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Financial crisis and high-cash conservative policy

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Abstract

A growing number of firms holding high quantities of cash has led to rising academic interest for this topic over the last three decades. As a result, there have been many studies investigating the determinants of this tendency called financial conservatism. This paper investigates the problem of the impact of the global financial crisis on the determinants of the probability of following a financially high-cash conservative policy. It defines a firm as being financially high-cash conservative if its cash holdings ratio is more than 15% in a particular year. Analyzing two large samples of non-financial Canadian firms referring to both pre-crisis and post-crisis periods, it provides evidence that there is a significant influence of the financial crisis on the characteristics of being high-cash conservative. The findings indicate that after the financial crisis size and dividend have become significant determinants. This means that companies following the high-cash conservative policy are more likely to be smaller and do not pay higher dividends as compared to their prior-crisis counterparts. Moreover, size has started to have a higher marginal impact. Thus, it can be inferred that the impact of the financial crisis on the determinants of the likelihood of following the high-cash conservative policy is significant. Further research can be done on the influence of the financial crisis on the determinants of pursuing the low-leverage conservative policy and examining this effect on executive ownership structure.

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Keywords

High-cash conservatism, financial crisis, determinants, probability model, logit regression.

Introduction

A growing number of firms holding high quantities of cash has led to rising academic interest for this topic over the last three decades. As a result, there have been many studies investigating the determinants of this tendency called financial conservatism. However, there has been only limited research undertaken on the impact of the financial crisis on these characteristics. Particularly, there have been no studies done on Canadian firms. As such, the goal of this paper is to contribute to the existing literature by examining the influence of this dramatic event on the determinants of the likelihood of Canadian firms of being high-cash conservative. To do it, the article investigates the characteristics of two large samples before and after the financial crisis using a logit regression model and shows how they have changed. It also defines a phenomenon of financial conservatism in a new way. More specifically, a firm has been identified as being high-cash conservative if its annual ratio of cash and short-term investments to total assets is more than 15% in a certain year. The main findings of this research are that after the financial crisis high-cash conservative companies are smaller in size and do not pay greater dividends. The following is a breakdown of the paper's structure. The primary literature on the subject is reviewed in the next section. The empirical technique employed in this work is described in section 3. After that the data used in the analysis are presented. Section 5 provides a reader with empirical results. Finally, Section 6 concludes and is then followed by references at the end.

Literature review

Various studies define financial conservatism differently. Some of them refer to high-cash companies; others consider low-leverage or zero-leverage firms. For example, Mikkelson and Partch [Mikkelson, Partch, 2003] describe firms pursuing a financial conservative policy as ones having high cash holdings. Specifically, a firm is being conservative if its annual ratio of cash and cash equivalents to total assets is more than one forth for 5 consecutive years. The authors use a sample of 89 publicly traded US companies following a high-cash conservative financial policy between 1986 and 1991 years. During the following 5 years these companies are then compared with two sets of firms: nonconservative ones matching to them by industry and size and firms pursuing the financially conservative policy temporarily. To find the relationship between operating performance and high cash holdings, in addition to a logit model approach, the authors employ 2 extra tests. The first test is 2 steps OLS regression where cash holdings in 1991 are used as a dependent variable in the first equation and operating performance from 1992 to 1996 in the second one. The second test is based on matching tendency of sample and temporarily conservative firms to retain substantial quantities of cash and then comparing performance of the groups having similar propensity. The logit model is used to identify tendency score ranging from 0 to 1. The third test is the cross-sectional investigation of performance variation across the sample of high-cash conservative businesses. Overall, the findings of these three tests reveal that operating performance in the ensuing 5 years is not affected detrimentally by high cash holdings. Additionally, the authors find that firms adopting the persistent financial high-cash conservative policy have a lower number of operating assets, higher level of total investments, and greater market-to-book ratio.

