Does Working Capital Financing Structure Affect Firm Value? --- An Empirical Research Based on Data of China's A-Share Listed Companies

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Abstract

In this paper, we use financial data of Chinese listed companies from 2010 to 2020 to explore the relation between working capital financing structure and firm value under certain monetary policy and macro economy situation. We find that when monetary policy expands, the use of aggressive working capital financing structure is conducive to value maximization; when the macroeconomic situation is good, the aggressive working capital financing structure helps to improve firm value. Further study finds that monetary policy expansion urges firms to use more short-term debt to cut capital cost, and better macroeconomic situation can cut firm's bankrupt cost to bring down working capital financing structure and improve firm value.

Keywords: working capital financing structure, firm value, monetary policy, macroeconomic situation

1. Introduction

Working capital financing structure is an important topic in financial management. As to the different structure of working capital financing, the academic community divides the enterprise working capital financing policy into three types: Matching, Aggressive and Conservative policy. Based on this theory, current research on the working capital financing structure mainly focuses on the following aspects: (1) Different firms have different working capital financing strategies. For example, large international companies prefer more bank loans to raise working capital, while startups use more commercial credit financing (Erdogan, 2015); SMEs are more likely to adopt conservative financing strategies (Sardo & Serrasqueiro, 2022); companies with more operating risk are more likely to adopt conservative financing strategies (Wang & Zhu, 2019). (2) Industry characteristics affect firm's working capital financing. For example, agricultural and ocean transport firms with high risk of natural disasters choose more long-term debt or equity financing (Weinraub & Visscher, 1998; Vučković et al., 2017; Oil and gas field companies tend to have more conservative financing (Rajak, 2022). (3) How macro factors affect working capital financing. When firms face macroeconomic recession, they will reduce short-term current debt financing, thus enhancing the conservativeness of working capital financing strategy (Wang & Sun, 2021); When the national monetary policy is tight, firms will reduce their working capital holdings and reduce short-term liabilities, thus making the financing structure more conservative (Deng & He, 2018).

With the gradual progress of research, scholars have paid attention to the management selection behavior and influence of working capital financing structure. For example, Li (2016) found that the higher the risk aversion degree of the management, the more conservative the working capital financing structure of the firm; Wang and Sun (2021) found that the monetary compensation incentive of the management will lead to a more conservative working capital financing strategy, while the equity incentive promotes the enterprise's working capital financing strategy to an aggressive direction. Wang and Wang (2021) found that high management confidence will encourage firms to adopt more aggressive working capital financing strategies. Financing strategies for working capital have an impact on corporate financial performance and value. Setianto et al. (2022) found that the aggressiveness of working capital financing was inversely U-shaped with corporate financial performance, and Wang and Wang (2021) confirmed that confident management's aggressive working capital financing strategy has a positive impact on corporate value.

In view of the above research results, although the current literature pays attention to the influencing factors of the working capital financing structure, a more important issue still needs to be further clarified, that is, whether the financing structure of the working capital affect the firm value. If there is an influence over the firm value, what is the mechanism and direction of this influence. If these problems are clearly answered, we can further understand the direction and path of working capital financing structure adjustment. Considering the real situation in China, with the slowdown of the macroeconomic development speed, the working capital financing strategy has a conservative trend (Wang & Sun, 2021). Therefore, the possible academic contribution of this paper is: to determine the relationship between working capital financing structure and firm value under certain environment conditions, to analyze the mechanism of working capital financing structure on firm value, to discuss in the current economic environment, how main influencing factors affect the relationship between working capital financing structure and firm value.

2. Theoretical Analysis and Deduction of Hypothesis

Traditional theory divides the firm working capital financing policy into three types: Matching, Aggressive and Conservative policy, but no appropriate measurement models about working capital financing are given, and it is inconvenient for quantitative analysis. For the convenience of research, we first set a model to measure firms' working capital financing strategy, and then use the mathematical model to study the relationship between the working capital financing structure and firm value.

2.1 Basic Model Setting

Assume that in a firm, the total assets is A, including non-current assets *FA*, long-term current assets (current assets held to maintain basic sales scale) *CA*, temporary current assets *LA* (incremental current assets used for sales over basic sales). The firm obtains commercial credit *TL* in normal business activities, other short-term debt financing *BL*, the long-term debt financing *FL*, and the owner's equity *EQ*. We set up variable *H* to measure corporate working capital financing structure, which are measured as follows:

$$H = \frac{TL + FL + EQ}{CA + FA} = \frac{A - BL}{A - LA} \tag{1}$$

When the *H* value is 1, it indicates that the sum of the commercial credit, long-term liabilities and owners' equity obtained by the firm is equal to the sum of the long-term current assets and non-current assets. Temporary current asset *LA* is equal to other short-term debt financing *BL*. At this time, the working capital financing strategy of the firm is the Matching strategy. When the *H* value is greater than 1, the sum of the commercial credit, long-term liabilities and owners' equity obtained by the firm is greater than the sum of the long-term current assets and non-current assets, and the *LA* is greater than *BL*, it indicates that a part of the temporary current assets are financed from long-term capital sources, at this time, the working capital financing strategy of the firm is the Conservative strategy. Similarly, if the *H* value is less than 1, the company adopts an Aggressive working capital financing strategy.

2.2 Analysis of Firm Value Change under Different Working Capital Financing Structure

Different types of working capital financing structure is mainly manifested in the difference of *H* value, while the impact of working capital financing on firm value mainly includes two aspects: capital cost and bankruptcy cost caused by financial risks. Assuming that the firm operation scale, supply and demand market remain unchanged, and the equity capital remains unchanged, then *A*, *CA*, *FA*, *TL* and *EQ* values remain unchanged. The value of *H* mainly depends on *FL*. If *FL* increases, *BL* decreases, the *H* value increases, and the working capital financing structure turns to a conservative direction. Firm's financial risk is reduced, capital cost is increased, and bankrupt cost is reduced.

