

## **Measuring Transparency of Corporate Transitional Performance in Egypt: A Quantitative Approach**

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### **ABSTRACT**

This paper develops a model to quantify the major aspects of the privatized public enterprise transitional performance. The paper expands the literature on corporate performance to address the various factors that should be taken into account for monitoring the performance of the public enterprises considered for privatization. The paper incorporates measures adopted from the literature of corporate strategy, corporate governance, corporate finance, and international business. By using discriminant analysis, this paper develops a Z model that can be used for structuring the public enterprise transitional performance in Egypt as a developing transition economy. The results conclude that transparency of public enterprise transitional performance is determined by three dimensions, which are: (1) Measures of alternative corporate governance structures, (2) Measures of company's competitive position, and (3) Measures of the risk of financial transformation.

*JEL: L33, C30*

*Keywords: Public enterprise; Privatization; Transitional performance; Z score model; Egypt*

## I. INTRODUCTION

The institutional infrastructure in the developed economies has provided the literature relatively common measures of corporate performance. As for the transitional developing countries, the weak economic infrastructure does not help to adopt certain measures of corporate performance. In addition, the transition state requires studying public enterprise performance from many angles. According to a theory of privatization developed by Boycko et al., (1996), the dominant motive of privatization is the political control of public enterprise performance which has resulted in clear inefficiency. The theory explains public enterprise inefficiency through the politicians' tendency to obscure the true public enterprise performance through subsidies to protect their political interests: e.g., votes of the people whose jobs are in danger. For this reason, there is a need to monitor public enterprise performance in a stage of transition in order to assess their true capabilities taking into account that transitional developing countries lack enough resources that can subsidise public enterprise inefficiencies<sup>1</sup>.

The effective monitoring can come into place through conveying certain information to the stakeholders whose interests are tied up to the public enterprises performance. Examples of those stakeholders are individual shareholders, managers, employees, banks, corporations, domestic residents and foreigners (World Bank, 1988). The type of information to be conveyed is another important issue. Transitional developing countries lack the necessary infrastructure that supports the efficient market hypothesis (Stiglitz, 1990). The stock prices, therefore, do not reflect the true value of the public enterprises and cannot be used as an effective monitoring tool. In this regard, the type of information conveyed is to help resolving the challenge to economic analysis of privatisation (Vickers & Yarrow, 1991). In this sense, the model developed in this paper is to help monitoring and determining the critical factors of corporate performance that call for privatizing it.

## II. PRIVATIZED CORPORATE PERFORMANCE: A REVIEW

Privatization has extended the literature on corporate performance to investigate the effects of changes in corporate capital and ownership structures on corporate performance. The literature on corporate performance in the developed countries helped a lot in understanding the credibility and validity of privatization programs. To that end, the issue of what determines privatized public enterprise performance in developing countries arises. Privatization programs in developing countries have been characterized by certain aspects that are different from corporate transformation. Many of the developing countries, particularly those with relatively low per capita income, lack the strong infrastructure for viable financial resources and competent managers (Vernon-Wortzel & Wortzel, 1989). Some research has provided aspects of the performance of the privatized firms using different performance measures. Megginson et al., (1994) studied the financial and operating performance of pre- and post privatized firms from 18 countries (12 industrialized and 6 developing) for the period 1961-1990. Their results showed strong evidence that post privatization firms' performance is characterized by increases in profitability, real sales, investment

spending, operating efficiency, dividends payments, employment levels and low debt ratios. Their sample firms included a small number of firms headquartered in developing countries, which may call for concluding that generalizing their results is not valid enough. Galal et al., (1994) used an economic measure (welfare gains or losses) to evaluate the performance of 12 firms operating in relatively non-competitive markets in four countries: Chile, Malaysia, Mexico, and the UK. They reported positive net welfare gains in 11 of the 12 firms. Nevertheless, any generalizations out of their small sample can lead to invalid research results in other developing countries. Boubakri & Cosset (1998) studied the financial and operating performance of larger sample set that comprised 79 firms headquartered in 21 developing countries that experienced full or partial privatization during the period 1980-1992. Their results show significant increases in the ratios of profitability, operating efficiency, capital investment spending, output, employment level and dividends. In a more general approach, Perotti (1995) introduced a model that uses the government orientation and commitment as a proxy measure to signal the credibility of privatization programs. The model predicts that, in a sale plan involving several firms, a government committed to not interfering with privatized firms will distribute these sales over time to establish policy credibility and thus receive a better price for its shares. This is consistent with the available evidence on privatization programs in some European countries. Both the Hungarian and the British data suggest a clear tendency to retain large stakes in individual companies for a few years. It is obvious that Perotti's results on the macro level encourage exploring the effects of government support on the micro level, i.e., the effects of government financing on privatized public enterprise performance. This really helps in the case of transitional developing countries where investors are concerned with the extent of government interference. Nevertheless, there is a general scarcity in developing countries' research that explores and utilizes quantitative models to structure some of the dominant factors of corporate transitional performance. Therefore, the approach of this paper takes a new research route through which a statistical model is built to show the relevant information to be conveyed to the stakeholders in the Egyptian textile industry.