Magerakis et al. [Magerakis et al., 2020] investigate the determinants of cash holdings in the post-crisis period. They use a sample of 992 non-financial listed UK companies with the total number of 6629 annual firms’ observations between 2010 and 2018 years. The main finding of this research is

that smaller firms tend to hold a higher amount of cash. Furthermore, firms with higher cash holdings have lower leverage, net working capital, capital spending, and lesser liquid assets, whereas higher market-to-book ratios, and R&D expenditures. The results on leverage and size can be supported by Le et al. [Le et al., 2018] who also come to the same conclusion by studying a sample of non-financial listed UK firms constituting the FTSE 100 Index between 2011 and 2016 years.

Drobetz and Gruninger [Drobetz, Gruninger, 2006] (2006) also look at the determinants of cash holdings. In their analysis they use a sample of 156 non-financial public Swiss companies with the total number of 1299 annual firms' observations from 1995 to 2004. Their results are partially consistent with the prior literature. They find that cash holdings are negatively correlated with asset tangibility and company size whereas positively connected to stock dividends and operational cash flows. However, as opposed to Mikkelson and Partch [Mikkelson, Partch, 2003], Magerakis et al. [Magerakis et al., 2020], and Rizwan and Javed [Rizwan, Javed, 2011], the relationship between cash holdings and market-to-book ratio appears to be insignificant.

On the contrary, according to Minton and Wruck [Minton, Wruck, 2001], a company is defined as being financially conservative when its yearly ratio of long-term liabilities to total assets belongs to the lowest 20% of all sample firms over a five-year period. The analysis is conducted using a sample of 5613 US firms with 46,675 annual observations between 1974 and 1998 years. The authors study all these firms and investigate the determinants of following a financially low-leverage conservative policy. They employ a logit analysis during the research. The main results of this work are that in comparison to non-conservative firms, financially conservative ones have higher cash flows and balances of funds. As far as other determinants are concerned, in general market-to-book ratio is higher and size is smaller for low-leverage conservative companies. In addition to it, the authors also show that financial conservatism is not a phenomenon which is based on a specific industry. However, firms following the financial conservative policy occur more frequently in the industries that are perceived to be more vulnerable to financial distress.

Iona and Leonida [Iona, Leonida, 2016] challenge both previous views of financial conservatism and study low-leverage and high-cash holdings strategies jointly by calling it an extreme financial policy. In addition to it, they investigate whether executive ownership affects the probability of adopting this policy. A logit regression model is employed in this research. To execute the analysis, the authors use a sample of 1196 nonfinancial public UK companies with 14,317 annual observations from 1990 to 2007. According to Iona and Leonida (2016), a firm is said to be conservative if its leverage (cash ratio) is less (more) than the first (last) interior minimum of leverage (cash ratio) distribution during that year. It is then identified as being extremely conservative if it is both leverage and cash conservative. To capture persistency, the company must satisfy this condition for 3 consecutive years. The main results of this research are the following: firms that follow the extreme financially conservative policy are smaller, have higher market-to-book ratios while lower capital expenditures. The influence of executive ownership on the probability of pursuing the strategy is U-shaped: it is negative at lower levels and positive at higher levels of ownership.

Theoretical and Empirical framework

To examine the determinants of the probability of choosing the financially conservative policy, a non-linear model should be utilised. When we analyze OLS regression, the dependent variable usually has a quantitative dimension. However, in our case the dependent variable has a binary structure. More specifically, it takes the value of one if the firm is financially cash conservative, and zero otherwise. In

this case, the fitted values obtained using the OLS regression are the likelihoods of the firms to adopt the financially conservative policy. It is called a linear probability model. However, there is a problem associated with this linear approach. Since the regression line is not restricted, the probabilities of being financially conservative can take nonexistent values which are higher than 1 or lower than 0. To overcome this issue, a non-linear approach constrained between 0 and 1 should be employed. More specifically, we use linear equation (1) as an index function to model the probability as equation (2), where e is exponential.

$$Y_i = \alpha + \beta_1 X_1 + u_i \quad (1),$$

where $Y_i = 1$ if the firm follows the high-cash conservative policy, and 0 otherwise.

