Financial Performance Measures And Shareholder Value Creation: An Empirical Study For Chilean Companies

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Abstract

This paper focuses on the most important Chilean companies and studies whether EVA™ dominates REVA and competing accounting measures in explaining shareholder value creation. Our results indicate that REVA outperforms alternative measures in associations among their current and lagged realizations and value creation. However, at the industry level, REVA explains value creation only for construction and investment industries. For the remaining industries, in addition to the high explanatory power associated to REVA, the net income and operating cash flows help to explain only a low portion. We conclude that accounting measures should be only considered as marginal complementary performance measures used to compensate executives mainly from the electric, beverage, metallurgic and pension fund industries.

I. Introduction

Economic Value Added (EVA™) and Refined EVA (REVA) have attracted an increasing attention as alternatives to traditional accounting measures for use in both value creation and incentive compensation plans for the U.S. companies. However, the empirical literature about what measure dominates in explaining shareholder value creation is scarce for either the U.S. or emerging economies as Chile.

Regarding the previous issue, this paper focuses on sixty-two Chilean companies and shows evidence about whether EVA™ dominates REVA and competing accounting measures (Net income and Operating cash flows) for the 1994-1999 period.

This research differs from those that have been reported in the financial literature in at least two aspects. First, most of the previous studies are concentrated in the U.S. case. This study recognizes that there exist additional business environments (i.e., Chile) that are possible to analyze. Second, although many companies use EVA™ for both resource allocation and compensation purposes[1], virtually there is only one research reported in the published U.S. literature that provides information about the statistical relationship of EVA™ to shareholder value, Bacidore et al. (1997).

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The previous situation is also observed for the Chilean case, where companies traditionally have been managed following the U.S. paradigms used in management. In order to achieve the paper's objective we follow a similar approach to Bacidore et al. (1997). However, we focus on a different country and industries in another period of time and data frequency (quarterly). First, we analyze the explanatory power of EVA™ and REVA against competing accounting measures for the entire sample, before and after controlling for the last metrics. Then, once obtained the best predictor for value creation, we analyze Chilean industries, in particular. This paper is divided into seven sections. The second section reviews previous studies of financial performance measures and their relationships with stock price and abnormal returns. The third section presents the methodology used to measure shareholder value creation. The fourth section shows the empirical analysis. Empirical findings are presented in section five. Conclusions are presented in section six followed by suggestions for future research at the end.

II. Literature Review

Traditionally in the seminal finance theory of Modigliani and Miller (1958, 1963) managers have the fiduciary duty to make decisions that maximize the wealth of the firm's shareholders. However, in real business practices shareholders must be able to costlessly monitor management decisions if they want to be sure that management makes every decision in a way that maximizes their wealth. In most agency relationships, the owner will incur nontrivial monitoring costs in order to keep the agent's incentives in line. Consequently, the owner faces a trade-off between monitoring costs and forms of compensation that cause the agent behaves ac-cording to the owner's interest.

The basic point is that if managers are offered compensation contracts that link their wealth to shareholders', their incentives will be better aligned with those of shareholders. In making such contracts, however, an important issue is which measure of management performance to use in designing the contract. Jensen and Murphy (1990) and Milbourn (1996) argue that the best performance measure should be the stock price itself. Stock price, however (or returns based on stock price), may not be an efficient contracting benchmark because they are affected by some factors beyond the manager's control. In addition, the inefficiencies of stock-based compensation as a means of aligning managerial interests with those of shareholders become more evident since CEO decisions at higher organization's level are more material than management decisions at lower levels.

A reasonable financial performance measure used in managerial compensation should be highly correlated with shareholder wealth and it should not be exposed to the "randomness" associated with the firm's stock price determination.

A recent example of a new class of metrics that attempts to resolve this tension is economic value added (EVA™). This measure, proposed by Stern Stewart Management Services, links the firm's accounting data to its stock market performance (Stewart (1991)). Basically EVA™ is a measure of surplus value created on an investment. Formally EVA™ is defined as

$$EVA = NOPAT - Kw(NA) \quad (1)$$

where NOPAT is the net operating profits after taxes, Kw is the weighted-average cost of capital and NA is defined as adjusted book value of net capital at the beginning of the period.

The natural question so far is whether or not EVA™ has a theoretical foundation in order to be used as a useful performance measure for management. Rogerson (1997) develops a theoretical model in order to show how managerial investment incentives are affected by alternative allocation rules when managerial compensation is based on accounting measures of income that include allocations for investment expenditures.