2.2.1 The Relationship between Working Capital Financing Structure Change and Firm Value

We use Figure 1 to discuss the relationship between the changes in the working capital financing structure *H* and the firm value, as shown in the figure below:
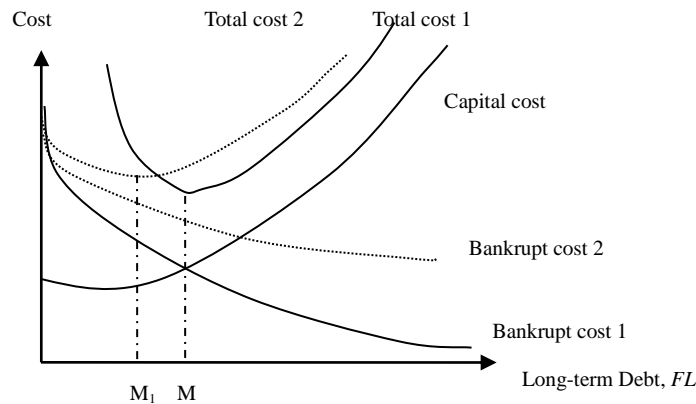
Figure 1. Schematic diagram of the relationship between working capital financing structure and firm value

The figure above shows that the cost of capital rises with long-term debt because the level of capital cost of long-term debt is higher than the cost of short-term debt capital. On the other hand, due to the long-term maturity date, the bankrupt cost of long-term debt decreases, as shown by Curve Bankrupt cost 1 in Figure 1. with the increase of long-term debt, the total cost has a trend of first falling then rising, as shown by Curve Total cost 1 in Figure 1. When *FL* equals M, the firm's total cost reaches minimum, the firm gets optimal working capital financing structure, and firm value reaches maximum.

2.2.2 The Relationship between Working Capital Financing Structure and Firm Value under the Actual Financing Environment

In China's real economic environment, due to the weak legal protection of creditors' rights, and because of many firms' insufficient attention to credit rating, creditors are not willing to provide long-term credit loans to firms, and prefer to short-term debt (Sun et al., 2005). Therefore, in China, many firms regularly realize "long-term investment with short-term loan" by renewing creditors or borrowing new debt to repay maturing debt (Ning & Wang, 2021), thus extend real maturity date and reduce financial risk. In this case, compared with Curve Bankruptcy cost 1, the absolute value of slope of actual bankrupt cost curve decreases in Figure 1, the actual bankrupt cost curve becomes flat, as shown by Curve Bankrupt cost 2 in Figure 1. Assume Curve Capital cost remains unchanged, as the actual bankrupt cost curve becomes flat, total cost line are more affected by capital cost line (Note 1), thus we get Curve Total cost 2. When *FL* equals M₁, the firm gets optimal working capital financing structure, and firm value reaches maximum. Because M₁ is less than M, according to Model 1, *H* drops, and the firm working capital financing structure turns aggressive.

The realization of "long-term maturity date with short-term loan" by renewing creditors or borrowing new debt to repay maturing debt are mainly affected by the macro monetary policy. When monetary policy is loose, the market capital supply is abundant, and it is easy for companies and creditors to reach a "regular contract renewal", companies are also prone to obtaining new loans to repay maturing debt. At this time, due to the low capital cost of short-term liabilities, more firms choose short-term debt financing (Zhang et al., 2016). In the case of monetary tightening, it is more difficult for firms to realize "long-term maturity date with short-term loan" by renewing creditors or borrowing new debt to repay maturing debt, companies are more inclined to ensure the supply of funds through long-term debt financing, resulting in the extension of the debt maturity (Dong, 2012), that is to say, the looser the monetary policy is, the easier it is for firms to extend the use term of debt through the short-term debt, reduce the total cost, and realize the optimization of firm value. Thus, we propose the first hypothesis of this paper:

Hypothesis 1: When monetary policy is loose, the aggressiveness of working capital financing structure is positively correlated with firm value.

2.2.3 The Relationship between Working Capital Financing Structure and Firm Value under Certain Macroeconomic Situation

The influence of macroeconomic situation on the relationship between working capital financing structure and firm value is mainly manifested by the effect of macroeconomic situation on capital cost and bankruptcy cost. We use Figure 2 below to analyze and demonstrate:
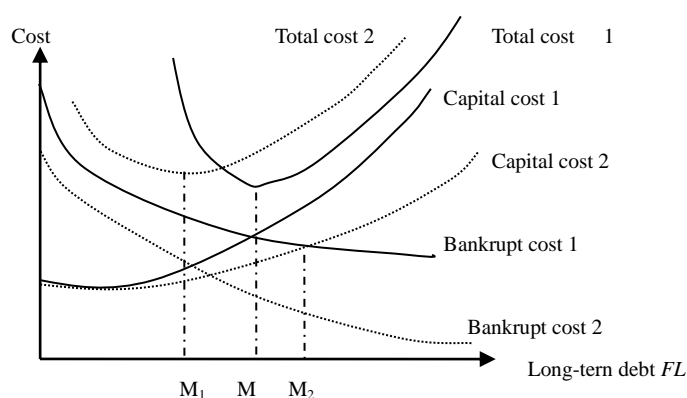
Figure 2. Schematic diagram of the influence of the macroeconomic situation on the relationship between the working capital financing structure and firm value

(1) The impact of the macroeconomic situation on the capital cost line

When the macroeconomic development situation is good, the cost of debt decreases (Wang & Zheng, 2016; Zhang & Wang, 2021). In Figure 2, the impact is represented by a reduced capital cost line slope, from Curve Capital cost 1 to Curve Capital cost 2, and at M_2 we get the minimum total cost. Because M_2 is larger than M, H increases, the firm working capital financing structure becomes conservative.

