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Measuring the Informativeness of Financial Fundamentals to Shareholders in Egypt: A Dynamic Approach

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Abstract

This study examines the measurement of the market reaction (MB ratio is a proxy for shareholder value) to fundamental financial information. The issue of measuring the stock market reaction to fundamental information stems from the fact that there is a strong need to focus on those fundamentals that support shareholder value. The methodology utilizes the dynamic properties of the partial adjustment model that shows the extent to which shareholder value in a previous period adjusts to a target level because of the presence of financial fundamentals. The results indicate that (a) shareholder value is positively associated with elements of short-term debt financing, earnings power, liquidity, stock returns, (b) in contrast, the shareholder value is negatively associated with elements of capital expenditure, accounts receivables and long-term debt financing, (c) shareholder value is positively associated with elements of cash flow rather than accruals basis. The results of the sensitivity analysis indicate that the fundamentals related to the income statement and financial ratios (regarded as an example of co-integrated financial information) are very informative in a sense that they help adjust the shareholder value to a target level. The models examined in this paper have practical use to investment analysts, particularly in transitional markets, in a sense that these models indicate the sources and types of fundamentals that help adjust the MB ratio from a pervious level to a target level. The overall results of this paper help investment analysts measure the informativeness of the financial information they communicate with stockholders.

JEL classification: G30, P31
Key words: Financial Fundamentals, Informativeness, Partial Adjustment Model, Egypt.

I. Financial Fundamentals and Shareholder Value

Financial ratios have been providing the basic financial information to various decision makers. Many studies assumed a close association between certain fundamentals and stock market characteristics such as the effects of fundamentals on stock returns and on stock risk. This association implies a degree of informativeness to some extent. This is true as long as financial statement information typically captures information about firm's activities. In this study, the informativeness of financial fundamentals is examined for three sources of financial information: balance sheet-related information, income statement-related information and financial ratios as a form of co-integrated financial information. The use of fundamental financial information has also been extensively examined within the context of 'efficient market hypothesis.' It has long been recognized that the capital market that produces rapid adjustments to information, mostly fundamental, is referred to as an efficient market (Fama, 1965; Fama and Blum, 1966; Fama et al., 1969; Fama, 1970 ; Gonedes, 1972, 1973; Fama, 1991). In addition, the empirical results of the association between fundamental signals or information and future returns suggest that some of the tools required to improve the efficiency of process (or alternatively exploit mispricing) may be found in the practice of fundamental analysis (Abarbanell and Bushee, 1998). This requires examining to what extent financial fundamentals are informative to the market participants. This paper examines the financial ratios as a form of co-integrated financial information as a common factor in two interdisciplinary fields of study which are corporate finance and investments. Financial ratios are used in both fields based on the assumption that they reflect (to some extent) events that have affected the firm's operations. As financial ratios are used extensively in the corporate financial reports, it is now a common understanding that if corporate financial reporting is to be adequately supportive to investment deci-

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sion making, then clearly it must provide information useful to the formation of risk and return assessment (Farelly et al., 1985). This, again, shows the necessity to examine the extent to which the various types of financial fundamentals are informative.

On the usefulness of financial ratios, many studies have shown a positive association between certain financial ratios and market-based measures (Beaver et al., 1970; Eskew, 1979; Elgers, 1980; Farrelly et al., 1985; Ferris et al., 1990; Capstaff, 1991). The BM (or alternatively MB) ratio is one of the fundamentals that has been exposed to an extensive empirical examination[1]. This ratio has long been recognized as an indicator to the value created to the shareholder (Shapiro and Balbirer, 2000). Many studies concluded that the BM ratio reflects the investors' assessment of the future abnormal, or excess, profits of the firm. These studies have found a positive association between the BM ratio and subsequent stock returns (Rosenberg et al., 1985; Chan et al., 1991; Fama and French, 1992, 1995; Lakonishok et al., 1994; Chan and Chui, 1996; Strong and Xu, 1997). In this study, the MB ratio, rather than BM ratio, is used as the dependent variable for two reasons: (1) it is a common measure of the value created to shareholders, and (2) the data used in this study do not contain negative values that can cause any interpretation problems.

