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VALUE CREATION IN BANKS AND INFORMATIONAL CONTRIBUTION OF VALUE EFFICIENCY

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ABSTRACT

This paper investigates the contribution of cost, profit and value efficiency in explaining bank performance for a sample of U.S. listed bank holding companies from 2004 to 2006. In the first stage of the analysis, we estimated efficiency scores and made a descriptive analysis. We found a strong correlation between profit and value efficiency scores although these two concepts are not necessarily associated with cost minimization objective. In the second stage, we measured bank performance using; first, stock return as an indicator of market sensitivity and second, EVA as shareholder value creation indicator. We used OLS and Panel regression models to assess the informational contribution of these efficiency concepts. Our results show that market indicators are not very sensitive to bank efficiency. Thus, shareholder value creation can better be explained by value efficiency rather than profit or cost efficiency.

JEL: G21, G32

KEYWORDS: Shareholder Value, Cost, Profit and Value Efficiency, Stochastic Frontier, EVA, Banking, Market Performance

INTRODUCTION

Banks play a central role in developing economic activity. This pushes the monetary authorities, regulators and stakeholders to bring interest in their performance. This subject, although widely treated for decades, is still relevant. Traditional measures of bank performance were generally based on the objective of cost minimization or/and profit maximization. Recently, many researches have focused on value creation objective. Latest researches demonstrate that the focus should be on creating value for shareholders. (Albouy, 2006; Vernimmen *et. al.* 2016; Koller *et al.,* 2010). In the present study, we try to add to this literature by providing evidence on the link between bank value efficiency and their performance. This paper focuses on two aspects. First, we consider the three concepts of efficiency namely, cost, profit and value efficiency. Second, we link these three concepts of efficiency with bank performance for a sample of U.S. listed bank holding companies from 2004 to 2006 to investigate which of these three concepts is more linked to bank performance. The rest of this paper is organized as follows. The first section presents literature review. Section two presents data and methodology. The next section discusses empirical results. The last section concludes.

LITERATURE REVIEW

The financial theory shows that the aim of a firm is to maximize its value, and to improve the welfare of all stakeholders (Jensen, 2001) and mainly for shareholders. (Koller *et al.,* 2010). Many researches show that EVA (Economic Value Added) can be a good measure of value creation for shareholders in banks (Uyemura *et. al.*, 1996 ; Fiordelisi and Molyneux, 2010). EVA joins the notion of residual income or economic benefit that has its origins in the work of Marshall (1890). It considers wealth creation after

remuneration of all factors, including equity (Stern *et. al.* 2001, Ehrbar 2000; Koller *et. al.* 2010). By introducing some adjustments, EVA avoids problems related to the manipulation of accounting origins measures (Grant 2003). However, there is no consensus about the best performance measure and the techniques for its estimation. Inefficiency is defined as the difference between the performance of a firm and the best practice actually observed in the market. Many concepts of efficiency are used in bank literature. Cost efficiency considers that banks act in the objective of costs minimization, presuming an optimal capital structure. Several studies applied this approach to the banking sector in the United States (Mester 1996, Berger and Mester 1997). According to the profit efficiency concept, the banks are working with the objective of maximizing their profits. Berger and Mester (1997) consider that the profit efficiency concept is superior to the cost efficiency concept in evaluating bank performance since it considers inefficiency both on the output and on the input side. However, profit does not consider the risks that affect future production plans and the interest rate at which profit is discounted. The least risky production plan will be disadvantaged since it would be less profitable (Modigliani and Miller 1958, Berger and Mester 2003). So, the profit maximization hypothesis should be rejected.

The third concept concerns shareholder value efficiency. Fiordelisi and Molyneux (2006) and Fiordelisi (2007) were the first to develop this idea. Value efficiency frontier is based on the assumption that banks objective is to maximize value creation for shareholders. Few studies tried to join the two branches of literature linking bank efficiency to performance. They show that efficient banks should be more profitable, and so, generate more return for shareholders. These researches focused on listed banks trying to link stock returns to cost and/or profit efficiencies. Eisenbeis *et. al.,* 1999 estimated cost efficiency for U.S. banks and Beccalli *et. al.* (2006) focused on European banks. They found that changes in cost efficiency are reflected in changes in stock prices. Cost efficient banks are more performant than their inefficient counterparts. Kirkwood and Nahm (2006) estimated cost and profit efficiency for Australian banks and Liadaki and Gaganis (2010) for European banks.