(2) The impact of the macroeconomic situation on the bankruptcy cost line

When the macroeconomic situation is good, the system risk will decrease, and the operational risks and financial risks of a firm will become smaller. In this case, the bankrupt risk of a firm is reduced, thus leading to more debt financing in a firm (Cai & Li, 2003; Huang, 2017). In Figure 2 above, the impact is shown as the absolute value of the bankrupt cost line slope increases, The bankrupt cost falls faster as long-term capital increases, from Curve Bankrupt cost 1 to Curve Bankrupt cost 2. Without considering changes in the capital cost, when the macro economy is better, at M_1 we get the minimum total cost. Because M_1 is smaller than M, H decreases, the firm working capital financing structure becomes aggressive.

(3) The comprehensive impact of the macroeconomic situation on the relationship between the working capital financing structure and firm value

From the above analysis, we can see that when the macroeconomic situation improves, there are two different effects on the relationship between the working capital financing structure and firm value. Therefore, its combined effect mainly depends on the overall outcome of these two different directions. From the actual situation of China, the macroeconomic situation has a great impact on the bankruptcy risk of a firm. Table 1 below is the statistical table of national GDP growth and the number of market entities logout in year 2015-2019.

Table 1. Statistical Table of the national GDP growth rate and the logout of market entities in 2015-2019

Year	Total number of market entities logout (unit: 10 thousands)	Total number of market entities registered (unit: 10 thousands)	The ratio of logout (unit: %)	Annual GDP growth rate (unit: %)
2015	338.2	950.9	35.57	7
2016	396.6	1090.8	36.36	6.8
2017	517.2	1368.6	37.79	6.9
2018	605	1579.6	38.30	6.7
2019	741	1933.3	38.33	6

Source: Website of the State Administration for Market Regulation.

From the above data, we can see there is an obvious negative correlation between the annual GDP growth rate and the market entities logout ratio. Comparing the data of 2015 and 2019, it can be seen that the GDP growth rate decreased by each 1%, and the cancellation proportion of market entities increased by 2.76%. It shows that with the deterioration of the macroeconomic development situation, the risk of enterprise bankruptcy has increased significantly. In contrast, due to China's state-dominated financial system, the deposit and loan interest

rates are not fully market-oriented, so in the context of macroeconomic growth, although the capital cost increases with long-term debt, the increase is limited. To confirm the above assertion, we have collected some empirical papers using similar measures to study the cost of debt capital, and made a statistic about the cost of debt capital, and we get the following Table 2.

Table 2. Statistic of debt capital cost from some literature

Literature	Sample period	Mean	Standard Deviation	Maximum	Variable measurement
Huang et al. (2020)	2007-2016	0.0246	0.0147	0.052	Financial Expense/ending balance of total debt
Yang (2021)	2008-2017	0.0226	0.0154	0.0612	Interest expenditure/average balance of total debt
Gao (2021)	2016-2019	0.0248	0.0118	0.0612	Interest expenditure/average balance of total debt
Tong et al. (2018)	2012-2017	0.0076	0.0373	0.0677	Financial Expense/ending balance of total debt

As can be seen from the data above, when considering the impact of macroeconomic changes on the cost of debt capital, the scope of the impact is very limited, because the maximum cost of debt capital of sample corporate debt does not exceed 7%. In this regard, the impact of the reduced cost of capital on the total cost is less than the impact of bankrupt costs falling with the increase of long-term capital. Therefore, from the perspective of firms, when the macroeconomic situation is relatively good, the working capital financing structure has a higher tendency to be more aggressive due to the decline of bankrupt costs than to be more conservative due to the decline of capital costs. As a result, the overall working capital financing structure tends to be aggressive, and the *H* value is reduced. Thus, we propose the second hypothesis of this paper:

Hypothesis 2: When the macroeconomic situation is good, the aggressiveness of the working capital financing structure is positively correlated with firm value.

3. Research Design

3.1 Data Sources

We use China Stock Market & Accounting Research Databases (CSMAR) to collect the data of A-share listed companies in China. Sample period is year 2010-2020. We winsorized all the variables used in our regression analysis. We delete the following samples: (1) PT, ST or *ST samples (Note 2). (2) Financial companies such as banks, insurance companies and so on. (3) Samples which have a much higher long-term asset (Note 3). We obtain a total of 18,884 valid samples.

3.2 Model Design and Variable Definition

3.2.1 Regression Model

To verify the Hypotheses 1 and 2, the regression analysis model is constructed as follows:

$$TobinQ_{i,t}=\alpha+\beta_1 H_{i,t}+\beta_2 M2_t+\beta_3\, M2\_H_{i,t}+\beta_4 GDP_t+\beta_5\, GDP\_H_{i,t}+\beta_6 Control+\varepsilon$$

3.2.2 Variable Definition

1) Definitions of the main variables

Working Capital Financing Structure (H): According to Model (1) aforementioned, this paper refers to the practice of Wang and Zhu (2019), and measure H as the sum of long-term debt, operating current liabilities and shareholders' equity divided by the sum of long-term assets and stable current assets. Long-term debt includes debt with maturity over one year and the minimum amount of short-term debt during one year. Operating current liabilities include accounts payable, notes payable, advanced receivables, employee compensation payable, etc. Stable current assets measure the linear relationship between current assets and operating income through subindustry regression analysis, and then calculate the minimum current assets demand of each firm to maintain its business according to this linear analysis. The larger the H value is, the more conservative the firm working capital financing structure is.

Firm Value (TobinQ): The sum of stock market value and net debt market value, divided by total assets.

Monetary policy (M2): The annual growth rate of M2-GDP growth rate-CPI growth rate.

Macroeconomic situation (GDP): The annual national GDP growth rate.

