An Empirical Study on the Relationship Between Working Capital Management Efficiency and Firm Value of Chinese Manufacturing Listed Companies —Differences Between State-Controlled and Non-State-Controlled Companies

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ABSTRACT
Based on the perspective of the nature of property rights, the paper uses the two-way fixed effects model to analyze the influence of listed company's working capital management efficiency on firm value. The results show that from 2001 to 2008, the working capital management efficiency of Chinese manufacturing listed companies in China is positively related to firm value, that is, reducing the cash conversion cycle can increase the return on assets; the value effect of working capital management efficiency is more significant in non-state-controlled companies, indicating that the improvement of working capital management efficiency in non-state-controlled companies can increase firm value more than state-controlled companies.
Keywords: working capital management efficiency, firm value, nature of property rights

1. INTRODUCTION

Working capital is a very important resource in the company's daily business activities (Marobhe, 2015[1]). It not only provides a foundation for the value creation, but also provides a guarantee for the company's sustainable development. Firm value is usually closely related to investment and financing strategies. Most companies use short-term financial control methods to achieve long-term financial goals and development strategies. Therefore, the company's working capital management efficiency is strongly related to firm value. Managers should pay attention to the working capital management efficiency. Existing studies show that if a company improves the working capital management efficiency, they can not only reduce transaction costs and reduce financing constraints, but also enhance financial flexibility and ultimately increase firm value (Wu Na, 2013[2]; Aktas et al, 2015[3]).

Due to the special system in China, the property rights affects all aspects of the company, especially the financing constraints faced by companies are quite different. On the one hand, state-controlled companies are guaranteed by the national government and have advantages in obtaining government subsidies and bank credit funds. On the other hand, non-state-controlled companies are vulnerable to credit discrimination due to their size and internal control. Studies have shown that companies are more sensitive to liquidity management behavior when facing financing constraints (Lian Yujun et al., 2010[4]). Due to the strong

liquidity of working capital, it will be preferred by financial managers. Based on Chinese special system, the role of working capital management efficiency varies with the nature of property rights. State-controlled companies face less financing constraints, and excessively improving working capital management efficiency will increase company management costs and opportunity costs, reducing value creation capabilities; if the financing cost of non-controlled companies is high, and the working capital management efficiency is too low, it may easily lead to financial crisis such as capital chain break. Therefore, under different property rights, the impact of working capital management efficiency on firm value will be a problem worth studying.

Many studies have shown that the working capital management efficiency can affect firm value. However, most of the current research in China focuses on improving the working capital management efficiency evaluation system and the methods to improve working capital management efficiency, while there are few studies on the impact of different property rights on working capital management efficiency. Secondly, the current sample used in many studies is the entire A-share listed company in China, and the industry characteristics of working capital management efficiency are more obvious, and the research depth of subdivided industries can be strengthened. Based on the importance of manufacturing industry in Chinese economy, as well as the large proportion of manufacturing companies in the sample of listed companies and the strong representation of state-controlled companies, this paper will focus on the impact of working capital management efficiency of Chinese

manufacturing listed companies on their firm value since 2001, and provide empirical evidence for a better understanding of the role of working capital management efficiency; the value effect of efficiency provides a reference for companies with different property rights to make decisions.

2. THEORETICAL ANALYSIS AND RESEARCH HYPOTHESIS

The cash conversion cycle (Richards et al., 1980[5]) is often viewed as a comprehensive indicator of the working capital management efficiency. Existing research shows that appropriately increasing the working capital management efficiency can effectively reduce operating risks, help control transaction costs, maintain trade relations, and enhance the profitability of companies, thereby increasing firm value (Lazaridis et al., 2006 [6]).Because working capital adjustment costs are low and cashability is strong, improving working capital management efficiency can reduce daily operating costs. Reduced invalid working capital investment can quickly increase cash flow and ensure that the company has sufficient resources to seize investment opportunities (Aktas et al, 2015[3]). Therefore, hypothesis 1 is proposed in this paper.

H1: Improving the working capital management efficiency (reducing the cash conversion cycle) in Chinese listed manufacturing companies can increase firm value.

Under the special financial system of China, it is a common problem for companies to give up favorable investment opportunities because of financing constraints. At this time, working capital management efficiency is positively correlated with firm value (Ju Xiaosheng，2013[7]). When an company is faced with financing constraints, the difference in property rights will affect its decision-making behavior. Under the special institutional background of China, companies with different property rights face different degrees of financing constraints, which makes the adjustment of the working capital management efficiency of different property rights companies to smooth the fluctuation of the company's capital investment demand. In comparison, non-state-controlled companies are more enthusiastic about adjusting current assets (Zhou Mingshan, 2012[8]; Zeng Yi，2015[9]). Therefore, hypothesis 2 is proposed in this paper.