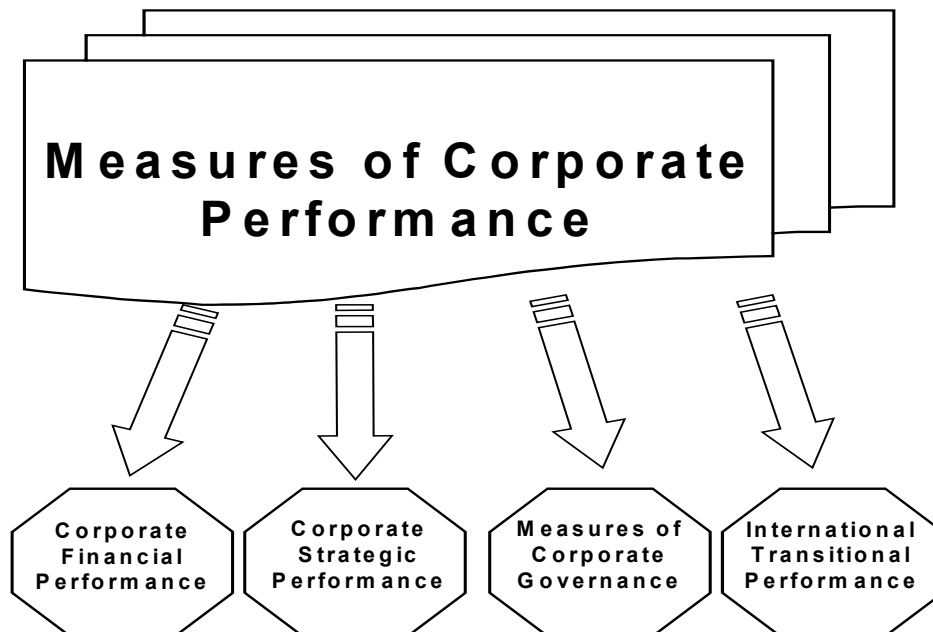
The remaining paper is organized as follows. The next section presents the theoretical framework for developing wider measures of public enterprise performance. This section provides multi perspectives measures cited in the literature of corporate finance, corporate strategy, corporate governance, and international business. The data, the research variables, and method used for analyzing the data are described next. The section that follows discusses the results of the study. Finally, the last section concludes.

### **III. DEVELOPING MEASURES OF PUBLIC ENTERPRISE TRANSITIONAL PERFORMANCE: THEORETICAL FRAMEWORK**

There is a wide range of research that criticizes certain capitalist-based measures of corporate performance. These critics such as short-termism, managerial opportunism, stock market myopia, fluid capital and impatient capital (Hayes & Abernathy, 1980; Jacobs, 1991; Bhide, 1994; Laverty, 1996; Narayanan, 1985; Stein, 1989). Therefore,

the capitalist-based measures may not work out quite well in transitional countries taking into account the uncertainty that characterizes transitional developing countries and the different cultures and commercial practices. This has very important implications for initiating privatization programs in developing countries. An important discerning feature of the transitional process in developing countries is the lack of monitoring mechanisms that help to foresee the most adaptable path of privatization, which promotes sound public enterprise economic efficiency. Companies in transitional developing countries should be monitored on the basis of their ability to reflect a strategic adaptable and sustainable performance. Considering that there is a wide range of aspects of corporate strategic performance, the ones that should be adopted are to reflect the basic elements of the transitional performance. The measurement of corporate performance has been examined in different scopes in the literature of finance, strategic management and international business. There is a little agreement on how strategic performance should be measured (Cameron & Whetten, 1983). This provides an opportunity to bring some ratios altogether from more than one literature to outline broader course of measures of company performance that can be used in the case of developing countries in transition. This is shown in figure 1.