The main assumptions of the Rogerson's model are better-informed managers, risk adverse shareholders, and an investment rule that maximizes the expected discounted cash flows. The main result of his model is that there exists a unique allocation rule that always induces the manager to choose the efficient investment level. The income measure created by this allocation rule is usually referred to as residual income or economic value added (EVA™).

The implication in real business practices is that it is correct to impute interest costs at the firm's cost of capital when using income as a performance measure for management. Therefore, the current wave of enthusiasm for EVA™ measure would seem justified.

Proponents of EVA™ measure have traditionally examined the issue of whether EVA™ dominates earnings (NI) and operating cash flow (CFO) in explaining contemporaneous annual stock returns. The empirical literature is almost fully concentrated on the studies that analyze evidence on associations between EVA™ or alternative measures and stock returns and firm values (Peterson and Peterson (1996), Chen and Dodd (1997), O'Byrne (1995), Biddle, Bowen and Wallace (1999)). Biddle et al. (1999), for instance, examine 6,174 firm years over the period 1984-1993 and test the correlation between EVA™ and stock prices. Their results indicate that EVA™ does not dominate traditional accounting earnings in associations with stock returns and firm values. Similar results are achieved in the previous studies. The main limitation of these studies lies on the assumption that a high correlation between EVA™ and stock price would represent that high EVA™ projects are associated with significant wealth changes. However, it is possible to find a perfect correlation between EVA™ measure and portfolio value and at the same time a significant negative performance in the stock market for such portfolio. Thus, before examining the correlation between shareholder wealth and a performance measure, one must first define the appropriate way to measure changes in shareholders' wealth.

One way to measure wealth changes is through a model with theoretical basis (i.e., CAPM) that describes the securities' equilibrium pricing process. Thus, any significant deviation from the equilibrium would indicate the presence of abnormal returns, which would reflect increases or decreases in wealth. In other words, the abnormal return shows the return that shareholders earn in excess of what they expected to earn for a firm within a given systematic risk class. On the one hand, when this return is positive, shareholders have more than covered their risk-adjusted opportunity cost of providing their capital. On the other hand, when this return is negative, they have been inadequately compensated for risk. Given the previous relationship, a good financial performance measure should correlate highly with abnormal stock returns.

Empirical evidence regarding this last issue is scarce for either the U.S. market or emerging countries as Chile. Bacidore et al. (1997) conclude for the U.S. case that EVA™ does quite well in terms of its correlation with the abnormal returns defined as "Jensen's alpha" (Jensen 1968, 1969). However, according to them, EVA™ views the book value of the physical assets in place as the capital financiers commit to the firm. These authors propose that a more appropriate measure of the capital used in the firm for any period of time is the market value of the firm at the beginning of the period instead of the adjusted book value of net capital (NA in equation 1). This approach led them to use a refinement of the EVA™ measure, REVA. This measure assesses a capital charge for a period equal to the weighted-average capital cost times the market value of the firm at the beginning of the period. Thus, REVA would have two advantages relative to EVA™. First, if REVA is positive then additional shareholder value has been generated. The operating income going to financiers at the end of the period, as a percentage of the market value of their investment at the beginning

of the period, will cover their opportunity cost of capital. This condition does not apply for EVA™; the financiers might be obtaining an operating income return that is lower than their opportunity cost of capital even in presence of a positive EVA™. Second, REVA might be estimated based on either total operating cash flows to debt and equity or only on the flows to equity. This feature is true for EVA™ only when the market values of debt and equity are equal to their respective book value. They conclude that REVA is a more appropriate performance measure than EVA™ from shareholders' view of the firm. Hence, the senior executives in the firm should be evaluated on the basis of the firm's REVA performance.

Bacidore et al. (1997) emphasize that the value of a firm is generated from both, its physical assets in place and its strategy with respect to future business growth opportunities. Both values are regarded appropriate areas of the firm's senior executives. Thus, according to them (Bacidore et al. pp. 16): "The market value of the firm, which is a component in REVA, includes the values of physical assets and the strategy, whereas the book value of the firm, which is a component in EVA™, represents only the values of the physical assets in place. Strategy is the primary responsibility of top management. The firm's book value is an adequate representation of invested capital from the standpoint of those below top management. Therefore, REVA could be used to compensate senior executives and EVA™ could be used to compensate divisional managers and those who belong at lower levels in an organization."

Empirical research regarding the previous issues has not been conducted for the Chilean case where particularly the stock market has experienced a notable development thanks to the Chilean economic growth exhibited in the last 15 years. In spite of some Chilean companies are currently using performance measures like EVA™, there are no studies that try to link these measures to the Chilean shareholders' wealth changes.