$$\Pr [Y_i = 1 \mid X_1] = \frac{1}{1+e^{-(\alpha+\beta_1+u_i)}} \quad (2)$$

Referring to the second model, if $\alpha+\beta_1 X_1 + u_i$ goes to infinite, then the probability goes to 1. On the other hand, if $\alpha+\beta_1 X_1 + u_i$ goes to minus infinite, then the probability goes to 0. Hence, any value in the parentheses yields the probability of being financially conservative restricted between 0 and 1. The obtained non-linear model is called a logit estimator. The model is also applicable if we have 2 or more regressors. The Stata software will be employed to perform this analysis.

It is also possible to use a probit model under the circumstances discussed above. Both models produce very similar results. For this research, the former is chosen.

Based on the literature there is evidence that leverage, size, capital expenditures, market-to-book ratio, and dividends can have a significant impact on the decision to hold a higher amount of cash. Thus, these independent variables will be included in the regression for examining high-cash conservatism.

As we want to analyze firms following a high-cash conservative policy, the dependent variable in our case is cash holdings respectively.

Table 1 - Definition of the variables

Variable	Definition
Cash holdings (Cash)	The ratio of cash and short-term investments (CHE) to total assets (AT)
Leverage	The ratio of long-term debt (DLTT) plus debt in current liabilities (DLC) to total assets (AT)
Size	The natural logarithm of total assets (AT)
Market-to-book (Mtb)	The ratio of total market value (MKVALT) to total assets (AT) minus total liabilities (LT)
Capital expenditures (Capex)	The ratio of capital expenditures (CAPX) to total assets (AT)
Dividend	The ratio of total dividends (DVT) to total assets (AT)

To estimate the marginal impact, we should take the first derivative of Y (explained variable) with respect to X (explanatory variable):

$$\frac{\partial Y}{\partial X} = \beta * \Lambda * (1-\Lambda), \text{ where } \Lambda = \frac{1}{1+e^{-(\alpha+\beta_1 X_1)}} \quad (3)$$

The marginal impact shows an incremental change of the probability by increasing the variables

by 1%.

The problem of heteroscedasticity may arise in the analysis. This issue can lead to misleading and biased estimations of the coefficients. To address it, a robust standard errors technique should be used.

Since we have a panel structure of the data, we will use random effects in this analysis.

Hypotheses proposed in this research are the following:

Before the financial crisis firms following a high-cash conservative policy have lower leverage and size, spend less on capital, have higher market-to-book and dividend ratios.

After the financial crisis firms pursuing a high-cash conservative policy have lower leverage and size, spend more on capital, have higher dividend, and market-to-book ratios.

Data description

There are 2 samples in our analysis. One of them refers to the pre-crisis period (1998-2007 years) while the other one covers the post-crisis one (2009-2018 years). The data are collected from the Compustat North America database provided by Wharton Research Data Services (WRDS). Financial businesses are not included in the samples. During the chosen periods, we also eliminate annual observations which have missing information on one of the variables included in the model. In addition, small companies with less than 10 million dollars of total assets are also excluded from the samples. It provides us with 4810 firm-year observations of 534 non-financial public Canadian companies for the first period, and 5240 firm-year observations of 582 non-financial public Canadian firms for the second one.

Table 2

Variable	Mean (1)	Mean (0)
Cash	.3488059	.0381102
Leverage	.0937525	.2643557
Size	5.307248	6.471202
Cap ex	.0731892	.0844404
Mtb	2.3305	1.326925
Sales	5.980864	4.179866
Dividend	.0206629	.018681

Descriptive statistics for analysis of cash conservatism before the financial crisis. Note: (1) represents firms following high-cash conservative policy, (0) – other firms from the sample

Table 3

Variable	Mean (1)	Mean (0)
Cash	.3581721	.0444397
Leverage	.0963359	.2677436
Size	5.162713	6.478735
Cap ex	.0747441	.0722281
Mtb	1.795674	1.046542
Sales	5.343302	3.305756
Dividend	.0217681	.0178343

Descriptive statistics for analysis of cash conservatism after the financial crisis. Note: (1) represents

firms following high-cash conservative policy, (0) – other firms from the sample.

