THE PERFORMANCE ANALYSIS OF THE TURKISH BANKS THROUGH VAIC™ AND MV/BV RATIO

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ABSTRACT

The objective of this study is to determine if there is a meaningful relationship between the VAIC™ (Value Added Intellectual Coefficient) values and MV/BV (Market Value/Book Value) ratios of Turkish Banks, of which stocks are exchanged at the Istanbul Stock Market (IMKB).

The paper begins with the introduction of the concepts 'intellectual capital', 'company performance', and 'VAIC™'. Then, the association between VAIC™ values and MV/BV ratios of twelve banks in Turkey is empirically explored for the years 1998 and 2001.

According to the data of these four years, there has been no meaningful relationship between the dependent variable MV/BV and the independent variables VACA (Value Added Capital Coefficient) STVA (Structural Capital Value Added Coefficient), and VAHU (Value Added Human Capital Coefficient), the three sub-components VAIC™ consists of.

Keywords: *Commercial Banks, Intellectual Capital, Performance, Value, Turkey.*

INTRODUCTION

In today's global marketplace, hardly anybody would dispute the decisive role of information and skilled workers in producing goods and services effectively and efficiently. Consistently increasing progress of information has taken the knowledge-based workforce into a superior position.

Modern companies base their operations upon information and relevant technologies. Therefore, so as to evaluate performances of them, new valuation techniques are continued to be sought.

It is commonly agreed that there is a lack of appropriate method of valuation, particularly in monitoring and managing intangible assets.

After the long-lasting hegemony of the classical factors of production, many authors are now to define the term "Intellectual Capital" that is actually not novel, but has not been openly discussed until the last decade. While modern managers acknowledge the importance of fixed

assets and financial assets, they tend to be uncertain about the importance of intellectual capital and about utilizing it efficiently and adequately.

Today, knowledge has become the key resource, which will require to be continually acquired and up-dated. It wouldn't be wrong to contend that the society has turned out to be an information society in which the main economic resource is information. In this new information society and in its economy, information and skilled workers– in other words intellectual capital will determine the competitive edge of the firms.

The conventional indicators of business success serve to heavily accentuate physical and/or tangible capital. The valuation techniques, such as ROI (return on investment), ROS (return on sales), and EPS (earnings per share), are inadequate to measure the business success of companies, implementing intellectual capital intensely. While it is quite burdensome to formulate the information aspect in traditional accounting, financial performance can be measured easily and monitored, though it represents only the tip of the iceberg.

Whereas conventional companies base their operations on physical and financial capital, modern companies rely on information. Information is more or less inherent in workers to transform it into value. Intellectual capital studies may be divided into two main views. While the first view focuses on determining, managing, and creating intellectual capital, the latter view concentrates upon appropriately measuring it.[1]

Researchers, such as Edvinsson, Malone[2], Sveiby[3], and Stewart[4], maintain that traditional accounting is inapplicable to modern companies for it cannot appropriately measure and indicate their natural dynamics. However, only using intellectual brainpower intensely in the production process can now increase the value of commodities. To accomplish this, a company should and may rely on its skilled workers.

Conventional companies' objective was to increase production, and everything was contingent upon production. Modern companies' objective is, however, to produce commodities by using more

[1] Petty and Guthrie, 2000"Intellectual Capital Literature Review: Measurement, Reporting and Management", *Journal of Intellectual Capital*, Vol:1, No:2, MCB University Press, Bradford.

[2] Edvinsson, L., M. Malone (1997) *Intellectual Capital: Realizing Your Company's True Value by Finding Its Hidden Brainpow*er, New York: Harper's Business.

[3] Sveiby, K.E., (2001) "A Knowledge-Based Theory of the Firm to Guide in Strategy Formulation", *Journal of Intellectual Capital*, Vol: 2, No: 4, Bradford, pp. 344-358.

[4] Stewart, T.A., (1997), *Intellectual Capital: The New Wealth of Organizations,* New York: Doubleday Currency.

information as much as possible. Today, business success rests upon the ability and efficiency of companies to utilize information. The value-based management approach pushes the managers so as to maximize the economic value of the assets by using them efficiently[5].

INTELLECTUAL CAPITAL AND COMPANY PERFORMANCE

Hitherto, no consensus has been reached for a general definition of intellectual capital. According to Stewart[6], "Intellectual capital is the sum of everything everybody in your company knows that gives you a competitive edge in the marketplace". For Brooking[7], intellectual capital is the sum of intangible assets by which companies operate, while Edvinsson[8] considers intellectual capital as the information that can be transformed into value. Klein and Prusak[9] define intellectual capital as a tool that is carefully formulated, captured, and leveraged to obtain a greater-valued asset.

Whilst some researchers, such as Edvinsson, Malone and Roos, classify intellectual capital into two groups, as human capital and structural capital, other researchers, such as Bontis and Stewart, classify intellectual capital under the titles of human capital, structural capital, and customer capital.[10]

How is intellectual capital measured? This discussion is first started by L. Edvinsson who advocated that intellectual capital should be exhibited in the companies' annual reports. Measuring the performance of a company is one of the most rigorous fields of strategic management.[11]

Strassman draws attention to the attempts that are made to measure and value intellectual capital in the last two decades, whereas these attempts had insoluble difficulties in pricing intangible assets. With the help of this problem, researchers realized that the value of intellectual assets is exhibited not in their costs but in their usage. Strassman argues that it is

[5] Şamiloğlu, F., (2002) *Entelektüel Sermaye,* Gazi Kitapevi, Ankara.
[6] Stewart, T.A., (1991) "BrainPower", Fortune, 123(11), pp. 44-56.
[7] Brooking, A., (1996) Intellectual Capital: Core Assets for the Third Millennium Enterprise, London: United Kingdom, Thomson Business Press, p. 12.
[8] Edvinsson, L., (1997) "Developing Intellectual Capital at Scandia", Long Range Planning, Vol:30, No:3, pp. 366-372.
[9] Klein, D.A., and L. Prusak. 1994. Characterizing intellectual capital. Center for Business Innovation. Ernst & Young LLP Working Paper, March.
[10] See, Edvinsson and Malone, 1997; Sveiby, 1997; Stewart, 1997.
[11] Day, D.L., Farley, J., Wind, J., (1990), "The State of Art in Theory and Method in Strategy Research" Management Science (Special Issue) p. 36.

now widely understood that there exists no relationship between the cost of acquiring information and the potentially value-adding ability of information.

