EVALUATING OVERSEAS CONVERTIBLE BONDS FROM FINANCIAL STATEMENTS USING FIVE FORCES ANALYSIS

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ABSTRACT

We measure the financial performance of overseas convertible bonds according the analysis of five forces retrieved from financial statements, including the current ratio, debt ratio, asset turnover ratio, net profit ratio, and P/E ratio, as convertible bonds are occasionally issued by high-tech firms for raising funds in Taiwan. By using the evaluation method called technique for order preference by similarity to ideal solution (TOPSIS), we reveal the firms with superior performance using a limited sample, unlike the other approaches adopted in finance. We argue that this study will contribute to the existing literature by presenting persuasive results using limited samples, which is rarely explored in the relevant literature.

Keywords: Performance Evaluation, Overseas Convertible Bonds, TOPSIS

1. INTRODUCTION

Enterprises raise internal funds, loans, bond issued, and new share issues, in sequence according to pecking order theory (Myers and Majluf, [18]), as investments in projects are necessary for organizations to remain competitive nowadays (Cheng and Lyu, [4]). As a result, raising funds for investments is essential for enterprises. Although enterprises allot funds for valuable capital budgeting projects, enterprises have to concern the issue of capital structure, that is, the allocation between debt and equity. Thus, aside from raising internal funds by issuing new shares, firms also raise funds by loans, which not only have tax shield effects but also prevent directors' shareholding and earing per share (EPS) to be diluted due to new share issues (King [13]).

Nevertheless, we find that convertible bonds, rather than traditional bonds, seem to appeal to high-tech firms in Taiwan. We argue that a lower interest burden and few limitations are the advantages of the convertible bonds issued (Brigham and Ehrhardt, [1]). Moreover, market participants may trade stocks as new information is released, such as the issuance of convertible bonds declared. Therefore, we investigate how to screen the stocks of high-tech firms that issue convertible bonds, and then provide references for investors while trading these high-tech stocks. Thus, we survey the relevant literature related to the issuance of convertible bonds, share price performances, and even the relationship between the convertible bonds issued and share price performance.

Pilcher [22] uses a questionnaire to survey the motivation of convertible bonds issued, and reveals that 82% of firms postpone the issuance of ordinary shares and 18% are inclined to reduce the debt ratio after exchanging convertible bonds into equity. Hoffmeister [10] employs a questionnaire to determine why firms issue convertible bonds and finds that 34% of firms raise funds for investment and 30% reduce the interest burden. Lee and Loughran [14] also use a sample of 986 convertible bond issuers of U.S.-operating companies over the period of 1975 to 1990. They argue that poor stock and operating performance result in the years following the offering. Moreover, they also reveal that both profit margin and return on assets (ROA) are approximately one-half in the four years after the convertible bond is issued. Stein [23] argues that corporations may use convertible bonds as an indirect way to gain equity in their capital structures when adverse-selection problems make a conventional stock issue unattractive.

In terms of financial performance, Palepu and Healy [21] find that the information retrieved from financial statements can be used to evaluate enterprises. De Miguel et al. [7] find that firm value is

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affected by firm size, debt ratio, and intangible fixed assets. Wagner [24] argues that the asset turnover ratio can be used to measure the capital intensity of a firm's operations. Easton and Trevor [9] reveal that the EPS affect the share prices. Lee et al. [15] show that debt repayment, working capital, capital expenditure, and operating cash flow are the main variables determining the key determinants of capital structure. Ni et al. [19] find that companies with trouble in cash flow stress the increase in turnover ratio of inventory, which is beneficial in capital management. These studies indicate that firm performance can be evaluated by taking financial statements into account.

Lewis et al. [16] illustrate that the relations among firm value, financial leverage, investment opportunities, and rate of future growth are more complex among convertible debt issuers than in situations in which firms issue standard financial securities. Therefore, investors have to make more effort to disclose the veil of convertible bonds. Dann and Mikkelson [6] provide evidence on the valuation effects of convertible debt issuance and suggest that convertible debt offerings convey unfavorable information about the issuing firms. Lee and Loughran [14] reveal that profit margin and ROA for the issuers are approximately halved in the four years after the convertible bond issue, indicating that poor stock and operating performance are likely to occur in the years following the offering. Zeidler et al. [27] use the real option framework and provide a rational explanation for the negative announcement effect, as well as any long-term underperformance subsequent to the convertible bond offerings.

