Financial flexibility, managerial efficiency and firm life cycle on firm performance

An empirical analysis of Chinese listed firms

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Abstract

Purpose – As the capital market in China is still developing, several constraints on a Chinese-listed firm's financing strategy have a direct impact on its financial flexibility. The purpose of this paper is to reconstruct traditional financial flexibility index (FFI) derived from the western context, provide empirical evidence within eastern context by modified FFI and examine how the managerial efficiency of Chinese-listed firms is demonstrated with modified FFI to escort corporate life cycle hypothesis.

Design/methodology/approach – By tailored FFI to fit the contemporary operations of Chinese-listed firms, this study investigates how managerial efficiency varies across different life stages to demonstrate the moderating power in the firm performance of financially flexible firm.

Findings – It is found that financially flexible firms in the Chinese stock market generally experience good firm performance, yet the managerial efficiency could gradually be diminishing at their mature stage even firms' financial flexibility remains consistent with the agency theory. This paper sheds light on the necessity to reexamine the components in financial flexibility based on the eastern context, and provides avenue to further understand the managerial behavior of Chinese listed firms when considering firm life cycles.

Research limitations/implications – Although it is difficult for this current study to offer the precise weights on each factor in calculating financial flexibility, the judgment matrix method is adopted to at least provide reliable estimates in accordance with Chinese business contexts with less than 10 percent errors in contrast to the actual weights.

Practical implications – This modified FFI is particularly suitable for Chinese-listed firms under certain unique financial reporting regulations by adjusting a number of weights and factors. This study may help practitioners understand the managerial conduct of publicly listed firms in China.

Originality/value – The paper constructs a modified FFI with Chinese stock market characteristics embedded, and provides insightful evidence to explain the new pecking order theory by considering the life cycle stage of Chinese-listed companies.

Keywords Firm performance, Life cycle, Managerial efficiency, Chinese listed firms, Financial flexibility

Paper type Research paper

1. Introduction

The dispute over the puzzling effect of financial flexibility on a firm's capital structure is continued both in research and practice as it drives managerial leverage choices (Byoun, 2007; Marchica and Mura, 2010). However, the evidence based upon prior studies is principally derived from the western context which not necessarily fits the eastern context, particularly for developing economy such as China market. Therefore, the first aim of this paper is to construct a modified financial flexibility index (FFI) to reflect the features of present Chinese stock market. Listed firms in China are prone to follow the "new pecking order theory" whereby they prefer external equity financing rather than external debt financing because of the underdeveloped bond market in China (Chen, 2004; Huang *et al.*, 2016).

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Moreover, Chinese-listed firms have been constrained to obtain cash flows by means of equity financing since the China market is contemporarily at the stage of developing. For instance, the government confines Chinese-listed firms with the dividends payout policy and seasoned offerings by equity financing, and with transaction restrictions of special treatment listed firms. Therefore, Chinese-listed firms' financial flexibility capability is of significant importance to influence their future investment.

The other purpose is to examine whether the managerial efficiency of Chinese-listed firms with modified FFI is demonstrated differently across firm life cycles. Because of numerous regulations to make firms have difficulties in acquiring cash flows to sustain financial safety, Chinese managers may opportunistically demonstrate their preferences when attaining required capitals in response to this growing economy (Wagner, 2010; Mukherjee and Mahakud, 2010). In addition, one of the characteristics of Chinese-listed firms intrigues us to re-examine the managerial efficiency at different firm life cycles because the average age of Chinese listed firms is about 17.7 years old, which could highlight the existence of agency problem along with possible managerial inefficiency (Shefrin and Thaler, 1988). Escorted to the life cycle hypothesis (DeAngelo *et al.*, 2006), young firms are generally trapped into taking future investment opportunities due to fewer resources to support, they hence make better use of managerial efficiency in business operations in contrast to firms in the other stages. Along with the economic open to foreign investments in the past decade, China markets have benefited from the continuous international cash-flow that helped China become a strong predator. Therefore, the novelty of this study lies in exploring the managerial efficiency among listed firms while adopting modified FFI, which is commonly seen in western research but rarely observed in the communism economy. Particularly, this study finds that corporate behavior in adjusting capital structure exists in China market and also varies across firm life cycle stages.

