The Influence of Cash Holdings and Macroeconomic Conditions on Corporate Acquisitions

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Abstract: Based on the data of Chinese A-share listed companies from 2011 to 2020, this paper finds that corporate cash holdings promote corporate acquisitions. The better the macroeconomic situation, the more likely companies are to make acquisitions. In a bad economy, a high level of cash holdings will promote corporate acquisitions, and the promotion effect is very significant. In better times, cash has little incentive to make acquisitions happen. In addition, economic policy uncertainty inhibits corporate acquisitions. Finally, the endogeneity problem is eliminated through instrumental variable regression.

1. Introduction

As an important investment activity of an enterprise, enterprise acquisition profoundly affects the development direction and quality of the enterprise in the future. Generally, acquisition activities involve a large amount of capital and many aspects of business, so they are often affected by micro factors at the enterprise level and macro factors at the national level. Li Shanmin et al. (2020) pointed out in their research that the acquisition activities of Chinese enterprises are strictly supervised by the CSRC, which has very strict regulations on the pricing of shares and the use of funds. According to the CSMAR database statistics, from 2008 to 2017, in the acquisition of listed companies as buyers, the pure cash payment was as high as 82.78%. Therefore, at the corporate level, the impact of cash holdings on corporate acquisitions is worth studying. In addition, the essence of all business activities of enterprises is the interaction with the economic environment, so the acquisition behavior of enterprises will also be deeply affected by the economic environment. This paper divides the influence into two aspects: the macroeconomic situation measured by GDP growth rate and the economic policy uncertainty index based on news reports.

The structure of this paper is as follows: The second part is a literature review, summarizing the achievements and shortcomings of previous studies; The third part is the research design, which puts forward the research hypothesis and explains the variable design and empirical model of this paper. The fourth part is empirical analysis, explains the data sources and data processing methods, and explains the empirical results; The fifth part is the robustness test. Finally, the conclusion of this paper summarizes the results of the whole paper, points out the shortcomings of the research and prospects for the future.

2. Literature review

There are many literature studies on the level of corporate cash holdings. At the micro level, there are a lot of literature on corporate cash policy at home and abroad, which can be divided into two major theories: tradeoff theory and agency theory. Opler et al. (1999) pointed out that the tradeoff theory corresponds to the transaction motive and prevention motive of the enterprise to accumulate cash assets. Almeida et al. (2004) also believe that when companies have more business transactions, more investment opportunities and higher financing costs, they have higher incentives to accumulate cash. Agency theory holds that corporate managers hold a large amount of cash in order to satisfy their own interests, and use the company's cash to create personal interests and damage the interests of shareholders. Jensen (1986) and Stulz (1990) pointed out in research that the higher the company's

cash holdings level, the more likely the company will overinvest. In addition, From the perspective of behavioral finance, Chen et al. (2020) found that for innovative industries requiring more investment, overconfident CEOs tend to hold a high level of cash to prevent future transaction demands.

It can be found from the above scholars' research that both the trade-off theory and the agency cost theory point out that there is a very close relationship between cash holdings level and corporate investment activities. Corporate acquisition is a large and observable investment activity, and the company has a great deal of decision-making power in this aspect. Therefore, if a company's cash level affects investment, it is easy to observe its impact on acquisition initiation through data testing.

From the macro level, Harford (2005) found that the wave of corporate acquisitions in the market is pro-cyclical. Isil Erel (2021) believes that this is because the financial market is not perfect. When the economic situation is bad, it is more difficult for enterprises to obtain financing in the market, which inhibits the acquisition motivation of enterprises. Through research, Erel et al. (2012) found that macroeconomic conditions simultaneously affect the supply and demand of funds in the market, which will eventually affect the financing behavior of the company, and the worse the rating of the company will face, the more difficult financing problems when the economic situation deteriorates. Kahle and Stulz (2013) studied enterprises during financial crises and found that in recent financial crises, compared with non-leveraged enterprises, enterprises that relied on bank loans would hoard cash during crises.

Therefore, in previous studies, it can be found that the macroeconomic situation is closely related to the financing situation of enterprises. The macroeconomic situation affects enterprises' access to external financing, which in turn affects their acquisitions.