Lin et al. [17] suggest that a positive relation exists between returns on convertible bonds and information transparency when estimating idiosyncratic risk on a monthly basis and that a positive association also exists among credit rating, idiosyncratic risk, and returns on bonds. Dutordoir et al. [8] indicate that recent empirical research on convertible debt not only provides valuable insights into issue motives and determinants of financial innovations but also considers the broader question of how investor demand characteristics affect corporate finance decisions. Therefore, we conclude with an overview of potential research questions to be addressed by future research on convertible bonds.

In this study, we propose five important financial ratios identified as the five forces in financial statements (Will et al. [25]), which can evaluate firm performance by measuring the market evaluation, liquidity, leverage, profitability, and asset management for firms listed in the stock exchange. These ratios include P/E ratio, current ratio, debt ratio, net profit ratio, and asset turnover ratio. Therefore, we consider these five ratios in evaluating the firms that issue convertible bonds and then evaluate the financial performance of several high-tech firms that issue overseas convertible bonds using the TOSIS method.

By using the econometric methodology widely adopted in finance, the abundant samples are taken into account to obtain objectivity. As regards the technique for order preference by similarity to ideal solution (TOPSIS) approach, Chen [3] indicates that TOPSIS should be used in the fuzzy environment. Jahanshahloo et al. [12] find that the decision-making problem is the process of finding the best option from all the feasible alternatives. They [12] also suggest that the TOPSIS method can be used in decision-making problems with fuzzy data, even with limited data. In fact, investors often make decisions using limited samples. Therefore, we argue that this study will contribute to the existing literature by presenting persuasive results with limited samples using the TOPSIS approach, which is rarely explored in the relevant literature in finance. In this study, using the five important financial ratios to measure firm performance, we derive the ranking of firm performance from among these limited firms. This ranking will help investors in making their decisions with limited targets.

The remainder of this paper is organized as follows. Section 2 introduces the research method used in this paper. The empirical results are analyzed in Section 3. Section 4 presents our conclusion.

2. RESEARCH METHOD

Hwang and Yoon [11] develop a multiple criteria evaluation method called TOPSIS. Suppose that n projects $A = \{A_i | i = 1,2,\cdots,n\}$ evaluated under m criteria $C = \{C_j | j = 1,2,\cdots,m\}$ are required to find the best project. The performance of Project A_i under criterion C_j can be quantified and expressed as $X_{ij} = \{i = 1,2,\cdots,n;\ j = 1,2,\cdots m\}$.

Then, the performance values of n projects under m criteria constitute an evaluation matrix D:

$$D = [X_{ij}]_{N\times M} \tag{1}$$

The TOPSIS evaluation method assumes that each stage of the evaluation criteria has a monotony increasing or a monotony decreasing effect. Therefore, the larger the performance value, the greater the effect preference is when the maximizing criteria (efficiency criteria) are evaluated; and the larger the performance value, the smaller the effect preference is when the minimizing criteria (cost criteria) are evaluated. To obtain consistent measurement units for effect preference and to avoid extreme values affecting the measurement of similar scale, the TOPSIS evaluation method adopts a statistical normalization method on performance values, that is, the normalized method in Equation (2). Let $g_j(A_i)$

represent the normalized value of Project A_i under criterion C_j. Therefore,

$$g_j(A_i) = \frac{X_{ij}}{\sum_i^n X_{ij}}, \quad \forall i, j \tag{2}$$

Through the normalization of the performance evaluation matrix, the following normalized evaluation matrix G is obtained:

$$G = \left[g_j(A_i)\right]_{n\times m} \tag{3}$$

As the degrees of importance among the m evaluation criteria are different, the corresponding weights are also different. Weights of the m evaluation criteria $W = \{w_j | j = 1,2,\cdots,m\}$ satisfy the following two conditions:

$$\sum_j w_j = 1, \tag{4}$$

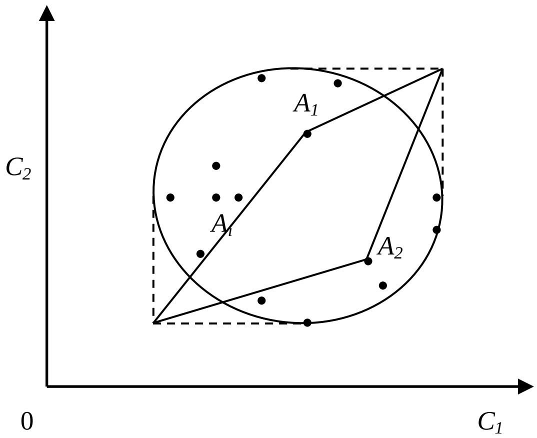
$$0<w_j<1. \tag{5}$$

The larger weight the evaluation criterion has, the more important its performance value is. To reflect this fact, the performance value is multiplied by the weight of the criterion. The normalized data of matrix G multiplied by the weights of the m evaluation criteria then form a weighted-normalized matrix V as follows:

$$V = [v_{ij}]_{n\times m}, \tag{6}$$

$$v_{ij} = w_j g_j(A_i), \quad \forall i, j. \tag{7}$$

Under n projects and m criteria, ($n\times m$) weighted-normalized performance values V_{ij} can be found in the analog to the n sample points in the m-dimensional space. The basic concept of the TOPSIS evaluation method is to define an ideal



solution composed of the best values of the m criteria and a negative-ideal solution composed of the worst values of the m criteria. The best project is then found that corresponds with the analysis logic of "being nearest to the ideal solution and being farthest from the negative-ideal solution." The basic concept of the TOPSIS evaluation method is described in Figure 1.

Figure 1: Concept of the TOPSIS evaluation method

Two evaluation criteria (m=2) are assumed in this figure. S represents the sample space constructed by n projects, A^* is the ideal solution, and A^- is the negative-ideal solution. When comparing Project A_1 with Project A_2, Project A_1 is closer to the ideal solution (A^*) than Project A_2, whereas Project A_1 is further from the negative-ideal solution (A^-) than Project A_2. Therefore, Project A_1 is better than Project A_2. The ideal solution and the negative-ideal solution are both sample points in the m-dimensional space. The ideal solution(A^*)is composed of the best performance values of the m criteria. That is, it is composed of the maximum value of maximizing criteria and the minimum value of minimizing criteria defined as follows:

$$A^* = \{(\max_i v_{ij} | j \in C_b), (\min_i v_{ij} | j \in C_c)\}$$
$$= \{v_j^* | j = 1,2,\cdots,m\} \tag{8}$$

$$C_b = \{C_j | j = 1,2,\cdots,m_1\}. \tag{9}$$

$$C_c = \{C_j | j = 1,2,\cdots,m_2\}. \tag{10}$$

In the above equations, C_b is a set composed of m_1 maximizing criteria, and C_c is a set composed of m_2 minimizing criteria. At the same time, they must satisfy the following conditions:

$$m_1 + m_2 = m. \tag{11}$$

The negative-ideal solution (A^-) is composed of the worst performance values of the m criteria. That is, it is composed of the minimum value of the maximizing criteria and the maximum value of the minimizing criteria defined as follows:

$$A^- = \{(\min_i v_{ij} | j \in C_b), (\max_i v_{ij} | j \in C_c)\}$$
$$= \{v_j^- | j = 1,2,\cdots,m\}. \tag{12}$$