Previous studies generally use single indicator by using sole variable to proxy for financial flexibility, such as leverage for representing firms' untapped borrowing power (Billet *et al.*, 2007; Denis and McKeon, 2012; Marchica and Mura, 2010), and cash holdings (Chen *et al.*, 2017; Hoberg *et al.*, 2014; Riddick and Whited, 2009), and some other studies have considered multiple variables to measure financial flexibility by composite indicators (Arslan-Ayaydin *et al.*, 2014; Gamba and Triantis, 2008; Rapp *et al.*, 2014). Regarding that financial flexibility represents the ability of a firm effectively in response to unanticipated shocks and investment opportunities (Loderer *et al.*, 2016; Riddick and Whited, 2009), and the ability to acquire capitals at a low cost (Arslan-Ayaydin *et al.*, 2014; Gamba and Triantis, 2008), it is thus identified that basic cash holdings and potential cash inflows to produce cash flows at a low cost and financing costs to sustain corporate financial safety as the decisive factors in constructing the modified FFI to fit Chinese market. On the basis of a hierarchy analysis, the weights are assigned to the first level index factors, and then the coefficient of variation is used to further assign weights to the second level index factors. The modified FFI is thus constructed (details are shown in Section 3).

Over the past decade, the effect of managerial conduct has received considerable attention in finance and economics studies. Managers may play a role in shaping corporate outcomes by making specific managerial decisions, and may alter investors' prevailing concept of corporate practices by opportunistically manipulating internal firm resources (Bertrand and Schoar, 2003). Accordingly, it is underlined that managerial efficiency is considered as a technique to transform input resources into outputs, and hence meets shareholder prospects. Managerial efficiency is commonly regarded as the effect achieved to manage costs, and may differ across diverse firm life cycle stages when financial flexibility is documented to influence firm performance. Given the circumstances that Chinese listed firms try hard to acquire cash flows under a number of restrictions by government, when increased by size, scope and complexity along with life cycle stages, business operations

involving additional administrative costs raise the possibility of the inefficient exploitation in internal firm resources (Klein and Saidenberg, 2010; Wagner, 2010). Accordingly, young and mature firms that are more sensitive to business costs and investment inputs are more likely to conduct effective management than stagnant firms do (García-Quevedo *et al.*, 2014).

This study adopts Anthony and Ramesh's (1992) life cycle measure relying on a composite of economic characteristics, including sales growth, dividend payout, capital expenditures and firm age. As such, this life cycle measure appropriately matches the approach in this study for exploring the relationship between financial flexibility and firm performance, because these economic characteristics can distinguish the determinative sources of financial flexibility. For example, firms at an early stage of life cycle tend to make preemptive investments to create advantages over competitors until the net present value of the marginal profitability of capital becomes zero (Spence, 1977; Anthony and Ramesh, 1992). When firms allocate internal resources to make investments, their capital structure is influenced because the financial flexibility is managed (Byoun, 2008). In a similar vein, when firms are at a stagnant stage, the unexpected sales growth and capital expenditures are least valued by investors, and the conduct of managerial efficiency is thus least likely to play a full role.

In summary, this study presents the relationship between financial flexibility and firm performance, and also examines how managerial efficiency at different corporate life cycle stages can determine the focal relationship. This modified FFI is particularly suitable for Chinese-listed firms under certain unique financial reporting regulations by adjusting a number of weights and factors. This study also extends the literature on financial flexibility by exploring whether managerial efficiency varies across firm life cycle stages. The findings of this study may help scholars and practitioners understand the managerial conduct of publicly listed firms in China.

The remainder of this study is organized as follows. In next section, the research design is elaborated by constructing FFIon the basis of Chinese capital market perspective, and further demonstrating our sample data and methodology. The empirical results are provided in the third section, and the last section is conclusion.

