Academic Journal of Management and Social Sciences
ISSN: 2958-4396 | Vol. 7, No. 3, 2024

Research on Relationship between Cash Holdings and Performance of Manufacturing Enterprises

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Abstract: This paper empirically studies the impact of cash holdings of state-owned or non-state-owned manufacturing enterprises on enterprise performance, with data of manufacturing enterprises listed in Shanghai and Shenzhen A-shares from 2012 to 2018. It is found that the cash holdings can promote the enterprise performance to a certain extent in case of most manufacturing enterprises; Further, such promotion effect is more obvious for the non-state-owned manufacturing enterprises. The research results can be good reference of new ideas and research directions for the research of the cash holdings on the performance of manufacturing enterprises.

Keywords: Manufacturing Enterprises; Cash Holdings; Enterprise Performance.

1. Introduction

Cash is the blood of an enterprise and a necessary prerequisite for its sustainable development, as is the case for manufacturing enterprises. As a necessary and pillar industry of production and life in China, the manufacturing industry has contributed indispensable power to the GDP of the society. Manufacturing is one of the more traditional industries. Keeping a certain amount of cash can not only help them seize opportunities and cope with crises, but also enable them to achieve better transformation in the wave of supply-side reform. For different coal enterprises, the impact of cash holdings on the performance varies due to financing constraints, governance level and agency. This paper aims to analyze the relationship between cash holdings and corporate performance for manufacturing companies of different property rights.

2. Theoretical and Research Assumptions

2.1. Relationship between Cash Holdings and Enterprise Performance

As part of a company's retained earnings in previous years, cash and cash equivalents sometimes serve to increase financing amounts and reduce loan amounts. In the theory of financing trade-off, keeping a certain amount of cash is sometimes a way to increase the profitability and performance of a corporation (over aggressively keeping cash holdings too low can sometimes make it harder for a company to turn around, which can indirectly lead to bankruptcy).

By empirically analyzing the impact of customer concentration ratio on the relationship between cash holdings and corporate performance, Al-Matari et al. (2014) found that when customer concentration ratio is high, the cash holdings of enterprises are also abundant, and the performance of enterprises at this time is also worth expecting. In his empirical study, the results of correlation multiple regression analysis confirmed that there was a significant positive correlation of 1% between the two [1]. Jebran et al. (2019) held a similar view: a high level of cash holdings would empower enterprises the basic protection and ability to deal with potential risks, and would also significantly promote the company's performance [3]. Ma and Zhang (2016) studied the relationship between R&D expenditure, cash holdings and enterprise performance, and seemed that the cash holdings of manufacturing enterprises could significantly promote company's R&D expenditure, and thus had a more significant role in promoting the performance level of enterprises [11]. Jing (2020) carried out research on listed manufacturing enterprises with high cash holdings, and found that relatively abundant cash holdings would significantly improve the profitability, meanwhile provide "restructuring capital guarantee" for future investments [4]. Kuan et al. (2012) empirically analyzed the relationship between cash holdings, property rights and corporate performance and the conclusion was that keeping more cash holdings had a positive impact on corporate performance [5]. Lian et al. (2011) focused the research more on the relationship between the company's excess cash holdings and performance, and reached a similar view: a certain amount of excess cash holdings had a positive impact on the company's future operating conditions and performance [9]. With European SMEs as samples, La Rocca et al. (2019) empirically analyzed and demonstrated that "corporate cash holdings have a dominant impact on performance" [7]. Therefore, we hypothesize as follows:

H1: Cash holdings of manufacturing enterprises can promote the company's performance to a certain extent.

2.2. Relationship between Cash Holdings and Performance of Enterprises of Different Property Rights

The biggest issue that property right can cause is "financing constraint". It affects the amount of loans available to non-state-owned enterprises, which typically can borrow less than state-owned enterprises. Berghe and Levrau (2004) studied the cash holdings, property rights and investment efficiency of enterprises. it is found that depending on the property rights nature of different enterprises, the degree of financing constraints and the high agency costs, the respective cash holdings of each company would also have a certain impact on their investment efficiency [2]. By analyzing the cash holding ratio of each year, Kusnadi (2011) found that the cash