III. Measuring abnormal returns

Shareholders might obtain a return on their investment in two ways: through dividends and through capital gains. Within any period of time, t, the shareholder return for firm j can be specified as

$$R_{jt} = \{D_{j,t} + (P_{j,t} - P_{j,t-1})\}/P_{j,t-1} \quad (2)$$

where $D_{j,t}$ is the dividends paid during the period t-1 to t and $P_{j,t}$ is the price of the shares at the end of period t. Different factors can affect R_{jt}, most significantly, the risk of the investment, the interest rates in the capital markets, and the experience of companies' managers. The capital asset pricing model (CAPM) directly involves the first two factors by indicating that the expected return on a stock investment is given by

$$E(R_{j,t}) = Rf_t + B_j\{E(Rm_t) - Rf_t\} \quad (3)$$

where, Rf_t is the risk-free interest rate at time t. β_j is the firm j's beta, a measure of the firm's systematic risk. $\{E(Rm_t) - Rf_t\}$ is the expected equity market risk premium, usually measured as the long-run, average ex-post return on the market in excess of risk-free interest rate. The CAPM is useful in order to determine the abnormal return of a firm j earned in period t. This return known in the literature as Jensen's alpha is estimated as

$$\alpha_{j,t} = R_{j,t} - E(R_{j,t}) \quad (4)$$

$\alpha_{j,t}$ measures the current shareholder return in excess of the return that was expected in a period, given the company's systematic risk. Jensen's alpha is thus an adequate measure of shareholder value creation in a determined period. This measure represents a high benchmark for performance. In practice, because a company with continuous positive Jensen's alphas is one that systematically generates shareholder returns

in excess of the risk-adjusted expected return, this company would be consistently "beating the stock market." Companies that perform so well are uncommon in the market.

Taking into consideration the previous literature review and antecedents, we can state at least four research questions that will be addressed in this paper. First, in general, Does EVA™ and/or REVA dominate traditional accounting net income (NI) and operating cash flow (OCF) in explaining quarterly abnormal returns derived from Chilean companies? Second, could be past realizations of EVA™, REVA, NI and OCF significant predictors of future abnormal returns? Third, in general, Does EVA™ and/or REVA have explanatory power after controlling for other accounting measures? Fourth, in particular, considering each Chilean industry and the best predictor derived from the answer to the previous question; does this predictor have explanatory power after controlling for other accounting measures?

IV. Empirical Analysis. Sample and Features of Chilean Industries

We examine a sample of 62 Chilean companies over the period 1994-1999 using quarterly data. This sample comprises the most traded and representative industrial companies on the Chilean stock market. Table 1 presents: the distribution of Chilean companies according to their industry classification, the annual operating margin and assets turnover with their respective growths and the operating assets return considering each industrial portfolio in the sample.

Among the industries, the electric sector shows the highest operating margin for the entire sample period. This result reflects operative and administrative efficiencies that management of Chilean power firms has achieved after the process of restructuring applied to the companies in the last two decades. On the other hand, the beverage and metallurgy industries show the lowest operating margin indicators. In this case, it might reflect a relative lack of efficiency either in terms of productivity or managerial skills in comparison with other industries. At the same

As can be seen in Table 1, the electric power as well as beverage and pension fund sectors comprise the most important industries in our sample. Construction, investment and metallurgy sectors present the same low frequency. The Industry classified into "others" presents a heterogeneous mixture of different sectors containing each one a number of three or less companies. Fishing, food, forest, mining, navigation, paper pulp and telecommunication companies represent these sectors.

Table 1
Distribution By Industry Classification And Efficiency Indicators

Industry	Beverage	Construction	Electric	Investment	Metallurgy	P.Funds	Others
No. of Firms	6	4	16	4	4	5	23
Percentage %	9.7	6.5	25.8	6.5	6.5	8.1	37.1
Operating Margin%*	11.8	16.1	27.1	18.5	11.2	25.2	
Annual Average Growth %	-1.4	-7.6	-3.8	-18.2	-9.0	3.0	
Assets Turnover (Times)*	0.44	0.52	0.23	0.21	0.76	0.53	
Annual Average Growth %	11.6	16.1	8.6	37.6	14.6	-3.3	
Operating Assets Return %	5.2	8.4	6.2	3.9	8.5	13.4	

* These indicators correspond to weighted average estimates of industrial portfolios. The weights are sales and market value of assets respectively. (Annual averages.1992-1999 period).

time, the investment industry in spite of locating around the industry average it shows the highest negative annual average growth for the previous indicator. This situation seems to come from relatively high operating costs and administrative expenses incurred through the sample period, which in turn are associated with business activities developed by firms that belong to this sector. However, this industry has shown an explosive growth in terms of market value assets turnover, which would reflect a notable increase in terms of sales per dollar invested.