They found that the stock return was positively linked to profit efficiency, but not to cost efficiency. Liadaki *et.al.* (2008) found a positive and statistically significant relationship between technical efficiency and stock return for Greek banks while scale efficiency was not significant. However, these studies did not take into consideration value creation and value efficiency. Gascón *et al.*, 2002 studied the relationship between value maximization and economic efficiency in eighteen countries (North America, Japan and Europe). They found that cost efficiency is consistent with value maximization. Fiordelisi (2007) introduced the EVA as a measure of value creation and he found that value efficiency scores explain value creation better than cost or profit efficiency for European banks. Nevertheless, it is worth mentioning that on the one hand, he integrated both listed and non-listed banks belonging to different financial systems and with different activities. Thus, it can be considered that the heterogeneity of the sample would accentuate heteroscedasticity problems. On the other hand, he has not tested the relationship between different measures of efficiency and market response. Indeed, in a context of efficient market, it would be reasonable to assume that the ablest banks to create value for their shareholders would realize the best return.

DATA AND METHODOLOGY

Our study concerns listed US bank holding companies, from 2004 to 2006. We choose this period, before the 2007-2008 financial crisis, to test the relevance of value efficiency concept in a stable period. The dataset is a combination of accounting data, collected from the FDIC web site, and market data collected from the Yahoo finance web site. Some more data, as deferred taxes, were collected directly on the annual report of each bank. Data on treasury bonds have been collected from the Board of Governors of the Federal Reserve System web site. We have excluded the multi-holding companies and banks that are not member of FDIC from the sample. Our final dataset consists of 278 to 293 banks each year. Financial data is annual, presented as at the 12/31 of every year. Following Berger and Mester (1997) and

Fiordelisi (2007), we use stochastic cost, alternative profit and alternative shareholder value efficiency approaches to estimate efficiency scores. The alternative profit and value functions provide estimations that do not depend on output prices. We use efficiency estimates to compare cost minimization, profit maximization and value maximization objectives. The cost efficiency frontier is estimated using the parametric approach SFA (Stochastic Frontier Approach) under the translog form. $\ln u_c$ and $\ln \varepsilon_c$ represent respectively the terms of inefficiency and random error. Where C is the total cost, standardized by z_2 (i.e. the financial capital) to control for heteroscedasticity, y_k are the output quantities (credits and securities), w_j are input prices (the cost of deposits and the salary by employee) and z_r are netput quantities (physical capital and financial capital). A control variable is used to consider the difference in market conditions, which is the part of nonperforming loans in the state to which the bank belongs (stnpl). $ln\, u_c$is inefficiency factor that is zero for the best-practice banks and positive for the others, increasing their cost, $ln\varepsilon_c$ is a random error term with mean of zero.

$$\begin{aligned}\ln(C/z_2) = \alpha + \sum_i \beta_i \ln(w_i) + {}^1/_2 \sum_i \sum_j \beta_{ij} \ln(w_i) \ln(w_j) + \sum_k \gamma_k \ln(y_k/z_2) + {}^1/_2 \sum_k \sum_m \gamma_{km} \ln(y_k/z_2) \ln(y_m/z_2) \\ + \delta \ln(z_1/z_2) + {}^1/_2\, \delta_{ii} \ln(z_1/z_2)^2 + \sum_i \sum_k \eta_{ik} \ln(w_i) \ln(y_k/z_2) + \sum_i \sum_r \rho_{ir} \ln(w_i) \ln(z_r/z_2) \\ + \sum_k \tau_k \ln(y_k/z_2) \ln(z_1/z_2) + \ln u_c + \ln \varepsilon_c\end{aligned} \quad (1)$$

