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# Does the improvement in accounting standard IAS/IFRS cure the financial crisis and bank profitability? Evidence from banking sector in Lebanon\*

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## ABSTRACT

This study is to examine the improvement in accounting standards IAS/IFRS on the 24 Lebanese banks profitability, concerning the financial crisis. Over the period 2000Q1–2015Q4, the period is divided as pre-IAS/IFRS adoption, post-IAS/IFRS adoption, Post-IAS/IFRS adoption-pre-world crisis, and Post-IAS/IFRS adoption-post-world crisis. Via applying GMM the main results show that assets quality have a positive influence under GAAP on bank profitability, and negatively under the IAS/IFRS with minting their trend after the financial crisis. Also, liquidity and capital adequacy have a negative effect on bank profitability which increased Post-IAS/IFRS adoption-post-world crisis comparing with GAAP, which gives a signal prior the crisis under IAS/IFRS, in turn, it led to increasing the leverage. Moreover, there is a negative relationship between economic activities (Co-Index) under GAAP on bank profitability, whereas the value reduced under the adoption of IFRS which reflect the mark-to-market value of financial assets. Therefore, improvement in standards of transparency and reduction of complexity both increase financial stability and thereby restore participants' confidence in the financial market.

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## KEYWORDS

Accounting Standards IAS/IFRS; banks' profitability; financial crisis; panel dynamic GMM model

## 1. Introduction

Standard setter, regulators, and policy-makers all have energetic concerns regarding the impact of the financial reports on the economy. This is the accrued interest on the economic consequences associated with the financial information (Paea 2013). Over the last decade the accounting term 'value-relevance' has gradually emerged in the related academic literature (Aboody, Hughes, and Liu 2002; Ali and Hwang 2000; Ball, Robin, and Sadka 2006; Hopkins et al. 2008; Liu 2011). The aims of these studies were either to evaluate the usefulness of studied accounting numeric data or to study these numbers purpose of use (Boone 2002). According to economics information, accounting and financial reporting are vitally important to the capital market and its efficiency (Chang 1998; Chen and Dodd 2001). Both the International Accounting Standards Board (IASB) and the Financial Accounting Standards Board (FASB) took on the investor-oriented information usefulness perspective (Liu 2011). These accounting boards stated precisely; the major purpose of accounting and all its functions are

reaching the necessities of capital markets (FASB and IASB 2006). Considerable attention has been given to accounting numbers and its relation with stock markets, not to mention its vital importance made it clearly step out among other issues discussed in the academic literature in fields of accounting and finance (Bao, Lee, and Romeo 2010; Beaver 2002; Kothari 2001; Stiglitz 2002).

Barth, Beaver, and Landsman (2001) recommended that if a certain accounting amount is associated with predicted values of a certain equity market, then this accounting amount is considered and it can be defined as value relevant. Majority of the studies in the field of value relevance considered using Ohlson or modified Ohlson models under different sets of accounting standards (Easton, Harris, and Ohlson 1992; Feltham and Ohlson 1995; Gietzmann and Ostaszewski 2003; Taplin 2004). Thus this paper will help to predict the values and the performance of the selected banks profitability upon a sample of Lebanese banks based on the size of the deposit.

In February 2010, The European Union (EU) anticipated a regulation upon every listed company on EU stock exchange markets which requires them to draft consolidated financial statements corresponding with International Accounting Standards (IASs), to be updated as International Financial Reporting Standards (IFRS) (Albu et al. 2011; Doukakis 2010; Liu 2011). As soon as this regulation took place effectively in 1 January 2005 (Doukakis 2010), approximately 7000 European listed companies were obligated to apply IFRSs for their financial reporting systems (Callao et al. 2009). Other developing countries have followed the EU by exercising this regulation, especially countries that expect continuity in their foreign investments (Al-Shammari, Brown, and Tarca 2008).