Following with our analysis, metallurgy, pension funds and construction industries show the highest assets turnover indicators; respectively. It is important to note that in addition to the investment industry, which shows the highest annual growth, the construction industry shows the second place. Again, this result indicates a higher capacity of construction companies to generate sales per dollar invested than the remaining industries.

IV.1 Measures and Analysis

Estimating a company's quarterly EVA™, REVA, net income and operating cash flow requires estimates of its net operating income after tax, weighted-average cost of capital (WACC), book value of assets, and market value of assets. The market value of assets was estimated by adding the market value of equity, book value of liabilities, and book value of preferred stock. Book values were used for debt and preferred stock because market values for these variables were not available. The WACC was estimated as the weighted-average of the cost of equity, debt, and preferred stock, where the weights were obtained using proxies available for the estimated market-based financial structure. To estimate the firm's cost of debt, we assigned an appropriate bond yield according to the debt risk class issued for each company, which can be estimated according to each respective bond rating. The after-tax cost of debt was estimated by multiplying the firm's cost of debt by one minus its marginal tax rate, which was estimated by dividing the tax expense by the firm's pre-tax income. The cost of equity was estimated using CAPM. Given the theoretical risk class of preferred stock, it was estimated as the average of the cost of equity and debt.

To estimate the cost of equity, estimates of the risk-free rate, the expected market risk premium and the company's beta are required. As our analysis is based on quarterly data, monthly data from the previous series were used in order to achieve quarterly estimates. The yield to maturity of 90 days bond issued by the Central Bank of Chile was used as a proxy for the risk free-rate. For the expected market risk premium, historical averages of realized monthly market risk premiums from 1992 to the quarter prior to that under estimation were calculated. Companies' betas were estimated individually based on monthly security and market returns following the same procedure used in estimating the expected risk premium.

EVA™ was estimated using NOPAT and the book value of assets obtained from ECONOMATICA™ database[2], and the WACC used to estimate EVA™ was also used to estimate REVA. We follow this approach in order to insolate the real difference between EVA™ and REVA, that is, the different measures used as assets in their estimation.

V. Empirical Results

This section examines our research questions. First, in general, Does EVA™ and/or REVA™ dominate traditional accounting net income (NI) and operating cash flow (OCF) in explaining quarterly abnormal returns derived from Chilean companies?

The first set of tests involved general least squared regressions (hereafter, GLS regressions) using pooled time series in a cross-section way. Our regression specification was based on the following equation:

$$y_{it} = \alpha_{it} + \beta_i x_{it} + \varepsilon_{it} \quad (5)$$

where $i = 1,2,.....,62$ cross-section units (Chilean companies in the sample) and periods $t = 1,2,.....,23$ (from March '94 to September '99). y_{it} is the CAPM-based (Jensen's alphas) abnormal returns of company i at time t. α_{it} is equal to "α" (identical intercept for all pool members). β_i is equal to the sensitivity measure of y_{it} with respect to x_{it}. x_{it} represents the measure of management performance (EVA™, REVA, NI, OCF, respectively). ε_{it} is a white noise error term.

To estimate reliable beta coefficients our GLS regressions consider cross section weights assuming heteroskedasticity. After that, in order to correct the presence of general heteroskedasticity in our estimates (since variances within cross-section are allowed to differ across time) we used the White heteroskedasticity consistent covariance method of correction. The measures of management performance used in our estimates were scaled in order to make the variables consistent with the abnormal return variable, which is measured as a percentage. For EVA™ and REVA cases the market value of equity was used as denominator because both measures are linked to the value creation for shareholders. For net income, (NI) was used the book value of equity. For operating cash flow, (OCF) was used the book value of assets. In these two last cases book values were used because the measures of management performance are based on accounting numbers.