2. Research Design

2.1 Constructing financial flexibility

2.1.1 Designing the first level index factors. Stacked on conventional wisdom, basic cash holding, potential cash inflows and financing cost are taken into consideration as the first-level index factors. The analytical hierarchy process (AHP) is adopted to determine weights for these three factors. AHP is a multi-criteria method that helps decision makers find the best solution to satisfy needs by making pair-wise comparison between factors, and the process creates weighting on each factor that ensures consistency across the factors (Boucher and McStravic, 1991; Cambron and Evans, 1991; Putrus, 1990). Table I includes the overall structure and the details of each factor.

First, the formula is modeled as a hierarchy containing the decision goal (the criticality), the alternatives for reaching it (the spare parts), and the criteria for evaluating the alternatives. Second, priorities are set among the criteria of the hierarchy (assigning weights), and a series of judgments is made based on pair-wise comparisons of the elements, and a matrix with the alternatives for each criterion is build. This step is critical because each pair of factors in the judgment matrix is compared according to their relevance. For example, if two factors are regarded as equally important, "1" is assigned. If the factor at the left column is regarded as more important than the factor on the top row, 3, 5, 7 or 9 is assigned depending on how much more important the factor on the left column is, considering Satty's 1 to 9 scale method that indicates 3 as somewhat more important,

Major factors	First level	Second level	Formula	Sign
Basic cash holdings	Cash reserves	Cash holdings	(Cash + Short-term investment)/Total assets	+
Potential cash flows	Financing ability	External spare debt capability	(1 – debt)/Total assets	+
		External equity financing capability	Assigning 1, 0.6, 0.3, 0 by WAROA criterion	+
		Internal equity financing capability	Net cash flow increment from operation divided by total assets	+
Financing cost restrictions	Financing cost	Financial safety	*Z*-score	+

Table I. The construction of modified FFI

5 as more important, 7 as much more important and 9 as extremely more important (Satty, 2000). Last, the local weights are determined for each pair of criteria, and calculated for each alternative by multiplying local weights with criteria weights and then adding it up.

Based on this judgment matrix, the weight is computed for three first-level index factors that result in Equation (1) shown as follows to calculate FFI (please see Appendix 1 for calculation details):

$$FFI_j = 0.44A_j + 0.49P_j + 0.07L_j, \tag{1}$$

where FFI_j is the financial flexibility for the jth firm, A_j is basic cash holding, P_j is potential cash inflows and L_j is financing cost.

2.1.2 Designing the second level index factors. 2.1.2.1 Estimating potential cash inflows. Potential cash inflows can come from internal cash flow and external debt and equity financing capability to generate cash flow, and it is estimated by following procedures.

The coefficient of variation is calculated for the ith factor by the following equation:

$$v_i = \frac{\sigma_i}{\overline{\chi_i}}, \tag{2}$$

where ν_i is the coefficient of variation for the ith factor, σ_i is the standard deviation for the ith factor, $\overline{\chi_i}$ is the mean value for the ith factor, and i represents internal equity financing ability, external equity financing ability and external debt financing ability.

Next, the weights are computed based on the coefficient of variation by the following equation:

$$\omega_i = \frac{v_i}{\sum_{i=1}^{3} v_i}, \tag{3}$$

where ω_i is the weight based on the coefficient of variation for the ith factor.

Finally, the factor of "potential cash inflows" is computed as follows:

$$p_j = \omega_i \sum_{i=1}^{3} I_{i,j}, \tag{4}$$

where p_j is the potential cash inflows factor for the jth company and $I_{i,j}$ is the value of jth firm's ith factor.

2.1.2.2 Internal equity financing capability. Internal financing refers to a firm using its retained earnings as a source of capital internally provided by operations, which is less

costly than debt or equity capital according to the pecking order theory (Myers and Majluf, 1984). Chinese-listed firms commonly suffer from negative cash inflows increment because a big part of them have to pay interests in the fiscal year end. Therefore, 0 is assigned if a Chinese-listed firm's beginning or year-end operating net cash flow is negative, indicating that such a firm lacks the ability to generate more cash flow. The internal equity financing capability is measured as net cash flow increment from operation divided by total assets.