The rest of the paper is organized as follows. Section II describes the research variables. Section III describes the data used in the paper and the methodology of the analysis. Section IV discusses the results. Section V concludes.

II. Research Variables and Proxies

Dependent Variable

The dependent variable is the firm's market-to-book ratio. This ratio is recognized as a measure of shareholder value creation (Shapiro and Balbirer, 2000).

Independent Variables

Primarily, the independent variables include the financial information that reflects firm's fundamentals. Regarding the financial ratios, the literature on the use of financial fundamentals is extensive and does not include a consensus of the number, type and measurement of the financial ratios to be used. The ratios examined in this study were selected on the basis of (a) their popularity in the relevant literature, (b) popularity in the 'Corporate Finance,' 'Financial Management' and 'Investment' textbooks that include financial ratio analysis as one of the main topics, (c) the ratios' commonality of use by investors and financial analysts, and (d) the availability of the relevant annual-based data.

III. Data and Methodology

Data

The data used in this study are obtained from many sources. The data related to firms' income statement and balance sheet are obtained from the firms' annual reports, stock market authorities and Kompass Egypt Financial Year Book (Fiani & Partners). The data covers six years, 1998-2003. A total of 99 firms are included in the study. Firms were selected based on two criteria. First, the non-financial firms amongst the 100 actively trading firms in Egypt stock market. Second, the non-financial firms amongst the 100 firms with the highest market value.

Methodology

The methodology examines the effects of the fundamental financial information on the firm's MB ratios. The fundamental financial information is divided into three basic categories. First,

[1] This relationship is typically expressed in the form of B/M ratio, rather than M/B ratio, for some practical reasons. As Beaver and Ryan (1993) indicate, the book-to-market form is used because the book value of common equity can take on small values or negative values. If book value is in the denominator of the ratio, problems of interpretation arise, while no particular problems arise if book values appear in the numerator. Therefore, the indications of B/M ratio, or M/B ratio, are the same when the book values are not discrete.

balance sheet-related financial information. Second, income statement-related financial information. Third, financial ratios taken and co-integrated financial information. The general estimating equation of the partial adjustment autoregressive models takes the following form[1]

$$y_{tk} = \alpha_k + \beta_k y_{t-1,k} + \sum_{i-1}^{k} \beta_{ik} x_{itk} + \varepsilon_{tk},$$

where $t = 1,\ldots,6$,

k = number of firms,

y = Market-to-Book ratio,

x = variables included in the balance sheet, income statement and the financial ratios.

The usefulness of studying the effects of fundamental financial information is met by the properties of the partial adjustment models. That is, in general, sometimes the economic theory specifies that the desired rather than the actual value of the dependent variable is determined by the independent variable(s). But, this relationship cannot be estimated directly because the desired level of the dependent variable is unknown. This dilemma is usually resolved by specifying that the actual value of the dependent variable adjusts or is adjusted to the desired level according to some simple rule. In the partial adjustment models, the actual value adjusts by some constant fraction of the difference between the actual and desired values (Kennedy, 1998). The partial adjustment formulation offers a number of significant practical advantages (Greene, 2000) that (1) it is intrinsically linear in the parameters (unrestricted), and (2) its disturbance is nonautocorrelated if the error term ε_t was to begin with. As such, the parameters of this model can be estimated consistently and efficiently by ordinary least squares in regression equations.

(b) Sensitivity Analysis (Robustness of the Estimates):

In the literature on fundamental analysis, selective reporting is highly likely given the very large number of potential regressors. The Extreme Bound Analysis (EBA) avoids the pitfalls of selective reporting by directly incorporating prior information and following a systematic approach to testing the fragility of coefficient estimates. As indicated by Leamer (1983, 1985), Leamer and Leonard (1983) and Levine and Renelt (1992), the EBA uses equation that takes the form

$$\boldsymbol{Y} = \beta_i \mathbf{I} + \beta_m \boldsymbol{M} + \beta_z \boldsymbol{Z} + \boldsymbol{u},$$

where Y = the proxy for shareholder value (MB ratio).