In addition, from the macro level, scholars believe that there are three main channels for economic policies to influence corporate acquisition behavior: real option theory, expected financing cost theory and growth option value theory. Real option theory holds that an irreversible investment is equivalent to a financial call option, which can be exercised or deferred at any point in time. Bhagwat (2016), Bonaime (2018), Baker (2016), Zhang Chengsi et al. (2016), Zhang Qianxiao et al. (2018) all proved through empirical research that the higher the uncertainty of theoretical economic policy, the more motivated enterprises are to postpone major investment.

While Adra et al. (2020) are committed to the expected financing cost theory and believe that the acquirer is worried about the possible future financing cost rise in the monetary tightening environment, which will affect the normal operation of the company. Zhang Fangli et al. (2018) also paid more attention to the expected financing cost theory and pointed out that the loose monetary policy is conducive to alleviating the negative effect of debt financing on acquisition performance, which is more obvious in non-state-owned enterprises.

Bloom (2014) and Dou (2016) focus on the growth option theory and believe that economic policy uncertainty to a certain extent will improve the value of growth options and play a positive role in enterprises' investment and business activities. Gu Xiaming et al. (2018) and Shen Minghao et al. (2019) found that economic policy uncertainty would promote enterprises' r&d investment. Yang Dongxu et al. (2019) found a significant positive correlation between economic policy uncertainty and the probability of OFDI by empirical test.

Therefore, the real option theory, the expected financing cost theory and the growth option value theory do not have a unified view on whether economic policy uncertainty promotes or inhibits corporate acquisitions.

3. Hypothesis, variables and regression model

3.1 Hypothesis

Corporate cash holding level motivation mainly includes transaction motivation, prevention motivation and agency motivation. All three incentives encourage companies to raise their cash holdings. According to Chinese laws and regulations on the means of payment in the acquisition, more

than 80% of the acquisition cases, companies use cash payment method. Therefore, this paper makes the following assumptions:

H1. The higher the company's cash holding level, the more likely it is to acquire the company.

In addition, from the macroeconomic level, because the financial market is not perfect, there are financing costs in the market, and the financing costs are higher in the poor economic situation, enterprises are more difficult to obtain financing in the market, and acquisition, as a major investment activity, has a high demand for cash. This contradictory situation will restrain the enterprise's acquisition motivation. However, if the company has enough cash, it can greatly alleviate the problem. Conversely, when times are good, companies have easier access to finance, are more likely to make acquisitions and less likely to retain cash. Therefore, this paper makes the following assumptions:

H2. The worse the macroeconomic environment is, the less likely the company is to acquire the company. At this time, the influence of cash on the acquisition of the company is very obvious.

H3. The better the macroeconomic environment is, the higher the possibility of acquisition is. At this time, cash has little influence on the acquisition of the company.

According to real option theory and expected financing cost theory, the greater the uncertainty of economic policy, the more incentive enterprises have to delay the acquisition, while the growth option theory believes that the uncertainty of economic policy will promote the investment of enterprises. Combined with the actual situation of The Chinese market, the following assumptions are made:

H4. The greater the macroeconomic policy uncertainty, the less likely the company is to make acquisitions.

3.2 Variables

The dependent variable of this paper is corporate acquisition behavior (Acq). This paper focuses on whether the company's cash holdings and macroeconomic situation will affect the company's acquisition and investment. Therefore, we draw on the practice of Wan Liangyong and Hu Jing (2014) and take whether the company conducts acquisition and investment in the t year as the measure of the dependent variable company acquisition activities. If the company makes acquisition investment in the t year, the Acq is equal to 1; otherwise, it is equal to 0.

The independent variables of this study are as follows. Corporate Cash is the sum of cash and cash equivalents divided by total corporate assets. GDP growth is the sum of the current year's GDP minus the previous year's GDP divided by the previous year's GDP. Low GDP growth (Low_GDP_Growth) is the GDP growth rate is in the bottom 20% of the GDP growth distribution for all years. High GDP growth rate (High_GDPG_rowth), where GDP growth rate is in the top 20% of the GDP growth rate distribution for all years. Unexpected GDP growth (UnGDP_Growth), the residual of estimates that predict GDP growth. Referring to the study of Barro (2000), OLS regression was used for estimation. Dependent variables were the growth of real GDP and independent variables, including logarithm of per capita GDP, square of logarithm of per capita GDP, inflation rate, ratio of government consumption to GDP, and growth rate of ratio of export and import prices. In addition, the independent variables include economic policy Uncertainty Index (Epu), monetary policy Uncertainty Index (Mpu), exchange rate and capital control uncertainty Index (EXpu), trade policy uncertainty Index (Tpu) and fiscal policy uncertainty Index (Fpu).

