

# ASSET-CAPITAL RELATIONSHIPS IN PHILIPPINE COMMERCIAL AND SAVINGS BANKS

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*This study looks into the management of bank risks through adequacy of capital. It validates the use of bank assets as a predictor of equity through the use of a simple linear regression model. A comparison of savings banks and commercial banks was made. Regression models were used in the analysis, relating equity capital to assets. Although a significant linear relationship is obtained for both types of institutions, the degree of fit as shown in the coefficient of determination appears low for commercial banks (66 percent) compared to savings banks (94 percent).*

*There is a substantial implication as to the adequacy of capital among commercial banks as opposed to savings banks. Savings banks maintain a better relationship of capital backup vis-a-vis assets. This apparently emanates from essentially more conservative asset acquisition policies by savings banks. Commercial banks, on the other hand, may portray a greater degree of risk to depositors due to greater variation in the amount of bank assets relative to capital.*

**B**anks become insolvent when they channel excessive loans, investments and other activities to areas where unanticipated events occur due to unforeseen adverse factors. Possibilities of high profits "blind" them to their portfolio risks.

There are four major approaches that banks can take to identify and reduce risks.

- *Diversify assets and liabilities so that the impact of unexpected events will not be overwhelming. Increases in interest rates cause heavy losses in the value of portfolios that contain loans, securities and liabilities with a long average maturity. A similar lack of diversification may occur when there is a concentration of loans within a single industry, in a particular location, in foreign markets, or when making off-balance-sheet commitments.*

- *The risks from non-diversification can be measured by estimating the probability distributions of*

*possible outcomes around those that are predicted. The larger the share of the distribution that lies below expected outcomes, the greater the danger. Institutions can thus choose smaller distributions to reduce total risks to an acceptable level.*

- *The danger that depositors or those who lend to banking institutions will lose their funds can be eliminated or alleviated by insurance. A third party can guarantee against loss. Such insurance is provided by the Philippine Deposit Insurance Corporation (PDIC).*

- *Capital can be used as a buffer to absorb any losses likely to occur. In this case, adequate capital is the amount required to assure that the probabilities of future insolvency are reduced below a predetermined level. When a bank selects its assets, liabilities, commitments, and operational requirements, it determines both the levels of expected returns and loss risks. The bank cannot know with certainty what results will be achieved, but it can minimize its probability of bankruptcy by making sure that the risks assumed do not exceed the capacity of its capital to absorb possible losses.*

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Without delving into an operational-empirical definition of adequate capital, this article studies the



fourth approach to risk reduction by analyzing the relationship between bank assets and capital. The absence of a comprehensive data base dictates the use of a model such as the simple linear regression. The simple linear model utilized in this paper appears to be the best test. However, the study will not address the asset-capital relationship in a policy-analytic framework.

### THE NATURE OF BANK CAPITAL

The amount of capital deemed adequate for a firm varies depending upon the type of firm and the attitudes of its owners and creditors toward risk. Among banks, capital is defined as the combination of assets and liabilities in the banks' portfolio in relation to risks of insolvency that result from particular portfolio choices. The amount of risk in a set of assets and liabilities, in relation to levels of capital, must be measured. In lieu of this kind of rigorous analysis, regulatory authorities in the banking sector simply require higher levels of bank capital as a surrogate measure to offset asset risk.

In assessing the total risk facing a bank, capital plays a crucial role. Available capital can offset other losses. The greater the initial capital and the more capital added from earnings or new investments, the lesser the danger of insolvency. The assumption that equity capital requires no fixed outlay means that the average duration of the bank's portfolio of assets grows with its ratio of capital to other liabilities. Given the risks of an asset portfolio, the risk of insolvency falls rapidly as capital is increased, but approaches an asymptote. Beyond that point, additional capital only has a minor impact.

In the international arena, capital adequacy guidelines address the long-term decline in capital ratios, particularly in the case of the multinational banks. Two principal measurements are used: primary capital to total assets and total capital to total assets. Primary capital consists of common stock, perpetual preferred stock, capital surplus, undivided profits, reserves for contingencies and other capital reserves, mandatory convertible instruments, and allowances for possible loan losses. Total capital includes primary capital components plus limited-life preferred stock and qualifying notes and debentures.

### THE NATURE OF BANK ASSETS

Capital is desired as a trade-off to risk in fluctuations of the value of assets. The amount of capital on its face value is not significant. What is important is the relationship of capital to total assets, or its sub-categories such as risk assets or earning assets. Regulatory agen-

cies consider the ratio of assets to capital as a measure of capital adequacy. What we seek in this study is the relationship between assets and capital which would set the stage in analyzing asset-capital ratios.