2) Control variables and their definitions

For comprehensive scientific research, we collected relevant control variables such as corporate governance and

operation variables, and we use these variables as control variables in our regression model. All the definitions of variables in our regression model are shown in the Table 3 below:

Table 3. Variable definition table

Variable name	Variable definition
$TobinQ_{i,t}$	For firm i, the sum of stock market value and net debt market value, divided by total assets in year t
$H_{i,t}$	For firm i, the sum of long-term debt, operating current liabilities and shareholders' equity divided by the sum of long-term assets and stable current assets in year t
$M2\_H_{i,t}$	Set up dummy variable $UM2_t$, when M2 in year t is larger than the mean of M2, $UM2_t$ equals 1, otherwise $UM2_t$ equals 0. $M2\_H_{i,t}$ equals $UM2_t$ multiply by $H_{i,t}$
GDP_H	Set up dummy variable $UGDP_t$, when GPD in year t is larger than the mean of GDP, $UGDP_t$ equals 1, otherwise $UGDP_t$ equals 0. $GDP\_H_{i,t}$ equals $UGDP_t$ multiply by $H_{i,t}$
$M2_t$	The annual growth rate of M2-GDP growth rate-CPI growth rate in year t
GDP_t	The annual national GDP growth rate in year t
$Size_{i,t}$	For firm i, logarithm(total assets at the end of year t)
$Lever_{i,t}$	For firm i, total liabilities/total assets in year t
$Roa_{i,t}$	For firm i, gross profit/total assets in year t
$Risk_{i,t}$	For firm i, the standard deviation of the ratio of EBIT/total assets for the late three years in year t
$Interest_{i,t}$	For firm i, financial expense/total loans in year t
$Growth_{i,t}$	For firm i, (sales revenue in year t-sales revenue in year t-1)/sales revenue in year t-1
$Tc_{i,t}$	For firm i, the sum of accounts payable, notes payable, advanced receivables divided by total liabilities in year t
$State_{i,t}$	Dummy variable, for firm i, if the largest shareholder is the state, then it equals 1, otherwise it equals 0 in year t
$Board_{i,t}$	For firm i, the total number of directors in the Board in year t
$Top1_{i,t}$	For firm i, the shares held by the largest shareholder/ total shares in year t
$Dual_{i,t}$	Dummy variable, for firm i, if the chairman of the Board of Directors and the general manager is the same person, it equals 1, otherwise it equals 0 in year t
$Inde_{i,t}$	For firm i, the total number of independent directors/the total number of directors in the Board in year t
$MO_{i,t}$	For firm i, the sum of the total number of shares of the board of directors, the board of supervisors and the senior executives /the total number of shares of the company in year t
Fdl_t	For firm i, the marketization index where the firm registered in year t. The marketization indexes were published by Fan and Wang in their Series of reports
$Ind_{i,t}$	The control variable for the industry of firm i in year t
Year	The control variable for the year

3) Analysis software

All statistical analyses in this paper were implemented in STSATA13.

4. Empirical Research Results

4.1 Descriptive Statistical Results

Descriptive statistics of each variable of the regression model are shown in Table 4:

Table 4. Descriptive statistics of the regression model variables

Variable name	Number of the observations	Mean	Standard deviation	Minimum	Maximum
TobinQ	18884	1.866774	1.043713	0.856075	6.765565
H	18884	0.9553962	0.2738545	0.5147178	1.823735
M2	18884	11.86331	2.941712	8.1	19.7
GDP(%)	18884	7.035858	1.938699	2.3	10.64
Size	18884	22.40223	1.2356	20.30617	26.27975
Lever	18884	0.4616103	0.1985804	0.060187	0.89128
Roa	18884	0.0399642	0.0553805	-0.184019	0.201842
Risk	18884	0.028384	0.0344929	0.0011687	0.2095292
Interest	18884	0.0191917	0.0348702	-0.054321	0.191516
Growth	18884	0.1845477	0.4050245	-0.492402	2.606758

Tc	18884	0.4070831	0.2192449	0.0324946	0.9097923
State	18884	0.3981148	0.4895223	0	1
Board	18884	8.73782	1.700671	5	15
Top1	18884	34.93634	14.85008	9.23	74.82
Dual	18884	0.2478288	0.4317633	0	1
Inde(%)	18884	373.015	5.284913	33.33	57.14
MO	18884	0.1171293	0.1851465	0	0.670428
Fdl	18884	8.35351	1.854763	3.26	11.31

The mean of H is 0.95536, it is close to the mean (0.9197) of Wang and Zhu (2019), it shows that about more than half of China's firms adopt a matching or aggressive working capital financing structure. As for TobinQ, the mean is 1.866, which is a bit less than the median (2.029) of Wang (2022), and it may due to the downturn in the securities market in recent years. Other values are relatively normal and we will not discuss in detail.

To further realize the distribution of the variables in the sample, we made the annual mean statistics of the main variables, which are shown in Table 5 below:

Table 5. Statistical table of annual mean value of the main variables

year	TobinQ	H	M2	GDP	Size	Tc	Top1	Roa	Lever	Growth	Risk
2010	2.290267	0.937789	19.7	10.64	22.01739	0.391678	36.59877	0.055461	0.484347	0.325058	0.031261
2011	1.61784	0.917780	13.6	9.55	22.03503	0.408094	36.70973	0.052567	0.447527	0.247322	0.031755
2012	1.537987	0.919665	13.8	7.86	22.07221	0.410099	37.20145	0.041617	0.445882	0.127943	0.029758
2013	1.747988	0.920924	13.6	7.77	22.12774	0.403716	36.63629	0.041847	0.447698	0.171996	0.027709
2014	2.010549	0.926402	12.2	7.43	22.2609	0.39533	35.99009	0.041006	0.448984	0.153138	0.022982
2015	2.744981	0.921737	13.3	7.00	22.38268	0.384658	35.12792	0.036406	0.443985	0.148555	0.025335
2016	2.140942	0.984207	11.3	6.80	22.58081	0.418945	34.19508	0.038451	0.455259	0.234731	0.024787
2017	1.790653	1.004952	8.2	6.90	22.65921	0.423098	33.61286	0.043709	0.461065	0.301547	0.025125
2018	1.351895	0.983812	8.1	6.70	22.70799	0.402489	33.22841	0.029695	0.487832	0.183513	0.029995
2019	1.56323	0.993023	8.7	6.00	22.71797	0.414332	32.81166	0.030752	0.484752	0.124368	0.031681
2020	1.80446	1.003904	10.1	2.30	22.76894	0.424857	32.50012	0.035177	0.480015	0.096025	0.032962

From the data in Table 5, we can see that TobinQ has a downward trend during 2010- 2020 (only in 2014-2016 its value exceeds 2). It may be due to the securities market recession and the downturn of the macroeconomic situation. Although H value sometimes rose and sometimes fell, it has a trend of rise during the sample time, This may be related to the great downward pressure of China's macro economy and the increasing pressure of market competition. M2 shows an overall downward trend, indicating that the monetary policy contracted during the sample period. As for the firm performance, Roa and Growth are declining year by year, which may be greatly affected by the macroeconomic downturn.