As for the above policy uncertainty indices, BBD index constructed by Baker, Bloom and Davis (2016) and China's economic policy Uncertainty Index constructed by Huang and Luk (2018) are the most recognized indices at present. The index constructed by Baker et al. (2016) is a weighted average of three components: first, a news-based scale factor is constructed by using the number of news articles containing index-related keywords (such as "uncertainty" and "regulation"); Second, a measure based on the discounted value of the revenue impact of expiring tax provisions; Third, estimates of the divergence of economic forecasts related to government spending and the consumer price index (CPI). However, when Baker et al. (2016) calculated the uncertainty of China's economic policy, the news reference only came from The South China Morning Post in Hong Kong, so the index was very one-sided to describe China's economic situation.

The index of Huang and Luk (2018) is based on the news reports of ten authoritative domestic media such as Beijing Youth Daily and Beijing News, combined with the method of Baker et al. (2016) to construct the economic policy uncertainty index. Therefore, relatively speaking, the index constructed by Huang and Luk (2018) is more comprehensive and objective. This paper quotes the index constructed by Huang and Luk (2018) for research.

This paper refers to the research methods of Isil Erel et al. (2021) and the following variables are selected as control variables. Total company assets: The logarithm of total company assets is used to measure the size of a company. Sale_Growth: The growth rate of the company's operating revenue. Measures of corporate Profitability: Integrating the company's earnings before interest, tax, depreciation and amortization (EBITDA) divided by total assets. Company leverage (Lev): Company liabilities divided by total assets. Money supply growth (M2): the growth rate of M2 relative to the previous year.

3.3 Regression model

Referring to the studies of other scholars, the empirical model is set as follows:

$$Acq_{it} = \beta_0 + \beta_1 Cash_{it} + \beta_2 GDP\_Growth_{it} + \beta X_{it} + \varepsilon_{it} \tag{1}$$

$$Acq_{it} = \beta_0 + \beta_1 Cash_{it} + \beta_2 GDP\_Growth_{it} + \beta_3 Cash \times GDP\_Growth_{it} + \beta X_{it} + \varepsilon_{it} \tag{2}$$

$$Acq_{it} = \beta_0 + \beta_1 Cash_{it} + \beta_2 LGDP\_Growth_{it} + \beta_3 HGDP\_Growth_{it} + \beta X_{it} + \varepsilon_{it} \tag{3}$$

$$Acq_{it} = \beta_0 + \beta_1 Cash_{it} + \beta_2 LGDP\_Growth_{it} + \beta_3 Cash \times LGDP\_Growth_{it} + \beta_4 HGDP\_Growth_{it} + \beta_5 Cash \times HGDP\_Growth_{it} + \beta X_{it} + \tag{4}$$

Where i represents the company, t represents the year, and ε_{it} represents the error term. X_{it} represents the control variable. In this paper, Isil Erel et al. (2021) proposed that the control variables of the above four models include Asset, Sale_Growth, Profitability, and Assets squared.

Although the dependent variable is a binary discrete variable, this study is consistent with that of Isil Erel et al. (2021) because the regression model contains interaction terms and there are well-known serious problems in probit or Logit in explaining interaction coefficients (Ai and Norton (2003)). Linear probability models are used to estimate the equations.

$$Acq_{it} = \beta_0 + \beta_1 epu\_HL_t + \beta_2 m2_t + \beta_3 GDP\_Growth_t + \beta_5 Asset_{it} + \beta_6 Cash_{it} + \beta_7 Lev_{it} + \alpha_i + \varepsilon_{it} \tag{5}$$

Where i represents the company, t represents year, α_i represents individual fixed effect, and ε_{it} represents error term. Because the dependent variable is a dummy variable with a value of 0 or 1, what this paper studies is the probability of corporate acquisition. Liu Kuifu (2019) mentioned in his study that there would be some errors in using the traditional linear regression model, so this paper chose to use the nonlinear panel model probit regression.