Empirical results

The findings of this work will be divided into two parts: before the financial crisis and after the financial crisis. Firstly, we will report the results before and then after the financial crisis.

Table 4 - Logit regression for high-cash conservative firms before the financial crisis

Log pseudolikelihood	**-1851.1694**				**Wald chi2(5)= 111.32 Prob > chi2 = 0.0000**	
Cashc	**Coef.**	**Robust Std. Err.**	**z**	**P>|z|**	**[95% Conf. Interval]**	
Leverage	-6.036407	1.783929	-3.38	0.000	-9.532843	-2.53997
Size	-.1140629	.1383675	-0.82	0.330	-.3852583	.1571324
Capex	-3.079717	1.838661	-1.67	0.122	-6.683426	.5239909
Mtb	.3836622	.1994228	1.92	0.049	-.0071992	.7745237
Dividend	2.262223	.8049379	2.81	0.002	.6523472	3.872098
_cons	-.8724015	.9491709	-0.92	0.358	-2.732742	.9879394

Table 4 illustrates that the coefficient of leverage is negative and significant, the coefficient of mtb is positive and significant at 5%, and the coefficient of dividend is also positive and significant. This means that firms following a high-cash financially conservative policy have lower leverage, but higher mtb and dividend ratios. The coefficients of size and capex are not significant.

Table 5 - Logit regression for high-cash conservative firms after the financial crisis

Log pseudolikelihood	**-2154.251**				**Wald chi2(5) = 157.23 Prob > chi2 = 0.0000**	
Cashc	**Coef.**	**Robust Std. Err.**	**z**	**P>|z|**	**[95% Conf. Interval]**	
Leverage	-4.070233	1.751036	-2.32	0.000	-7.5022	-.638265
Size	-.6651935	.1349704	-4.93	0.000	-.9297306	-.400656
Capex	.9265318	1.186928	0.78	0.435	-1.399805	3.252869
Mtb	.1902967	.0846113	2.25	0.025	.0244616	.3561318
Dividend	3.386112	3.683455	0.92	0.358	-3.833327	10.60555
_cons	2.010057	.608759	3.30	0.001	.8169118	3.203203

According to Table 5, the coefficients of leverage and size are negative and significant, the coefficient of mtb is positive and significant at 5% significance level. This means that firms following a high-cash conservative policy are smaller in size, have lower leverage, and are more likely to have a higher mtb ratio. The coefficients of capex and dividend are not significant.

As compared to the results obtained before the financial crisis, size has become a significant determinant whereas dividend has ceased to be an important one.

If we compare these results with the literature and proposed hypotheses, the before crisis findings are partially consistent with the views of Mikkelson and Partch (2003), Magerakis et al (2020), and Iona and Leonida (2016). The differences are that size and capex turn out to be insignificant determinants. The after-crisis results are also not completely in line with the proposed hypotheses and previously discussed literature. It is due to insignificance of the capital spending and dividend payout

ratios.

Table 6 - The marginal impacts of the determinants on the probability of adopting a high-cash conservative policy before the financial crisis

	dy/dx	Std. Err.	z	P>|z|	[95% Conf. Interval]	
Leverage	-.5262598	.1718495	-3.06	0.000	-.8630787	-.189441
Size	-.0099441	.0121388	-0.82	0.375	-.0337356	.0138474
Capex	-.2684928	.1608648	-1.67	0.193	-.583782	.0467965
Mtb	.033448	.017074	1.96	0.048	-.0000164	.0669125
Dividend	.1972228	.0643444	3.21	0.001	.0806223	.3328478