The alternative profit efficiency frontier uses the same variables as those of cost efficiency frontier, except that the dependent variable is replaced by $\ln[(\pi/z_2) + |(\pi/z_2)^{\min}| + 1]$, where π is the bank profit,$|(\pi/z2)\min| +1$ is the absolute value of the minimum of $(\pi/z2)$ for all the banks at the same year. So, $\theta t = |(\pi/z2)t_{min}|+1$ is added to the dependent variable for each bank to calculate the log of positive numbers, since the minimum profit may be negative. So, for banks having the smallest value of $(\pi/z2)$ for a given year, the dependent variable is ln(1)=0. To estimate the value efficiency frontier, the dependent variable is replaced by $\ln[(\tau/z_2) + |(\tau/z_2)^{\min}| + 1]$, where τ is the economic value added, EVAbkg, estimated according to the recommendations of Fiordelisi (2007). For alternative profit function (respectively value function), the only other change concerns the term of composite error, that is replaced by $-\ln u_{a\pi} + \ln\varepsilon_{a\pi}$, (respectively $-\ln u_\tau + \ln\varepsilon_\tau$,) as the exogenous variables are the same for the cost function.Total cost (C) includes all financial and operating costs. Financial costs are mainly interest expenses. Operating costs correspond to labor and capital expenditure, i.e. personnel expenses and general operating expenses. Profit (π) is as reported in the bank financial statements. EVAbkg (τ) is calculated for each bank in the sample during the period t-1, t by using a procedure that incorporates banks features. Thus, EVAbkg is calculated as follows, according to Equation 2:

$$EVA_{bkg(t-1,t)} = NOPAT_{(t-1,t)} - (CI_{t-1} * E(R_i)_{(t-1,t)}) \quad (2)$$

Where the NOPAT is the net operating profit after tax, CI is the capital invested in the beginning of the period, namely equity capital, (Sironi, 2005 and Fordelisi, 2007). E(Ri) the estimated cost of the capital invested using the Capital Asset Pricing Model (Other studies used the shadow price of equity as the cost of capital (Hughes and Mester, 2013; Radić, 2015)). Some specific adjustments, developed by Fiordelisi (2007), are applied to NOPAT and to capital invested making accounting values as close as possible to economic values. Next, we report descriptive statistics to compare the three efficiency scores. We also report Spearman's rank correlation coefficients between different concepts and across time to test consistency of the different scores rankings. This coefficient is very important in detecting good and bad practices. It is more appropriate in testing correlations to stress banks classifications rather than efficiency scores. Finally, we examine which of these three efficiency concepts brings better informational contribution in explaining performance. To do so, we consider two measures of performance: stock return for a market approach and shareholder value creation for a mixed (financial and accounting) approach. The choice of market approach is justified by the hypothesis that in an efficient market, it would be reasonable to assume that the more efficient banks would have better return (Liadaki and Gaganis, 2010).

Mixed approach is justified by various studies that provide evidence that EVA is useful in evaluating shareholder value (Ferguson *et. al.*, 2005, Fiordelisi, 2007, Heffernan and Fu, 2010).The following model is estimated using the ordinary least squares approach for stacked data and the random effect panel data for more robustness in our results.

$$\psi_{i,t} = \varsigma + \alpha.TR + \beta_h X_{i,t} + \sum_j \delta_j Z_j + e_{i,t} \quad (3)$$

Where $\psi_{i,t}$ is the performance measure by bank i at time t (stock return (STRET) and the ratio of $EVA_{bkg,t}$ to capital invested in t-1 (EVACI)). TR expresses the trend, $X_{i,t}$ are the various efficiency variables (cost, alternative profit and shareholder value) for bank i at time t, introduced sequentially. To control differences in the regulatory environment and bank activities, Z_j (j = 1, ..., 5) is a set of five additional characteristics: OCCDIST is the Office of control of currency district, TRUST indicates if the bank is Trust Powers Granted, BVCAPR is the book value capital to asset ratio to control for differences in the solvency. ASSGR is the total asset growth rate as a measure of management quality. CONC is the concentration of assets held by the three largest banks in each state. It measures market structure. ς is constant and $e_{i,t}$ is the random error term for bank i at time t. We expect that the model incorporating value efficiency scores has the highest explanatory power in explaining bank performance.