4. Data

This study uses data related to corporate acquisitions in China's A-share market from 2011 to 2020 and macroeconomic variables such as national GDP from 2011 to 2020. The data related to the company's acquisition comes from CSMAR database and Ruisi database, and the data related to the national macroeconomic situation comes from the official websites of the National Bureau of Statistics. In this paper, the obtained data are processed as follows. First, as financial companies mostly have a large proportion of liabilities in their assets, which will affect the empirical results, samples of acquisition events of listed financial companies such as banks, securities brokers and insurance institutions are excluded. Second, delete the samples with missing control variables; Thirdly, delete the samples that select listed companies as sellers to ensure that the empirical research is carried out from the perspective of listed companies. Fourth, eliminate the sample of the announced acquisition transaction size below one million yuan; Fifth, the acquisition samples coded as "debt restructuring", "share repurchase" and "asset replacement" were excluded. In addition, if a listed company has

multiple acquisition events in the same year, only one acquisition event is counted, and only the first acquisition completed by the listed company in the same year is retained. Finally, 25879 observations were obtained. In order to prevent the influence of outliers on the regression results, the continuous variables were winsorized at the level of 1%.

Firstly, this paper conducts statistical analysis on the obtained data, and the results are shown in the following table. As can be seen from Table 1, the average GDP growth rate of China is 0.089339 and the median is 0.085334, which indicates that China's economy is in a stage of high growth on the whole. From 2011 to 2020, the probability of acquisition in China's stock market reached 42.5155% on average.

Table.1. Sample distribution

Variable	Average	Median	Max	Min
Acq	0.425155	0	1	0
Cash	0.159693	0.122304	0.999993	-0.164788
GDP_Growth	0.089339	0.085334	0.183978	0.025352
High_GDPG_rowth	0.170286	0	1	0
Low_GDP_Growth	0.227087	0	1	0
UnGDP_Growth	-9.12E-05	0.000232	0.014797	-0.021061
Epu	4.95253	4.947828	5.11044	4.828536
Mpu	1.944988	1.590188	4.430272	1.480165
EXpu	1.899028	1.569032	4.09148	1.474998
Tpu	2.13868	1.572045	5.523662	1.502316
Fpu	2.021352	1.566153	4.907707	1.522347
Asset	22.11361	21.95272	28.63649	15.71515
Sale_Growth	0.204478	0.111966	3.93601	-0.617089
Profitability	0.073716	0.073411	0.263683	-0.286534
Lev	0.440084	0.430685	0.973384	0.052957
M2	0.119599	0.113331	0.197331	0.08174

As can be seen from Table 2, the number of listed companies in China's stock market has gradually increased since 2011, and the acquisition rate in the market has been on the rise in the past 10 years. Even when the epidemic has a huge impact on the national economy in 2020, the acquisition rate in the market has reached 39.64%.

Table.2. Sample by year

Year	N	Acquisition	GDP Growth Rate
2011	1669	0.336129419	0.183978104
2012	2019	0.331352155	0.103782742
2013	2255	0.341019956	0.100975315
2014	2387	0.36196062	0.085333908
2015	2431	0.436034554	0.070381785
2016	2546	0.507069914	0.083524938
2017	2738	0.515704894	0.114739358
2018	3013	0.500497843	0.104857464
2019	3376	0.445201422	0.07786952
2020	3446	0.396401625	0.025352482

Note: The acquisition rate is calculated based on the percentage of companies that made at least one acquisition during a financial year. The average GDP growth rate of China is calculated. As shown in Table 2, GDP growth rate lags one year.

5. Estimating the effects of cash and macroeconomic conditions on acquisition likelihoods

In order to clarify the influence of corporate cash holdings and macroeconomic environment on corporate acquisition behavior, this study takes a-share market data as A sample to estimate the possibility of corporate acquisition in A specific year.

At the same time, Isil Erel et al. (2021) also pointed out in the study that the characteristics of the company itself affect its cash holding and acquisition ability, so it is necessary to add the company-specific fixed effect into the regression. Therefore, this paper studies the influence of cash on acquisition decisions of specific companies. As a result, the larger the company is, the stronger its financing ability will affect the major investment decisions of the enterprise. Therefore, this paper takes the total assets of the company as the measurement index of the size of the company, and takes logarithm as one of the control variables. More profitable companies and more growth companies are more likely to make acquisitions, so include these two factors in the regression. Finally, the regression contains the GDP growth rate with a lag of one year. When this variable is not included in the regression, the year fixed effect is added to the equation to control for any potential time-varying omissions. The regression results are shown in Table 3.