**Figure 1**  
Approach for developing corporate performance measures



Monitoring firm's strategy requires measures that can capture its potentials in the future. Empirical evidence suggests that conventional referents of performance, whether they are measures of profitability or financial market measures like the 'Market-Book ratio,' are unsatisfactory discriminants of 'excellence.' For example, Chakravarthy (1986) has applied profitability ratios as measures of strategic performance and found that none of those ratios are capable of distinguishing between 'excellent' firms and 'non-excellent' ones. Chakravarthy concluded that financial and stock market measures of performance have at least three major limitations: (1) they assume that a single performance criterion can assess 'excellence', (2) they focus only on outcomes to the exclusion of transformation processes within the firm, and (3) they ignore the claims of other stakeholders besides the stockholders. As for the M-B ratio, it is not possible to give credible and sustainable results in the case of the public enterprise in transitional developing countries. The reason is that the stock markets in these countries are not efficient enough to reflect a true market value<sup>2</sup>. In sum, financial ratios (or broadly financial analysis) reflect only the ultimate financial profile of a company rather than the links between and among the company's various activities. In addition, from a corporate strategy point of view, we should focus on the other company activities to find out the important cornerstones that eventually lead to financial outcomes (Wallman, 1995).

However, there is an agreement to use number of financial ratios that show company's aggregate financial profile, such as ROCE (Return On Capital Employed), Profit Margin, and Asset Turn (Eilon, 1988; Weston & Brigham, 1993). Buzzell, et al., (1975) state that company's market share position is widely believed to be a determinant of profitability, thus would be a meaningful indicator of performance. Van Horne & Wachowicz (1995) provide a model of 'Sustainable Growth Rate,' which is used for financial planning. Company's financial autonomy is measured by a number of proxy measures of financial transformation such as market-oriented financial discipline and transparency in financial relations (Ayub & Hegstad, 1987). In addition, some inventory and capacity utilization-related measures are used to monitor the functional aspects of an industry and/or a company (McTigue, 1993).

The literature on corporate strategy provides variety of measures that explore and examine company's business strategies. Chakravarthy (1986) and McGuire & Schneeweis (1983) suggest number of measures to monitor company's transformation process. Nevertheless, it should be noted that Chakravarthy has ignored measures that are related to "market position" and "growth in sales and market share" because they are not readily available for all businesses. Lev (1992) suggests corporate information disclosure strategy that helps deterring political and regulatory intervention and, at the same time, avoids misperceptions by non-investors stakeholders. Venkatraman & Ramanujam (1986), Taffler (1982, 1984) and Prahalad (1993) combined insights from the literature of finance and corporate strategy by using the ratio of corporate value added/average total assets as a measure of corporate financial performance.

Other research focuses on the financial phase of the governance process that shows the effects of corporate financial structures and decisions on managers reaction and, eventually, on corporate performance (Williamson, 1988). As most of the Anglo-Saxon corporate governance mechanisms are not viable to transitional developing

countries, the author focuses on the basic governance structures that emphasize on the relative importance of governmental, banking and foreign financing (Triantis & Daniels, 1995; Carney, 1997; Borish, et al., 1995; Kim, 1995; Kaplan, 1997; Macey & Miller, 1995; Phelps, et al., 1993).

Hoskisson & Turk, (1990), Grier & Zychowicz (1994), Aoki & Kim (1995) and Pannier (1996) combine the literature of corporate governance and corporate strategy to provide proxy measures of alternative modes of corporate governance. In terms of international business systems, these measures are very useful for transitional developing countries taking into account that the process of transition itself involves examining alternative modes of governance so as to adopt what is (are) relevant to each country according to the country-specific characteristics of its economic, political and social institutions.

The literature on international business provides some measures of the process of internationalization that are helpful in the cases of developing countries in transition (Aggarwal & Agmon, 1990; Sullivan, 1994; Ramaswamy & Kroeck, 1996; Ietto-Gillies, 1998). In general, these measures focus on the role of exports as a stage of country and/or company internationalization process. Porter (1985) provides measures of company's competitiveness that incorporate insights from the literature of finance, corporate strategy and international business to highlight some aspects of a company's competitiveness. Finally, a standardized measure of risk is included in this study as a measure of risk (Van Horne & Wachowicz, 1995).