RESULTS

Table 1 presents descriptive statistics of main variables on 12/31/2006. We present the mean, the standard deviation, the minimum and the maximum of each variable used in estimating the frontier efficiency scores and in the regression models. Profit and EVA can be negative. On average, mean value created τ is much lower than profit π and performance measured by stock return is higher than measured by the EVA to capital invested ratio.

Efficiency Scores Analysis

Table 2 presents estimation results for efficiency scores. The estimation results of cost efficiency and profit efficiency scores are broadly consistent with those generally obtained from empirical research for the U.S. market. We find that profit efficiency is lower than cost efficiency as in Berger and Mester (1997, 2003) and Bos and Schmiedel (2007). Value efficiency scores are much lower, around 62% on average, suggesting the difficulty for banks to create value for their shareholders. Value inefficiency is due to cost inefficiency, profit inefficiency in addition to bad risk management , implying loss in value (U.S. banks lose more than one-third of their potential to create value). In addition, value efficiency scores are more scattered than cost and profit efficiency scores. This result suggests the heterogeneity of bank behavior. All these results are consistent with those of Fiordelisi (2007) for the European banks, but different from those of Hughes *et. al.* (1996) who found a small dispersion in the efficiency scores.

Table 1 : Some Key Variables on 12/31/2006 (Thousand Dollars)

Variable	Label	Mean	Standard Deviation	Min	Max
C		101	245	4	2 988
π	Profit	24	51	(0)	497
τ		12	29	(7)	312
y1	Credits	1,203	2,603	38	26,000
y2	Securities	342	677	0,96	5 183
w1	Cost of deposits	2.36%	0.94%	0.20%	6.48%
w2	Salary per employee	56	14	21	141
z1	Physical capital	60	171	0,31	2 371
z2	Financial capital	161	312	2,88	2 943
stnpl	State nonperforming loans	0,623	0,283	0,150	3,080
EVACI	EVA to Capital invested ratio	6.22%	5.04%	-14.63%	24.84%
STRET	Stock Return	8.60%	16.84%	-22.51%	77.78%

This table presents descriptive statistics for all the variables used in estimating frontier models. In estimating efficiency scores, the dependent variables are Total cost (C), Profit (π), and Economic Value Added (τ) and the independent variables are Credits (y1), Securities (y2), Cost of deposits (w1),Salary per employee (w2), Physical capital (z1), Financial capital (z2) and State nonperforming loans (stnpl). In estimating the informational contributions of value efficiency the dependent variables are EVA to Capital invested ratio (EVACI) and Stock Return (STRET)

Table 2 : Efficiency Scores (Descriptive Statistics)

	Cost Efficiency			Profit Efficiency			Value Efficiency		
Period	**2004**	**2005**	**2006**	**2004**	**2005**	**2006**	**2004**	**2005**	**2006**
Number of observations	278	290	293	278	290	293	278	290	293
Mean	0.856	0.884	0.887	0.757	0.843	0.832	0.546	0.677	0.644
Standard deviation	0.069	0.053	0.063	0.237	0.121	0.118	0.578	0.267	0.270
Minimum	0.562	0.658	0.604	-1.757	-0.165	0.108	-6.663	-1.573	-0.735
Maximum	0.965	0.968	0.977	1.000	1.000	1.000	1.000	1.000	1.000

This table shows estimation results for cost, profit and value efficiency scores. Mean scores and standard deviation are presented for each year. The number of observations varies between 278 and 293 per year.

To test the robustness of the results, the efficiency scores are estimated with a few changes from the preferred approach: First, by removing randomly from the sample 10% of the observations; second, by changing the assumption about the distribution of inefficiency term. The Spearman correlation coefficients show the stability of bank ranking. The Student test for equality of means shows that the average efficiency scores have remained essentially the same, implying robustness in the estimation of efficiency scores.

Table 3 : Spearman's Rank Correlation Between Efficiency Concepts and Over Time

A	**Cost vs Profit**	**Profit vs Value**	**Cost vs Value**
2004	0.235*	0.844*	0.337*
2005	0.320*	0.796*	0.334*
2006	0.323*	0.818*	0.337*
B	**Cost Efficiency**	**Profit Efficiency**	**Value Efficiency**
2004-2005	0.83*	0.77*	0.72*
2005-2006	0.80*	0.80*	0.78*
2004-2006	0.69*	0.64*	0.60*

This table shows the Spearman correlation rank. Part A compares efficiency concept scores for each year. Part B compares efficiency scores for each concept over time. All the correlations are significant at the 1% level.