Table.3. The influence of cash on corporate acquisition probability in fiscal year under macroeconomic conditions

Model	Dependent Variable:*Acq*			
	(1)	(2)	(3)	(4)
Constant	2.376624** (2.273939)	2.560016** (2.446816)	2.499372** (2.394788)	2.607547** (2.496518)
Cash	0.248457*** (7.317524)	0.474496*** (6.414562)	0.242173*** (7.151676)	0.215477*** (5.670804)
GDP_Growth	0.156113* (1.725041)	0.506355*** (3.717119)		
Cash×GDP_Growth		-2.23144*** (-3.439265)		
LGDP_Growth			-0.016867** (-2.307289)	-0.03908*** (-3.378315)
Cash×LGDP_Growth				0.153376** (2.485687)
HGDP_Growth			0.032589*** (4.063455)	0.029716** (2.310779)
Cash×HGDP_Growth				0.0176 (0.289378)
Control variables	*yes*	*yes*	*yes*	*yes*
Firm FE	*yes*	*yes*	*yes*	*yes*
No. of obs.	25879	25879	25879	25879
Adj.R^2	0.11516	0.115589	0.116078	0.116245

Note: ***, ** and * represent significant at 1%, 5% and 10% confidence levels respectively.

5.1 The impact of company's cash holding level

As can be seen from Table 3, the regression result of model (1) reflects the influence of cash on acquisition possibility, with a regression coefficient of 0.248457, which is significant at 1% confidence level, meaning that the possibility of company acquisition increases with cash level. As can be seen from Table 1, the standard deviation of cash is 0.13, so if the cash holding level increases by one standard deviation, the possibility of company acquisition will increase by 3.23%. This result is basically consistent with Isil Erel et al. (2021). In addition, in the four regression models in Table 3, the coefficients of variable Cash are all significantly positive at 1% level, indicating that the company's Cash holding level has a positive impact on the possibility of acquisition, which is a robust result.

According to statistics, cash is the main means of payment for corporate acquisitions in China, accounting for more than 80% of all payment methods. Therefore, the higher the company's cash level, the fewer restrictions on managers, and the more likely the company is to make significant investment activities. This result confirms hypothesis 1 above.

5.2 The impact of macroeconomic conditions

If financial markets allowed companies to trade cost-free at the fundamental value of their assets, there would be no need for companies to hold cash because they would not have the problem of financing constraints. However, this is not the case. When the country's macroeconomic situation is good and the financial market is active, companies can easily raise funds in the market, so it is wise to hold a lower level of cash. However, when the economic situation becomes severe and enterprises generally face greater financing constraints, cash will be very important for enterprises, and only enterprises with sufficient cash can carry out investment activities. Therefore, the macroeconomic situation has an impact on the acquisition behavior of enterprises in theory.

Model (1) in Table 3 reflects the influence of national macroeconomic situation on corporate acquisition behavior. The coefficient of GDP_Growth is 0.156113 and is significantly positive, which indicates that the higher the GDP growth rate of the country where the enterprise is located, the more likely the enterprise will conduct acquisition activities. Even after controlling for corporate cash holdings, GDP growth positively affects the likelihood of acquisitions in a given year. One standard deviation of GDP growth increases the probability of corporate acquisitions by 0.5%. That is, the occurrence of acquisition time is cyclical.

In the regression results of model (2) in Table 3, the coefficient of interaction term between GDP_Growth and Cash is -2.23144, which is significant at the confidence level of 1%, indicating that the influence of corporate Cash level on acquisition is counter-cyclical. When the macroeconomic situation deteriorates, cash is a strong incentive for companies to make acquisitions.