2.1.2.3 External equity financing capability. Pecking order theory tells that issuing equity is the last for a firm to raise funds unless issuing debt becomes very costly (Shyam-Sunder and Myers, 1999). However, a remarkable difference in choosing the order of preference to raise capitals is that Chinese-listed firms prefer external equity financing, in contrast to other developed economies. The capital choice for Chinese-listed firms follows new pecking order – retained earnings, then external equity financing, and finally external debt financing – because of immature corporate bond market (Chen, 2004). As a result, bank loans become the sole source to get the capital needs which might be insufficient to support potential net present value investment projects. Therefore, Chinese-listed firms depend on the external equity financing to obtain cash flows.

This indicator reflects if a firm could attract investors to invest and generate cash inflows. Whether a Chinese-listed firm is qualified to pay dividends and issue seasoned offerings ascertains its capability to attract more investors. The most substantial criterion among all is that firms must have a minimum of 6 percent weighted average rate of return on net assets (WAROA) during the latest three fiscal years. Therefore, assigning numerical values is needed to a firm based on its WAROA in the past three fiscal years to measure a firm's external equity financing capability. Put it specific, if a firm's WAROA is equal to 6 percent or higher than 6 percent during the past three fiscal years (y-3), "1" is given to such a firm. If its WAROA is equal to 6 percent or higher than 6 percent during the past two fiscal years (y-2), "0.6" is given. "0" is assigned when its WAROA is smaller than 6 percent (y-1).

2.1.2.4 External spare debt capability. When encountering cash shortage, Chinese-listed firms usually rely on external debt financing to acquire cash flows. The operating characteristics of certain industries such as airlines industry entail relatively a high debt ratio since the majority of an airline company's assets is financed. According to our data, some of the debt ratio can be over 90 percent. To feature the spare capability, 1-debt ratio is used to measure this variable.

2.1.3 Cash holdings. Cash holding generally consists of a firm's cash deposit in banks and short-term investment whose purpose is to receive a higher return than deposit while still liquid enough to be converted to needed cash (Lie, 2005). This variable is thus calculated as the sum of cash and short-term investment divided by total assets.

2.1.4 Financial safety. Because financial flexibility matters with the cost of financing, which, in turn, is related to a firm's financial health (Gamba and Triantis, 2008), *Z*-score (Altman, 1968) is thus adopted to proxy for financial safety. Since the financing activities commonly occur for Chinese-listed firms to raise capitals, the underlying meaning of *Z*-score relating to a firm's operating activities can appropriately indicate a Chinese-listed firm's financial safety.

2.2 Data and sample

This study constructs the sample by obtaining required information from CCER Economic and Financial Database during the period from 2010 to 2012. The key factor to extract this study period is due to the significant impact of new Accounting Standards enacted in 2007 in China, and the reform has caused disclosing firms to lose comparability before and after 2007. Therefore, to avoid the information noise of this abnormal event on our empirical results, listed firms along with financial information are selected after 2009.

Finally our sample includes A-share 287 firms listed in Shanghai Stock Exchange and Shenzhen Stock Exchange. Financial services firms are excluded because their capital structure is likely to differ from others, and newly listed firms in recent five years are deleted to ensure that our sample firms are financially stable. Special treated firms are excluded since they have negative net profits in consecutive two years and are regulated not to deteriorate financial conditions for investors protection.

3. Empirical results

3.1 Descriptive statistics

Table II reports summary statistics of full sample for all testing variables used in our regression models. Table III reports the descriptive statistics for our major tested variables by classifying all listed firms according to four indicators for firm life cycle, i.e. sales growth, dividend payout, capital expenditures and firm age, into growth, mature and stagnant stages. This study finds that firms in their stagnant stage possess greater degree of financial flexibility (0.324) compared to firms in growth (0.237) and mature (0.266) stages. The degree of managerial efficiency and firm performance is displayed in a similar form for three stages. Firms in the stagnant stage demonstrate their weary management ability, and hence the agency problem would be easily aroused to an extent that their flexibility ability would be constrained. This finding is consistent with Anthony and Ramesh (1992).