In the new economy as was in the old economy, it is important to understand performance of a firm. According to Garbi, however, it seems difficult to formulate a method measuring the future performances of electronic companies.[12]

Financial performance indicators consisting of previous terms inform about previous performance. Non-financial indicators, however, as being different from financial indicators, gives important information about the present value of company as well as the value-adding potential of a company.[13]

For about several centuries, conventional accounting equation has helped financial managers to perform operations. But now time is ripe for a new equation in which human ability plays a pivotal role.[14]

According to Kalafut and Low, despite often being neglected, intangible assets are the main determinants of the performance of a company. Therefore, investors, who are aware of the effects of intangible assets on the performance of a company, monitor these assets in their analyses to estimate the yields of these assets, and attempt to formulate unconventional methods for measuring intangible assets.[15] Measuring intellectual capital is one of the most attractive fields in information management. However, further international research in this field is needed.[16]

In the new economy, because in measuring performance, financial measures seem to be restrictive, there is a need for non-financial measurements, and research in this field is being performed.[17] Skandia model of Leif Edvinsson consists of finance, customers, process innovation and development, and human capital. Index of intellectual

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[12] Garbi, E., (2002) "Alternative Measures of Performance for E-Companies: A Comparison of Approaches", Journal of Business Strategies, 19(1), pp. 1-18

[13] Kalafut, P.C and Low, J., (2001) "The Value Creation Index: Quantifying", Strategy and Leadership, 29(5), pp. 9-15.

[14] Barsky, N. P. and A. Catanach (2001) "Provide insight or face extinction" Strategic Finance. 82(12) pp. 50-54.

[15] Kalafut and Low, *The Value…,* pp. 9-15.

[16] Liebowitz, J; Suen, C.Y., (2000) "Developing Knowledge Management Metrics For Measuring Intellectual Capital" Journal of Intellectual Capital, 1(1), pp. 54-67.

[17] Cumby, J. and J. Conrod (2001) "Non-Financial Performance Measures in the Canadian Biotechnology Industry", Journal of Intellectual Capital, 2(3), pp.261-72

capital was first formulated by G. Roos and friends and used by Skandia in 1997.[18] "Balanced Scorecard" of Kaplan and Norton is a system that monitors the critical effects in valuation process, and embraces the financial and non-financial measures.[19]

Annie Brooking developed the Technological Broker Model to measure intellectual capital. Brooking defines intellectual capital as a mix of four components, i.e. market value, human-centered assets, intellectual ownership assets and structural assets. So as to form an indicator of intellectual capital, Brooking directed 20 questions to the organization.[20]

Karl-Erik Sveiby believes that difficulties in measuring intangible assets can be overcome. Sveiby offers a conceptual framework, focusing on three kinds of intangible assets, i.e. external structure (trademarks and relations with customers and suppliers), internal structure (organizational management, legal structure, software, and research and development), and individual efficiency (education and experience)[21].

Thus, Sveiby provides an informational outlook instead of conventional accounting approaches. In this perspective, Sveiby discusses the measurement techniques of intangible assets using non-financial measures as well as financial measures, representing shareholder's value and financial success as a whole.[22]

CORPORATE VALUE CREATION EFFICIENCY METHOD

Ante Pulic contends that VAIC^{TM} method performs well in measuring and monitoring the value-adding potential of a company, a sector, or a national economy and can be used in valuation of business performance as a modern tool. VAIC^{TM} is quite easy to be calculated and does not give rise to additional managerial costs.[23]

VAIC^{TM} method assumes that company is a dynamic and ever-changing system, and a company's workers are viewed as the primary asset for

[18] Roos, G., L. Edvinsson, J. Roos, and N. C. Dragonetti (1997) Intellectual Capital: Navigating the new business landscape, London: Macmillan Publications.

[19] Kaplan, R. S. and D. Norton (1996) "Using the Balanced Scorecard as a Strategic Management System", Harvard Business Review, 74(1), pp.75-85

[20] Brooking, *Intellectual…,* p. 12.

[21] Sveiby, K.E., (2001) "A Knowledge-Based Theory of the Firm to Guide in Strategy Formulation", Journal of Intellectual Capital, 2(4), pp.344-358.

[22] See, Sveiby, K.E., (1997), The New Organizational Wealth: Managing and Measuring Knowledge Based Assets, San Fransisco: Berrett-Koehler Publishers; and Bontis, N. (2001) "Assessing Knowledge Assets: A Review of the Models Used to Measure Intellectual Capital" International Journal of Management Reviews 3(1), pp.41-60.

[23] Pulic, A. (2000) "VAIC™ – an accounting tool for IC management", International Journal of Technology Management, 20(5,6,7,8) pp.702-714.

success. VAIC™ method is based upon physical, financial and intellectual capital. This method measures the performance of both physical and intellectual capital in value-adding process. The coefficient of VAIC™ is the efficiency of all resources and exhibits the value-adding ability of a company or an economy. The larger the coefficient, the more efficiently used physical, financial and intellectual capital turn out to be.

VAIC™ numerically shows that total efficiency of physical, financial and intellectual capitals in value-adding process. Pulic's methodology focuses on value-adding, value-adders, and value-adding procedures. VAIC™ considers the entire company as a dynamic system.

CE (Capital Employed) can be briefly described as the company's financial and physical assets.

CE= Total assets – non interest bearing short term liabilities

In VAIC™ methodology, while calculating CE, physical and non-financial assets are subtracted from total assets, because these assets are taken into consideration as intellectual assets, i.e. intellectual capital.