H2: Compared with state-controlled companies, non-state-controlled companies can increase firm value by the working capital management efficiency (reducing the cash conversion cycle).

3. SAMPLE CONSTRUCTION AND EMPIRICAL METHODS

3.1. Variable definitions and empirical methods

For hypothesis 1, this paper establishes a regression model (1) to determine the relationship between working capital efficiency and firm value.

$$ROA_{it} = \alpha_i + \alpha_1 CCC_{it} + \alpha_2 SIZE_{it} + \alpha_3 CASH_{it} + \alpha_4 FC_{it} + \alpha_5 LEV_{it} + \lambda_i + \varepsilon_{it} \quad (1)$$

Model (1), the subscript i and t denote the sample company and years respectively, ROA_{it} is firm value, CCC_{it} is cash conversion cycle as the proxy variable of working capital management efficiency, $SIZE_{it}$ is the company scale, $CASH_{it}$ is the cash holding rate, FC_{it} is fixed assets ratio, LEV_{it} is asset-liability ratio, α_t and λ_i represent fixed effects of year and company, respectively. ε_{it} is residual term, all variable definitions can be found in table 1.

Table 1 Variables definition and measurement

Variable	Definition	Measurement
DEPENDENT VARIABLE		
ROA	Return on assets	(Total profit + Financial expenses)/Average total assets
INDEPENDENT VARIABLES		
CCC	Cash conversion cycle	Inventory turnover days + Accounts receivable turnover days - Accounts payable turnover days
CONTROL VARIABLES		
SIZE	Firm size	Ln (value of total assets).
CASH	Cash holding ratio	Cash and cash equivalents / Total assets
FC	Fixed assets ratio	Fixed assets / Total assets
LEV	Asset-liability ratio	Total debt/Total assets

3.2. Sample construction

This paper takes 2001-2008 Shanghai and shenzhen A-share manufacturing listed companies as the research samples, and removes the observations of STs and incomplete data of listed companies during the sample period, and finally obtains 2,136 sample companies and 2,0085 observations. The industry classification shall use the 2012 version of the "Sector Guidelines for Listed Companies" issued by the China Securities Regulatory Commission. The data comes from CSMAR database, and Stata was used for processing and analysis. All continuous variables were treated with Winsorize of 1% above and 1% below to reduce the influence of outliers, and the cash conversion cycle of independent variables was standardized to solve the "dimension" problem.

4. THE EMPIRICAL ANALYSIS

4.1. Descriptive Statistics

Table 2 lists the descriptive statistical results of the main variables in this paper. We see that the minimum value of return on assets is -0.183, the maximum is 0.354, the average is 0.072, and the median is 0.061, which indicates that the firm value of Chinese manufacturing listed companies is skewed to the right. The minimum value of the standardize cash conversion cycle is -0.351 and the maximum value is 1.378, indicating that the working capital management efficiency varies greatly between different listed companies in the Chinese manufacturing industry.

At the same time, the correlation analysis between variables shows that working capital management efficiency is significantly negatively correlated with firm value, which preliminarily confirms the basic hypothesis of this paper. The absolute value of the maximum correlation coefficient between the independent variable and the control variable is 0.3951, so the variance expansion coefficient VIF=1.18, indicating that there is no collinearity problem in the regression model.

Table 2 describes the statistics

Variable	Mean	Median	St:dev.	Min	Max	observations
ROA	0.072	0.061	0.078	-0.183	0.354	20085
CCC	-0.019	-0.094	0.271	-0.351	1.378	20085
SIZE	21.703	21.560	1.154	19.415	25.181	20085
CASH	0.169	0.129	0.134	0.009	0.649	20085
FC	0.251	0.224	0.147	0.019	0.660	20085
LEV	0.429	0.410	0.462	0.007	43.075	20085

Table 3 shows the mean t-test of all variables grouped by the o nature of property rights (whether it is state-controlled). We found that the mean value of CCC of Chinese manufacturing non-state-controlled listed companies was 0.001, while the mean value of CCC of Chinese manufacturing state-controlled listed companies was -0.052, a difference of 0.053. The main reason for this difference is that non-state-controlled listed companies took an average of about 20 days longer to sell inventory than state-controlled listed companies, and non-state-controlled listed companies take an average of about 14 days longer to recover customers' debts than state-controlled companies. At the same time, state-controlled listed companies have larger scale, higher fixed assets ratio and asset-liability ratio than non-state-controlled listed companies, but lower cash holding ratio than non-state-controlled listed companies.