Once applied the regression equation (5) to each management performance measure, our results indicate that each management performance measures are positively related to abnormal returns at the 1% level (see Table 2). A 1 percent increase in EVA™ results in a 0.66 percent increase in abnormal returns. A 1 percent increase in REVA leads to a 1.48 percent increase in abnormal returns. A 1 percent increase in NI results in a 0.48 percent increase in abnormal returns. Finally, a 1 percent increase in OCF turns leads to 0.8 percent increase in abnormal returns. As a test of association (goodness of fit) we use adjusted R-squared. The results indicate (see Table 2) that REVA (Adjusted R-squared = 10.3%) outperforms EVA™ and the remaining accounting measures in terms of goodness of fit. In addition, it is possible to observe that an increase in any management performance measure leads to an increase in shareholders wealth. However, among the measures, REVA would explain better than its alternatives the presence of abnormal returns or wealth creation for shareholders. Our second research question states

Table 2. Abnormal Returns As Explained By EVA, REVA, NI, And OCF, Respectively. (T-Statistics In Parenthesis)

Variable	Coefficient	Coefficient	Coefficient	Coefficient
Intercept (α)	0.042	0.110	-0.009	-0.008
	(7.844)*	(12.470)*	(-1.553)	(-1.403)
Beta1(EVAt)	0.663			
	(7.236)*			
Beta1(REVAt)		1.483		
		(12.177)*		
Beta1(NIt)			0.483	
			(4.139)*	
Beta1(OCFt)				0.805
				(4.025)*
Adjusted-R^2	0.035	0.103	0.014	0.010

Note: The dependent variable is abnormal returns. Sample size (total panel observations) = 1426
* Significant at the 1 percent level.

whether past realizations of EVA™, REVA, NI and OCF are significant predictors of future abnormal returns. Thus, our next set of tests take into consideration additional lagged valued for each management performance measure regarding its respective GLS abnormal return regression. These tests were performed in order to examine whether past realizations of EVA™, REVA, NI and OCF have a significant effect on abnormal returns. In the GLS regression of abnormal returns on EVA™ and lagged EVA™, EVA™ is significantly positive related to abnormal returns and lagged EVA™ is significantly negatively related to abnormal returns (see Table 3). Bacidore et al. (1997, pp. 17-18) explain these coefficients as follows: " The coefficient on lagged EVA™ represents the sensitivity of abnormal returns to changes in lagged EVA™, which are uncorrelated with contemporaneous EVA™. Similarly, the coefficient on EVA™ measures the sensitivity of abnormal returns to changes in EVA™, which are uncorrelated with last period's EVA™. Therefore, the coefficient on EVA™ shows how abnormal returns vary with unexpected changes in EVA™, where expectations are based on previous period's EVA™. They continue indicating " The previous interpretation is consistent with the view that the market uses EVA™ not only to achieve abnormal returns this period but also to predict future performance. If the firm has a large EVA™ the current period, the market may review its valuation of the firm upward significantly, showing revised expectations about future profitability. If the market's beliefs are not confirmed in the next period, however, the value of the stock may fall. Thus, even if a firm has a positive EVA™ this period, the stock may not earn positive abnormal returns. The first implication of the above analysis is that the market would seem to reward unexpected increases in EVA™ and bases expectations on future profitability on this period's EVA™. The second implication is that EVA™ may be inappropriate to use as a compensation

Table 3. Abnormal Returns On Current And Lagged EVA, REVA, NI, OCF.
(T-Statistics In Parenthesis)

Variables	Coefficient	Coefficient	Coefficient	Coefficient
Intercept (α)	0.021	0.066	-0.004	-0.006
	(3.600)*	(7.281)*	(-0.755)	(-1.109)
Beta1 (EVA_t)	4.398			
	(9.451)*			
Beta2(EVA_{t-1})	-4.084			
	(-8.613)*			
Beta1 ($REVA_t$)		3.455		
		(12.448)*		
Beta2($REVA_{t-1}$)		-2.512		
		(-9.931)*		
Beta1 (NI_t)			1.954	
			(5.322)*	
Beta2(NI_{t-1})			-1.622	
			(-4.689)*	
Beta1 (OCF_t)				3.198
				(3.895)*
Beta2(OCFt-1)				-2.515
				(-3.058)**
Adjusted-R^2	0.240	0.225	0.032	0.015

Note: The dependent variable is abnormal returns. Sample size (total panel observations) = 1364
* Significant at the 1 percent level.
** Significant at the 5 percent level.

measure for top management because the market is actually rewarding only the unexpected portion of EVA™. Basing compensation on total EVA™ may result in rewarding managers for inefficient performance."