HC: As the Human Capital is not only one of the most important components of intellectual capital, it is also the ability source of intellectual capital. Stewart suggests that the workers in a company from bottom to top must be seen not as assets, but investment.

SC: Structural Capital is made up of patents, intellectual properties, databases, information technologies etc. of the company. It also consists of social relationships between the individuals in the company. Structural capital is a mean of transportation channel in the company.

VAHU: Shows the value created from each dollar invested on the workers in the company. VAHU shows the value creation efficiency of human capital in the company.

VAHU= VA / HC

STVA: Shows the efficiency of structural capital in value creation process in the company.

STVA= SC / VA

VAIC™= VAHU + STVA + VACA

OUTPUT: Is the income generated from the sales of products and services of the company.

INPUT: Is all the expenses and costs undertaken by the company, except the expenditures made for the workers of the company.

VA: OUTPUT – INPUT

VACA: Is the ratio between value created and the physical and financial capital total.
VACA= VA / CE

METHODOLOGY OF THE RESEARCH

In this research, the relationship between the dependent variable MV/BV and the independent variables of VAHU, STVA and VACA of 12 Turkish banks, of which shares are traded-off in IMKB (Istanbul Stock Exchange Market), are examined by using simple and multiple regression analyses.
The data of the study is gathered from the financial statements of the banks and of IMKB. The significance of determination coefficient (R^2), which is found as the result of the analysis is tested with F test. To be able to determine whether or not R^2 is found in the regression analysis, the result of F test was used. In order to find whether there is a dependency between independent variables, firstly, the correlation coefficient ρ between free variables was calculated. Then, by using the suitability of v=n-2 freedom degree and Student (t) split, the comments have been made according to T table. Moreover, the significance of partial correlation coefficient, which is a proportional measure used to calculate the relationship between one of the independent variables and the dependent variable, isolating it from the effects of other variables, is examined by using F test. In order to find if there is a strong auto-correlation between standard error terms, Von-Neumann test has been used, as N<15.

QUESTIONS OF THE RESEARCH

1. Whether there is a correlation between the variables VAHU, STVA, VACA and the variable MV/BV
2. When STVA is constant, whether there is a correlation between variables VAHU and VACA and the variable MV/BV
3. When VACA is constant, whether there is a correlation between the variables STVA and VACA and the variable MV/BV
4. When VAHU is constant, whether there is a correlation between the variables STVA and VACA and the variable MV/BV

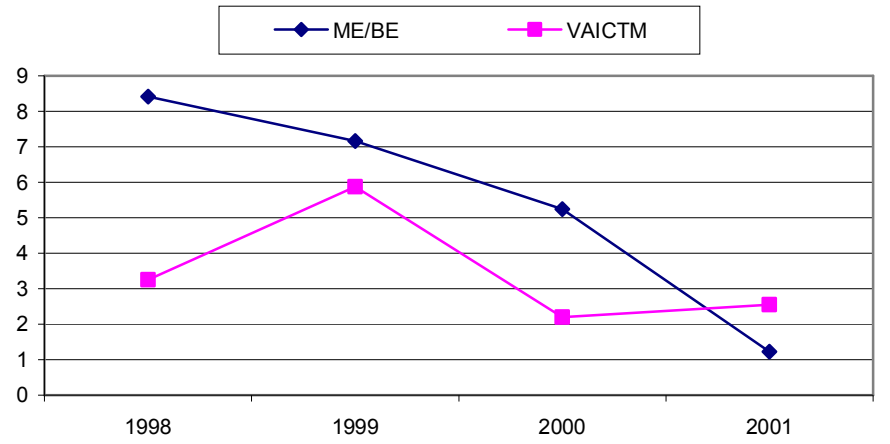
ANALYSING THE PHYSICAL, FINANCIAL AND INTELLECTUAL CAPITAL AND MV/BV OF THE BANKS IN QUESTION

The physical, financial and intellectual capital and MV/BV of banks used in the research are analyzed below. The money amounts in the tables and figures are presented in thousands of US dollars.

Table 1:
Findings for Akbank

Year	HC	SC	CE	VA	VAHU	STVA	VACA	VAIC™	MV/BV
1998	98.228	634.288	7.704.760	732.516	7,457	0,865	0,095	8,417	3,25
1999	99.431	589.606	8.024.733	689.037	6,929	0,144	0,085	7,158	5,87
2000	124.937	498.159	11.029.753	623.096	4,987	0,200	0,056	5,243	2,20
2001	108.755	12.134	11.743.169	120.889	1.111	0,100	0,010	1,221	2,55

Figure 1:
Findings for Akbank

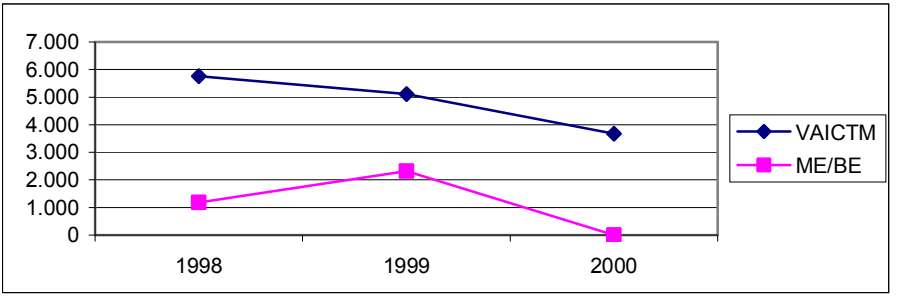


As shown at Table 1, between 1998-2001 Akbank's HC was increasing %11, its CE increased about %50. In 1998, 1 $ CE investment was creating 0,095$ VA, in 2000 0,056$ VA and in 2001 0,010$ VA it created. In 2001 in comparison with the previous year there was a significant decrease in VAIC™, there was some increase in MV/BV. In 1998 while each 1$ HC investment was creating 7,457$ VA, in 2001 1$, 1,111$ VA it created.

