bills receivable)/total assets.

3.2.2 Explanatory Variables

This paper takes cash holding level as explanatory variable. Select (monetary capital + trading financial assets)/the measurement index of total assets to measure the level of cash holdings. In Cash, the larger the ratio is, the higher the enterprise's cash holdings will be.

3.2.3 Control Variables

This paper mainly selects the following control variables: (1) company size. The size of the company is related to the competitive position of the enterprise in the supply chain and then affects the scale of obtaining commercial credit. The larger the company is, the easier it is to obtain commercial credit. (2) Enterprise growth. The better the growth of an enterprise, the higher the capital adequacy and the stronger the development momentum, and the enterprise will correspondingly increase the scale of commercial credit. In addition, other control variables include asset liability ratio, asset profit ratio and fixed asset ratio. The types, definitions and descriptions of main variables are shown in Table 1.

Table 1. Variable Definition Table

Variable Type	Variable name	Variable symbol	Variable definition
Interpreted variable	Occupy the commercial credit of upstream suppliers	TcU	(Accounts payable+notes payable - prepayments)/total assets
	Occupy the commercial credit of downstream customers	TcD	(Advances from customers - accounts receivable - notes receivable)/total assets
	Commercial credit	Tc	(Accounts payable+notes payable - prepayments+advances from customers - accounts receivable - notes receivable)/total assets
Explanatory variable	Cash holding level	$Cash$	(Monetary capital+trading financial assets)/total assets
control variable	company size	$Insize$	The natural logarithm of the company's total assets
	Tobin Q value	TBQ	Enterprise market price/enterprise replacement cost
	Growth	$Grow$	(Current operating income - previous

		operating income)/previous operating income
Asset liability ratio	<i>Lev</i>	Total liabilities/total assets
Return on assets	<i>ROA</i>	Net profit/total assets
Fixed assets ratio	<i>FixA</i>	Net fixed assets/total assets

3.3 Model Construction

This paper studies the mode that the cash holdings of upstream suppliers and downstream customers in the supply chain affect the business credit of enterprises. With the help of regression analysis, the following models are established to verify the three assumptions proposed in this paper :

$$TcU = \beta_0 + \beta_1 Cash + \beta_2 Insize + \beta_3 Grow + \beta_4 Lev + \beta_5 ROA + \beta_6 FixA + \beta_7 TBQ + +\varepsilon$$

(Model 1)

$$TcD = \beta_0 + \beta_1 Cash + \beta_2 Insize + \beta_3 Grow + \beta_4 Lev + \beta_5 ROA + \beta_6 FixA + \beta_7 TBQ + +\varepsilon$$

(Model 2)

$$Tc = \beta_0 + \beta_1 Cash + \beta_2 Insize + \beta_3 Grow + \beta_4 Lev + \beta_5 ROA + \beta_6 FixA + \beta_7 TBQ + +\varepsilon$$

(Model 3)

4. Empirical Analysis

4.1 Descriptive Statistics

This paper first makes descriptive statistics on variables, as shown in Table 2. At the upstream level, the average level of commercial credit occupied by the selected sample companies in the study is 13.1%, and the median level is 11.5%; At the downstream level, the average level of business credit occupied by enterprises in downstream customers is - 14.6%, and the median level is - 13.1%, indicating that the sample manufacturing enterprises are providers of business credit; The total commercial credit occupied by enterprises in the supply chain is the sum of the commercial credit occupied by upstream suppliers and downstream customers. The average level is - 1.5%, and the median level is - 13.2%. This shows that the funds of manufacturing enterprises in the supply chain are occupied, and manufacturing enterprises are the providers of commercial credit for downstream customers.