I = set of variables always included in the regression. These are the significant estimates of the balance sheet, income statement and financial ratios included in the regression model.

M = the variables of interest. In this study, these variables refer to the speed of adjusting shareholder value to a target level in the partial adjustment model [$(\mathrm{Log}_{10}\mathrm{MB})_{t-1}$ and $\mathbf{MB_{t-1}}$].

Z = subset of variables chosen from a pool of variables identified by past studies as potentially important explanatory variables that affect the dependent variable. In this study, these variables refer to (a) sources and uses of financing in firms' balance sheets, (b) operating activities in firms' income statements, and (c) the common classification of financial ratios as liquidity, assets efficiency, expense control, debt levels and profitability respectively.

The EBA involves varying the subset of Z variables to find the widest range of coefficient estimates on the variable of interest M that standard hypothesis tests do not reject. The implementation goes that the first step is to choose the first M variable and run a base regression that includes only the I variables and the first M variable. Then, each Z variable is to be included in the regression equation on at a time and for all possible linear combinations of the Z variables, and identify the highest and the lowest values for the coefficient on each variable of interest β_m that cannot be rejected at the 0.05 significance level. Thus, the extreme upper bound is defined by the

[1] For more detailed discussion about the structures of partial adjustment models, see, Kennedy (1998, pp.143-156) and Greene (2000, pp. 720-724).

group of *Z* variables that produces the maximum value of β_m plus two standard deviations. The degree of confidence that one can have in the partial correlation between the *Y* and *M* variables can be inferred from the extreme bounds on the coefficient β_m. If β_m remains significant and of the same sign at the extreme bounds, then one can maintain a fair amount of confidence in that partial correlation. In such a case, we refer to the coefficient estimate as "Robust", otherwise, it is "Fragile".

IV. Results and Discussion

This section discusses the results of regressing (stepwise) the three types of financial information against the MB ratio and the associated regression sensitivity analysis. The results are divided into two parts. Part (*a*) discusses the estimates of the regression coefficients and part (*b*) discusses the robustness (sensitivity analysis) of the estimates.

(a) Estimates of the Regression Coefficients:

The results of regressing (stepwise) the financial information included in the balance sheet, income statement and the derived financial ratios against the MB ratio are shown in Table 1. The overall results show that the three regression equations are statistically significant at the 1% level and are free from the effects of autocorrelation since the D-W scores are significant at the 2% level, two-sided level of significance. The Theil test for the predictive power of the each model shows that the balance sheet items have the highest predictive power since its inequality coefficient (0.001) is the lowest. The financial ratios equation has the next predictive power with inequality coefficient (0.12), and the income statement items have the lowest predictive power since its associated inequality coefficient (0.25) is the highest among the three equations.

Table 1

The Informativeness of Financial Information and Shareholder Value [a]

Fundamental Financial Information[1] *Dependent*: $(\text{Market - to - Book})_t$					
Balance Sheet *Independents*		**Income Statement** *Independents*		**Financial Ratios** *Independents*	
Constant	-0.001	Constant	-0.051	Constant	0.588
$\mathbf{LMB}_{t-1}$	-0.0001 (-0.80)	$\mathbf{LMB}_{t-1}$	0.615 (25.01)***	MB_{t-1}	0.656 (25.01)
NSO	-0.99 (-3383.1)***	SGAE	-0.072 (-2.81)***	Liquidity Ratios	
MV	0.99 (4822.6)***	PRO	0.007 (0.98)	CCA	0.268 (4.66)***
BVPS	-0.99 (-3435.7)***	TE	0.037 (5.07)***	ARCA	-0.622 (-3.21)***
NWC	-0.0001 (-1.76)*	EBIT	-0.022 (-1.54)	CRTE	0.002 (3.84)***
		IntExp	-0.022 (-3.07)***	Assets Efficiency Ratios	
		OR	0.025 (2.73)***	INVC	0.016 (3.17)***
		EBT	0.096 (4.08)***	DPAP	-0.0001 (-1.51)
				WCCF	-0.012 (-6.14)***

[1] Definitions of the abbreviations are listed in the appendix.