Table 2:
Findings for Finansbank

	HC	SC	CE	VA	VAHU	STVA	VACA	VAIC™	MV/BV
1998	28.769	111.609	1.662.314	140.378	4,879	0,795	0,084	5,758	1,18
1999	37.096	121.671	2.454.142	158.767	4,279	0,766	0,064	5,109	2,32
2000	54.342	106.465	2.969.794	160.804	2,959	0,662	0,054	3,675	0,69
2001				0					

Figure 2:
Findings for Finansbank

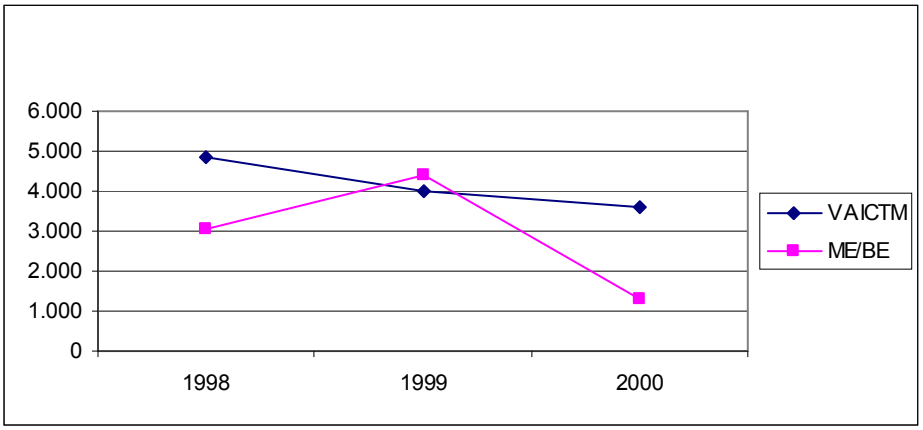


Between 1998-2000 Finans Bank's HC increased twice, while its SC was decreasing %5. While its CE was increasing %75, its VA increased %15. In 2000 VAIC™ and MV/BV decreased at the same rate.

Table 3:
Findings for Garanti Bankası

	HC	SC	CE	VA	VAHU	STVA	VACA	VAIC™	MV/BV
1998	137.484	416.907	7.423.474	554.391	4,032	0,752	0,074	4,858	3,05
1999	147.800	335.517	8.09.524	483.317	3,270	0,694	0,041	4,005	4,42
2000	160.361	307.777	9.636.579	468.138	2,919	0,657	0,048	3,624	1,29
2001				0					

Figure 3:
Findings for Garanti Bankası

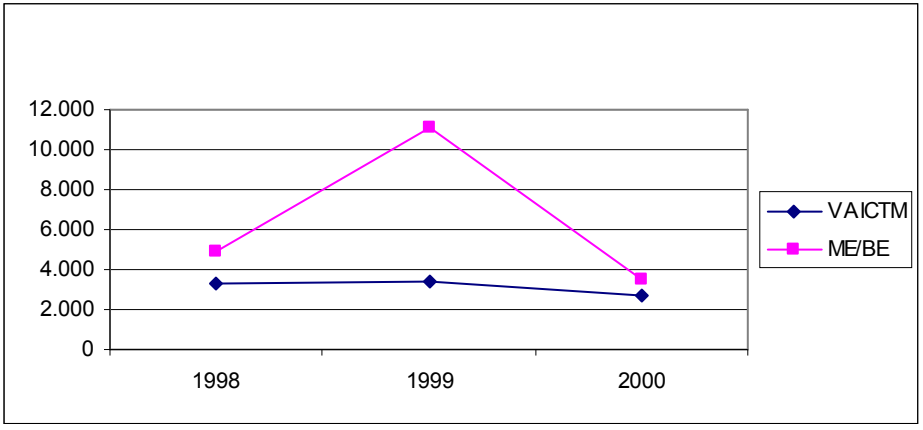


Garanti Bank's HC increased % 17 between 1998 and 2000. In the same period, while there was an increase of %30 in its CE, there was a decrease of %20 in its VA.

Table 4:
Findings for İş Bankası

	HC	SC	CE	VA	VAHU	STVA	VACA	VAIC™	MV/BV
1998	272.385	433.048	6.542.413	705.433	2,589	0,613	0,107	3,309	4,93
1999	275.227	465.414	8.474.057	740.641	2,691	0,628	0,087	3,406	11,15
2000	350.012	383.153	10.424.151	733.165	2,094	0,522	0,070	2,686	3,55
2001				0					

Figure 4:
Findings for İş Bankası

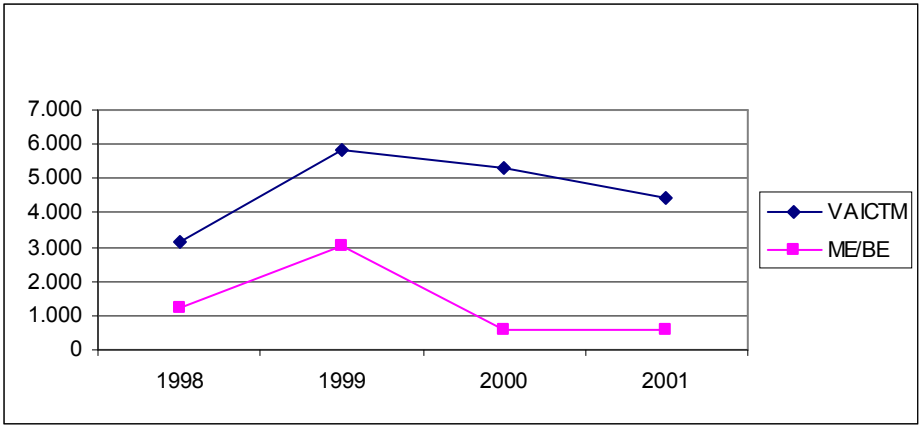


İş Bank's HC increased about %25 between 1998 and 2000. Its SC decreased %15 and its VA increased %5. In 2000, while VAIC^{TM} was increasing, MV/BV decreased significantly.