A banks' financial performance expressed by its disclosure of financial reports is heavily influenced by the tools of measurement used to reflect this performance. The basis implemented to capture the change of share prices and variations of volume traded of a certain bank which reflects the outlook of this banks' performance (Barth, Caprio, and Levine 2004; Omran and Pointon 2004). The improvement in accounting standard IAS/IFRSs regulation according to the expectations of (Daske 2006; Luzi et al. 2008), will affect significantly disclosure of all financial statements and their components (Horton and Serafeim 2010; Hung and Subramanyam 2007; Stickney, Brown, and Wahlen 2007). According to the pure shareholder model country along with the presumption that public information is the main source for investors (Elbakry, EI-Masry, and Pointon 2006), capital, both equity and debt, will be raised by institutions also from the public (Ball, Robin, and Sadka 2006). Consequently, this system has the bias for high degree public disclosures. These public disclosures require being fueled by active and prospective shareholders model in which determine the accounting rules (Ball 2006; Hope 2003; Hope et al. 2006). Therefore, the government does not have any determination on the accounting standards in which are developed in such a context through the accounting market. The government, employees, managers, shareholders and debt holders are all considered stakeholders in the pure stakeholder model state (Lantto 2007).

Due to the fact that Stakeholder model systems tend to require a lesser standard of public disclosure, this system tends to generate less public information (Beckman, Brandes, and Eierle 2007). Given the previous fact, stakeholder model does not apply to large public capital markets; in contrast it is applied on intermediaries such as banks (Lantto 2007). If a corporation has a long-term relationship with a bank, for example, it can raise debt and equity capital in relatively large amounts. In turn, the bank serving as an intermediary raises the capital from the public (Ball, Robin, and Sadka 2006). The private information about the corporation needed to assess its risks will be only exposed to the bank; therefore public disclosure of this information is not needed. (Daske and Gebhardt 2006).

Previous research in the field of value-relevance found that the objective of financial statements, based on the definition given by the IASB framework, is acquired in stakeholder model countries (Epstein 2009; IASB 2006). For example, a higher financial reporting quality on firms post-implementing IAS/IFRSs was found in a research by Barth et al. (2006). The same research indicated that this result is true and appears strongly in countries classified under the stakeholder model. Furthermore, experts in the rating of the annual reports of Swiss, Austrian and German firms along with Daske and Gebhardt (2006) indicated significant increase regards the quality of disclosure under IAS/IFRSs.

Among the previous studies, it is debatable whether more value-relevant accounting information is provided under IAS/IFRS or under the General Accepted Accounting Principle (GAAP) of a stakeholder model country (Hung and Subramanyam 2007). The implementation of IAS/IFRS in the Middle East has been reported as generally leading to a greater degree of volatility in leverage measures and income-related figures (Ahmed 2007). As Hung and Subramanyam (2007) point out the orientation of IAS/IFRS towards fair value, and the volatility in income, as a result, might lead to financial distress or result in an adopting Banks violating its debt covenant. Resilience and elasticity of Lebanese banking sector in the record to various turmoil economic shakes made it a pillar in the structure of Lebanon's economic structure. This performance also gives a better image for Lebanon and its solid emerging economy foundations. Even international attention was attracted to Lebanon banks by rating agencies particularly after they extraordinarily survived 2008 world recession. Regulatory, supervisory, and reduction in loan supply can hinder a banks' performance (Barth, Caprio, and Levine 2004).

To date, there is no exhaustive literature review examining the relationship between the improvement in the accounting standards and their effect on the financial ratio to banks profitability in the developing countries. Therefore, the main objective of this study is to examine the impact of the adoption IAS/IFRS on financial ratios in Lebanese banking sectors. This paper will contribute to the literature as following firstly; it is the first study that analyses numerically the impact of the adoption IAS/IFRS on financial ratios in Lebanese banking sectors. Secondly, a comparative investigation on the banks' performances of opposing cases pre-adoption and post-adoption of IAS/IFRS. Thirdly, the study determines to what extent awareness of such impact reflects on the decisions of the preparers of the financial statements, auditors, and investors. Fourthly, the study seeks to evaluate the effect of accounting standard improvement IAS/IFRS and shed light on consequences of the financial crisis on the banks profitability after the improvement in the accounting standards, for the selected 24 Lebanese banks.