Next, we run similar GLS regressions using REVA, NI, OCF and their respective lagged variables. The coefficients on current and lagged variables are all significant and consistent in terms of sign among them. It is important to note that the coefficient on lagged REVA is significant. This result does not support the view that any revaluation based on past period's REVA is impounded into contemporaneous REVA directly despite REVA is estimated based on the market value rather than on the book value of equity. This result is not compatible with Bacidore et al. (1997, pp. 17-20) findings, where lagged REVA coefficient was insignificant. Under their results they supported the idea that only a positive current coefficient for REVA that leads to revisions in the market's expectations regarding future performance will "raise the barrier" by increasing the market value of equity and, as a consequence, next period's capital charge. Thus, according to them, REVA should be a more adequate compensation measure because it is a real measure of whether the company has surpassed the market's expectation and thereby added shareholder value. Our results are not in line with the previous authors despite that the negative effect of lagged REVA on abnormal results is lower than the EVA™ case. The important point here is that Chilean investors seem to take into account the revaluation based on past period's REVA at the moment to build their market's expectations regarding future Chilean companies' performance.

Further, our results indicate that in terms of "goodness of fit" EVA™ dominates marginally to REVA in explaining abnormal returns. This result, on average, does not support our preliminary GLS regression estimates where REVA clearly dominates the remaining management performance measures. However, we recognize that the previous results could vary either once we control for other accounting measures or among Chilean industries.

Our third and fourth research questions state whether EVA™ or REVA have explanatory power after controlling for other accounting measures regarding either our general sample or the most important Chilean industries, respectively. We established these questions in order to study how sensible are the explanatory power of EVA™ or REVA after controlling for accounting measures. We expect that the degree of reliability of our estimates should not be significantly affected by the previous measures due to if EVA™ or REVA explain by themselves the variability of abnormal returns, then the accounting measures should be redundant.

Table 4 reports regressions of abnormal returns on current and lagged EVA™ and RE-VA, respectively, once we control for NI and OCF measures.

The results indicate that the inclusion of accounting measures do not contribute to increase significantly the explanatory power of the models. The coefficients for EVA_t, EVA_{t-1}, $REVA_t$ and $REVA_{t-1}$ vary only marginally and the adjusted R^2 only increases 0.1% in comparison to the results reported in Table 3. However, for EVA™ regression the net income measure is positive and significant at the 5% level. This situation indicates that some portion of the abnormal returns variability is being explained by the net income and thus EVA™ fails to be the sole explanatory variable. This situation does not apply to REVA, which holds its explanatory power after controlling for accounting measures. Therefore, the results for the whole sample suggest that REVA is a better performance measure than its competing ones in explaining value creation. Therefore, regarding the previous results we proceed with our analysis by testing whether the results obtained for REVA are also applicable when we analyze each Chilean industry in particular.

Table 4. Abnormal Returns On Current And Lagged EVA, REVA, And Controlling For NI And OCF Measures. All Sample. (T-Statistics In Parenthesis)

Variables	Coefficient	Coefficient
Intercept (α)	0.006	0.059
	(0.444)	4.957*
Beta1(EVAt)	4.315	
	(9.353)*	
Beta2(EVAt-1)	-4.129	
	(-8.770)*	
Beta1(REVAt)		3.419
		(12.187)*
Beta2(REVAt-1)		-2.520
		(-10.075)*
Beta3(NIt)	0.334	0.217
	(1.997)**	1.237
Beta4(OCFt)	-0.161	-0.183
	-0.457	(-0.635)
Adjusted-R^2	0.241	0.226

Note: The dependent variable is abnormal returns. Sample size (total panel observations) = 1364.
* Significant at the 1 percent level.
** Significant at the 5 percent level.

Table 6 reports regression results of abnormal returns on current and lagged REVA once we control for accounting NI and OCF measures. The results for construction and investment industries show that either $REVA_t$ or $REVA_{t-1}$ coefficients do not vary significantly and the inclusion of accounting measures do not contribute to the explanatory power of the models. The coefficients for NI and OCF are not significant at any conventional level and the adjusted R^2 does not vary significantly in comparison to the results before controlling accounting measures (Table 5). A natural question that arises from the previous findings is why REVA by itself is able to explain value creation for these industries and no for the others. This research question requires additional investigation in order to determine which particular factors make REVA a "unique" performance measure for these industries. However, in order to obtain preliminary answers to this issue we can back to Table 1 and observe that construction and investments sectors have exhibited the highest rates of growth in terms of assets (market value) turnover. This situation seems to be appreciated by Chilean investors in terms of value of growth, which in turn seems to be captured only by RE-VA. Indeed, in Chile, the investment and construction industries have exhibited an extraordinary growth thanks to the development of the domestic capital market. Today almost 40% of the Chilean pension fund portfolio is invested in mortgage bonds issued by Chilean private banks that are used precisely in financing real estates. At the same time, this fact has stimulated the creation of investment businesses oriented to the trade of financial instruments.