Table 5:
Findings for Alternatif Bank

Year	HC	SC	CE	VA	VAHU	STVA	VACA	VAIC^{TM}	MV/BV
1998	12.654	17.67	17.0618	30.321	2,396	0,582	0,177	3,155	1,21
1999	16.198	62.782	460.512	78.980	4,875	0,794	0,171	5,840	3,02
2000	37.096	121.671	631.141	158.767	4,279	0,766	0,251	5,296	0,56
2001	147.800	335.967	1.069.958	483.317	3,270	0,695	0,451	4,419	0,60

Figure 5:
Findings for Alternatif Bank

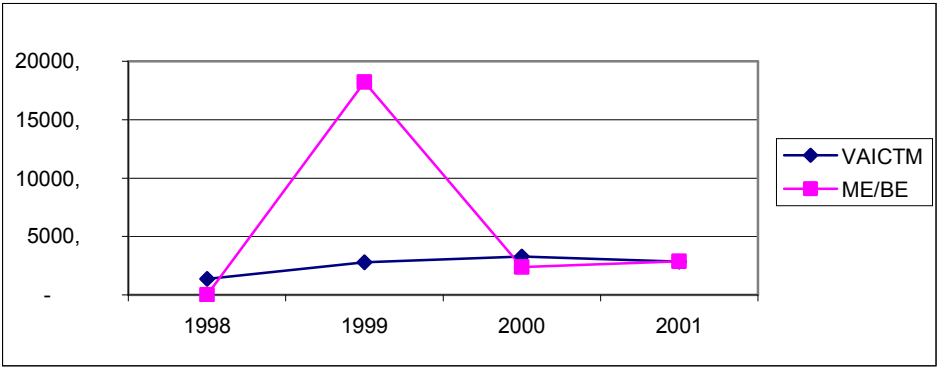


Between 1998 and 2001, Alternatif Bank's HC 12 times, its SC 20 times, its CE 6 times and its VA 16 times increased. In 2000 and 2001 VAIC^{TM} and MV/BV decreased.

Table 6:
Findings for T.Kalkınma Bankası

	HC	SC	CE	VA	VAHU	STVA	VACA	VAIC^{TM}	MV/BV
1998	13.571	2.352	389.054	15.928	1,173	0,147	0,040	1,360	2,20
1999	12.831	15.008	365.498	27.839	2,169	0,539	0,076	2,784	18,23
2000	13.741	21.511	354.168	35.252	2,565	0,610	0,099	3,274	2,39
2001	9.766	11.654	201.964	21.420	2,193	0,544	0,106	2,843	2,86

Figure 6:
Findings for T.Kalkınma Bankası

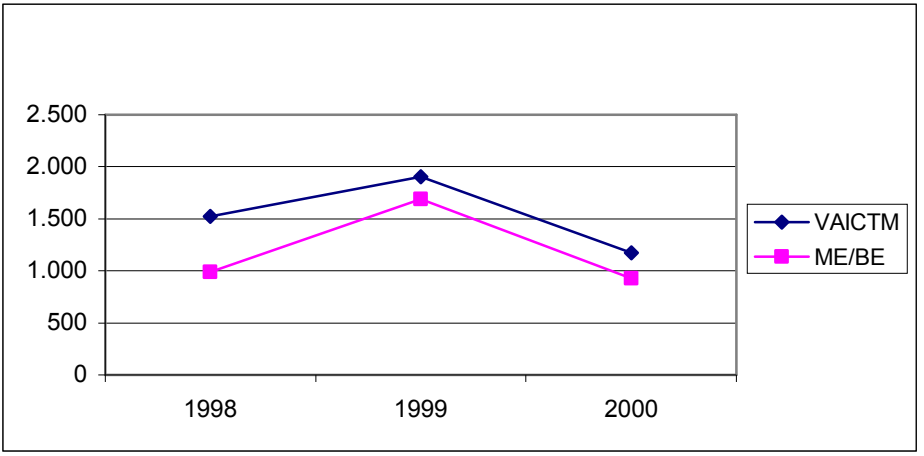


The example of Türkiye Kalkınma Bankası exemplified the importance of HC in creating value. For Türkiye Kalkınma Bankası in 1998 VAHU was 1,173, MV/BV was 2,20; in 1999 VAHU increased up to 2,169 and MV/BV increased up to 18,23. That was a significant increase. In 2000, while VAHU increased up to 2,565. MV/BV decreased significantly.

Table 7:
Findings for Şekerbank

	HC	SC	CE	VA	VAHU	STVA	VACA	VAIC™	MV/BV
1998	35.779	9.315	978.128	45.494	1,271	0,204	0,046	1,521	0,99
1999	33.607	17.715	1,534.987	51.322	1,527	0,345	0,033	1,905	1,69
2000	42.970	3.073	1,241.378	46.043	1,071	0,066	0,037	1,174	0,93
2001				0					

Figure 7:
Findings for Şekerbank

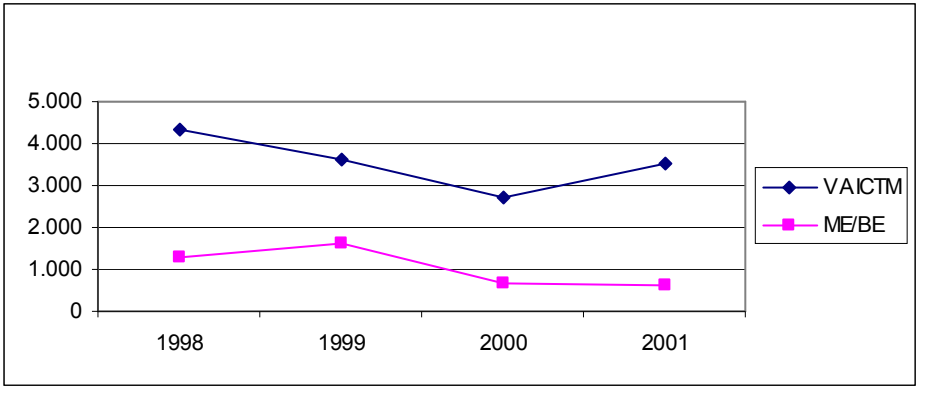


As seen on Table 7 and Figure 7, between 1998 and 2001 there was a parallel trend between VAIC^{TM} and MV/BV for Şekerbank.