Table IV shows the comparison of major tested variables between sub-samples. The results of these two tests are very similar with a statistical significance at the 5 and 1 percent levels.

	Notation	Mean	SD	Min.	Max.	2	3	4
1. Tobin's q	*Q*	2.054	1.306	0.734	12.196	0.220***	−0.087**	−0.002
2. Ownership	*OWN*	0.032	0.134	0.000	0.638		−0.103***	−0.001
3. Governance	*GOV*	0.233	0.435	0.000	3.972			0.123***
4. Concentration ratio	*CR*	0.504	0.175	0.000	1.484			
5. Size	*SIZE*	22.290	1.296	19.880	28.405			
6. Firm age	*AGE*	17.707	0.225	7.000	33.000			
7. Tangibility	*TANG*	0.259	0.185	0.001	0.971			
8. Dividends	*DIV*	0.088	0.132	0.000	1.000			
9. Financial flexibility	*FFI*	0.278	0.126	0.020	0.722			
10. Managerial efficiency	*ME*	0.089	0.097	0.002	1.065			
11. Return on Assets	*ROA*	0.043	0.109	−0.224	2.529			

	5	6	7	8	9	10	11
1. Tobin's q	−0.437***	−0.201***	−0.108***	0.100***	0.319***	0.179***	0.216***
2. Ownership	−0.219***	−0.298***	−0.054	−0.033	0.089***	0.013	0.001
3. Governance	0.063*	0.031	−0.002	−0.077**	−0.127***	−0.031	−0.064*
4. Concentration ratio	0.386***	−0.350***	0.068**	0.294***	0.039	−0.080**	0.047
5. Size		−0.041	0.182***	0.279***	−0.211***	−0.243***	−0.066*
6. Firm age			−0.008	−0.228***	−0.161***	−0.036	−0.082**
7. Tangibility				−0.044	−0.307***	−0.101***	−0.089***
8. Dividends					0.277***	−0.013	0.179***
9. Financial flexibility						0.096***	0.192***
10. Managerial efficiency							−0.040
11. Return on assets							

Notes: *$p > 0.10$; **$p > 0.05$; ***$p > 0.01$

Table II.
Descriptive statistics and correlations – full sample

	Mean	SD	Min.	Max.
LC: growth stage				
FFI	0.237	0.115	0.020	0.602
ME	0.067	0.061	0.006	0.444
ROA	0.025	0.089	−0.224	1.486
LC: mature stage				
FFI	0.266	0.113	0.065	0.618
ME	0.090	0.091	0.002	1.000
ROA	0.038	0.049	−0.214	0.200
LC: stagnant stage				
FFI	0.324	0.129	0.046	0.722
ME	0.110	0.122	0.011	1.065
ROA	0.063	0.141	−0.082	2.529

Table III.
Descriptive statistics for major variables – considering life cycles

	Variables	*t*-statistic
Growth vs Mature stage	*FF*	−2.69***
	ME	−2.84***
	ROA	−2.07**
Mature vs Stagnant stage	*FF*	−5.24***
	ME	−2.16**
	ROA	−2.97***
Growth vs Stagnant stage	*FF*	−9.44***
	ME	−5.87***
	ROA	−4.22***

Notes: **$p > 0.05$; ***$p > 0.01$

Table IV.
Comparison of major variables between different life cycles

These results in Table IV provide clear support that the degree of financial flexibility and the efficiency of management are generally of significance in explaining firm performance. However, it is important to note that these results may be deviated from what have expected without controlling for other potential factors that may also influence firm performance.