The literature on the measurement of public enterprise quantitative transitional performance quantitatively is relatively new. The ratios that can be developed from the literature mentioned above are very helpful for providing a variety of *first-order ratios* that can help examine and monitor public enterprise transitional performance in developing countries. Accordingly, numbers of meaningful ratios are used to build a **Z-Score** model for monitoring public enterprise transitional performance in the textile sector in Egypt.

#### IV. DATA AND RESEARCH VARIABLES

##### A. Data

The data used in this study cover the period 1992-1997. The data was collected from many sources. First, companies' annual reports and financial statements. Second, companies' performance reports held by many governmental authorities in Egypt including the Ministry of Industry, the Public Sector Authority, Information and Decision Support Center (IDSC) and the annual reports of the Textile Industry held by the three Holding Companies to which the thirty-one textile companies (the population of the study) report to.

##### B. Research Variables

The literature of finance, corporate strategy, corporate governance, and international business include number of ratios that are useful in monitoring transitional public

enterprise performance. Thirty-one ratios are emphasized upon in the literature and are considered appropriate to the nature of the study. To address the issue of multicollinearity, a correlation analysis is carried out. As a result, seven ratios were excluded, as their coefficients of correlation are very high.

### **C. Data Normality**

To test for the normality of the data, a Chi-square test was carried out to each of the variables. The results show that only two variables out of the twenty-four variables are not normally distributed. This means that 91.67% of the data is normally distributed.

### **D. Discriminant Validity**

To test for the discriminant validity and to address the dimensionality of the twenty-four ratios that are basically drawn from various literature, a multivariate technique which is the Principal Component Analysis (PCA - varimax rotated) was carried out (Podsakoff, & Organ, 1986; Hair, et al., 1995; Manly, 1998).<sup>3</sup> The results of the PCA analysis in Table 1 show that the dimensionality of the twenty-four variables could be reduced to eight dimensions. That is, the variables are loaded on eight factors that describe eight aspects of companies' transitional performance. The eight factors accounted for 77.6 per cent of the explained variance.

### **E. Content and Construct Validity**

As for the content validity, the variables used in this study are considered an adequate coverage of the important content as long as they are drawn from relevant literature that adequately provides multi-dimensional perspectives for measuring public enterprise performance (Nunnally, 1978). In addition, these variables provide an adequate evidence of construct validity as they have been empirically examined in many related studies in the literature of finance, corporate strategy, corporate governance and international business.

### **F. Dimensionality of the Variables**

The PCA analysis shows that each factor includes various variables that emphasize on more than one dimension of public enterprise transitional performance at a time. These factors can be readily interpreted as shown in Table 2.

**Table 1**  
The Principal Component Analysis (PCA - varimax rotated)

Variables	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
Banking Finance/Total Finance	0.646							
Cost of Capital					0.9			
Capacity Utilization							-0.547	
Exports/ Industry Exports				0.738				
Exports/Sales							0.677	
Foreign Component						0.758		
Foreign Component in a Company's Portfolio	0.579							
Foreign Debt/Total Financing	0.531							
Governmental Financing/Total Financing	0.797							
Growth in Market Share			0.81					
Growth in Total Investments in Production Facilities				0.802				
Internal Financing/Total Financing	-0.742							
Total Imports/Total Exports				0.908				
Inventory Weeks of Consumption							-0.711	
Rate of Defected Products							-0.715	
R&D/Sales								0.719
Sustainable Growth Rate								0.795
Sales/Total Capital	-0.636					0.541		
Standardized Measure of Risk	0.791							
Sales/Total Employees			0.715					
Total Exports Growth				0.838				
Value Added/Average Total Assets	-0.808							
Variations in the availability of Qualified Employees			0.611					
Working Capital/Sales						-0.838		
Eigenvalue	5.20	2.94	2.78	1.98	1.70	1.45	1.37	1.16
Percentage of Variance	21.7	12.3	11.6	8.3	7.1	6.00	5.7	4.9
Reliability analysis <sup>4</sup>								
Alpha	0.546	0.659	0.699	0.701	0.788	0.512	0.510	0.772
F Statistic	14.0*	4.5**	215.3*	4.8*	28.6*	52.8*	287*	0.1***

\* Significant at  $p$ -value < 0.01    \*\* Significant at  $p$ -value < 0.05    \*\*\* Not Significant at  $p$ -value < 0.10