4.2 Correlation Analysis Results

We made the correlation analysis of the main variables in this paper, as shown in Table 6. From the data in Table 6, H is significantly negatively correlated with Tobin Q, M2, GDP are significantly and positively correlated with Tobin Q. It shows that a significant correlation between the main variables in this paper, therefore, the model design of this paper is statistically significant.

Table 6. The correlation analysis table of the main variables

	TobinQ	H	M2	GDP	Size	Lever	Roa	Risk	Interest	Growth	Tc	State	Board	Top1	Dual	Inde	MO	Fdl
TobinQ	1.0000																	
H	-0.2017***	1.0000																
M2	0.1657***	-0.0980***	1.0000															
GDP	0.0389***	-0.0870***	0.6465***	1.0000														
Size	-0.3856***	0.4712***	-0.1953***	-0.1797***	1.0000													
Lever	-0.1797***	0.3316***	-0.0311***	-0.0312***	0.5050***	1.0000												
Roa	0.2576***	0.0127*	0.0949***	0.0911***	-0.0509***	-0.4054***	1.0000											
Risk	0.0725***	-0.1443***	0.0025*	-0.0175**	-0.1684***	-0.0731***	-0.2303***	1.0000										
Interest	-0.1728***	-0.0399***	-0.0263***	-0.0328***	0.2431***	0.4903***	-0.3635***	0.0150**	1.0000									
Growth	0.0475***	0.0100	0.0433***	0.1042***	0.0155**	0.0076	0.2528***	-0.017**	-0.0868***	1.0000								
Tc	0.0809***	0.2765***	-0.0313***	-0.0299***	-0.2057***	-0.2505***	0.1648***	-0.0272***	-0.500***	0.0133**	1.000							
State	-0.1419***	0.1741***	0.1391***	0.1205***	0.3274***	0.2854***	-0.1099***	-0.1186***	0.1365***	-0.0794***	-0.0946***	1.0000						
Board	-0.1164***	0.1026***	0.1119***	0.1120***	0.2426***	0.1317***	0.0046	-0.0665***	0.0988***	-0.0229***	-0.0841***	0.2900***	1.0000					
Top1	-0.0889***	0.1028***	0.0903***	0.0868***	0.2030***	0.0590***	0.1160***	-0.0584***	-0.0477***	0.0082	0.0283***	0.2103***	0.0260***	1.0000				
Dual	0.0668***	-0.0901***	-0.0655***	-0.0554***	-0.1565***	-0.1180***	0.0372***	0.0630***	-0.0707***	0.0340***	0.0528***	-0.2910***	-0.1811***	-0.0541***	1.0000			
Inde	0.0216***	0.0036	-0.0464***	-0.0526***	0.0342***	0.0059	-0.0180**	0.0095	-0.0084	-0.0027	-0.0137*	-0.0603***	-0.4533***	0.0510***	0.1077***	1.0000		
MO	0.0664***	-0.1613***	-0.0839***	-0.0662***	-0.3284***	-0.3131***	0.1563***	0.0771***	-0.2095***	0.0753***	0.1812***	-0.4890***	-0.2029***	-0.1166***	0.2451***	0.0664***	1.0000	
Fdl	0.0102***	0.0450***	-0.3838***	-0.3987***	0.0428***	-0.0698***	0.0325***	0.0119	-0.1070***	-0.0117*	0.1241***	-0.2571***	-0.1517***	-0.0517***	0.1356***	0.0396***	0.1815***	1.0000

4.3 Multiple Regression Results

4.3.1 Regression Analysis of Hypothesis 1

The results of the multiple regression analysis for Hypothesis 1 are shown in Table 7:

Table 7. Multiple regression analysis table of working capital financing structure and firm value under certain monetary policy condition

Independent variables	Dependent variable: TobinQ		
	(1)	(2)	(3)
H	-0.7134975	-0.6486958	-0.2327936
	(-26.45)***	(-22.48)***	(-7.05)***
M2	0.0527337	0.0718434	0.0697035
	(20.97)***	(18.20)***	(18.30)***
M2_H		-0.1469584	-0.0524449
		(-6.27)***	(-2.40)**
GDP			-0.077838
			(-16.39)
Size			-0.2927705
			(-37.38)***

Lever			-0.2939717
			(-6.11)***
Roa			4.798302
			(32.24)***
Risk			1.968989
			(9.73)***
Interest			-0.0596366
			(0.24)
Growth			0.0149063
			(0.86)
Tc			-0.1075723
			(-2.80)**
State			-0.0346591
			(-2.04)**
Board			-0.0140074
			(-2.96)**
Top1			-0.0036945
			(-7.85)***
Dual			0.0182722
			(1.13)
Inde			0.0070894
			(4.97)***
MO			-0.7496714
			(-17.50)***
Fdl			0.0200646
			(4.90)
_cons	1.707974	1.496099	8.051129
	(25.17)***	(19.76)***	(44.40)***
Industry	Controlled	Controlled	Controlled
Year	Controlled	Controlled	Controlled
F value	423.2	327.89	349.21
Adj R-squared	0.0629	0.0648	0.2493
Number of observations	18878	18878	18878

We can see in columns (1) - (3) of Table 7, H is significantly negatively correlated with TobinQ, it shows that normally the aggressive working capital financing structure in China leads to the increase of firm value. In columns (2) and (3), M2_H is significantly negatively associated with TobinQ, it shows that in the case of monetary policy easing, when firms adopt aggressive financing strategy, the firm value increases. This proves the correctness of Hypothesis 1 in our paper.