3.2 The role of managerial efficiency at each life cycle

After implementing the procedure to estimate each factors for modified FFI, the following fixed-effect regression model with several firm-level variables is obtained (Marchica and Mura, 2010) to control for firm-specific effects[1]:

$$ROA_{it} = \alpha_0 + \beta_1 FFI_{it} + \beta_2 ME_{it} + \beta_3 FFI_{it} \times ME_{it} + \beta_4 Q_{it} + \beta_5 OWN_{it} + \beta_6 GOV_{it}$$

$$+ \beta_7 CR_{it} + \beta_8 SIZE_{it} + B_9 AGE_{it} + \beta_{10} TANG_{it} + \beta_{11} DIV_{it} + \varepsilon_{it}.$$

The results of the multivariate cross-sectional regression analyses are presented in Table V. In Model 1 of Table V, only control variables are included. The effect of the degree of financial flexibility is tested in Model 2, with the results that the coefficient of *FFI* is 0.080 ($t = 2.01$) at the 5 percent level. This result suggests that financially flexible firms lead to good performance. The coefficient of *ME* is −0.097 ($t = -2.37$), which indicates that the good conduct of management has positive correlation with firm performance. (Please note that the higher value of *ME* indicates the more poor conduct of management because the ratio of administrative costs over total income is used) The interaction of *FFI* and *ME* is

	Dependent variable: ROA		
	Model 1	Model 2	Model 3
Constant	0.082 (0.098)	0.070 (0.103)	0.048 (0.103)
Q	0.016*** (0.004)	0.015*** (0.004)	0.016*** (0.004)
OWN	−0.059 (0.038)	−0.063* (0.037)	−0.059 (0.037)
GOV	−0.011 (0.008)	−0.009 (0.008)	−0.009 (0.008)
CR	0.013 (0.024)	0.010 (0.024)	0.008 (0.024)
SIZE	−0.002 (0.004)	−0.002 (0.004)	−0.002 (0.004)
AGE	−0.010 (0.018)	−0.010 (0.018)	−0.014 (0.018)
TANG	−0.036* (0.020)	−0.025 (0.021)	−0.024 (0.021)
DIV	0.115*** (0.030)	0.097*** (0.031)	0.090*** (0.031)
FFI		0.080** (0.033)	0.144*** (0.045)
ME		−0.097** (0.038)	0.071 (0.090)
FFI × *ME*			−0.640** (0.311)
Year Dummy	Yes	Yes	Yes
Adj. R^2	0.071	0.082	0.085
F-value	7.52***	7.39***	7.17***
Observations	861	861	861

Notes: Standard deviation is in the parenthesis. Two-tailed test. *$p > 0.10$; **$p > 0.05$; ***$p > 0.01$

Table V.
Empirical results of fixed-effect regression analysis – full sample

shown in Model 3, saying that *ME* strengthens the focal relationship between financial flexibility and firm performance. In summary, Table V shows that the financially flexible firms are able to create good performance outcomes, and managerial efficiency is evidenced to moderate this relationship since the previous studies have documented mixed results of the impact of firms' financial flexibility on their firm performance.

Model 1 of Table VI reports that in growth stage, the coefficient of *FFI* is 0.090 ($t = 1.86$), and the coefficient of *ME* is −0.191 ($t = -2.37$). However, in Model 3 and Model 5, no significance in *FFI* is found, suggesting that the agency problem is emergent along with the aging of a firm. Moreover, this finding is also consistent with some prior papers documenting the mixed evidence on the firm performance of financially flexible firms (Lie, 2005). This study further puts the interaction term of *FFI* and *ME* to find more robust evidence when firms are at different life cycle stages. In Model 2, the coefficient of *FFI* is 0.173 ($t = 2.62$), and the coefficient of interaction term is −1.161 ($t = -1.69$). In Model 4, the coefficient of *FFI* is 0.147 ($t = 2.91$), and the coefficient of interaction term is −1.358 ($t = -3.09$). Model 2 and Model 4 together indicate that the role of management efficiency negatively moderates the focal relationship when firms are in their rising stage. However, no significance of both *FFI* and the interaction term in Model 6 is found, which is consistent with previous studies that the degree of resource abuse is greater in a firm's declining stage due to greater agency problem, in contrast to that in a firm's rising stage. Moreover, our findings also suggest that managerial efficiency is likely to mitigate the agency problem because the explanatory power in Model 2 and Model 4 is significant.