holding ratio of listed state-owned enterprises was 6.28%, while 2.86% of listed non-state-owned enterprises. In terms of average cash holding and holding ratio of individual enterprise, the values of state-owned enterprises were slightly higher than those of non-state-owned companies [6]. Similarly, based on the basic data of enterprises of different property rights, Megginson et al. (2014) also discovered that the cash holding of state-owned enterprises was significantly higher than that of non-state-owned enterprises, which had a greater impact on their performance [12]. However, Li et al. (2014) investigated empirically the relationship between credit resource allocation and corporate performance under different economic environment and monetary policies. It was found that most of financial lending institutions would demonstrate credit discrimination against non-state-owned enterprises especially during the policy tightening period [8]. This tendency also directly or indirectly urged the non-state-owned enterprises to have higher credit capital usage efficiency, so as to "use limited money to improve the performance to the maximum extent", so that corporate performance could be up to a higher level in the future. Liu et al. (2018) dedicated their research to the two factors of influencing the value of cash holdings, i.e. monetary tightening and cash lock-in. It was found that non-state-owned enterprises were more likely to have higher ratio of cash lock-in, this demonstrated again that such enterprises faced credit discrimination in harsh economic environment [10]. With the data of listed company covering the financial crisis from 1999 to 2009, Lian et al. (2011) reached a conclusion that "the stricter the financial constraints and the more funds held, the more opportunities of investment at the same time" [9]. Hereby, it is believed that non-state-owned enterprises is more constrained than state-owned enterprises when facing economic environment pressure. Therefore, we hypothesize as follows:

H2: Compared with state-owned manufacturing enterprises, the increased amount of cash holdings of non-state-owned manufacturing enterprises will have a greater impact on the improvement of enterprise performance.

3. Research Design

3.1. Sample Data Source and Variable Selection

In this study, manufacturing enterprises listed on China Shanghai and Shenzhen A-share markets from 2012 to 2018 are the research object, and 8 financial indicators are used as the research samples. ST, *ST listed companies and companies with missing data have been excluded, and all the data are from CSMAR database.

3.2. Definition of Variables

In addition to selecting ROA as the explanatory variable; total asset turnover rate, asset-liability ratio, enterprise size, Tobin Q, property right nature (state-owned as 1) and list years are supplemented as control variables. Definitions of all variables are shown in Table 1.

Table 1. Variable definitions

Variables	Definitions
Independent variables	
Cash	The natural logarithm of cash and cash equivalents divided by total assets.
Dependent variables	
ROA	Return on asset-income before extraordinary items divided by total assets.
Control variables	
Tat	Tangible assets divided by total assets
Lev	Financial leverage - total debt divided by total assets
Size	Firm size - natural logarithm of total assets
TobinQ	It is computed as dividing market value of firm by assets' replacement cost (market value of equity + market value of debt) to book value of asset.

Source: Authors formation.

3.3. Regression Model

In order to reveal the relationship between corporate performance level and cash holdings for manufacturing companies, the following regression model is established based on the previous analysis and assumptions mentioned above:

$$ROA=\beta_0+\beta_1 Cash_{i,t}+\beta_2 Tat_{i,t}+\Sigma\beta_i Controls_{i,t}+\varepsilon_{i,t}$$

4. Empirical Findings and Analysis

4.1. Descriptive Analysis of Key Variables

According to the data provided by CSMAR database, descriptive analysis was carried out for the variables to be studied in this paper, and the results are shown in Table 2. As can be seen in Table 2, the total number of samples is 10929. The average value of ROA is about 4.902, with maximum value 49.641, and minimum value -69.033. With a value span of 118.674, standard deviation of 6.585, the span of results is large, and the difference is obvious; The average level of cash holdings is 1.764. With maximum value 5669.690 and

minimum value 0.003, the span is 5669.688, and the standard deviation is 57.325. This means that there is also a large individualized difference in terms of the level of cash holdings; The average value of total assets turnover ratio A is 0.643. With maximum value 7.609, minimum value 0.003, the data span is 7.606, and the standard deviation is 0.414. The data values are of relatively small difference, and higher concentration; The average asset-liability ratio is 38.49. With maximum value 168.53, minimum value 0.80, the span is 167.72, and the standard deviation is 19.36, indicating that the asset-liability ratio varies greatly according to enterprises. However, the amount of debt is not large generally.

From the perspective of control variables, the maximum size of enterprise is 27.39, while the minimum value is 17.81. Thus, the span is 9.57, proving that manufacturing enterprises are generally large in scale; For the property right nature, 1 is designated for state-owned, and 0 for non-state-owned. The resulting average value is 0.28, indicating that 28% of manufacturing enterprises are state-owned.