Table 1 (continuous)

			SNW	-0.029 (-1.37)
			AG	0.087 (1.44)
			Expense Control Ratios	
			COGSS	-0.224 (-2.88)***
			Leverage Ratios	
			DWC	-0.306 (-4.36)***
			AE	0.116 (7.35)***
			STDR	0.326 (3.74)***
			TIE	0.0004 (2.01)**
			EBITFC	0.015 (2.12)**
			NII	0.001 (2.03)**
			Profitability Ratios	
			BVPS	-0.003 (-3.76)**
			CFPS	0.016 (4.06)***
			PE	-0.007 (-9.75)***
			PCF	0.070 (7.95)***
			MVA	0.0001 (5.44)***
			REA	-1.134 (-3.52)***
			RET	0.028 (7.49)***
			SR	-0.001 (-2.18)**
			NID	-0.017 (-3.60)***
N	515	540	546	
F statistics (*Sig F*)	17564292***	179.54***	191.98***	
$\overline{R}^2$	0.99	0.72	0.90	
D-W test	1.96****	1.83****	1.75****	
Theil Inequality Coefficient	0.001	0.25	0.12	

[a] Regression coefficients for the information content of the financial ratios. The dependent variable is the market-to-book ratio. The *t*-statistics are shown in brackets. The multicollinearity was examined before carrying out the regression analysis, and variables associated with VIF ≥ 5 are excluded. Outliers are detected and excluded as well. The heteroskedastic effects are corrected using the White's HCSEC, which improves the significance of the OLS estimates.

**** D-W test significant at 2% two-sided level of significance

*** Significant at the level 1%

** Significant at the level 5%

* Significant at the level 10%

Table 1 shows the effects of the three types of financial information on shareholder value taking the MB ratio as a proxy. Regarding the speed of adjustment, the results show that coefficients of $(\text{Market - to - Book})_{t-1}$ are positive and statistically significant but for the balance sheet. The results show that the financial ratios category is associated with the highest speed (0.656) of adjusting the MB ratios to a target level. The income statement speed of adjustment (0.615) is the next speed of adjustment.

Balance Sheet Financial Information

The results for the balance sheet-related financial information show that the items that are related to the market affect the shareholder value significantly. Those items are the number of shares outstanding (NSO), market value of shares outstanding (MV), book value per share (BVPS). The negative coefficient of NSO indicates that the investors do not encourage the diffusion of ownership. The negative coefficient of BVPS is expected since it has to be inversely related to market value per share. This is obvious since the coefficient of MV is positive. The negative coefficient of net working capital NWC indicates that elements of firm's liquidity are not valued by the investors and, in fact, the investment in elements of liquidity affects the shareholder value negatively.

Income Statement Financial Information

The results of the income statement information show very consistent results. The negative coefficient of selling, general and administrative expenses (SGAE) indicates that the higher this item is, the less the shareholder value appears to be. The results also show that the high SGAE renders firm's EBIT negative as well although its coefficient is not statistically significant. The positive coefficient of the total expenses (TE) indicates the view that firm's total expenses are regarded as a form of capital expenditure that supports firm's operating activities. The negative coefficient of interest expenses (IntExp) indicates that the higher the firm's borrowing, and the associated interest payments are, the less the shareholder value is. This indicates that the investors do not value excessive debt financing. Finally, the positive coefficients of other revenues (OR) and Earnings before taxes (EBT) are quite indicative. That is, the shareholder value is positively associated with positive earnings items that indicate firm's earnings power.

Financial Ratios Information

The results of the financial ratios show that the statistically significant ratios present the five ratio categories: Liquidity, Assets Efficiency, Expense Control, Leverage and Profitability. The liquidity ratios show consistent results. The positive coefficients of cash/current assets (CCA) and (cash+ Receivables)/Expenditure for operations (CRTE) indicate that firm's liquidity is highly valued by the market. The negative coefficient of accounts receivables/current assets (ARCA) shows support to the negative coefficient of net working capital (NWC) in the balance sheet. That is, the accounts receivables is the item that is not valued by the market. It also indicates that the firms have a problem with expanding credit sales since the investors seemingly do not value credit sales as an indicator to operating activities.