The distance in the n projects between the ideal solution (A^*) and the negative-ideal solution (A^-) is expressed by the m-dimensional Euclidean distance; this type of distance is called the separation of a project. The distance between A_i and the ideal solution is expressed by S_i^* as follows:

$$S_i^* = \sqrt{\sum_{j=1}^m (v_{ij} - v_j^*)^2}, \quad \forall i. \tag{13}$$

The distance between A_i and the negative-ideal solution is expressed by S_i^- as follows:

$$S_i^- = \sqrt{\sum_{j=1}^m (v_{ij} - v_j^-)^2}, \quad \forall i. \tag{14}$$

Along the path of the negative-ideal solution A^- to the ideal solution A^*, the performance of Project A_i depends on the position it stands in the path. The closer A_i is to A^*, the better the place Project A_i will be. In other words, the further A_i is from A^-, the better the place Project A_i will be. To understand the position of each project, it can be measured using the degree of relative closeness RC_i^*, which is defined as

$$RC_i^* = \frac{S_i^-}{S_i^* + S_i^-} \text{ , } \forall i . \quad (15)$$

This index is the ratio of the distance to the negative-ideal solution to the length of the path. A larger RC_i^* value means that Project A_i is relatively farther from the negative-ideal solution in the path or nearer to the ideal solution, and that it is a better project. If the relative position is measured from the ideal solution, then the degree of relative closeness RC_i^* is defined as

$$RC_i^* = \frac{S_i^*}{S_i^* + S_i^-} \text{ , } \forall i . \quad (16)$$

Here, a smaller RC_i^* value means that Project A_i is a better project because it is closer to the ideal solution. Based on this definition of the degree of relative closeness RC_i^*, clearly

$$0 \le RC_i^* \le 1 \text{ , } \forall i . \quad (17)$$

If A_i = A^*, then Equation (15) is defined as $RC_i^* = 1$, and Equation (16) is defined as $RC_i^* = 0$; if A_i =A^-, then Equation (15) is defined as $RC_i^* = 0$, and Equation (16) is defined as $RC_i^* = 1$. According to the number of RC_i^* value, the performance sequence of the *n* projects can be sorted in order. Based on the definition of Equation (15), the principle of ordering the projects is

$$A_i \succsim A_{i'} \quad iff \quad RC_i^* \ge RC_{i'}^* \text{ , } \forall i, i' \text{ ; } i \ne i' . \quad 18)$$

$$A_i \succsim A_{i'} \quad iff \quad RC_i^* \le RC_{i'}^* \text{ , } \forall i, i' \text{ ; } i \ne i' . \quad 19)$$

$$g_j^d(A_i) = 1 - g_j(A_i), \forall_j \in C_c . \quad (20)$$

$$C_c = \{C_{c1},\ C_{c2}, \cdots,\ C_{cm2}\}. \quad (21)$$

After normalization using Equation (2) and if these values can be directionally normalized again using Equations (20) and (21), then the ideal solution A^* and the negative-ideal solution A^- are expressed as follows respectively:

$$A^* = \{\max_i v_{ij} | i = 1,2,\cdots,m\} . \quad (22)$$

$$A^- = \{\min_i v_{ij} | i = 1,2,\cdots,m\} . \quad 23)$$

These solutions will make the processing analyses easier afterwards. According to the contents and the solution procedure of the TOPSIS evaluation method, the following solving steps are performed:

Step 1: Define the decision maker (or makers) for the decision problem.

Step 2: Deliberate on the possible projects $A = \{A_1, A_2, \cdots A_m\}$.

Step 3: Deliberate on the evaluation criteria $C = \{C_1, C_2, \cdots C_m\}$ for the decision problem.

Step 4: The decision maker(s) decide(s) the weights $W = \{w_1, w_2, \cdots w_m\}$ for these *m* evaluation criteria.

Step 5: The measurements of the project performance value $X_{ij} = (i = 1,2,\cdots,n; j = 1,2,\cdots,m)$ are taken and the evaluation matrix $D = [X_{ij}]$ is obtained.

Step 6: These matrix data are normalized using Equation (2) and a normalized evaluation matrix $G = [g_j(A_i)]$ is obtained. If necessary, the data can be directionally normalized using Equations (20) and (21) and reformed to another evaluation matrix Gd.