As for the other control variables, Size is significantly negatively correlated with TobinQ, it shows that the value of stock of small firms is relatively large. This may be caused by our country's speculation on small-cap stocks in securities market. Lever is significantly negatively associated with TobinQ, indicating that the more corporate liabilities, the lower the value. State is significantly negatively associated with TobinQ, indicating that Non-state-owned holding companies have a better market performance. Roa is significantly and positively correlated with the TobinQ, indicating that companies with good performance have high stock market value. It is interesting that Risk was significantly and positively associated with TobinQ, maybe companies with more variable market growth are prone to attract market attention, thus causing the price rise effect.

4.3.2 Regression Analysis of Hypothesis 2

The results of the multiple regression analysis for Hypothesis 2 are shown in Table 8:

Table 8. Multiple regression analysis table of working capital financing structure and firm value under certain macroeconomic situation

Independent variables	Dependent variable: TobinQ		
	(1)	(2)	(3)
H	-0.7455273	-0.3989759	0.1904117
	(-27.32)	(-13.58)***	(5.92)***
M2			0.1206996
			(25.6)***
GDP	-0.0408307	-0.1238579	-0.0157272
	(-5.18)***	(-15.00)***	(-1.92)*
GDP_H		-0.8082071	-0.614643
		(-28.37)***	(-23.61)***
Size			-0.3156451
			(-41.37)***
Lever			-0.2101164
			(-4.49)***
Roa			5.009095
			(34.64)***
Risk			2.035526
			(10.36)***
Interest			-0.0717913
			(-0.30)
Growth			-0.0110026
			(-0.66)
Tc			-0.1051292
			(-2.81)**
State			-0.0260654
			(-1.58)
Board			-0.0056292
			(-1.22)
Top1			-0.0028027
			(-6.13)***
Dual			0.0156309
			(0.99)
Inde			0.0077959
			(5.63)***
MO			-0.7388769
			(-17.77)
Fdl			0.01183
			(2.95)**
_cons	80.20991	388.9137	-35.99134
	(7.94)***	(26.44)***	(-1.89)*
Industry	Controlled	Controlled	Controlled
Year	Controlled	Controlled	Controlled
F value	220.79	345.17	412.05
Adj R-squared	0.0445	0.0838	0.2927
Number of observations	18878	18878	18878

As in Table 7, we can see in columns (1) - (3) of Table 8, H is significantly negatively correlated with Tobin Q. In columns (2) and (3), GDP_H is significantly negatively associated with Tobin Q. It shows that in the good macroeconomic situation, when firms adopt the aggressive financing structure, the firm value increases. This proves the correctness of Hypothesis 2 in our paper.

4.4 Further Study: Test of the Mechanism of the Two Hypotheses

The previous study has confirmed the validity of Hypotheses 1 and 2 in this paper, but the mechanism of the two hypotheses has not been tested. In this part, we continue to use the sample data to test the correctness of the hypotheses mechanism.

1) The mechanism test of monetary policy influence on the relationship between working capital financing structure and firm value

In the aforementioned hypothetical reasoning, we believe that when the monetary policy is loose, more companies choose short-term debt financing. This leads to long-term occupation of short-term debt, reducing the cost of debt capital, so as to enhance the firm value. To test the reasoning process of this hypothesis, we need to test two propositions: first, whether the corporate debt has a shorter maturity when the monetary policy is easing; second, whether the shorter-term debt increases the corporate value.

We use a two-stage instrumental variable method to verify this mechanism. First, we set variable zwjg to measure the structure of debt with different maturity, the value of $zwjg_{i,t}$ equals firm i's current liabilities divided by total liabilities in year t. Second, a two-stage regression is then used to test the above two propositions. In the first stage, the variables of former regression model are used as the instrumental variables, to measure their effect on zwjg. In the second stage, H, M2, and M2_H are eliminated from the regression, and the regression is repeated, to assess the impact of debt structure changes on the Tobin Q. Detailed results are shown in Table 9 below:

Table 9. Test of the mechanism of Hypotheses 1

	First stage: Dependent variable: zwjg	Second stage: Dependent variable: TobinQ
zwjg		17.9683 (7.42)***
H	-0.0093309 (-2.08)**	
M2	0.0026992 (4.57)***	
M2_H	-0.0053478 (-1.67)*	
GDP	0.003348 (5.02)***	-0.0168384 (-1.5)
Size	-0.0330207 (-27.01)***	-0.8730094 (-11.23)***
Lever	0.1070546 (13.81)***	1.594905 (5.53)***
Roa	-0.0200124 (-0.88)	4.388484 (9.14)***
Risk	0.1140595 (3.38)***	4.170243 (5.86)***
Interest	-0.951507 (-17.68)***	-17.21194 (-6.80)***
Growth	-0.0122339 (-4.36)***	-0.1968156 (-3.24)***
Tc	0.3569412 (56.43)***	6.3726 (7.26)***
State	-0.0253312 (-9.80)***	-0.499547 (-6.20)***
Board	0.0010594 (1.38)	0.0042349 (0.29)
Top1	-0.0003558 (-4.93)***	-0.0099731 (-5.85)***
Dual	0.0059962 (2.51)**	0.134481 (2.76)**
Inde	0.0004869 (2.21)**	0.0154119 (3.50)***
MO	-0.025129 (-3.97)***	-1.196546 (-8.73)***
Fdl	0.0028713 (4.40)***	0.0726411 (4.74)***

	32.34973	32.34973
_cons	(48.40)***	(10.18)***
Industry	Controlled	Controlled
Year	Controlled	Controlled
F value	654.50	Wald chi2(16): 750.51
Adj R-squared	0.3943	Root MSE: 2.6178
Number of observations	18420	18420

From the data in Table 9, we can see that in the first stage, M2 is significantly and positively correlated with zwjg, this shows that short-term corporate debt increases when monetary policy eased. H is significantly negatively correlated with zwjg, indicating that the more short-term debt leads to lower H. M2_H is significantly negatively correlated with zwjg, indicating that short-term corporate debt increases as monetary policy eased, and this leads to a less H value. In the second stage, zwjg is significantly and positively correlated with TobinQ, indicating that short-term debt increases when monetary policy eases, and this leads to an increase in firm value, this verifies the correctness of the theoretical reasoning of Hypothesis 1 in our paper.