In addition, based on the ideas of Isil Erel et al. (2021), this study identifies high AND low GDP growth rates and adds them into the regression model. According to the regression coefficient of LGDP_Growth and HGDP_Growth in column 3 of Table 3, when the macro economy is good, the possibility of corporate acquisition increases by 3.2%. The likelihood of a company buying a business is 1.7 per cent less likely when the macro economy is weak. According to the interaction term regression coefficients of LGDP_Growth and HGDP_Growth and Cash respectively in column 4 of Table 3, the coefficient of LGDP_Growth is significantly -0.03908, and the coefficient of Cash×LGDP_Growth is significantly 0.153376. The coefficient of HGDP_Growth is 0.029716, while the coefficient of Cash×HGDP_Growth is not significant. Therefore, by comparison, it can be found that cash has a greater impact on acquisitions when the macroeconomic environment is depressed, because it is more difficult for enterprises to obtain external financing at this time, and cash can alleviate financing needs in investment activities to some extent. This result confirms hypothesis 2 and hypothesis 3.

5.3 Payment method of merger and acquisition

According to the above analysis, a higher level of cash holdings promotes the acquisition of enterprises, and greatly reduces the impact of corporate acquisition behavior on the sluggish economic environment. Then, if the enterprise acquirements in the form of stock payment, the probability of acquisition will not be affected by the economic environment. To further prove this point, grouping regression was performed on the sample data by acquisition payment method. The dependent variables are Eacq (whether the acquisition with equity payment takes place) and Cacq (whether the acquisition with cash payment takes place) respectively, as shown in Table 4.

As can be seen from the data in Column 1 of Table 4, the coefficient of GDP_Growth is not significant, and the possibility of stock financing acquisition does not change with the business cycle. In the second column, the coefficient of GDP_Growth is 0.348778, which is significant at the 1% confidence level, and the interaction term coefficient of Cash and GDP_Growth is -2.76966, which is

significant at the 1% confidence level, which is consistent with the previous conclusion that the influence of corporate Cash level on acquisition is anti-economic cycle.

Table.4. Probability of acquisition under different payment methods

Dependent Variable	*Eacq*	*Cacq*
Constant	-0.550471 (-1.413384)	1.407239 (1.38291)
Cash	0.037641 (1.368466)	0.517753*** (7.204392)
GDP_Growth	-0.036567 (-0.717033)	0.348778*** (7.204392)
Cash×GDP_Growth	-0.296041 (-1.227653)	-2.76966*** (2.617565)
Control variables	yes	yes
Firm FE	yes	yes
No. of obs.	25879	25879
Adj.R^2	0.123187	0.247369

Note: ***, ** and * represent significant at 1%, 5% and 10% confidence levels respectively.

5.4 The impact of macroeconomic policies

In order to understand the specific impact of macro-economic policy uncertainty on corporate acquisition behavior, this paper uses model (5) to conduct regression, and the regression results are shown in Table 5:

Table.5. Probit model regression results

Model	(1)	(2)	(3)	(4)	(5)
Constant	-0.5559 (-1.0301)	-1.3612 *** (-8.9699)	-1.3582 *** (-8.9348)	-1.3526 *** (-8.9070)	-1.3677 *** (-9.0217)
Epu	-0.2141** (-1.9823)				
Mpu		-0.0759 *** (-8.8593)			
EXpu			-0.0817 *** (-8.4276)		
Tpu				-0.0589 *** (-8.9803)	
Fpu					-0.0666 *** (-8.9405)
Cash	0.2673*** (3.9942)	0.2689*** (4.0171)	0.2678*** (4.0008)	0.2698*** (4.0302)	0.2697*** (4.0290)
Sale_Growth	0.1283*** (8.7252)	0.1239*** (8.4119)	0.1240*** (8.4221)	0.1245*** (8.4573)	0.1241 (8.4277)
Lev	0.0022 (0.0478)	0.0056 (0.1223)	0.0047 (0.1013)	0.0053 (0.1155)	0.0056 (0.1224)
M2	-2.6605*** (-9.4704)	-3.6310 *** (-14.0714)	-3.5983*** (-13.9442)	-3.9137*** (-14.5529)	-3.6974 (-14.2104)
Profitability	-0.0407 (-0.3393)	-3.6310 (-0.4584)	-0.0557 (-0.4637)	-0.0561 (-0.4664)	-0.0553 (-0.4603)
Asset	0.0758*** (11.19101)	-0.0551*** (11.2393)	0.0762*** (11.2500)	0.0763*** (11.2630)	0.0762*** (11.2477)
No. of obs.	25879	25879	25879	25879	25879

Note: ***, ** and * represent significant at 1%, 5% and 10% confidence levels respectively. The values in parentheses are the Z statistic.