**Table 2**  
Dimensions of Public Enterprise Transitional Performance

Factor	Dimension
Factor 1	Viability of Financial Transformation
Factor 2	Proxy Measures of Alternative corporate Governance Structures
Factor 3	Company's Relative Market Position
Factor 4	Company's Position in the Process of Internationalization
Factor 5	Inputs of Company's Competitive Position
Factor 6	Company's Strategic Aspects of Investing Slack Resources
Factor 7	Degree of Success in Foreign Markets
Factor 8	Proxy Measures of Management of Innovation

## V. METHOD

### A. Discriminate Function Analysis

In the field of business, the discriminate analysis has initially been utilized by Altman, (1968), and Altman & Fleur, (1981).<sup>5</sup> The discriminate analysis technique has the advantage of considering an entire profile of characteristics common to the relevant observations (i.e., companies) as well as the interaction of these characteristics. The linear discriminate analysis has also the advantage of yielding a model with a relatively small number of selected measurements, which has the potential of conveying a great deal of information. It is sometimes useful to be able to determine functions of the variables  $X_1, X_2, \dots, X_p$  that in some sense separate the  $m$  groups as well as possible. The simplest approach involves taking a linear combination of the  $X$  variables in such a way that  $Z$  reflects group differences as much as possible.<sup>6</sup>

$$Z = a_1 X_1 + a_2 X_2 + \dots + a_p X_p \quad (1)$$

One way to choose the discriminant coefficients  $a_1, a_2, \dots, a_p$  in the index is to maximize the  $F$  ratio for a one-way analysis of variance. As this paper is concerned with only two groups (privatized companies and not-yet-privatized companies) the resulted  $Z$  function is only one function (i.e., one-dimension analysis). When the discriminant coefficients are applied to the actual ratio, a basis for classification into one of the mutually exclusive groupings exists.

## VI. RESULTS

### A. The Z-Score Model

Thirty-one cases were used to develop the  $Z$  index ( $Z$  model) that discriminates between the two groups (privatized companies and not-yet-privatized companies).

Using a stepwise selection algorithm, it was determined that four variables were significant predictors of grouping. The discriminating function with p-value < 0.05 is statistically significant at the 95% confidence level. The discriminating function with its standardized coefficients is as follows.

$$Z = 1.07X_1 + 1.24X_2 + 0.76X_3 - 0.63X_4 \quad (2)$$

where  $Z$  = Overall score

$X_1$  = Governmental Finance/Total Finance

$X_2$  = Banking Finance/Total Finance

$X_3$  = Cost of Capital

$X_4$  = Standardized measure of risk

As the two groups are not in equal size, the model can be used operationally by taking into account the prior probability estimates of each group (Taffler, 1982, 1984). The prior probability ratio is an estimate of the proportion of companies with a ratios profile more similar to that of group 1 (the privatized companies) and a ratios profile more similar to that of group 2 (the not-yet-privatized companies). The estimated prior probability ratios are 0.23 for group 1 and 0.77 for group 2, resulting in a cut-off point of -1.21 on the  $Z$ -Scale. Table 3 shows the model's accuracy of classification, which is tested using *Lachenbruch Holdout Test* (jack-knife test), reaching a high degree of accurate classification amounts to 93.55% of grouped cases correctly classified.

**Table 3**  
*Lachenbruch Holdout Test* (jack-knife test)

Actual Group Membership	No. of cases	Predicted Group Membership *	
		Privatized	Not-yet-privatized
Privatized	7	7 100%	0 0.00%
Not-yet privatized	24	2 8.3%	22 91.7%

\* Percent of "grouped" cases correctly classified: 93.55%.

### B. Relative Contribution of the Model's Discriminatory Power

Since the actual variable measurement units are not all comparable to each other, simple observation of the discriminant coefficient is misleading. Therefore, the final

four-variables profile is to show the relative contribution of each variable to the total discriminating power of the **Z**-Score model and the interaction between them as well.<sup>7</sup>