Table 7 - The marginal impacts of the determinants on the probability of adopting a high-cash conservative policy after the financial crisis

	dy/dx	Std. Err.	z	P>|z|	[95% Conf. Interval]	
Leverage	-.4949157	.1490236	-2.31	0.000	-.7369966	-.0928349
Size	-.0563692	.0110078	-5.12	0.000	-.077944	-.0347943
Capex	.0785153	.100045	0.78	0.233	-.1175693	.2745999
Mtb	.0361259	.0072424	2.23	0.026	.001931	.0303208
Dividend	.1869426	.3118871	0.92	0.358	-.2243449	.7982301

As can be seen from the analysis, the most noticeable distinction between Tables 6 and 7 is that size has a higher marginal impact after the financial crisis.

At the end of the work, we merge the data before and after the financial crisis and analyze the whole period from 1998 to 2018.

Table 8 - Comparing the determinants of high-cash conservatism of the whole period with two subsamples (before and after the financial crisis)

	1998-2018	1998-2007	2009-2018
Leverage	-4.993193*** (1.039577)	-6.036407*** (1.783929)	-4.070233*** (1.751036)
Size	-.3266198*** (.0699213)	-.1140629 (.1383675)	-.6651935*** (.1349704)
Cap ex	-1.753983 (.9891914)	-3.079717 (1.838661)	.9265318 (1.186928)
Mtb	.1749508** (.1382014)	.3836622** (.1994228)	.1902967** (.0846113)
Dividend	4.465842** (1.815129)	2.262223*** (.8049379)	3.386112 (3.683455)

Note: The standard errors are demonstrated in parentheses below the estimated coefficients. ***, **, and * denote significance levels at 1%, 5%, and 10% respectively.

Table 8 demonstrates that leverage is negative and significant while market-to-book is positive and significant at 5% significance level across all periods. The coefficient of size is negative and significant during the entire period while it turns out to be insignificant before the financial crisis and significant after it. On the contrary, the coefficient of dividend is significant for the whole period as well as before the financial crisis but has ceased to be significant after it. There is not any significant association between the capital spending ratio and cash holdings.

Conclusion

In this research, we have investigated the determinants of the probability of being high-cash conservative before and after the financial crisis and showed how they have changed due to its impact on them. In our analysis we have employed two large samples of non-financial, public Canadian firms collected before and after this dramatic event. In addition, we have used a new definition of high-cash conservatism. More specifically, a firm has been identified as being cash conservative if its annual ratio of cash and short-term investments to total assets is more than 15% in a certain year. Our findings indicate that after the financial crisis size and dividend have become significant determinants. This means that companies following the high-cash conservative policy are more likely to be smaller and do not pay higher dividends as compared to their prior-crisis counterparts. Moreover, size has started to have a higher marginal impact. Thus, it can be inferred that the impact of the financial crisis on the determinants of the likelihood of following the high-cash conservative policy is significant. Further research can be done on the influence of the financial crisis on the determinants of pursuing the low-leverage conservative policy and examining this effect on executive ownership structure.

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Финансовый кризис и консервативная политика в отношении высокого уровня денежных средств

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Аннотация

В данной статье исследуется проблема влияния глобального мирового финансового кризиса на детерминанты вероятности следования денежной консервативной политики. Статья определяет фирму, как консервативную с денежной точки зрения, если коэффициент ее запасов наличности превышает 15% в определенном году. Анализируя две большие выборки не кредитных канадских организаций, относящиеся к пре-кризисному и

посткризисному периодам, статья свидетельствует о значительном влиянии финансового кризиса на характеристики консервативности в отношении денежных средств. Можно сделать вывод о значительном влиянии финансового кризиса на детерминанты вероятности проведения консервативной политики в отношении высоких наличных средств. Возможны дальнейшие исследования влияния финансового кризиса на детерминанты проведения консервативной политики с низким уровнем заемных средств и изучения этого влияния на структуру собственности исполнительной власти.

Для цитирования в научных исследованиях

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Ключевые слова

Денежный консерватизм, финансовый кризис, детерминанты, вероятностная модель, логистическая регрессия.

Библиография

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