Step 7: A weighted-normalized matrix $V = [v_{ij}]$ is constructed, and the normalized performance values are multiplied by the criteria weights according to Equation (7).

Step 8: The ideal solution A^* and the negative-ideal solution A^- are obtained. If only the units are normalized in the form of Equation (33), then A^* and A^- are decided on the basis of Equations (8) and (12). If data are further directionally normalized, then A^* and A^- are decided on the basis of Equations (22) and (23).

Step 9: Solve for separations S_i^* and $S_i^- (i = 1,2,\cdots,n)$.

Step 10: Solve for the degree of relative closeness $RC_i^* (i = 1,2,\cdots,n)$ from the ideal solution.

Step 11: Sort out the order of the performance sequence of the m projects.

Step 12: Make a decision.

3. ANALYSIS OF THE EMPIRICAL RESULTS

After surveying the relevant studies (Lee et al. [14], Cheng et al. [4], and Chiou et al. [5]), we use current ratio, debt ratio, asset turnover ratio, net profit ratio, and P/E ratio as the criteria for evaluating firm performance. As these ratios are used in the real world, we assign different weights for these ratios, including the current ratio, debt ratio, asset turnover ratio, net profit ratio, and P/E ratio, as the relative importance for these evaluation criteria. We then evaluate firm performance using 10 high-tech firms that issue overseas convertible bonds in the data period of 2011-2014.

In this study, we suppose that the firm with optimistic prospects will have a higher current ratio, asset turnover ratio, net profit ratio, P/E ratio, and lower debt ratio according to our understanding. This supposition may represent the future prospects for these firms and reflect their share prices.

Therefore, using the data of 10 high-tech firms identified as A1, A2, A3, A4, A5, A6, A7, A8, A9, and A10, we present the current ratio, debt ratio, asset turnover ratio, net profit ratio, and P/E ratio of these firms that issue the overseas convertible bonds issuance in Table 1. We then set the weights for the five evaluation criteria as $W = \{W_1, W_2, W_3, W_4, W_5\}$ =(0.10, 0.15, 0.25, 0.30, 0.20), indicating that the weight assigned to the current ratio is 0.10, debt ratio is 0.15, asset turnover ratio is 0.25, net profit ratio is 0.30, and P/E ratio is 0.20. Then, we show that the normalization of the firms' performance values in Table 2 and the weighted-normalized performance values in Table 3 by multiplying the normalized performance values by each criterion weight.

By choosing the minimum value of the minimizing criteria set, $C_c = \min\{C_1, C_2.C_3.C_4.C_5\}$, we obtain the ideal solution A* and negative-ideal solution A-, as well as the separations S_i^* and S_i^-.

Table 1: Performance values of the 10 companies

	Current ratio	Debt ratio	Asset turnover ratio	Net profit ratio	Price earnings ratio
A1	0.1087	0.0851	0.1081	0.1246	0.0128
A2	0.0849	0.1226	0.1231	0.1078	0.0090
A3	0.1272	0.0823	0.0465	0.0050	0.9522
A4	0.0609	0.1410	0.1201	0.0147	0.0182
A5	0.1193	0.0622	0.0646	0.1434	0.0087
A6	0.0719	0.1347	0.3123	-0.0239	-0.0139
A7	0.0747	0.1283	0.0751	0.0526	0.0129
A8	0.0781	0.0854	0.0345	0.5069	0.0050
A9	0.2202	0.0822	0.0601	0.1849	0.0070
A10	0.0542	0.0761	0.0556	-0.1160	-0.0119

Table 2: Normalization of the performance values of the 10 companies

	Current ratio	Debt ratio	Asset turnover ratio	Net profit ratio	Price earnings ratio
A1	0.1087	0.0851	0.1081	0.1246	0.0128
A2	0.0849	0.1226	0.1231	0.1078	0.0090
A3	0.1272	0.0823	0.0465	0.0050	0.9522
A4	0.0609	0.1410	0.1201	0.0147	0.0182
A5	0.1193	0.0622	0.0646	0.1434	0.0087
A6	0.0719	0.1347	0.3123	-0.0239	-0.0139
A7	0.0747	0.1283	0.0751	0.0526	0.0129
A8	0.0781	0.0854	0.0345	0.5069	0.0050
A9	0.2202	0.0822	0.0601	0.1849	0.0070
A10	0.0542	0.0761	0.0556	-0.1160	-0.0119