Table 8:
Findings for Türkiye Sanayi Bankası

	HC	SC	CE	VA	VAHU	STVA	VACA	VAIC^{TM}	MV/BV
1998	11.356	28.884	524.285	40.240	3,543	0,717	0,076	4,336	1,28
1999	11.343	21.570	482.707	32.913	2,901	0,655	0,068	3,624	1,63
2000	14.172	15.749	478.347	29.921	2,111	0,526	0,062	2,699	0,67
2001	8.015	14.772	438.227	22.877	2,822	0,643	0,052	3,517	0,60

Figure 8:
Findings for Türkiye Sanayi Bankası

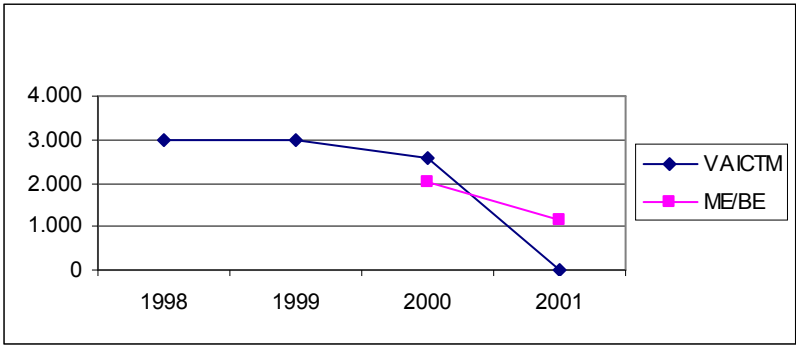


Moreover, the significance of degree of relationship between independent variable and each of independent variables was analyzed by considering the result of F-test, which is a ratio measure of partial correlation coefficients isolated from the effects of other variables.
Türkiye Sanayi Bank's VAIC™ decreased, its MV/BV increased in 1999. However, in 2000 the decrease in VAIC™ followed by a decrease in MV/BV.

Table 9:
Findings for Türkiye Ekonomi Bankası

	HC	SC	CE	VA	VAHU	STVA	VACA	VAIC™	MV/BV
1998	24.853	34.182	1.028.189	59.035	2,375	0,579	0,057	3,011	
1999	26.157	35.904	1.183.002	62.061	2,372	0,578	0,052	3,002	
2000	34.715	34.915	1.529.514	69.660	2,006	0,501	0,045	2,552	2,02
2001	23.658	0	1.086.842	14.472	0,611	0	0,013	0,612	1,16

Figure 9:
Findings for Türkiye Ekonomi Bankası

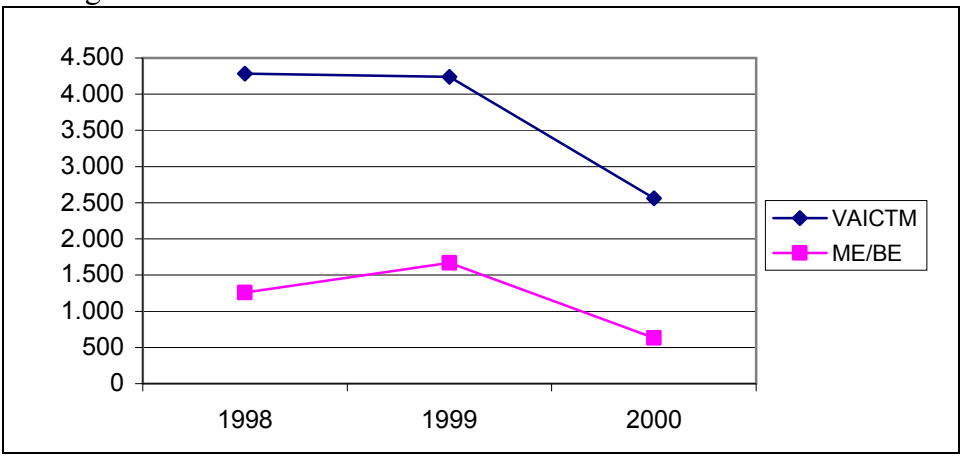


For Türkiye Ekonomi Bankası VAIC™ constantly decreased between 1998 and 2001. The decrease in 2001 was very significant. The two economic crises following each other with short periods that Turkey had, has been thought as the main reason for this result.

Table 10:
Findings for Tekstil Bank

	HC	SC	CE	VA	VAHU	STVA	VACA	VAIC™	MV/BV
1998	18.564	45.583	539.696	64.147	3,455	0.710	0,118	4,283	1,26
1999	19.687	47.663	603.619	67.350	3,421	0,707	0,111	4,239	1,67
2000	26.837	26.865	855.422	53.705	2,001	0,500	0,062	2,563	0,63
2001				0					

Figure 10:
Findings for Tekstil Bank

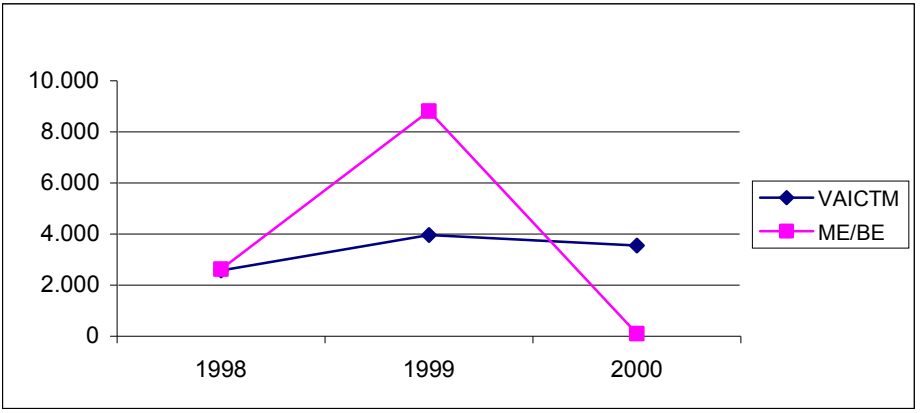


As seen on Table 10 and Figure 10, Tekstilbank's VAIC^{TM} decreased %39.5, and its MV/BV decreased %62. The increase and decrease in VAIC^{TM} between 1998 and 2001 heavily affected MV/BV.