The nature of bank assets when matched with liabilities points to interest rate risk. The longer the maturity of assets compared with liabilities, the greater the interest rate risk. When a bank buys a fixed rate security or makes a fixed rate loan, its interest revenues are frozen until the investment matures. Furthermore, because no asset will sell for more than its present value, if interest rates rise, the value of its portfolio falls. When the discount rates for future receipts go up as a result of current and projected increases in interest rates, the economic value of all future returns declines. And as the amount of loss grows, the more uncertain the expected payment becomes.

If bank assets are funded through borrowings, the ratio of net interest return to assets falls steadily. When interest rates jump, the rates paid on liabilities rise much faster than those received on assets, many of which have fixed yields. These movements narrow the spreads and cause a drop in net interest earnings. A squeeze on interest rates means that, even with only normal loan losses, banks lose money.

A second-order effect of bank asset decisions is the shift in the net worth position. The degree of impact depends on the degree of mismatch, i.e., on the weighted expected variances of assets and liabilities.

### TESTING ASSET-CAPITAL RELATIONSHIPS

An important question in the debate over assets vis-a-vis capital for banks is: who gains and who loses if the level of capital follows too stringently the level of assets?

The danger of insolvency and costs to PDIC and society falls rapidly as capital is increased, albeit nonlinearly. Some bankers may believe they are not disadvantaged if they are forced to increase capital needlessly. They lose the tax advantages of debt, whatever gains are made at the expense of PDIC, and transaction and marketing costs of new stock issues, not to mention probable control dilution of ownership.

Systematic and residual risk in banks can be predicted from predetermined fundamental data such as asset and capital levels on a time-series and/or a cross-sectional basis. Prediction rules estimated in this way would be useful in monitoring bank risk from the perspective of depositors. Fundamental descriptors



serve as a measure of appropriateness and as a target for regulation.

### THE TEST

The empirical test of how capital follows assets in the banking sector is a partial test: the use of capital as a buffer against insolvency risk. Bear in mind that there are four fundamental methods or approaches available: diversification, judicious choice of probability distributions, third party insurance, and the use of capital.

The domestic banking sector is divided into two sub-sectors namely, commercial banks and savings banks, numbering 19 and six, respectively. The sample banks are shown in Table 1. Asset and capital levels used are derived from end-of-1987 data. No norm in terms of type of financial institution is established. Although the variables being evaluated in terms of simple statistical relationships are inherently closely related, it is favorable for the simple linear model to be used as a "data snooping device."

The basic hypothesis tested is that asset levels of commercial banks and savings banks are fairly good predictors of the capital buffer. The tests are run on a cross-sectional basis, industry-wide but limited to domestic banks since multinationals do not reflect allocated Philippine capital, and cover the year 1987. The model is the simple Ordinary Least Squares (OLS) regression type, with capital as the dependent variable.

On a second level, the linear regressions run for each of the two sub-sectors are analyzed as to slope equality, which would show whether assets are good predictors of capital in both sub-sectors.

Finally, the output was examined as to the degree of the relationship between assets and capital, given by the coefficient of correlation, and the explanatory power of asset levels, given by the coefficient of determination. These coefficients are denoted by R and R-squared, respectively.

### THE FINDINGS

The mean asset and equity levels of the commercial banks in the sample are P9,379.6 and P537.5 million pesos, respectively, with corresponding standard errors of P8,401 and P573.3 million pesos, respectively. The asset level of commercial banks is significantly related to capital, reinforced by its significant t value, F ratio, and very low standard error in the correct direction. However, the coefficient of determination is low at 66 percent. This means that while the degree of relationship between assets and capital is at 81 percent, only 66 per-

cent of the behavior of equity for the commercial banking sub-sector is explained by assets (Complete results are given by Table 2 and Table 3).

The mean asset and equity levels of the savings banks in the sample are P2,516.2 and P537.5 million pesos, respectively, with corresponding standard errors of P3,222 and P120.8 million pesos, respectively. For the savings banks sub-sector, the OLS results are as expected, similar to the results for the commercial banking sub-sector. However, the explanatory power of assets for the level of capital is much greater, the R-squared being at 94 percent.

Table 4 gives a combined data set analysis. The R-squared is not a simple matter of averaging, but is weighed down by the relatively low R-squared for commercial banks. Thus, for the overall domestic banking sector, assets account for only 71 percent of the behavior of equity.

An adjustment has been made for the corresponding sample size in the R-squared. The corresponding R-squared values are 64 percent, 93 percent, and 68 percent, respectively. The basic formula applied in deriving the adjusted R-squared can be found in most basic statistics books.