Table 3 presents results for spearman's rank correlation between different concepts (A) and over time (B). We find that cost/profit and cost/value efficiencies correlations are positive but not high (around 30%).

These results are in contradiction with those of Bos et al. (2009) who found a negative correlation and Pasiouras, et.al. (2009) who found a non-significant correlation. By cons, profit/value correlations are very important (about 80%), in contrast to the results of Fiordelisi (2007) for European banks (he even found a negative correlation in France for the years 2001 and 2002). Then, profit efficient banks are more likely to be value efficient. This result suggests that these two concepts can provide similar information. However, the profit or value maximization behaviors are not necessarily associated with cost minimization objective. Concerning spearman's rank correlation over time, we find a strong stability from one year to another, mainly for consecutive years, bringing credibility for efficiency scores estimates. These results are consistent with previous research (Eisenbeis et al,. 1999; Bauer et al,. 1998)

Informational Contributions of Value Efficiency

The correlation matrix shows no significant correlation between the explanatory variables to justify the removal of some. So, all the variables considered above are adopted in the models. The estimation results of equation (3) using stock return (STRET) as performance measure are presented in Table 4 for each efficiency concept with stacked cross-sectional data (regressions (1), (3) and (5) and panel data (regressions (2), (4) and (6)). The Hausman test allowed us to keep the random effects model.

Table 4 : Regression Results, Relationship Between Stock Return and Cost Efficiency, Profit Efficiency and Value Efficiency, Respectively, Stacked Data and Panel Data

		(1)	(2)	(3)	(4)	(5)	(6)
Coefficients	**Variables**	**Cost Efficiency Model, Stacked Data**	**Cost Efficiency Model, Panel Data**	**Profit Efficiency Model, Stacked Data**	**Profit Efficiency Model, Panel Data**	**Value Efficiency Model, Stacked Data**	**Value Efficiency Model, Panel Data**
β	Efficiency considered	0.227**	0.227**	0.132***	0.132***	0.063***	0.063***
		(0.101)	(0.101)	(0.037)	(0.037)	(0.016)	(0.016)
α	Tr	-0.033***	-0.033***	-0.034***	-0.034***	-0.032***	-0.032***
		(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
δ_1	Occdist==central	-0.062***	-0.062***	-0.050***	-0.050***	-0.046**	-0.046**
		(0.018)	(0.018)	(0.019)	(0.019)	(0.019)	(0.019)
δ_2	Occdist==midwest	0.075***	0.075***	0.070***	0.070***	0.071***	0.071***
		(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
δ_3	Occdist==northeast	-0.079***	-0.079***	-0.072***	-0.072***	-0.072***	-0.072***
		(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
δ_4	Trust	-0.018	-0.018	-0.026**	-0.026**	-0.025*	-0.025*
		(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
δ_5	Bvcapr	-0.728**	-0.728**	-0.656*	-0.656*	-0.606*	-0.606*
		(0.340)	(0.340)	(0.339)	(0.339)	(0.339)	(0.339)
δ_6	Assgr	0.151***	0.151***	0.177***	0.177***	0.161***	0.161***
		(0.038)	(0.038)	(0.037)	(0.037)	(0.037)	(0.037)
δ_7	Conc	-0.034	-0.034	-0.036	-0.036	-0.036	-0.036
		(0.033)	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)
ς	Constant	0.063	0.063	0.148***	0.148***	0.209***	0.209***
		(0.093)	(0.093)	(0.053)	(0.053)	(0.046)	(0.046)
	R^2	0.165	0.164	0.172	0.172	0.176	0.175
	Within		0.064		0.073		0.071
	Between		0.311		0.331		0.342
	R^2 adjusted	0.155		0.163		0.166	