Table 3: Weighted-normalized performance values of the 10 companies

	Current ratio	Debt ratio	Asset turnover ratio	Net profit ratio	Price earnings ratio
A1	0.0109	0.0128	0.0270	0.0374	0.0026
A2	0.0085	0.0184	0.0308	0.0323	0.0018
A3	0.0127	0.0123	0.0116	0.0015	0.1904
A4	0.0061	0.0212	0.0300	0.0044	0.0036
A5	0.0119	0.0093	0.0161	0.0430	0.0017
A6	0.0072	0.0202	0.0781	-0.0072	-0.0028
A7	0.0075	0.0192	0.0188	0.0158	0.0026
A8	0.0078	0.0128	0.0086	0.1521	0.0010
A9	0.0220	0.0123	0.0150	0.0555	0.0014
A10	0.0054	0.0114	0.0139	-0.0348	-0.0024

Table 4: The ideal solution A^* (and the negative-ideal solution A^-) of the 10 companies

	S_i^*	S_i^-
Separation from the ideal solution A^* (the negative-ideal solution A^-) of Supplier A_1 ($i=1$)	0.2262	0.0753
Separation from the ideal solution A^* (the negative-ideal solution A^-) of Supplier A_2 ($i=2$)	0.2290	0.0710
Separation from the ideal solution A^* (the negative-ideal solution A^-) of Supplier A_3 ($i=3$)	0.1649	0.1969
Separation from the ideal solution A^* (the negative-ideal solution A^-) of Supplier A_4 ($i=4$)	0.2437	0.0451
Separation from the ideal solution A^* (the negative-ideal solution A^-) of Supplier A_5 ($i=5$)	0.2268	0.0795
Separation from the ideal solution A^* (the negative-ideal solution A^-) of Supplier A_6 ($i=6$)	0.2510	0.0748
Separation from the ideal solution A^* (the negative-ideal solution A^-) of Supplier A_7 ($i=7$)	0.2402	0.0519
Separation from the ideal solution A^* (the negative-ideal solution A^-) of Supplier A_7 ($i=8$)	0.2023	0.1871
Separation from the ideal solution A^* (the negative-ideal solution A^-) of Supplier A_7 ($i=9$)	0.2215	0.0925
Separation from the ideal solution A^* (the negative-ideal solution A^-) of Supplier A_7 ($i=10$)	0.2766	0.0111

The ideal solution A^* and the negative-ideal solution A^- are derived as follows:

$$A^* = \{\min_i v_{i1}, \min_i v_{i2}, \min_i v_{i3}, \min_i v_{i4}, \min_i v_{i5}\}$$
$$= (v_1^*, v_2^*, v_3^*, v_4^*, v_5^*)$$
$$= (0.0220,\ 0.0093,\ 0.0781,\ 0.1521,\ 0.1904)$$
$$A^- = \{\max_i v_{i1}, \max_i v_{i2}, \max_i v_{i3}, \max_i v_{i4}, \max_i v_{i5}\}$$
$$= (v_1^-, v_2^-, v_3^-, v_4^-, v_5^-)$$
$$= (0.0054,\ 0.0212,\ 0.0086,\ -0.0348,\ -0.0028)$$

The degree of relative closeness RC_i^* from the ideal solution is obtained as follows:

(1) $RC_1^* = \frac{S_1^-}{S_1^* + S_1^-} = \frac{0.0753}{0.2262 + 0.0753} = 0.2498$.

(2) $RC_2^* = \frac{S_2^-}{S_2^* + S_2^-} = \frac{0.0710}{0.2290 + 0.0710} = 0.2366$.

(3) $RC_3^* = \frac{S_3^-}{S_3^* + S_3^-} = \frac{0.1969}{0.1649 + 0.1969} = 0.5443$.