Table 2. Descriptive statistics

Variable	N	Min	Max	Mean	SD
Roa	10929	-69.033	49.641	4.902	6.585
Cash	10929	0.003	5669.690	1.764	57.325
Tat	10929	0.003	7.609	0.643	0.414
Lev	10929	0.797	168.527	38.488	19.364
Sca	10929	17.806	27.386	21.933	1.173
Tobin Q	10929	0.083	128.438	2.456	2.528

Source: Organized by the author

4.2. Correlation Analysis of Main Variables

According to the correlation analysis test, it is found that there was no significant relationship between corporate performance and cash holdings. Therefore, all the manufacturing enterprises involved in the study were sub-categorized (i.e., divided into 29 sub-sectors, such as metal manufacturing, paper industry, wine, beverage and tea) and correlation research was conducted for each sub-category. The results show that there is a significant correlation between enterprise performance and cash holdings in 12 sub-categories, including comprehensive utilization of waste resources, ferrous metal smelting, chemical raw material products, wine, beverage and tea, automobile manufacturing and other manufacturing industries, petroleum processing and nuclear fuel, food and general equipment and pharmaceutical manufacturing, rubber, plastics and paper manufacturing, while there is no strong correlation in 17 sub-categories including ship transportation, electrical machinery, textile and garment industry, non-metallic mineral products, chemical fiber and furniture manufacturing, computers, metal products, wood processing, agricultural and sideline food, leather & feather & footwear industry, culture & education & handiwork & beauty & sporting goods, instrumentation manufacturing, printing and recording media, nonferrous metal smelting and special equipment manufacturing.

By analyzing these data by sub-category, it can be seen that there should be a positive correlation between ROA and cash holdings, however, this correlation is less significant in some industries. This may be due to the different characteristics of the industries themselves. The level of cash holding is more related to the asset-liability ratio of enterprises. For the impact of state-owned or non-state-owned, it can be concluded that cash holding has a positive influence on the performance of state-owned enterprises, however, not as significant as on that of non-state-owned enterprises. Through the analysis of these two kinds of property right nature, a conclusion can be drawn that the performance of non-state-owned enterprises is more significantly affected by the level of cash holdings. And the reason of the less significant influence for state-owned enterprises might be the underlying financing constraint pressure; Among all manufacturing companies lack of access to stable cash flows, the performance of manufacturing firms with longer production cycles, regular and single product is more significantly affected by the level of cash holdings. While the performance of those with high product diversification, complex styles, strong product customization and shorter production cycles is less affect. However, this could also be the result of small sample sizes.

4.3. Regression Analysis of Main Variables

The regression fitting analysis was carried out on the overall objects of study, and the results are shown in Table 3. It can be seen that the fitting was poor, therefore, the industries was refined again according to their type and the fitting was carried out based on sub-industry type. And the results show that, the five sub-industries of ship transportation, electrical machinery, metal products, leather & feather & footwear industry and nonferrous metal smelting have poor fitting, while the other 24 sub-industries have good (Table 4 as an example) fitting. This strongly proves the reliability of the above data sources for correlation analysis. Moreover, the results of R^2 of the remaining 24 sub-industries are greater than 0.3, which also effectively prove that the level of corporate performance is positively correlated with the level of cash holding.

According to the nature of property rights, regression fitting analysis was also carried out according to those two types, state-owned and non-state-owned enterprises. It is found that the nature of enterprise property rights does not

help the degree of fitting, and the difference between the results of two kinds is not great; However, different sub-industry types have a great impact on the degree of data fitting, while for most of sub-industry types, the degree of data fitting is over the basic requirement line of R^2=0.3.

Table 3. The Association between Cash holding level and enterprise performance

	ALL	Stated	Non-stated
Cash	0.001 (0.001)	0.001 (0.001)	-0.002 (0.002)
Tat	1.930*** (0.149)	1.468*** (0.252)	2.530*** (0.182)
Lev	-0.130*** (0.003)	-0.130*** (0.005)	-0.127*** (0.004)
Sca	-0.352*** (0.053)	0.148* (0.083)	-0.231** (0.073)
Tobin Q	0.435*** (0.020)	0.917*** (0.063)	0.352*** (0.021)
N	10929	3007	7922

Notes: All variables are defined in Table 1. The sample period spans the years 2012 and 2018, inclusive.

We report robust standard errors in parentheses below coefficient estimates. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

Table 4. Subsample Test

General equipment manufacturing		Stated	Non-stated
Cash	0.007** (0.003)	2.587** (0.001)	0.007*** (0.004)
Tat	10.379*** (1.097)	1.556 (1.683)	13.463*** (1.351)
Lev	-0.139*** (0.013)	-0.126*** (0.019)	-0.161*** (0.018)
Sca	-0.570** (0.246)	-0.171 (0.083)	-1.110*** (0.377)
Tobin Q	1.187*** (0.146)	1.226*** (0.241)	1.278*** (0.180)
N	632	170	462

Notes: All variables are defined in Table 1. The sample period spans the years 2012 and 2018, inclusive.