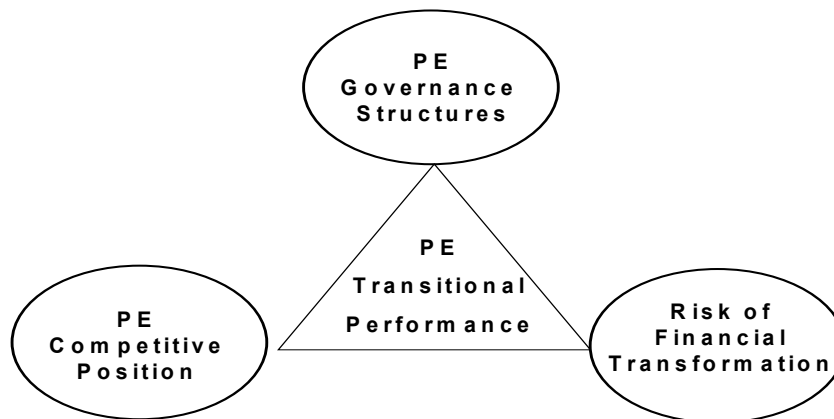
Table 4 shows that the ratio of Banking Finance/Total Finance accounts for proportionally high percentage of the total discriminatory power of the model. The next important variables are the ratio of Governmental Finance/Total Finance, the company's Cost of Capital and the Standardized measure of risk respectively.

**Table 4**  
Dimensions of the Transitional Performance and their Relative Contribution

Dimensions of (PE) Transitional Performance	Variable	Relative Contribution * %
Proxy Measures of Alternative Corporate Governance Structures	Banking Finance/Total Finance	33.51
	Governmental Finance/Total Finance	28.92
Inputs of Company's Competitive Position	Cost of Capital	20.54
Risk of Financial Transformation	Standardized Measure of Risk	17.03
		100

\* Mosteller-Wallace measure.

**Figure 3**  
Competitive Determinants of Public Enterprise (PE) Transitional Performance



## VII. DISCUSSION

### A. Public Enterprise Transitional-Specific Performance

The model developed in this paper adds an additional scope to the development and usage of these models by the inclusion of a substantial number of public enterprise transitional-specific ratios. These ratios emphasize on very important dimensions to transitional developing countries that enhance the credibility and validity of corporate strategies. That is, the resulted model illustrates the multi-dimensional public enterprise transitional performance, which is measured using both financial and strategic-related ratios. This is shown in Figure 3. The final outcomes of the transitional-based **Z**-model are to be viewed as strategies that need a major concern on the part of corporate top management in Egypt.

### B. Alternative Corporate Governance Structures

Table 4 shows that the first dimension emphasizes on the conventional alternative corporate governance structures, which are banking governance and government governance. This dimension is considered a matter of reality in the transitional countries where companies' financial structures combine both types of financing-source-based governance. Considering that markets in transitional developing countries are imperfect, the use of the **Z**-Score model for monitoring public enterprise performance can help reducing monitoring costs and information costs. This can help, *inter alia*, to bring about good governance by public enterprise constituencies who are interested in public enterprise reform.

### C. Inputs of Company's Competitive Position

As for the second dimension, factor 5 in Table 1 indicates some of the well-known inputs to build a competitive position, which are firm's cost of capital and growth in total investment in production facilities. This means that the lower the first variable and the higher the second one, the higher the competitive position of a company that is getting ready to go and compete publicly. The model incorporates the enterprise cost of capital as a monitoring tool of its relative competitive position.

### D. Risk of Financial Transformation

As for the last dimension, factor 1 in Table 1 shows that the ratios of foreign component in a company's portfolio, standardized measure of risk and foreign debt/total finance are the most important variables for monitoring the viability of financial transformation. This encourages firms' management to take into account the fact that when the degree of risk is considerable, privatization is hard to be viewed as a matter of capital transfer or capital restructuring. Moreover, when the risk is high, managers will not be able to disclose the potentials of public enterprise transformation, thus the privatization process is expected to be very slow. Bruijn (2002) argues that the

risk factor associated with performance measurement is considered a determining factor of public sector performance. This result is important to the transitional developing countries as the recent crises in the emerging markets in East Asia should encourage firms' management in developing countries to establish well-adaptable strategies that can reduce the degree of risk associated with the process of transition (Peng & Heath, 1996). Through focusing on major cornerstones in public enterprise transitional performance, which are revealed by the **Z** model, the variance of uncertain events can be decreased or less likely to escalate. In this sense, the quality of information about the privatization process can be enhanced.