Table 2. Descriptive Statistics of Main Variables

Variable symbol	Maximum	Minimum value	Mean value	Median	Standard deviation	Sample size
<i>TcU</i>	0.881	-0.109	0.131	0.115	0.088	1896

<i>TcD</i>	0.201	-0.597	-0.146	-0.131	0.101	1896
<i>Tc</i>	0.783	-0.418	-0.015	-0.132	0.111	1896
<i>Cash</i>	0.886	0.002	0.212	0.169	0.144	1896
<i>Insize</i>	27.123	17.904	21.993	21.863	1.142	1896
<i>FixA</i>	0.737	0.003	0.226	0.204	0.126	1896
<i>Grow</i>	86.637	-0.466	0.299	0.144	2.128	1896
<i>Lev</i>	1.175	0.007	0.113	0.364	0.179	1896
<i>ROA</i>	65.403	0.889	2.279	0.097	0.097	1896
<i>TBQ</i>	1.740	0.008	0.113	1.950	1.869	1896

4.2 Correlation Analysis

After the above descriptive statistics, Pearson correlation analysis was conducted for each variable to preliminarily verify the hypothesis theory proposed in the paper. The specific relevant results are shown in Table 3. In addition, there is a significant negative correlation between the enterprise cash holding level and the occupation of upstream suppliers' commercial credit at the 1% level, indicating that with the increase of the enterprise cash holding level, the occupation of upstream suppliers' commercial credit decreases. At the same time, the level of corporate cash holdings in the table shows a significant positive correlation with the business credit occupied by downstream suppliers at the level of 1%, indicating that the level of corporate cash holdings increases significantly with the increase of the business credit occupied by downstream customers. Therefore, hypotheses 1 and 2 are simply verified based on the Pearson correlation level.

In terms of control variables, enterprise size and Tobin's Q are significantly positively correlated with the occupation of commercial credit by upstream suppliers, while asset profit rate is significantly negatively correlated with the occupation of commercial credit by upstream suppliers, which means that the larger the enterprise size, the more commercial credit occupied by upstream suppliers. Similarly, firm size, asset profit rate, and Tobin's Q value are significantly positively correlated with the business credit of occupying downstream customers, while asset-liability ratio is significantly negatively correlated with the business credit of occupying downstream customers.

Table 3. Correlation Analysis Table of Main Variables

variable	<i>TcU</i>	<i>TcD</i>	<i>Tc</i>	<i>Cash</i>	<i>Insize</i>	<i>FixA</i>	<i>Grow</i>	<i>Lev</i>	<i>ROA</i>	<i>TBQ</i>
<i>TcU</i>	1									
<i>TcD</i>	-0.316*	1								
	**									
<i>Tc</i>	0.507**	0.658**	1							
	*	*								

<i>Cash</i>	-0.089*	0.226**	0.134*	1					
	**	*	**						
<i>Insize</i>	0.076**	0.054**	0.011	-0.029	1				
	*								
<i>FixA</i>	0.011	-0.023	-0.012	-0.039*	0.156**	1			
			*	*	*				
<i>Grow</i>	-0.028	-0.030	-0.050	-0.006	0.018	-0.053*			
			**			*			
<i>Lev</i>	0.032	-0.036*	-0.007	-0.060*	0.536**	0.191**	1		
		**		**	*	*			
<i>ROA</i>	-0.004*	0.018**	0.013*	0.001	-0.246*	-0.165*	0.305*	1	
	**	*	**		**	**	**		
<i>TBQ</i>	0.019*	0.025*	0.037*	0.007	-0.320*	-0.121*	0.603*	-0.113*	1
					**	**	**	**	

Note. ***, ** and * represent significant correlations at the levels of 1%, 5% and 10%, the same below.

4.3 Regression Analysis

4.3.1 Cash Holding Level and Occupation of Commercial Credit of Upstream Suppliers

In this study, Model 1 is used to analyze the relationship between cash holding level of enterprises and business credit occupation of upstream suppliers by regression analysis. The specific results are shown in Table 4. As can be seen from Table 4, the regression coefficient of corporate cash holding level in Model 1 is -0.091 and significant at the 1% level, which is consistent with theoretical assumptions and expectations. The higher the corporate cash holding level, the less commercial credit occupied by upstream suppliers. In other words, every 1 unit increase in cash holdings of an enterprise will reduce 0.091 units of occupation of business credit of upstream suppliers. Therefore, hypothesis 1 of this paper has been verified, that is, there is a significant negative correlation between the level of corporate cash holdings and the business credit occupied by upstream suppliers of the supply chain.