4. Concluding remarks and future research

This paper investigates a sample of publicly Chinese-listed firms with a modified index of financial flexibility to fit the eastern capital market context. The results reveal that financially flexible firms generally experience good firm performance, and a firm's managerial efficiency could gradually become reducing as a firm is aging, even with financial flexibility capability.

Our findings help scholars understand more about the managerial behavior of Chinese-listed firms in relating financial flexibility capability to firm performance. Particularly, this study

Table VI.
Empirical results of fixed-effect regression analysis – considering life cycle

	Dependent variable: ROA					
	Growth		Mature		Stagnant	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	−0.089 (0.135)	−0.101 (0.135)	−0.024 (0.130)	−0.075 (0.128)	0.295 (0.217)	0.271 (0.217)
Q	0.022*** (0.008)	0.023*** (0.008)	0.011*** (0.004)	0.014*** (0.004)	0.015** (0.006)	0.016*** (0.006)
OWN	−0.039 (0.049)	−0.040 (0.048)	−0.614 (0.658)	−0.687 (0.641)	−0.129* (0.067)	−0.126* (0.067)
GOV	−0.005 (0.011)	−0.005 (0.011)	−0.008 (0.007)	−0.007 (0.007)	−0.018 (0.022)	−0.019 (0.022)
CR	0.052 (0.039)	0.051 (0.039)	−0.008 (0.021)	−0.015 (0.021)	−0.011 (0.051)	−0.009 (0.051)
SIZE	−0.005 (0.005)	−0.005 (0.005)	−0.002 (0.004)	−0.001 (0.004)	−0.005 (0.007)	−0.005 (0.007)
AGE	0.048* (0.026)	0.044* (0.026)	0.029 (0.024)	0.031 (0.024)	−0.058* (0.037)	−0.063* (0.037)
TANG	−0.015 (0.029)	−0.011 (0.029)	−0.025 (0.024)	−0.018 (0.023)	0.007 (0.049)	0.006 (0.049)
DIV	0.210*** (0.069)	0.200*** (0.069)	0.135*** (0.039)	0.129*** (0.038)	0.053 (0.053)	0.045 (0.053)
FF	0.090** (0.045)	0.173*** (0.066)	0.035 (0.036)	0.147*** (0.051)	0.052 (0.067)	0.140 (0.094)
ME	−0.191** (0.085)	0.056 (0.169)	−0.074* (0.042)	0.186** (0.094)	−0.101* (0.063)	0.103 (0.167)
FF × *ME*		−1.161* (0.687)		−1.358*** (0.440)		−0.706 (0.534)
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.079	0.084	0.166	0.210	0.045	0.047
F-value	3.51***	3.48***	3.72***	4.36***	2.34***	2.30***
Observations	351	351	165	165	345	345

Notes: Standard deviation is in the parenthesis. Two-tailed test. *$p > 0.10$; **$p > 0.05$; ***$p > 0.01$

sheds further light on managerial efficiency at different firm life cycles. Managerial implications are twofold. One is that it is about time for Chinese managers to think carefully about their economic position based on life cycle theory, as they more than often suffer from restrictions to obtain capitals for future use. Chinese-listed firms are encouraged to delicately design managerial schemes to manage firm resources in order to sustain an optimal capital structure. The other is that Chinese-listed firms have reached to a certain level of economic condition that managers are highly likely to be encouraged to pursue self-interest in which firms are aging. Therefore, the policy makers should be noted to design appropriate financial reporting regulations to protect both domestic and foreign investors since Chinese managers are likely to take advantage of the financial statements reporting loopholes to maneuver capital structure, otherwise the good intention of special regulations on poorly performed listed firms will be discounted.