(4) $RC_4^* = \frac{S_4^-}{S_4^* + S_4^-} = \frac{0.0451}{0.2437 + 0.0451} = 0.1562$.

(5) $RC_5^* = \frac{S_5^-}{S_5^* + S_5^-} = \frac{0.0795}{0.2268 + 0.0795} = 0.2595$.

(6) $RC_6^* = \frac{S_6^-}{S_6^* + S_6^-} = \frac{0.0748}{0.2510 + 0.0748} = 0.2295$.

(7) $RC_7^* = \dfrac{S_7^-}{S_7^* + S_7^-} = \dfrac{0.0519}{0.2402 + 0.0519} = 0.1778.$

(8) $RC_7^* = \dfrac{S_7^-}{S_7^* + S_7^-} = \dfrac{0.1871}{0.2023 + 0.1871} = 0.4805.$

(9) $RC_7^* = \dfrac{S_7^-}{S_7^* + S_7^-} = \dfrac{0.0925}{0.2215 + 0.0925} = 0.2946.$

(10) $RC_7^* = \dfrac{S_7^-}{S_7^* + S_7^-} = \dfrac{0.0111}{0.2766 + 0.0111} = 0.0385.$

Afterwards, the performances of the seven companies are ordered according to the RC value: 0.5443(RC_3^*) > 0.4805(RC_8^*) > 0.2946(RC_9^*) > 0.2595(RC_5^*) > 0.2498(RC_1^*) > 0.2366(RC_2^*) > 0.2295(RC_6^*) > 0.1778(RC_7^*) > 0.1562(RC_4^*) > 0.0385(RC_{10}^*). As a result, the performance order of these 10 firms is $A_3 > A_8 > A_9 > A_5 > A_1 > A_2 > A_6 > A_7 > A_4 > A_{10}$. This order can help market participants to measure the financial performance of these firms in sequence.

4. CONCLUSIONS

The evaluation of enterprises is an important issue for market participants and enterprises. In the real world, investors may evaluate a limited number of firms instead of all firms listed in the stock exchange. Therefore, evaluating a small number of firms using the TOPSIS method is worthwhile, as this method can evaluate firm performance using a limited sample. Moreover, the TOPSIS evaluation method through multiple criteria can be applied to the real world, as demonstrated in the relevant studies (Chamodrakas et al. [2], Yue [26], Park et al. [21], and Zhang et al. [28]).

In this study, we refer to the relevant literature to follow the viewpoints from professionals and identify the five essential criteria, namely, the current ratio, debt ratio, asset turnover ratio, net profit ratio, and P/E ratio, for evaluating the firm performance of firms that issue convertible bonds.

In reality, the samples can be taken into account to attain objectivity using the econometric methodology used in finance. Nevertheless, investors may still make decisions using a limited sample. Therefore, we argue that this study will contribute the literature by offering the results with only a few samples using the TOPSIS approach, which is rarely explored in the relevant literature in finance.

Moreover, we use five essential financial ratios to measure firm performance and then we derive the ranking of these limited firms in firm performance. This ranking will not only enhance the managerial insights of investors when making investment decisions with limited targets but also assess whether the firms that issue overseas convertible bonds are worthwhile investments.

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(Received November 2014, revised December 2014, accepted December 2014)

使用財務報表之五力分析評估海外可轉換公司債券

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摘要

由於有些高科技公司以海外可轉債來籌措資金，是以本研究乃評估這些發行海外可轉債之公司績效，在本研究中，吾等採用財報的五力分析，其中包含流動比率，負債比率，資產週轉率，淨利率和本益比來評估這些公司的績效。而且本研究所採用TOPSIS研究方法，其相當有助於在有限的樣本中選取投資標的，此與傳統的財務研究方法有所不同。是以本研究對財務領域的文獻將有其貢獻，因其不僅提供有說服力的實證結果，而且對此財務領域的相關研究亦有擴展之效。

關鍵詞：績效評估、海外可轉換公司債、TOPSIS （理想解類似度偏好順序評估法）
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