*This table shows estimation results of equation 3 with stock return as dependent variable .In the models (1) and (2) β refers to cost efficiency coefficient. In the models (3) and (4) β refers to profit efficiency coefficient. In the models (5) and (6) β refers to value efficiency coefficient. The models (1), (3) and (5) use stacked data. The models (2), (4) and (6) use panel data .Standard deviations between parentheses. ***, ** and * indicate significance at the 1, 5 and 10 percent levels respectively.*

The results presented in Table 4 show no difference between stacked data and panel data providing some robustness for our results. In both cases and for the different efficiency concepts used, the coefficients for

the different efficiency scores are positive and statistically significant at the 1% level for profit and value efficiencies and 5% for cost efficiency. More efficient banks are more able to have important stock return. These results are coherent with our assumptions and with those of Beccalli *et al.* (2006), Adenso-Díaz and Gascón (1997) and Eisenbeis *et al.* (1999) for cost efficiency, but they did not estimate profit efficiency. However, they are partially different from those of Liadaki and Gaganis (2010) who found a positive relationship between profit efficiency and market return while cost efficiency was not significant. No research to our knowledge tested the relationship between banks market return and their value efficiency. The examination of control variables shows that most of the coefficients (40 coefficients over a total of 48 for all the models) are statistically significant. Management quality and regulation affect the ability of banks to create value for their shareholders. Only concentration is not significant. Concerning the explanatory power of these different models, the coefficients of determination are very low and close, although the models of value efficiency and profit efficiency have the highest explanatory powers (adjusted R^2 = 16.6% and 16.3% respectively). Cost efficiency model has the lowest coefficients (adjusted R^2 = 15.5%). These results show that a mature stock market can be influenced by all aspects of bank efficiency (cost, profit and value efficiency) that provide to investors further long-term information (Liadaki and Gaganis, 2010). However, stock market does not favor one of these concepts (the difference in the explanatory powers seems not significant).

Table 5 : Regression Results, Relationship Between Shareholder Value Creation Ratio and Cost Efficiency, Profit Efficiency and Value Efficiency, Respectively, Stacked Data and Panel Data

		(1)	(2)	(3)	(4)	(5)	(6)
Coefficients	**Variables**	**Cost Efficiency Model, Stacked Data**	**Cost Efficiency Model, Panel Data**	**Profit Efficiency Model, Stacked Data**	**Profit Efficiency Model, Panel Data**	**Value Efficiency Model, Stacked Data**	**Value Efficiency Model, Panel Data**
β	Efficiency considered	0.288***	0.280***	0.198***	0.179***	0.093***	0.088***
		(0.025)	(0.028)	(0.007)	(0.008)	(0.003)	(0.003)
α	Tr	-0.004**	-0.005***	-0.006***	-0.006***	-0.004***	-0.004***
		(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
δ_1	Occdist==central	-0.031***	-0.033***	-0.015***	-0.015***	-0.008**	-0.006
		(0.004)	(0.006)	(0.003)	(0.005)	(0.003)	(0.005)
δ_2	Occdist==midwest	0.027***	0.025***	0.018***	0.018***	0.020***	0.019***
		(0.004)	(0.006)	(0.003)	(0.004)	(0.003)	(0.005)
δ_3	Occdist==northeast	-0.012***	-0.012**	-0.001	-0.003	-0.001	-0.002
		(0.004)	(0.006)	(0.003)	(0.004)	(0.003)	(0.004)
δ_4	Trust	0.017***	0.016***	0.004	0.004	0.007***	0.005
		(0.003)	(0.005)	(0.002)	(0.003)	(0.002)	(0.003)
δ_5	Bvcapr	-0.505***	-0.231**	-0.399***	-0.259***	-0.330***	-0.139**
		(0.082)	(0.096)	(0.064)	(0.076)	(0.057)	(0.071)
δ_6	Assgr	0.075***	0.067***	0.110***	0.099***	0.085***	0.076***
		(0.009)	(0.007)	(0.007)	(0.006)	(0.006)	(0.005)
δ_7	Conc	0.003	-0.003	-0.000	-0.001	-0.000	-0.001
		(0.008)	(0.011)	(0.006)	(0.008)	(0.006)	(0.008)
ς	Constant	-0.150***	-0.162***	-0.064***	-0.059***	0.029***	0.017*
		(0.023)	(0.027)	(0.010)	(0.012)	(0.008)	(0.010)
	R^2	0.349	0.339	0.612	0.609	0.689	0.684
	Within		0.177		0.307		0.582
	Between		0.422		0.609		0.667
	R^2 adjusted	0.342		0.607		0.685	