Returning to the remaining industries, our results show that for beverage, electric, metallurgy and pension fund sectors, some NI and OCF coefficients are significant. For these industries it is necessary to recognize that in addition to REVA and lagged REVA, the accounting measures contribute to increase the regressions explanatory power. However, despite this contribution is statistically significant, it seems no as substantial as REVA and lagged REVA, respec-

Table 5. Abnormal Returns On Current And Lagged REVA For The Six Most Important Chilean Industries (T-Statistics In Parenthesis)

Industry Variables	Beverage Coefficient	Construction Coefficient	Electric Coefficient	Investment Coefficient	Metallurgy Coefficient	P.Funds Coefficient
Intercept (α)	0.087	-0.010	0.065	-0.004	0.018	0.064
	(3.479)*	(-0.304)	(3.994)*	(-0.115)	(0.337)	(1.868)
Beta1($REVA_t$)	5.322	2.173	2.596	3.189	4.180	4.090
	(6.148)*	(3.836)*	(5.291)*	(3.762)*	(5.873)*	(7.350)*
Beta2($REVA_{t-1}$)	-3.987	-1.962	-1.784	-2.997	-3.625	-3.757
	(-4.454)*	(-3.043)*	(-4.526)*	(-2.867)*	(-5.053)*	(-5.934)*
Adjusted-R^2	0.307	0.078	0.222	0.185	0.319	0.255
Sample Size	132	88	352	88	88	110

Note: The dependent variable is abnormal returns. Sample size (total panel observations)
* Significant at the 1 percent level.
** Significant at the 5 percent level.

Table 6. Abnormal Returns On Current Lagged REVA. Controlling For NI And OCF Measures. Six Most Important Chilean Industries. (T-Statistics In Parenthesis)

Industry Variables	Beverage Coefficient	Construction Coefficient	Electric Coefficient	Investment Coefficient	Metallurgy Coefficient	P.Funds Coefficient
Intercept (α)	0.201	0.038	0.056	-0.070	0.132	0.052
	(5.615)*	(0.593)	(2.329)**	(-1.578)	(1.949)	(1.120)
Beta1($REVA_t$)	5.831	2.354	2.536	3.006	4.669	3.980
	(7.396)*	(3.269)*	(5.171)*	(3.322)*	(5.936)*	(7.156)*
Beta2($REVA_{t-1}$)	-3.255	-1.877	-1.784	-3.104	-3.650	-3.822
	(-4.133)*	(-2.653)*	(-4.766)*	(-2.805)*	(-5.186)*	(-6.312)*
Beta3(NI_t)	-1.071	-1.787	0.579	1.269	1.008	2.666
	(-3.696)*	(-1.180)	(2.016)**	(0.953)	(1.626)	(2.602)**
Beta4(OCF_t)	-0.801	0.915	-1.117	4.097	-6.538	-3.189
	(-1.327)	(0.336)	-1.670	(1.139)	(-2.540)**	(-2.397)**
Adjusted-R^2	0.400	0.073	0.230	0.192	0.352	0.286
Sample Size	132	88	352	88	88	110

Note: The dependent variable is abnormal returns. Sample size includes total panel observations.
* Significant at the 1 percent level.
** Significant at the 5 percent level.

tively. In fact, if we compare our results in terms of adjusted R-squared before and after controlling for the accounting measures we find that for beverage industry REVA and lagged REVA contribute with a 77% to the total explanatory power of the model. For metallurgy and pension fund industries they contribute with 90% and for the power sector with 97%. Our interpretation of these findings is that net income and operating cash flows only might be considered as marginal financial performance measures used in managerial compensation for firms' executives who belong to the previous industries. Special attention deserves the power sector, where despite the net income has a significant impact in explaining value creation, REVA and lagged REVA keep a high explanatory power. Indeed, as Rudnick (19-98, pp. 197-199) points out, regarding the Chilean experience:

"The creation of competitive markets in a once fully monopolistic electric power activity has created significant challenges in power companies' management. The evolution from "State protected companies that provide electricity at a given cost" to "private firms that compete to offer a commodity at the resultant prices" has been a crucial free-market process that has implied new management requirements. Private electric utilities bid publicly against one another for the opportunity to supply large industrial and mining complexes with electricity. Generators also compete to supply price-regulated distributors. The utilities, while competing, must take action to increase their returns and respond to their stockowners. Financial and commercial departments have been strengthened, within new organizational structures that focus on selected business activities. Companies wanting to maintain their market share face important financial requirements to respond to load growth rates of 5 to 14 percent a year. Without the traditional support from the State in securing loans, companies must demonstrate their financial strength to multilateral funding sources. Financial departments have had to adapt to these new requirements, to keep adequate financial indexes."