Our efforts in modifying the FFI provide a road map for future research. With the approach taken herein to form and extend the traditional components in calculating flexibility, the objective of this study is adding richness to the debate on financial flexibility based upon eastern context. As the financial reform and economic growth are burgeoning, it is promising for Chinese-listed firms to improve financial market integration in an international perspective. Thus, the future research may dig whether the foreign investment is set out to relax Chinese-listed firms on more flexibility of external financing in terms of customized policies, and shape the Chinese capital market without one-side emphasis according to "new" pecking order theory (Chen, 2004). Applying the modified FFI to other similar-sized firms at different firm life cycle stages from developed economies would be interesting since the "new" pecking order theory may alter the norm in developed economies. Future research is thus encouraged to test the effects under different economies during a wider range of years.

Another potential research topic is one that links both life cycle effects with managerial characteristics in searching for the possibility of agency problem along with firm age. Since the life cycle is one of the factors that influence the financing choices, managerial characteristics may play a role in the choices of financing because Chinese-listed firms generally experience the dominant control from founders after conditional economy liberation. While the capital market in China remains quite obscure for outsiders due to special political atmosphere surrounding businesses, the motive for managers to select certain financing choice that influences a firm's financial flexibility could be an interesting area. In addition, managerial conducts generally matter with business strategy that shapes a firm's capital structure, and the motive for managers involving risk taking capability may be associated with financing choices, leading to dynamic capital structure forms. To contribute theoretical aspects when studying Chinese market, future research may take further consideration in incorporating factors in a firm's liquidity or cash policy to measure its managerial efficiency.

Note

1. Please see Table III for notations and Appendix 2 for variable descriptions.

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Appendix 1. Calculating judgment matrix on first level factors

Judgment matrix method in essence is an estimation method by assigning weights to some assigned factors which are relatively important than the others. Although it is difficult to offer the precise weights, the judgment matrix method still provides reliable estimate value with less than 10 percent errors in contrast to the actual weights (Kostlan, 1991).

Based on the weights assigned to each factor, the total value of each column is calculated, which equals 2.2, 2.14 and 13, respectively from left to right. Then, the judgment matrix was normalized by dividing each number by the sum of each column.

	Factor 1	Factor 2	Factor 3
Factor 1. Basic cash holdings	1	1	5
Factor 2. Potential cash inflows	1	1	7
Factor 3. Financing costs	1/5	1/7	1

Thus, the normalized number across each column would add up to 1, and the sum of all numbers in the matrix equals 3.

	Factor 1	Factor 2	Factor 3
Factor 1. Basic cash holdings	0.46	0.48	0.38
Factor 2. Potential cash inflows	0.45	0.47	0.54
Factor 3. Financing costs	0.09	0.05	0.08

To generate the weight for each factor, values across each row are summed, and require each total divided by 3 (the sum of all numbers in the matrix).

	Total value	Weight
Factor 1. Basic cash holdings	$0.46 + 0.48 + 0.38 = 1.32$	$1.32/3 = 0.44$
Factor 2. Potential cash inflows	$0.45 + 0.47 + 0.54 = 1.46$	$1.46/3 = 0.49$
Factor 3. Financing costs	$0.09 + 0.05 + 0.08 = 0.23$	$0.23/3 = 0.07$

Appendix 2

Table AI.
Variable descriptions

	Notation	Description
Dependent variable		
Return on assets	*ROA*	The ratio of net income over total assets
Independent variables		
Financial flexibility index	*FFI*	Shown in Section 3
Managerial efficiency	*ME*	The ratio of administrative costs over total net income
Control variables		
Tobin's *q*	*Q*	The ratio of market-to-book value of the firm's assets, where the market value of assets is the book value of assets minus the book value of common equity plus the market value of common equity
Managerial ownership	*OWN*	The ratio of shares held by managers over total outstanding shares
Control power	*GOV*	The ratio of shares held by the first biggest shareholder over shares held by the second biggest shareholder
Blockholder ownership	*CR*	The ratio of shares of first five big shareholders over total outstanding shares
Firm size	*SIZE*	Natural log of total assets
Firm age	*AGE*	Total years since the firm was established
Tangibility	*TANG*	The ratio of fixed assets over total assets
Dividend payout	*DIV*	Cash dividend per share given to shareholders

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