Table 3 Univariate tests grouped by Nature of Property Rights

	Non-state-controlled(12519)		State-controlled(7566)		Mean difference	T-value
	Mean	*St:dev.*	*Mean*	*St:dev.*		
ROA	0.080	0.082	0.058	0.070	0.022	19.203***
CCC	0.001	0.276	-0.052	0.259	0.053	13.278***
SIZE	21.477	0.996	22.075	1.293	-0.598	-36.748***
CASH	0.179	0.143	0.153	0.115	0.026	13.221***
FC	0.230	0.135	0.286	0.159	-0.056	-26.751***
LEV	0.373	0.196	0.487	0.193	-0.114	-40.096***

*, ** and *** denote significant at 10%, 5% and 1% respectively. The same below.

4.2. Panel Data Regression Analysis

4.2.1. Working capital management efficiency and firm value

Table 4 shows the regression results of the relationship between working capital management efficiency and firm value. The cash conversion cycle is negatively correlated with the return on assets at the level of 1%, and the regression coefficient is -0.1023. On average, the return on assets increases by 10.23% for every 1 standard deviation of CCC, which supports the H1 in this paper. At the same time, the components of the cash conversion cycle (CCC), accounts receivable turnover days (ARC) and inventory turnover days (INVC), are significantly negatively correlated with the firm value at the level of 1%. Surprisingly, that accounts payable turnover days (APC) is also significantly negatively correlated with firm value at the 1% level. This may be due to the listed company's large accounts payable or long overdue, which has a negative impact on the company's credit rating and reputation, making the company's firm value decline.

The regression results show that the cash holding ratio as a control variable is positively correlated with the firm value at the level of 1%, indicating that the cash holding level of Chinese manufacturing listed companies has a positive and significant impact on the firm value. However, the ratio of fixed assets and asset-liability ratio are significantly negatively correlated with the firm value at the level of 1%, indicating that the reduction of the ratio of fixed assets and asset-liability ratio of Chinese manufacturing listed companies is conducive to the improvement of firm value.

Table 4 Working capital management efficiency and firm value

	CCC(I)		ARC(II)		INVC(III)		APC(IV)	
	coefficient	*t-value*	*coefficient*	*t-value*	*coefficient*	*t-value*	*coefficient*	*t-value*
CCC	-0.102***	-17.06						
ARC			-0.241***	-25.40				
INVC					-0.077***	-11.95		
APC							-0.214***	-16.34
SIZE	-0.00271	-1.59	0.000523	0.32	-0.00302*	-1.71	-0.000784	-0.45
CASH	0.0831***	10.74	0.0757***	10.06	0.102***	12.97	0.107***	14.41
FC	-0.101***	-11.18	-0.0927***	-10.29	-0.0823***	-8,74	-0.0606***	-6.58
LEV	-0.0120**	-2.28	-0.00838**	-1.99	-0.0118**	-2.38	-0.00757**	-2.08
_cons	0.156***	4.34	0.0965***	2.84	0.138***	-3.69	0.0765**	2.07
Year	Fixed		Fixed		Fixed		Fixed	
Firm	Fixed		Fixed		Fixed		Fixed	
N	20085		20085		20085		20085	
Ad-R²	0.211		0.241		0.180		0.187	
F-value	102.31		121.60		93.88		101.16	

4.2.2. Working capital management efficiency and firm value based on Nature of Property Rights

Table 5 shows regression II and III proprietary nature of the impact on working capital management efficiency and firm value. The regression provide evidence that the regression coefficient between cash conversion cycle and firm value of state-controlled listed companies is -0.0875 (significant at 1% level), indicating that the return on assets will increase by 8.75% for every one standard deviation of cash conversion cycle. The regression coefficient between the cash conversion cycle of non-state-controlled listed companies and firm value is -0.109 (significant at the 1% level), shows cash conversion cycle by one standard deviation, reduces assets return rate will increase by 10.9%, illustrates the working capital management efficiency play a greater value effect in Chinese manufacturing non-state-controlled listed companies, which supports H2 of this paper.