2) The mechanism test of macroeconomic situation influence on the relationship between working capital financing structure and firm value

In the aforementioned Hypothetical 2 reasoning, we argue that when the macroeconomic situation is good, the decreased risk of firm bankruptcy leads to the reduction of bankrupt costs, reducing the firm working capital financing structure, so as to enhance firm value. To test the reasoning process of this hypothesis, we need to test two propositions: first, when the macroeconomic situation is good, the risk of enterprise bankruptcy is reduced. second, this risk of bankruptcy reduction enhances the firm value.

We still use a two-stage instrumental variable method to verify this mechanism. First, we set variable FCF to measure the free cash flow of the firm, the larger the FCF, the smaller the bankrupt risk. For firm i, $FCF_{i,t}$ equals (Net cash flow from operating activities-cash recovered from the purchase and construction of fixed assets, intangible assets and other long-term assets for the disposal of fixed assets, intangible assets and other long-term assets) / total assets in year t. Second, a two-stage regression is then used to test the above two propositions. In the first stage, the variables of former regression model are used as the instrumental variables, to measure their effect on FCF. In the second stage, H, M2, and M2_H are eliminated from the regression, and the regression is repeated, to assess the impact of FCF changes on TobinQ. Detailed results are shown in Table 10 below:

Table 10. Test of the mechanism of Hypotheses 2

	First stage: Dependent variable: FCF	Second stage: Dependent variable: TobinQ
FCF		18.33068
		(17.22)***
H	-0.0223171	
	(2.87)**	
GDP	0.0049767	
	(13.55)***	
GDP_H	-0.0148939	
	(-9.74)***	
M2	0.0006513	0.0833671
	(2.36)**	(15.78)***
Size	0.0003027	-0.3455217
	(0.50)	(27.19)***
Lever	-0.0251963	-0.0810496
	(-6.15)***	(2.94)**
Roa	0.3870445	2.266257
	(28.70)***	(4.57)***
Risk	0.1418074	-0.5492777
	(7.09)***	(-1.25)
Interest	0.1223368	-2.187565
	(5.70)***	(-4.70)***

	(1)	(2)
Growth	-0.0161695	0.3166542
	(-10.14)***	(7.78)***
Tc	0.0345499	-0.9203817
	(10.86)***	(-11.71)***
State	0.009863	-0.2112206
	(7.21)***	(-6.80)***
Board	-0.0001926	-0.0058498
	(-0.52)	(-0.76)
Top1	0.0000464	-0.0039603
	(1.22)	(-4.92)***
Dual	-0.0075554	0.1573199
	(-5.71)***	(5.36)***
Inde	0.0000403	0.0066444
	(0.36)	(2.83)**
MO	-0.0510933	0.1924928
	(-14.14)***	(2.05)**
Fdl	0.0007228	-0.0015736
	(2019)**	(-0.22)
_cons	-0.0258046	9.138804
	(-1.86)*	(31.05)***
Industry	Controlled	Controlled
Year	Controlled	Controlled
F value	144.02	Wald chi2(16): 2299.59
Adj R-squared	0.1340	Root MSE: 1.5289
Number of observations	18513	18513

From the data in Table 10, we can see that in the first stage, FCF is significantly and positively correlated with GDP, indicating that corporate free cash flow increases when the macroeconomic situation is good, H is significantly negatively correlated with FCF, indicating that the increase in free cash flows leads companies to adopt aggressive working capital financing structures. GDP_H is significantly and negatively correlated with FCF, it shows that when macroeconomic situation is good firms adopt aggressive working capital financing strategy, and firms' free cash flow increases. In the second stage, we see FCF is significantly and positively correlated with TobinQ, indicating that corporate free cash flow increases when the macro economy is good, and the aggressive working capital financing structure leads to an increase in corporate value, this verifies the correctness of the theoretical reasoning of Hypothesis 2 in our paper.

4.5 Robustness Test

To ensure the reliability of this study, we perform robustness tests of our hypothesis. We use three types of robustness test: (1) Change dependent variable, we use P/E ratio (PE) to replace TobinQ to measure firm value; (2) Change independent variable, we use deposit-reserve ratio (Dkl) to replace M2 to measure the monetary policy; (3) Delete samples of special years. Considering the special impact of the COVID-19 control measures in 2020, we deleted year 2020 samples. We repeat regression analysis, detailed results are shown in Table 11 below:

Table 11. Robustness test table

	(1) Dependent variable: PE	(2) Dependent variable: PE	(3) Dependent variable: TobinQ	(4) Dependent variable: TobinQ	(5) Dependent variable: TobinQ
H	-2.516883	-50.91813	-0.1945856	0.0421664	-0.1911308
	(-2.12)**	(-2.48)**	(-5.37)***	(1.23)	(-5.85)***
Dkl			0.3632482		
			(0.76)		
Dkl _H			0.2065018		
			(7.73)***		
M2	9.962657	6.658624		0.1682248	0.1677635
	(3.44)***	(2.23)**		(32.94)***	(40.60)***