We report robust standard errors in parentheses below coefficient estimates. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

4.4. Robustness Test

In order to further test whether the conclusions are reliable, a robustness test was also carried out. ROA was replaced by return on equity (ROE) to represent the performance level of the enterprise, while everything else remains unchanged. At this point, the conclusion is as follows:

By comparing Table 5 and Table 6, it can be found that this test was firstly performed to all the data, and it seemed that the enterprise performance and the cash holdings were positively correlated, but not significantly. The reason might be that the data of state-owned enterprises in the nature of property rights are more extreme, which has a great impact on the result of overall data. At the same time, although the more significant correlation was shown by the data of non-state-owned enterprises, the insignificant correlation shown by overall data has not been changed. As mentioned above, state-owned enterprises are generally large in scale, large in assets, of long borrowing history, long-term and good credit standing, which ensure that they can make a good impression on creditors when borrowing. As a result, the financing methods and efficiency are significantly higher than those of non-state-owned enterprises that do not have the above advantages. This fact will force non-state-owned enterprises to save a certain amount of cash for future investment, while maintaining the original performance level and striving for a higher level, which is the significant positive correlation shown above. However, this could also be due to the small data proportion of non-state-owned enterprises, so that the overall correlation appears "insignificant". After the examination of enterprises with different property rights, it is found the influences of cash holding level on performance are almost the same for state-owned and non-state-owned corporations. However, the influences of asset turnover rate, asset-liability ratio, enterprise size and other variables for two kinds of enterprises on the performance are different by at least 10%. When ROA is the dependent variable, the differences of the impacts generated by asset-liability ratio and the asset turnover ratio on the performance all show a value of over 1%. This indicates that these indicators have a significant impact on enterprise performance. It is well known that the cash holdings of enterprises will affect the results of the above ratios to a certain extent, and then indirectly infer that the enterprise performance level will also be affected by the cash holdings. After dividing the manufacturing enterprises into sub-segments, a regression of the same process was performed on 29 different manufacturing groups. it is found that most of them met a significance level of at least 10%, and in some industries the significance level could even reach 5% and 1%. Therefore, insignificant correlation shown above by certain data might be due to the different industry characteristics. The average values of indicators vary widely by industry, such as production cycle and inventory. And the unified usage of all data for the study may lead to complex

and confusing result. From the above, it can be concluded that the level of enterprise performance is positively correlated with the level of corporate cash holdings, and such correlation is more obvious for non-state-owned enterprises.

Table 5. Robustness tests (using alternative measure ROE)

	All	Stated	Non-Stated
Cash	0.001 (0.001)	0.001 (0.002)	-0.001 (0.002)
Tat	0.048*** (0.020)	0.083 (0.055)	0.043 (0.017)
Lev	-0.005*** (0.004)	-0.007*** (0.001)	-0.004*** (0.003)
Sca	-0.004 (0.007)	0.003 (0.018)	0.003 (0.007)
Tobin Q	0.006** (0.003)	0.019 (0.014)	0.003 (0.002)
N	10929	3007	7922

Notes: All variables are defined in Table 1. The sample period spans the years 2012 and 2018, inclusive.

We report robust standard errors in parentheses below coefficient estimates. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

Table 6. Robustness tests (using alternative measure ROE)

	General equipment manufacturing	Stated	Non-stated
Cash	0.014** (0.005)	0.138* (0.074)	0.012** (0.005)
Tat	1.629*** (0.549)	1.421* (0.823)	3.294*** (0.733)
Lev	-0.136*** (0.008)	-0.121*** (0.015)	-0.132*** (0.011)
Sca	-0.728*** (0.164)	-0.221 (0.273)	-0.579*** (0.216)
Tobin Q	0.977*** (0.091)	1.328*** (0.207)	0.732*** (0.010)
N	1106	374	732

Notes: All variables are defined in Table 1. The sample period spans the years 2012 and 2018, inclusive.

We report robust standard errors in parentheses below coefficient estimates. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

5. Conclusion

This research shows that the performance level of manufacturing enterprises is positively affected by cash holdings, but such influence is also constrained by the sub-industry type and property right nature. For state-owned manufacturing enterprises, most of them are large in scale and do not have strong financing pressure, so they do not hold a large amount of cash. Therefore, the positive relationship between the performance level of state-owned enterprises and cash holdings is not significant; On the contrary, for non-state-owned manufacturing enterprises, the sizes are diverse. For small and medium-sized enterprises, financing is more difficult, so they may hold a large amount of cash for rainy days, therefore, the positive relationship between the enterprise performance level and cash holdings is more obvious.

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