Table 4. Regression Analysis of Cash Holding Level and Occupation of Upstream Supplier Business Credit of Manufacturing Enterprises

Variable	R	P
<i>Cash</i>	-0.091	0.000***
<i>Insize</i>	0.100	0.000***
<i>Lev</i>	0.064	0.008***
<i>ROA</i>	0.039	0.142
<i>Grow</i>	-0.042	0.083*

<i>FixA</i>	0.011	0.644
<i>TBQ</i>	0.047	0.057*
N	1896	
<i>Adjust-R²</i>	0.017	

Note. ***, ** and * represent significant correlations at the levels of 1%, 5% and 10%.

4.3.2 The Level of Cash Held and the Occupation of Downstream Customers' Commercial Credit

In this part, regression model 2 is used to empirically analyze the impact of corporate cash holdings on the business credit of downstream customers occupying the supply chain. The specific results are shown in Table 5. As can be seen from Table 5, the regression coefficient of corporate cash holding level in Model 2 is 0.225 and significant at 1% level, which is consistent with the assumptions and expectations of this paper, indicating that the higher the corporate cash holding level, the more commercial credit will be occupied by downstream customers. In other words, every 1 unit increase in cash holdings of an enterprise will increase the occupation of commercial credit of downstream customers of the supply chain by 0.225 units. Therefore, hypothesis 2 of this paper has been verified, that is, there is a significant positive correlation between the level of corporate cash holdings and the business credit of downstream customers occupying the supply chain.

Table 5. Regression Analysis of Cash Holding Level and Occupation of Downstream Customers' Business Credit of Manufacturing Enterprises

Variable	R	P
<i>Cash</i>	0.225	0.000***
<i>Insize</i>	0.034	0.000***
<i>Lev</i>	0.025	0.011**
<i>ROA</i>	0.024	0.000***
<i>Grow</i>	-0.035	0.141
<i>FixA</i>	-0.002	0.093*
<i>TBQ</i>	0.009	0.000***
N	1896	
<i>Adjust-R²</i>	0.050	

Note. ***, ** and * represent significant correlations at the levels of 1%, 5% and 10%.

4.3.3 The Level of Cash Held and the Occupation of the Supply Chain Total Commercial Credit

In this part, regression model 3 is used to empirically analyze the influence of cash holding level on business credit of occupied supply chain, and the specific analysis results are shown in Table 6. In Model 3, the regression coefficient between cash holding level and total commercial credit is positive

and significant at 1% level, which means that the increase of cash holding level of manufacturing enterprises will increase the commercial credit occupation of the supply chain. Each additional unit of cash holding of enterprises will increase the commercial credit occupation of the whole supply chain by 0.132 units. In conclusion, hypothesis 3 of this study has been verified, that is, there is a positive correlation between the cash holding level of manufacturing enterprises and the occupation of supply chain business credit.

Table 6. Regression Analysis of Cash Holding Level and Occupation Supply Chain Business Credit of Manufacturing Enterprises

Variable	R	P
<i>Cash</i>	0.132	0.000***
<i>Insize</i>	0.048	0.056*
<i>Lev</i>	0.073	0.002***
<i>ROA</i>	0.053	0.044**
<i>Grow</i>	-0.065	0.007***
<i>FixA</i>	0.007	0.772
<i>TBQ</i>	0.045	0.066*
<i>N</i>	1896	
<i>Adjust-R²</i>	0.025	

Note. ***, ** and * represent significant correlations at the levels of 1%, 5% and 10%.

5. Conclusion

From the perspective of the upstream and downstream of the supply chain, this paper empirically analyzes the influence of the cash holding level of the manufacturing industry on the commercial credit of the upstream and downstream enterprises of the supply chain in Zhejiang Province. This paper mainly has the following three findings: (1) The cash holding level of manufacturing enterprises in Zhejiang Province is negatively correlated with the occupation of commercial credit of upstream suppliers in the supply chain, that is, the more cash, the less commercial credit occupied by suppliers; (2) There is a positive correlation between the cash holding level of manufacturing industry in Zhejiang Province and the occupation of commercial credit of existing customers. In other words, each additional unit of cash holding of sample enterprises will increase the occupation of commercial credit of downstream customers by 0.225 units. (3) The cash holding level of manufacturing enterprises in Zhejiang Province is positively correlated with the total commercial credit occupied in the supply chain, which means that enterprises occupy unequal commercial credit of upstream suppliers and downstream customers in the supply chain, and the proportion of commercial credit occupied by manufacturing enterprises in downstream customers is much higher than that of upstream suppliers.

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