### VIII. CONCLUSIONS

This paper can be considered as an extension to the literature that incorporates the international, corporate and business research levels (Dess, et al., 1995). The **Z** model is built using variety of measures that demonstrate the financial, operational, and competitive phases of a public enterprise performance. In general, the monitoring function of the **Z** model enables outsiders to monitor corporate transitional performance in transitional economies (Pannier, 1996; Lieberman, et al., 1997; Guislain, 1997).<sup>8</sup> The model developed in this paper can then be used conveniently for monitoring the transitional performance of a public enterprise (PE) in Egypt. In addition, the resulted ratios in the **Z** model can help developing strategies that enhance public enterprise long-term capabilities in Egypt. This is to do with the criticism of looking at stock prices as a criterion and indicator of public enterprise performance in capital markets. Stock prices have been described as the cause of 'short-termism' (Jacobs, 1991; Lavery 1996).

International and/or national investors who are willing to do business in Egypt can use these indicators as a guide to their investments in the Egyptian public enterprises. In this sense, the **Z** model can help promoting well-guided reform process and, eventually, motivating owners to participate in that process as actively as possible (Gray, 1996). Although the **Z**-Score model does not capture the qualitative or behavioral aspects of the privatization process, the components of the model must be regarded as the "*first-order ratios*" for monitoring the Egyptian public enterprise easily- observable and easily-measurable quantitative performance, rather than hard-to-measure qualitative performance. Further research can be carried out in other transitional developing countries to build **Z**-Score models that can be used to monitor the degree of convergence between and among those countries and between them and other Asian countries that have already emerged.

### ENDNOTES

1. The lack of subsidies as one reason for privatization is not limited to the developing countries in transition. Many developed countries have witnessed a lot of state enterprise inefficiencies. Donahue (1989) provides evidence of significantly higher cost of public relative to private provision of municipal services in the U.S. Mueller (1989) and Vining & Boardman (1992) surveys

dozens of studies of public and private firms around the world, most of which show that private firms are more efficient. Megginson et al., (1994) showed that firms efficiency improves after privatization.

2. In addition, this ratio is not entirely free from accounting manipulations that the book value of a firm can be distorted.
3. The decision to include a variable in a factor was based on factor loadings greater than 0.50 and all factors whose eigenvalue was greater than one were retained in the factor solution. (Tabachnick & Fidell, 1989; Hair, et al., 1995).
4. The results in Table 1 show acceptable *Alpha* coefficients for each factor (Churchill, 1979; Nunnally, 1978). Although three of the coefficients, ranging from 0.510 to 0.546, may be relatively low, they are acceptable considering that: (1) the combination of the variables used in this study is new, (2) the research instrument, *Z*-Score model in the field of international business in developing countries in transition studies is new, and (3) the relatively high volatility in the business environment in developing countries in transition affect the available data with some degree of noise or irregularity.
5. There are a lot of *Z* models that are used in the discriminant analysis. Most of these models are derived for the evaluation of company solvency. In the literature of finance, interests in this model, and the methodology itself, have continued in the work of Wilcox (1971), Edmister (1972), Deakin (1972), Blum (1974), Sinkey (1975), Taffler (1978, 1982, 1983, 1984) and Sudarsanam (1981).
6. Groups can be well separated using *Z* if the mean value changes considerably from group to group, with the values within a group being fairly constant. Hence a suitable function for separating the groups can be defined as the linear combination for which the *F* ratio is as large as possible. When this approach is used, it turns out that it may be possible to determine several linear combinations for separating groups. In general, the number available is the smaller of  $p$  and  $m-1$ . This is one of the advantages of the linear discriminant analysis. That is, the reduction of the analysis space dimensionality, i.e., from the number of different independent variables *X* to  $m-1$  dimension (s).
7. The common approach used to assess the relative contribution is based on measuring the proportion of the Mahalanobis  $D^2$ -distance between the centroids of the two constituent groups accounted for by each variable (Mosteller and Wallace, 1963; Taffler, 1981, 1983).  $p_j = c_j(\bar{r}_{jf} - \bar{r}_{js}) / \sum_{i=1}^4 c_i(\bar{r}_{if} - \bar{r}_{is})$  where  $p_j =$  The proportion of the  $D^2$ -distance accounted for by ratio *j*.  $\bar{r}_{jf}$  and  $\bar{r}_{js} =$  The means of the privatized and not-yet-privatized groups for ratio *i* respectively.
8. Other measures that provide checks on the behavior of managers, such as rating companies, brokers, financial investors that assess the performance of public enterprises, and the capital market are yet to develop.

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