*This table shows estimation results of equation 3 with shareholder value creation ratio as dependent variable .In the models (1) and (2) β refers to cost efficiency coefficient. In the models (3) and (4) β refers to profit efficiency coefficient. In the models (5) and (6) β refers to value efficiency coefficient. The models (1), (3) and (5) use stacked data. The models (2), (4) and (6) use panel data .Standard deviations between parentheses. ***, ** and * indicate significance at the 1, 5 and 10 percent levels respectively.*

To bring robustness to our results, we randomly remove 10% of the sample and run these models again. The results remain mainly unchanged regarding the sign and the significance of each explanatory variable. The results are therefore robust with respect to the sample selection. We also replace OCCDIST by FDICDBS (a geographical classification by the FDIC) as control variable. The results concerning the amplitude, the sign and the significance of explanatory variables remain essentially unchanged.

Table 5 presents the estimation results of equation (3) using shareholder value creation ratio (EVACI) as a dependent variable for each efficiency concept with stacked cross-sectional data (regressions (1), (3) and (5)) and panel data (regressions (2), (4) and (6)). The Hausman test allows us to keep the random effects model.As shown above, results obtained for these two specifications are very similar, providing robustness for our results. The coefficients for the different efficiency scores are positive and statistically significant at the 1% level for all models having a positive impact on the ability of banks to create value for their shareholders. These results are coherent with our assumptions. Examining control variables shows that, as for the previous model, only concentration variable is not significant.

Regarding the explanatory powers of the models, they are generally much higher than those with the stock return as dependent variable (R^2 about 16%) and those of Fiordelisi (2007) (R^2 adjusted 28.9% in the best case). For the two specifications, the results show that the model including value efficiency has the highest explanatory power (R^2 adjusted=68,5%), followed by the model including profit efficiency (R^2 adjusted =60,7%). The model including cost efficiency has the lowest explanatory power (R^2 adjusted = 34.2%). These results suggest that the value efficiency concept dominates the others in explaining value creation for shareholders. This finding can be explained by the global nature of value concept. Indeed; to create value, banks must control costs, make more profit and better manage their risk. These results are close to those obtained by Fiordelisi (2007) and Fiordelisi and Molyneux (2006) on European banks. We run the same robustness checks as for the previous models. Our results remain broadly the same.

CONCLUSION

This paper is the first to estimate U.S. listed banks value efficiency and to examine the link between their cost, profit and value efficiency and their performances. We used a sample of 293 listed banks, during the 2004-2006 period. The estimation of efficiency scores, controlling for macroeconomic and other regulatory characteristics, indicated very low value efficiency scores (62% on average), suggesting the difficulty for banks to create value for their shareholders in consistence with previous studies. Profit and cost efficiency scores were higher at around 85%. We found also that value and profit efficiency scores were strongly related suggesting that profit efficient banks were more likely to be value efficient.

In considering the relationship between these efficiency measures and stock return, our results indicated that all these concepts affected positively and significantly stock returns suggesting that all the efficiency concepts include useful but not sufficient information for investors (R^2 weak). None of these concepts dominate the others. Investors are not able to capture all the information relating to value creation in banks. So the stock returns do not accurately reflect bank performance. This can be explained by the presence of information asymmetry. Regarding the relationship between efficiency concepts and value creation measure for shareholders, we found a positive and significant influence. However, the contribution of value efficiency seemed to be most relevant, closely followed by profit efficiency. The cost measures were more limited. The value measure integrates simultaneously the notions of cost, income and risk. It is therefore of particular importance both as a direct measure of performance and as a concept of efficiency. Moreover, this measure faces less accounting distortions making it superior.

We suggest that banks should incorporate the objective of creating shareholder value in their strategy. This requires, for example, setting up a salary incentive system based on value creation. To study the

effects of deregulation, management quality, failure, risk behavior, and so on, researchers can direct their works by integrating value efficiency concept.

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