Finally, a slope equality test was done on the two sub-sector regressions, the objective of which is to test if the two sub-sectors behave similarly in terms of predicting capital levels of assets, despite a fairly large variation in coefficients of determination. The results indicate that the null hypothesis cannot be rejected (slopes are equal). The regression models for both sub-sectors are statistically the same. This means that as far as assets as a predictor of capital are concerned, the models are deemed adequate.

The slopes *per se* do not mean anything. The basic test is to determine if the linear model is significantly used. The only meaning we can attach to the slopes themselves is that the dependence of capital on assets for both sets of financial institutions is the same.

### CONCLUSIONS AND IMPLICATIONS

Results of the analyses indicate that asset levels may be used as a descriptor and even as a predictor of capital buffer in financial institutions, particularly commercial banks and savings banks. While the conceptual framework utilized is a partial equilibrium type in that the use of capital is only one of several approaches, it tends to indicate the usefulness of asset-capital relationships in evaluating bank risk.

The relatively low level of association between assets and capital in commercial banks indicates a higher level of systematic risk for this sub-sector as a whole. Commercial banks are more likely to fail due to its having riskier assets and less capital support. This is offset by the degree in which commercial banks have more diversified assets. On the other hand, when they fail to diversify, their greater inherent risk to capital posture means that other risks dominate, and the probability of their failure rises above that of savings banks. Commercial banks borrow more money and purchase a higher percentage of liabilities. They take riskier loans and higher income from loans and investments. They also engage in more miscellaneous activities. However, because they have higher operating expenses, pay more for their liabilities, and have larger loan losses, their income as a share of earning assets is lower. They also have a smaller

amount of capital behind each peso of assets. It would be evident that this lesser capital offsets the lower earnings on assets.

There are important implications for depositors. A relatively low level of relationship between assets and capital indicates a higher degree of risk. This is not necessarily offset by PDIC insurance, since the flat charges of the PDIC do not penalize added risk. On the other hand, operating revenues, even for individual commercial banks, usually do not deteriorate suddenly. It takes poor management or fraud and insider abuse to impair normal risk diversification. But a lot may be said for the tightening up of capital of commercial banks to make this at par with savings banks as a function of risky assets. Capital should be regarded as the first line of defense.

Table 1. **SAMPLE BANKS IN THE STUDY**

*Domestic Commercial Banks*

PNB  
BPI  
PCIB  
METROBANK  
UCPB  
RCBC  
ALLIED  
SOLIDBANK  
EQUITABLE  
PRUDENTIAL  
CHINA BANKING  
UNION BANK  
SECURITY  
TRADERS  
REPUBLIC PLANTERS  
PBCOM  
PHILIPPINE BANKING  
PHILIPPINE TRUST  
PILIPINAS BANK

*Savings Banks*

BPI FAMILY SAVINGS BANK  
BANCO DE ORO  
MONTE DE PIEDAD  
ASIAN SAVINGS  
HOME SAVINGS  
CITY SAVINGS



Table 2. REGRESSION RESULTS: COMMERCIAL BANKS

DEPENDENT VARIABLE: EQUITY

VAR	REGRESSION COEFFICIENT	STD. ERROR	T(DF = 17)	PROB.
ASSETS	.0556	.0096	5.793	.00002
CONSTANT	16,058.70			
STD. ERROR OF ESTIMATE = 342,086.52				
R-Squared = .66				
R = .81				
ANALYSIS OF VARIANCE				
F Ratio = 33.6				
Probability = 0.00002				

Table 3. REGRESSION RESULTS: SAVINGS BANKS

DEPENDENT VARIABLE: EQUITY

VAR	REGRESSION COEFFICIENT	STD. ERROR	T(DF = 5)	PROB.
ASSETS	.0364	.0040	9.073	.00027
CONSTANT	10,583.91			
STD. ERROR OF ESTIMATE = 31,670.85				
R-Squared = .94				
R = .97				
ANALYSIS OF VARIANCE				
F Ratio = 82.32				
Probability = 0.00027				

Table 4. REGRESSION RESULTS: COMBINED SAMPLE BANKS

DEPENDENT VARIABLE: EQUITY

VAR	REGRESSION COEFFICIENT	STD. ERROR	T(DF = 24)	PROB.
ASSETS	.056	.0073	7.640	.0000001
CONSTANT	-1,726.26			

STD. ERROR OF ESTIMATE = 290,963.36

R-Squared = .7086

R = .8418

ANALYSIS OF VARIANCE F Ratio = 58.37

Probability = .0000001