"Commercial activities have also been reshaped, with regular market appraisements and contract strategies being developed, aimed at reducing business risks. Aggressive plans to reach potential clients have also been put in place."

"Sensitivity toward public image has also increased in the competitive framework, with distribution companies completely reorganizing their customer services and billing systems. Computerized distributed networked offices have spread, improving response to consumers (both in the quality of service to current consumers as well as in reducing the connection times for new applicants). The restructuring process has advanced further, with both the creation of subsidiaries and the conception of new businesses related to the electricity market (as diverse as fuel, ports and ship-ping, engineering, computer services, road infrastructure, etc.), all within a decentralized framework. The objective has been to create independent companies that are then made to grow by serving new clients. New management approaches to labor relations and to deal with worker unions had to be developed. State companies were often over-staffed. Downsizing and outsourcing made old jobs disappear and brought new jobs into being. Labor force productivity increased as a result of the restructuring and privatization process. For instance, the number of customers per distribution worker more than doubled in 10 years and dramatic growth in electricity production has accompanied increasing productivity. Besides improving their management practices, utilities have had to incorporate technology in all those areas that noticeably affect income. More efficient maintenance, upgraded or replaced equipment, and more sophisticated control systems for a tighter use of installations have been used to increase reliability and postpone further capital investment. Development has been stimulated by the search for more efficient technologies in generation equipment as well as cheaper energy resources. Many investors have sought to build combined-cycle gas units, with related investment in trans-

porting natural gas across international frontiers".

The previous Rudnick's arguments seem to confirm our evidence that REVA (a more market value management measure) has a high explanatory power for Chilean power companies' abnormal returns. Chilean investors have appreciated the restructuring process exhibited by Chilean power companies as a mechanism of higher productivity and efficiency. In addition, the diversification process applied lately confirms the investors' expectations about more and profitable future growth opportunities for this sector. Thus, REVA should be a useful managerial mechanism used to compensate senior executives from the previous industry.

Finally, we are in agreement with Bacidore et al. (1997) in that REVA should be (due to its construction) a more adequate measure to compensate senior rather than junior executives within a given company. Therefore, EVA™ would be a more adequate measure to compensate those executives who participate at lower levels in an organization.

VI. Conclusions

Economic and Refined Economic Value Added (EVA™ and REVA, respectively) have attracted an increasing attention as alternatives to traditional accounting measures for use in both value creation and incentive compensation plans for the U.S. companies. However, the empirical literature about what measure dominates in explaining shareholder value creation is scarce for either the U.S. or emerging economies as Chile. Regarding the previous issue, this paper focuses on sixty-two Chilean companies and shows evidence about whether EVA™ dominates REVA and competing accounting measures for the 1994-1999 period. Our results indicate that REVA outperforms competing alternatives in associations between their current realizations and value creation. In addition, when past realizations for EVA™ and REVA are taken into account and once controlled for other accounting measures, REVA outperforms EVA™ for the whole sample. At the Chilean industry level, REVA explains by itself value creation for construction and investment industries. However, for the remaining industries, our findings indicate that in addition to the high explanatory power associated to REVA, the net income and operating cash flows explain only a low portion of value creation volatility. Our interpretation of these findings is that accounting measures should be only considered as marginal complementary performance measures used to compensate executives mainly from the electric, beverage, metallurgic and pension fund industries.

In agreement with Bacidore et al. (1997) our final comment is that REVA should be mainly used to compensate Chilean CEOs. However, EVA™ could be useful as a compensation mechanism for executives and workers who participate at lower levels in an organization.

VII. Suggestions for Future Research

One of the most important results found in this paper was that REVA and lagged REVA were able to explain value creation for the Chilean construction and investment sectors. However, a natural question that arises from the previous findings is why the previous explanatory variables were not able to explain value creation (by themselves) for the rest of the Chilean industries. This research question requires additional investigation in order to determine why REVA would represent a "unique" performance measure only for the case of some Chilean industries.

Endnotes

1. Coca-Cola, AT&T, Quaker Oats, Briggs & Stratton and CSX are some companies that have adopted EVA.
2. ECONOMATICA™ is a historical database, which tracks pricing, financial statements,

company reports, and local news on Latin American countries.

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