As can be seen from the regression results of Table 5, no matter the uncertainty of overall economic policy, subdivided uncertainty index of monetary policy, uncertainty of exchange rate and capital control policy, uncertainty of trade policy, and uncertainty of fiscal policy, all have a very significant negative effect on enterprise acquisition. This may be because the uncertainty of policies increases the cost of enterprises' investment activities, leading to more inclined to wait and see. This result confirms hypothesis 4.

6. Endogenous problems

There are potential endogeneity problems in this study. The company may have had acquisition plans in mind at an earlier stage and therefore actively accumulated cash to meet future payment needs, rather than because the level of cash held by the company affected the company's acquisition activities. In addition, Isil Erel et al. (2021) point out that cash holdings may be due to the expectation of funds required for future acquisitions, or may be due to economy-wide or company-specific factors. Companies adjust their cash holdings based on their expectations of future macroeconomic conditions. In addition, managers adjust the company's cash holdings based on their expectations of investment opportunities. Each of these factors can lead to a false relationship between a company's cash and investments.

Therefore, this paper uses the following two methods to solve the endogeneity problem.

6.1. Unexpected macroeconomic growth

This paper refers to the study of Barro (2000), recalculates The GDP growth rate as the unexpected GDP growth rate, namely UnGDP_Growth, and makes regression again. Where, UnGDP_Growth is the residual of regression as follows.

$$GDP\_Growth_t = \alpha_0 + \alpha_1 GDP\_Per_t + \alpha_2 GDP\_Per_t^2 + \alpha_3 Inflation_t + \alpha_4 Gov/GDP_t + \alpha_5 Term/Trade\_Growth_t + \varepsilon_t \tag{6}$$

Where, GDP_Per_t is the logarithm of per capita GDP in the t year. $Inflation_t$ is the inflation rate in the t year. In this paper, the annual average growth rate of CPI is used instead. Gov/GDP_t is proportion of government purchases in GDP in year t. $Term/Trade\_Growth$ represents the growth rate of the ratio of export to import prices in the year t. ε_t stands for random interference term. After obtaining the value of UnGDP_Growth sequence, Acq was used as the dependent variable for regression, and the results were shown in Table 6.

Table.6. The impact of unexpected GDP growth

Model	(1)	(2)
Cash	0.069128*** (2.720873)	0.065808*** (2.58905)
UnGDP_Growth	0.503126** (2.320858)	1.438098*** (4.184604)
Cash×UnGDP_Growth		-5.999639*** (-3.505603)
Control variables	yes	yes
No. of obs.	22433	22433
Adj.R^2	0.122893	0.122787

Note: ***, ** and * represent significant at 1%, 5% and 10% confidence levels respectively.

As can be seen from the results in Table 6, in the regression of model (1), the coefficient of UnGDP_Growth is 0.503126, which is significantly positive at the confidence level of 5%. The results are consistent with model (1) in Table 3. It shows that better macroeconomic conditions promote the occurrence of enterprise acquisition activities. In the second column of Table 3, the coefficient of

interaction term Cash×UnGDP_Growth is -5.999639, and the coefficient of UnGDP_Growth is 1.438098, both of which are significant at the confidence level of 1%, consistent with the regression results of model (2) in Table 3. This shows that enterprises change their cash holdings according to their expectations of macroeconomic conditions, eliminating the endogenous problem.

6.2. Instrumental variable method

Although in the previous part, by reestimating the GDP growth rate of the index, and found that firms change their cash holdings according to their expectations of macroeconomic conditions. However, it is still not possible to determine whether the correlation between cash holdings and firm investment is causal or whether firms change the outcomes of cash and investment as a function of investment opportunities. Fresard (2010) found through research that lagging cash level would be an effective instrumental variable of current company cash level. Therefore, this paper uses the amount of Cash lagging one and two periods to estimate the Cash of the current period, and conducts regression analysis. Regression results of instrumental variables are shown in Table 7.