Table 5 Nature of Property Rights, working capital management efficiency and firm value

	All（I）		State-controlled（II）		Non-state-controlled（III）	
	coefficient	*t-value*	*coefficient*	*t-value*	*coefficient*	*t-value*
CCC	-0.102***	-17.06	-0.0875***	-11.58	-0.109***	-13.22
SIZE	-0.00271	-1.59	-0.000135	-0.06	-0.00263	-1.10
CASH	0.0831***	10.74	0.119***	9.10	0.060***	6.06
FC	-0.101***	-11.18	-0.0782***	-6.70	-0.112***	-8.56
LEV	-0.0120**	-2.28	-0.0118*	-1.88	-0.0121	-1.38
_cons	0.156***	4.34	0.0776	1.56	0.164***	3.31
Years	Fixed		Fixed		Fixed	
Firms	Fixed		Fixed		Fixed	
N	20085		7566		12519	
Ad-R^2	0.211		0.182		0.244	
F-value	102.31		29.99		84.46	

5. ROUBSTNESS TEST

In order to verify the reliability of empirical results, this paper takes the 2008 financial crisis as the cut-off point to divide the samples into two parts, and the remaining variables are the same as above. As shown in table 6, we found that there was no substantial change between the robustness test results and those based on the full sample, indicating that the results in this paper would not change due to the change in the sample size.

Table 6 Working capital management efficiency and financial crisis

	All		Before the crisis		After the crisis	
	coefficient	*t-value*	*coefficient*	*t-value*	*coefficient*	*t-value*
CCC	-0.102***	-17.06	-0.100***	-10.32	-0.125***	-15.17
SIZE	-0.00271	-1.59	0.000439	0.09	-0.00330	-1.27
CASH	0.0831***	10.74	0.127***	7.73	0.0510***	5.23
FC	-0.101***	-11.18	-0.0912***	-5.70	-0.0962***	-8.13
LEV	-0.0120**	-2.28	-0.00716*	-1.90	-0.0185	-1.02
_cons	0.156***	4.34	0.0687	0.67	0.143**	2.50
Years	Fixed		Fixed		Fixed	
Firms	Fixed		Fixed		Fixed	
N	20085		5010		15075	
Ad-R2	0.211		0.187		0.215	
F-value	102.31		43.10		123.04	

6. CONCLUSION

This paper uses a two-way fixed effect model to quantitatively calculate the relationship between working capital management efficiency and firm value of Chinese manufacturing listed companies from 2001 to 2018, and analyses the influence of working capital management on firm value under different nature of property rights. Specific conclusions are as follows:

First, improving the working capital management efficiency can increase firm value. On average, for every standard deviation of the cash conversion cycle of Chinese manufacturing listed companies, the return on assets will increase by 10.2%, mainly through reducing the days of accounts receivable turnover and inventory turnover. Then, the study found that the negative relationship between accounts payable turnover days and firm value is contrary to previous experience, which indicates that the accounts payable turnover days of listed companies in Chinese manufacturing industry are too long. This is due to the low product profits and unreasonable industrial structure of some Chinese manufacturing listed companies, so managers should improve the company's own innovation capabilities, accelerate industrial upgrading, take the initiative to respond to supply-side reforms.

Second, under different property rights, there are differences in the impact of working capital management efficiency on firm value of Chinese manufacturing listed companies. Specifically, the coefficient of working capital management efficiency and firm value of non-state-

controlled listed companies is -0.109, while that of state-controlled listed companies is -0.0875, which is significantly different. Therefore, among Chinese manufacturing listed companies, working capital management efficiency has played a greater value effect in non-state-controlled listed companies. Non-state-controlled companies should pay more attention to working capital management efficiency, reduce dependence on external financing, and realize maximization of firm value.

REFERENCES

[1] Marobhe, M. I., Determinants of enterprises' working capital panel evidence from listed East African, International Journal of Business and Social Science, 2015, 6(12), pp. 108-116.

[2] Wu, N., The dynamic cooperative selection of economic cycle, financing constraint and working capital, Accounting Research, 2013, pp. 54-61.

[3] Aktas N., Croci E., Petmezas D., Is Working Capital Management Value-enhancing? Evidence from Firm Performance and Investments, Journal of Corporate Finance, 2015, 30, pp. 98-113.

[4] Lian,Y. J., Peng F. P., Su Z., Financing constraints and liquidity management, Financial research, 2010, pp. 158-171.

[5] Richards, V.D. & Laughlin, E.J., A cash conversion cycle approach to liquidity analysis, Financial management, 1980, 9(1), pp. 32–38.

[6] Lazaridis, Tryofonidis, Relationship between working capital management and profitability of listed companies in the athens stock exchange, Journal of Financial Management and Analysis, 2006, 19 (1) pp. 26-35.

[7] Ju X. S., Lu D., Yu Y. H., Financing constraints, working capital management and sustainability of enterprise innovation, Economic research, 2013, pp. 4–16.

[8] Zhou M. S., Ren Z., Li ,T., Property rights, financing constraints and cash adjustment: on the effectiveness of monetary policy, International finance research, 2012, pp. 83–91.

[9] Zeng Y., Can working capital smooth corporate capital investment? - empirical evidence based on the nature of property rights and financial developments, Journal of central university of finance and economics, 2015, pp. 60–68.