The assets efficiency ratios also show consistent results. The positive coefficients of inventory turnover on cost of goods sold (INVC) indicate the investors' interests in the investment in inventory as one element of current assets. This is supported by the negative coefficient of working capital/cash flows (WCCF) that indicates that investors do not value the total investment in current assets. The negative coefficient of cost of goods sold/sales (COGSS) bears the same indication as the negative coefficient of sales, general and administrative expenses (SGAE) that the investors see that capital expenditures reduce the firm's earnings power.

As for the leverage ratios, the negative coefficient of debt/working capital (DWC) indicates that debt financing is not favorable. When the positive coefficient of short-term debt (STDR) is taken into account, it may lead to the conclusion that long-term debt financing is not favorable. In the balance sheet items, it was realized that the negative coefficient of number of shares outstanding (NSO) indicates the unfavorability of equity financing. Here, it is obvious that short-term

debt financing is much favored since its coefficient is positive. The positive coefficients of EBIT/fixed charges (EBITFC) and (Net income + Interests)/interests (NII) indicate that the investors appreciate firm's earnings power and its ability to cover fixed obligations.

The profitability ratios also show consistent results. The negative coefficient of book value per share (BVPS) indicates the same results as in the balance sheet, where it is an expected result since the dependent variable favors the market value. This is supported, and having the same implication, by the positive coefficient of market value added (MVA). The positive coefficients of cash flow per share (CFPS) and price/cash flow (PCF) indicate that the market appreciates the cash flow basis. This appreciation is not seen with the accruals basis since the coefficient of price/earnings ratio (PE) is negative. This result highlights a new perspective that addresses the market appreciation to the basis of preparing firm's income.

(b) Robustness of the Estimates (Sensitivity Analysis)

The sensitivity analysis focuses on the variables that refer to the speed of adjusting shareholder value to a target level [$(\mathrm{Log}_{10}\mathrm{MB})_{t-1}$ and $\mathbf{MB_{t-1}}$] in the partial adjustment model. These variables show the extent to which shareholder value adjusts to a target level according to the content of financial information included in the balance sheet, income statement and the derived financial ratios. Table 2 shows the results of the sensitivity analysis.

Table 2

Sensitivity Analysis for Informativeness of Financial Information and Shareholder Value

Types of Financial Information	***M*** Variables (MB speed of adjustment)	β		SE	*t*	n	$\overline{R}^2$	Other Variables	Robust/ Fragile
Balance Sheet	$(\mathrm{Log}_{10}\mathrm{MB})_{t-1}$	High	-0.00023	0.0007	-0.357	496	0.99	$\mathbf{Log_{10}TCA}$ $\mathbf{Log_{10}NFA}$, $\mathbf{Log_{10}LTD}$, $\mathbf{Log_{10}TSE}$	Fragile
		Base	-0.001	0.0001	-0.393	496	0.99	-	
		Low	-0.0017	0.0006	-0.506	496	0.99	$\mathbf{Log_{10}TCL}$, $\mathbf{Log_{10}LTD}$	
Income Statement	$(\mathrm{Log}_{10}\mathrm{MB})_{t-1}$	High	0.674	0.026	23.50	542	0.70	$\mathbf{Log_{10}TE}$	Robust
		Base	0.648	0.027	23.40	542	0.68	-	
		Low	0.549	0.026	23.07	542	0.72	$\mathbf{Log_{10}TE}$, $\mathbf{Log_{10}EBT}$,	
Financial Ratios	$\mathbf{MB_{t-1}}$	High	0.744	0.022	29.90	548	0.89	CCA, INVC, COGSS, TIE	Robust
		Base	0.665	0.022	29.58	548	0.88	-	
		Low	0.614	0.024	27.51	548	0.89	COGSS, NID	

Note: The base β is the estimate coefficient from the regression with the variables of interest (***M*** variables) and the always-included variables (***I*** variables). When the dependent variable is the MB ratio, the ***I*** variables are the significant ones included in the model. The high β is the estimate coefficient from the regression with the extreme higher bound $(\beta_m + 2\sigma)$. The low β is the coefficient from the regression with the extreme lower bound. The "Other variables" are the ***Z*** variables included in the base regression that produce the extreme bounds. The "Robust/Fragile" designation indicate whether the variable of interest is robust or fragile.