	(1)	(2)	(3)	(4)	(5)
M2_H	-39.93938			-0.1836444	
	(-2.44)**			(-8.26)***	
GDP	9.974538	5.352889	-0.0224221	-0.3523406	-0.2451858
	(1.97)**	(2.02)**	(-2.87)**	(-33.62)	(-22.73)
GDP_H	***	-83.04522			-0.5559695
		(-4.99)***			(-28.35)***
Size	-23.9332	-25.01693	-0.3151167	-0.316685	-0.331732
	(-4.88)	(-5.10)***	(-38.89)***	(-38.70)***	(-41.37)***
Lever	-121.9281	-107.4999	-0.1911714	-0.205058	-0.1527895
	(-3.98)***	(-3.49)***	(-3.82)***	(-4.10)***	(-3.12)***
Roa	1839.206	1807.222	5.264021	5.005127	5.093729
	(15.75)***	(15.47)***	(34.02)***	(31.90)***	(33.19)***
Risk	-599.4762	-582.1799	2.207956 (10.39)***	2.147852	2.116327
	(-4.11)***	(-4.00)***		(9.85)***	(9.92)***
Interest	282.4317	291.0781	-0.4355908	-0.4386388	-0.4798768
	(1.65)*	(1.71)*	(-1.66)*	(-1.68)*	(-1.88)*
Growth	-3.680715	-6.984671	0.0002627	0.0139047	-0.0058576
	(-0.34)	(-0.65)	(0.01)	(0.78)	(-0.34)
Tc	-27.41526	-27.8829	-0.1256318	-0.1212625	-0.1236905
	(-1.15)	(-1.17)	(-3.17)***	(-3.07)***	(-3.20)***
State	-8.138444	-7.926823	-0.0054241	-.0192509	-0.0141661
	(-0.77)	(-0.75)	(0.31)	(-1.09)	(-0.82)
Board	-4.864933	-4.445303	-0.0078347	-0.0083328	-0.0028002
	(-1.64)	(-1.50)	(-1.59)	(-1.70)*	(-0.58)
Top1	-0.2145151	-0.1704578	-0.0033537	-0.0036298	-0.0029918
	(-0.74)	(-0.59)	(-6.94)***	(-7.50)***	(-6.32)***
Dual	-9.870375	-10.41556	0.0147997	0.0151902	0.0121686
	(-0.98)	(-1.03)	(0.88)	(0.90)	(0.73)
Inde	1.440257	1.533	0.0077525	0.0070931	0.0076086
	(1.62)	(1.72)*	(5.26)***	(4.80)***	(5.26)***
MO	-47.80827	-48.33741	-0.7859902	-0.8414472	-0.8306455
	(-1.82)*	(-1.84)	(-17.81)***	(-18.97)	(-19.15)***
Fdl	-1.027869	-0.3207998	0.0090641	0.014334	0.0102519
	(0.40)	(-0.12)	(2.13)**	(3.34)***	(2.44)**
_cons	-36757.51	19355.67	-35.61177	9.453855	8.914922
	(-3.36)***	(1.59)	(-3.28)***	(49.50)***	(47.54***
Industry	Controlled	Controlled	Controlled	Controlled	Controlled
Year	Controlled	Controlled	Controlled	Controlled	Controlled
F -value	21.2	22.23	297.09	379.67	437.53
Adj R-squared	0.0228	0.0251	0.2387	0.2967	0.3271
Number of observations	16424	16424	18024	16221	16221

As can be seen from Table 11, in columns (1) and (2) M2_H and GDP_H are both significantly negatively associated with PE, indicating that even if the firm value measurement variable is replaced, both assumptions 1 and 2 still hold true. In columns (3) Dkl _H is significantly and negatively correlated with TobinQ, indicating that even if the measurement mode of monetary policy is changed, The smaller the Dkl, the looser the monetary policy, the H value becomes smaller, and the greater the enterprise value is. The correctness of Hypothesis 1 is verified. Data in columns (4) and (5) are the regression results after the elimination of the year 2020 samples, both M2_H and GDP_H are significantly negatively associated with TobinQ. Thus the reliability of our study is further confirmed.

5. Research Conclusions, Policy Suggestions and Future Research Opportunities

We use theoretical deduction and empirical research, to find out what is the relationship between working capital financing structure and firm value under certain conditions. We find that when monetary policy expands, the use of aggressive working capital financing structure is conducive to value maximization. When the macroeconomic situation is good, the aggressive working capital financing structure helps to improve the value of enterprises.

Further study finds that monetary policy expansion urges firms to use more short-term debt to cut capital cost, and better macroeconomic situation can cut firm's bankruptcy cost to bring down working capital financing structure and improve firm value.

In view of the above study findings and China's current economic situation, we propose the following policy recommendations: (1) Considering the increasing uncertainty about global economic development due to the COVID-19 pandemic and the war between Russia and Ukraine, the business risk increase, and this leads to a steady trend of working capital financing structure (H value increases), this is also confirmed by the subannual descriptive statistics of our paper. This is not conducive to the improvement of firm value. China can consider adopting appropriate monetary policy to reduce the working capital financing structure (H value) and enhance the value of enterprises. (2) In view of the "new normal state" of China's economy will continue in the near future, macroeconomic development has entered a medium-and low-speed stage, and this leads to more conservative working capital financing structure. China can consider adopting appropriate economic stimulus policies to boost the speed of macroeconomic development, thus avoid too conservative working capital financing structure due to a stall in economic development, and achieve the purpose of maintaining the firm value.

In this paper we mainly focus on the influence of working capital financing structure on firm value under the specific circumstances of monetary policy and macroeconomic situation. In fact, there are product market competition, information technology, scientific and technological progress and other factors which affect the working capital financing structure and firm value relationship. Future research can further investigate the relationship between working capital financing structure and firm value from the aspects of market competition, scientific and technological progress and informatization.

Acknowledgements

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Notes

Note 1. In extreme cases, companies can automatically and regularly renew their short-term debt contracts with their creditors. At this time, the bankruptcy cost line in Figure 1 becomes a horizontal straight line. The bankrupt cost under any long-term debt amount is the same, the size of the total cost depends entirely on the capital cost.

Note 2. The trade rule of these companies shares are more strict than other shares, so we cannot compute TobinQ as other firm's shares

Note 3. The ratio of long-term asset is two times more than current asset.