Table 11:
Findings for Yapı Kredi Bankası

	HC	SC	CE	VA	VAHU	STVA	VACA	VAIC^{TM}	MV/BV
1998	181.516	186.279	7.483.048	367.795	2,026	0,506	0,049	2,581	2,63
1999	177.246	391.254	8.938.613	568.500	3,207	0,688	0,063	3,958	8,81
2000	207.747	348.027	10.007.315	591.774	2.848	0,648	0,059	3,555	1,04
2001	53.129	0		0					

Figure11:
Findings for Yapı Kredi Bankası



In 1999, there was a significant decrease in VAIC^{TM} for Dışbank, there while was an increase in MV/BV. In 2000, there was an important increase in VAIC^{TM}, but an important decrease in MV/BV.

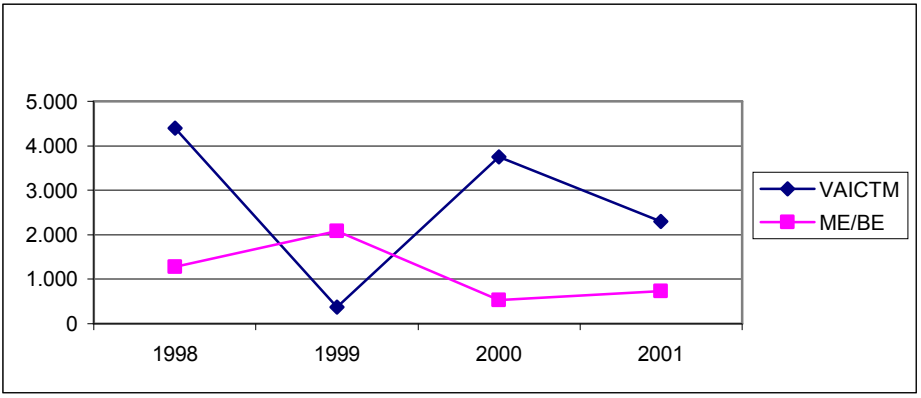
Table 12:

Findings for Dışbank

	HC	SC	CE	VA	VAHU	STVA	VACA	VAIC^{TM}	MV/BV
1998	30.971	80.648	1.486.753	111.619	3,603	0,722	0,075	4,400	1,28
1999	38.759	0	1.677.918	14.123	0,364	0	0,008	0,372	2,09
2000	53.129	106.018	1707.016	159.147	2,995	0,666	0,093	3,754	0,53
2001	41.419	33.580	1.731.749	74.999	1,810	0,447	0,043	2,300	0,73

Figure 12:

Findings for Dışbank



EMPIRICAL RESULTS

As seen on Table 13, VAHU, STVA and VACA variables, which are the parameters of VAIC^{TM}, explains together %30 of MV/BV variance.

According to the result of 2001, three variables explain %41.4 of MV/BV; while in 1999, explaining %2.2 of and in 2000 %6.6 of MV/BV. The adjusted R^2= -1.344 means that the low numbers of observations (n=5) caused high determination coefficient for 2001. According to the total results of the years between 1999 and 2000, the %1.6 of MV/BV is explained by VAHU, STVA and VACA variables.
When the significance of determination coefficient (R^2= 0.016), which is found according to the results of 1998-2000, is examined with F-test. The determination coefficient, which is equal to 0.016 does not show any significant correlation as F value is 0.002<0.187.
For Von-Neumann value 2.385 %1 significance level, which is found according to 1998's data, when observation value is 11, parameter is 4 and d=, it is tested whether there is an auto-correlation or not and an autocorrelation has not been found as 0.7163<2385<39504. In similar way according to the total results of 1998-1999 and 1998-2001, among standard errors, no correlation has been found.

Tablo 13:

MV/BV=CONSTANT +B1 VAHU+B2 STVA+B3 VACA + Σ i.

	1998	1999	2000	2001	1998-2001
CONSTANT	1,844 (1,329)* (0,226)**	5,613 (1,058)* (0,325)**	1,693 (1,453)* (0,184)**	4,150 (1,117)* (0,465)**	2,449 (1,685)* (0,101)**
VAHU	0,97 (0,196)* (0,850)**	-0,501 (-0,349)* (0,738)**	0,100 (0,281)* (0,786)**	-3,240 (-0,628)* (0,643)**	0,156 (0,353)* (0,726)**
STVA	0,237 (0,57)* (0,956)**	0,106 (0,012)* (0,991)**	-0,660 (-0,357)* (0,730)**	9,693 (0,593)* (0,659)**	0,630 (0,220)* (0,828)**
VACA	-2,264 (-0,164)* (0,874)**	20,275 (0,301)* (0,772)**	-3,115 (-0,427)* (0,681)**	1,180 (0,152)* (0,904)**	-5,470 (-0,666) (0,510)**
R^2	0,30	0,022	0,066	0,414	0,016
VON-NEUMANN	2,385	3,214	2,696	-	1,988
F	0,072	0,053	0,187	0,236	0,187
*t value.**p-value.					

Table 14:
ANOVA Table.

Model	Sum of Squares	DF	Mean Suquare	F	Sig.
Regression	6,742	3	2,247	0,187	0,905
Residual	421,370	35	12,039		
Total	428,112	38			

Table 14 shows that the relationship or the regression model of the relationship between ANOVA table, which is made by using the total data of the years between 1998 and 2001, MV/BV and VAHU, STVA and VACA is not significant statistically.