Table.7. Instrumental Variable Estimation

Model	Dependent Variable:Acq				Dependent Variable:$Cash(t)$
	(1)	(2)	(3)		(4)
$Constant$	3.1397*** (2.7155)	3.3332*** (2.8749)	3.3893*** (2.9289)	$Constant$	1.8382*** (10.4546)
$\widehat{Cash}$	0.3688*** (3.6489)	0.5859*** (4.3530)	0.2881*** (2.7661)	$Cash(t-1)$	0.387194*** (55.9104)
$GDPG$		0.4254** (2.4421)		$Cash(t-2)$	0.001175 (0.1876)
$\widehat{Cash}\times GDPG$		-2.4627** (-2.4670)		$Sale\_Growth$	-0.0004 (-0.3866)
$LGDP\_Growth$			-0.0583*** (-4.1130)	$Asset$	-0.1464*** (-9.2090)
$\widehat{Cash}\times LGDP\_Growth$			0.2973*** (3.5779)	$Profitability$	0.1498*** (17.2440)
$HGDP\_Growth$			0.0117 (0.7276)	$Asset^2$	0.0030*** (8.3706)
$\widehat{Cash}\times HGDP\_Growth$			0.1135 (8.3706)	$No.\ of\ obs.$	21918
$Control\ variables$	yes	yes	yes	$Adj.R^2$	0.614048
$No.\ of\ obs.$	21918	21918	21918		
$Adj.R^2$	0.123568	0.123782	0.124867		

Note: ***, ** and * represent significant at 1%, 5% and 10% confidence levels respectively.

By comparing the results in Table 7 with those in Table 3 and Table 5, it can be found that the coefficients and significance of variables in Table 5 do not change much compared with those in Table 3 and Table 5. Therefore, the endogeneity of cash holdings is not an important factor to be considered in this study.

7. Conclusion

Based on the data of listed companies in China's A-share market from 2011 to 2020, this paper deeply discusses the influence of corporate cash holding level and macroeconomic environment on

corporate acquisition behavior through regression analysis. Firstly, this paper divides the influence of macroeconomic environment on corporate acquisition behavior into macroeconomic boom state and macroeconomic policy uncertainty. Theoretically, the level of cash holdings of enterprises will affect the acquisition of enterprises, but this "influence" will also be affected by the degree of macroeconomic prosperity, thus presenting different sizes and significance of "influence" under different GDP growth.

First of all, hypothesis 1, hypothesis 2 and hypothesis 3 of this paper are verified by empirical study. Generally speaking, the higher the level of corporate cash holdings, the higher the possibility of corporate acquisition. The better the country's economic situation is, the higher the GDP growth rate is, and the higher the possibility of acquisition is. When the economic situation is poor and the GDP growth rate is low, the high level of cash holdings of enterprises will promote the occurrence of corporate acquisitions, and the promotion effect of cash is very significant. This is because when the economic situation is poor, enterprises face the problem of financing difficulties, and the high level of cash holdings can meet the needs of enterprises' investment activities. When the economy is good, the promotion effect of high level of cash holding on corporate acquisition is not obvious. This is because when the overall economic situation is better, financial markets are buoyant and financing is cheaper and easier for companies. Companies can use financial markets to fund their investment activities without the need to maintain high levels of cash holdings.

Secondly, by taking the uncertainty index of economic policy as the explanatory variable and the regression of whether a company has acquired a company as the explained variable, it is found that the five uncertainty indicators have a negative impact on the acquisition behavior of enterprises. This is consistent with the expected cost of financing theory. The uncertainty of economic policy increases the potential financing cost of enterprises, and the acquirers are worried about the rising financing cost they may face in the future in the monetary tightening environment, which will affect the company's operation (Adra et al., 2020). This confirms hypothesis 4 of this paper.

Finally, in order to solve the endogeneity problem and get a more robust conclusion, this paper uses two methods to re-estimate the GDP growth rate and corporate cash holding level respectively, and draws a conclusion consistent with the above content through instrumental variable regression.

In addition, the research of this paper also has the following deficiencies. For example, the dependent variable corresponding to the acquisition of enterprises within one year is 1. This does not take into account the fact that a company may acquire several times in a year. This paper focuses on whether the acquisition has taken place, without paying attention to whether the acquisition is successful or not, and the performance after the acquisition. As a result, the research content of this paper is not rich enough, and these two aspects need to be further improved in the future research.

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