Table 2 focuses on the analyzing the sensitivity of the coefficients of partial adjustment. The reason is that these coefficients are the major concern in the measurement issue addressed in this paper. The results in Table 2 show the extent to which the coefficients of speed of adjustment change according to changes in the financial fundamentals. The results also show that the shareholder value adjusts positively to a target level because of the financial fundamentals related to the

income statement and financial ratios. The robustness of these two coefficients indicates that the adjustment process itself is robust and it is less likely to change according to changes in the fundamentals related to the significant items in the income statement and significant financial ratios. The fragility of the coefficient of speed of adjustment related to the balance sheet indicates that this coefficient is not stable and it may change its sign and/or significance according to changes in the significant items in the balance sheet.

V. Conclusion

The results of this study provide evidence that firm's financial fundamentals help measure the stock market reaction when the MB ratio is taken as a proxy for shareholder value. The general conclusion is that firm's financial fundamentals help adjust the shareholder value to a target level. This is important for the investment analysts to know the extent to which the communicated financial information is informative to the stockholders. This paper offers practical implications to the investment analysts in a sense that it shows that the collective effects (in the case of financial ratios as a form of co-integrated financial information) of fundamentals help adjust the shareholder value to a target level very rapidly. The results reported in Table 1 indicate that:

a) The market favors the short-term debt financing.
b) The market does not value the investment in accounts receivables.
c) The market values the elements in the income statement that support firm's earnings power and elements of capital expenditure are seen to reduce shareholder value.
d) The market values the elements of firm's liquidity, although accounts receivables are the item that is not valued by the market.
e) The profitability ratios show that the shareholder value is positively associated with elements of stock returns, which is quite expected. The profitability ratios also show a preliminary insights that the shareholder value is positively associated with the cash flow rather than the accrual basis. This issue warrants further research to come in the near future.

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Appendix

Abbreviations of the Financial Information Variables Shown in Table 1

Fundamental Financial Information *Dependent*: $(\text{Market - to - Book})_t$					
Balance Sheet *Independents*		**Income Statement** *Independents*		**Financial Ratios** *Independents*	
Variables	Abbreviation	Variables	Abbreviation	Variables	Abbreviation
Log (Market-to-Book ratio)	LMB_{t-1}	Log (Market-to-Book ratio)	LMB_{t-1}	Market-to-Book ratio	MB_{t-1}
Shares Outstanding	NSO	Selling & Admin Expenses	SGAE	Cash/Current Assets	CCA
Market Value of Shares Outstanding	MV	Provisions	PRO	Accounts Receivables/Current Assets	ARCA
Book Value per Share	BVPS	Total Expenses	TE	(Cash + Receivables)/Expenditure for Operations	CRTE
Net Working Capital	NWC	Earnings Before Interest & Taxes	EBIT	Inventory Turnover on Cost of Goods Sold	INVC
		Interest Expenses	IntExp	Day's purchases in Accounts Receivables	DPAP
		Other Revenues	OR	Working Capital/Cash Flow	WCCF
		Earnings Before Taxes	EBT	Sales/Net Worth	SNW
				Assets Annual Growth	AG
				Cost of Sales/Net Sales	COGSS
				Total Debt/Working Capital	DWC
				Assets/Equity	AE
				Short-term Debt/Total Debt	STDR
				Times Interest Earned	TIE
				EBIT/Fixed Charges	EBITFC
				(Net income +Interest)/Interest	NII
				Book Value per Share	BVPS
				Cash Flow Per Share	CFPS
				Price-Earnings ratio	PE
				Price-Cash Flow ratio	PCF
				Market Value Added	MVA
				Retained Earnings/Total Assets	REA
				Retention Ratio	RET
				Stock Returns	SR
				Net Income Percentage Change	NID