Table 15:
Dual and Partial Correlation Coefficients.

	1998		1999		2000		2001		1998-2001	
	Dual Correlation (ρ)	Partial Correlation (ρ)	Dual Correlation (ρ)	Partial Correlation (ρ)	Dual Correlation (ρ)	Partial Correlation (ρ)	Dual Correlation (ρ)	Partial Correlation (ρ)	Dual Correlation (ρ)	Partial Correlation (ρ)
MV/BV										
VAHU	0,162	0,074	-0,065	-0,130	-0,012	0,096	-0429	-0,532	0,057	0,060
STVA	0,131	0,022	0,058	0,004	-,0207	-0,125	-0,334	0,510	0,032	0,037
VACA	-0,021	-0,062	0,069	0,113	-0,202	-0,149	-0,420	0,150	-0,083	-0,112

As is known the difference between simple correlation and partial correlation is that: in simple correlation the relationship between two variables is searched and other factors are not taken into account. However, in partial correlation, other factors are also taken into account but, the relationship between the two variables is searched by keeping other factors constant. Partial correlation is based on the assumption that dual relationship between various variables is always linear.
When dual and partial correlations between the explanatory variables and dependent variables are examined according to the total result of the years between 1998 and 2001, it is found that there is a positive and weak relationship (p=0.057) between VAHU and MV/BV variable, and when

other variables are constant the correlation (p=0.060) between two variables is calculated.

There is a positive and weak relationship (p=0.032) between STVA and MV/BV, too. However, when the other two variables are kept constant, this correlation is found as p=0.037. It can be seen that the negative and weak dual correlation (p=-0.083) found between VACA and MV/BV is still negative and weak (p=-0.012), when other two variables are kept constant.

The significance of the partial correlation coefficients at Table 15 is calculated with F-test. In this test, n shows observation numbers and k shows predicted parameter (series) numbers, and the formula is shown below:

$F= [r2 / (k-2)] / (1-r^2) / (n-k)$

If F, which is obtained by using the formula, with $v_1= k-2$ and $v_2= n-k$ freedom degrees is bigger than the value shown at F table according to the same level of significance, it is interpreted that the relevant correlation coefficient shows an important relationship, that is, there is a relationship between variables. However, if F's value is smaller than the value shown at the table, this means that there is no relationship between variables. For F value of 0.063 is smaller than the table value of 4.15, when the significance of partial correlation coefficient, which is calculated according to the data of the years between 1998 and 2000, keeping STVA and VACA variables constant, is tested according to %5 significance level. No important relationship between the partial correlation coefficient 0.060 VAHU, which is calculated keeping STVA and VACA constant, is found. This is shown at Table 15.

In similar way, since F value of 0.023, which is found when the significance of 0.037 correlation coefficient, which is calculated according to the data of years 1998-2000, keeping VAHU and VACA constant, is tested according to %5 level, is smaller than table value of 4.15, there is no significant relationship between STVA and MV/BV at 0.037 of the partial correlation coefficient calculated. Since, if value of 0.222, which is found by testing the significance of the partial correlation coefficient of 0.112, which is calculated according to the data of the years 1998-2000, keeping VAHU and STVA constant, is smaller than 4,15, no important relationship between VACA and MV/BV is not found.

In order to find whether there is a relationship between independent variables,

$$F = \frac{r^2/(k-2)}{(1-r^2)/(n-k)}$$

Comments are to be made according to t-table, using the split of test statistics, which is found by the formula above, to v=n-2 degree of freedom and student (t). When other correlation coefficients between independent variables show a significant relationship or not, is tested according to %1 level of significance level, in the period of 1998 no important relationship between VAHU and STVA is found. Similarly, there is no relationship found among the independent variables of VAHU, STVA and VACA. Since the numbers of observations are low in 2001, the relationship between independent variables was not tested.

Table 16:
Each Bank's Correlation and Determination Coeeficients

Banks	Correlation	R^2	Df	Sitatistics Signifance
Akbank	0,486	0,236	4	-
Finansbank	0,490	0,240	3	-
Garanti Bankası	0,369	0,136	3	-
İş Bankası	0,731	0,534	3	+
Alternatifbank	0,481	0,232	4	-
T.Kalkınma Bankası	0,230	0,53	4	-
Şekerbank	0,912	0,831	3	+
T.Sanayi Bankası	0,564	0,312	4	-
T.Ekonomi Bankası	1,000	1,000	2	+
Tekstil Bank	0,911	0,631	3	+
Yapı Kredi Bankası	0,579	0,535	3	-
Dışbank	0,656	0,430	4	+

When each bank's correlation and determination coefficients are examined, the VAIC™ and MV/BV of Finansbank, Garanti Bankası, Alternatifbank, T. Sanayi Bankası ve Yapı Kredi Bankası are negative and a moderate relationship is found. The statistical indicators of İş Bankası, Şekerbank, T. Ekonomi Bankası, Yapı Kredi Bankası and

Dışbank is positive, and a moderate level of significant relationship is found between them.

CONCLUSION

To summarize, it has been found that VAIC™ method, along with its parameters VAHU, STVA, and VACA, which are independent variables, explains 30% of the independent variable MV/BV in 1998, 2.2% of it in 1999, 6.6% of it in 2000, and 1.6% of it in 2001.

If the banks are to be considered separately, it has been found that there is a positive and exact (p=1.00) correlation between theTürkiye Ekonomi Bank's dependent variable MV/BV ratio and its independent variables VAHU, STVA, and VACA, which form the VAIC™ value, during the covered years. The other banks exhibiting a positive correlation is to be listed as Şekerbank with a p=0.912 value, Tekstilbank with a p=0.911 value, İş Bank with a p=0.731 value and Dışbank with a p=0.635 value. The associations between the independent variables and the dependent variable MV/BV for Akbank, Finansbank, Garanti Bank, Alternatifbank, Türkiye Kalkınma Bank, Türkiye Sanayi Bank and Yapı Kredi Bank have been found to be negative and medium level.