## 2. Literature review

The European Union (EU) proposal for a regulation in February 2001, which would make it a requirement for all companies registered in the EU to prepare consolidated financial statements, in accordance with IASs (Albu et al. 2011; Ballas, Skoutela, and Tzovas 2010), now known as IFRS (IAS Plus 2006). From 1 January 2005 the obligation to be effective, therefore, is meant to bring, which should from now on 7000 listed European companies to use IAS/IFRS measures (Nellesen and Zuelch 2011). Particularly after Lebanon's banking crisis, the regulatory and banking supervisory agency worked on standards compliant with IFRS for various financial entities such as banks and other institutions. Change and support of such new standards are aimed directly to support banks transparency in the market. This change was followed by coherent accounting standards by the IFRS in order of it to be compatible with all Lebanon financial entities (Balsari and Varan 2014).

One of the functions of financial reporting regulations is to act as an incentive and facilitate the security markets operations. For example, higher share prices and less cost of capital is a consequence of good reporting regulations which provides high-quality information about the market. In other words, investors' expectations regard inside information is a lot less in presence of high-quality disclosure regulations (Picker et al. 2013).

When the time comes to apply IAS/IFRS regulation standards practically, major adaptation issues arise such as its clear significant influence on financial ratio analysis. In addition to that more influence on earnings and firm book value is observed. Despite the implementation problem of these standards, they seem to have a positive influence on capital markets overall (Beneish, Miller, and Yohn 2012).

Moreover, the major differences between GAAP and IAS/IFRS by focusing on all financial statements of the two standards are the measurement of value and accounting treatment for investment. Whereas the capital debt and equity rose by banks, comes indirectly from intermediaries and directly from the public. The need and desire of adopting high disclosure standards is not just from legal or governmental parties but also from shareholders themselves, because shareholders aim only to

attract investors to their companies to raise its value of shares, simultaneously investors depend on public information in the market, so good information leads to better investment decisions (Fontes, Rodrigues, and Craig 2005). Some of these accounting treatments reflect this situation, such as these assets that are used by the banks are maintained off balance sheet. This has a significant impact on the debt/equity ratio of banks (Alexander, Britton, and Jorissen 2007).

The IAS/IFRS are considered as a system oriented towards the shareholder, with the presentation of financial statements that is fair value based (Alexander and Archer 2001). Meanwhile, the volatility in book values and reported earnings are likely to be introduced by the fair value orientation of IAS/IFRS (Barth et al. 2006; Hung and Subramanyam 2007). For instance, the measurement of the liabilities at the higher fair value and the amount recognized by IAS/IFRS as long as their fair value is measured reliably, (Al-Yaseen and Aldeen Al-Khadash 2011). As though, assets are measured at the lower of fair value and the best estimate that can be ascertained for an amount for future settlement (Songlan and Kathryn 2010). Also, under GAAP there is no requirement for any captions for the income statement. While there is a requirement for minimum captions in the income statement under IAS/IFRS (Kamal Hassan 2008). Both of these standards characterized by being more fair value oriented. Therefore, more likely to embodied effects of the economic event, into financial statements, in a manner that is more timely and volatile (Alexander and Archer 2001; Nellesen and Zuelch 2011).

Moreover, there are differences between the earnings that are generated under GAAP and those generated under IAS/IFRS, it is expected to have a higher degree of value relevance under IAS/IFRS which it might affect positively on the banks profitability (Liu and O'Farrell 2010). The economic losses are involved into announced financial statement quickly which is considered significant strength if the loss is recognized in a timely fashion, and hence decreases in the expected future cash flow from the long-term investment, would be embodied that accounting information into income as one-time losses quickly (Rehberg 2008). In the case of Lebanon, the main banks source of long-term investment from residents of outsiders. Subsequently, money was moved out of Lebanon overseas investors when losses were announced in the market during the crisis, this has led to difficulties in maintaining foreign investment in Lebanon banks. Furthermore, current and non-current assets and liabilities are presented by IAS/IFRS entities as separate classifications in the balance sheet, which gives more reliable information and relevant can be provided by a liquidity presentation (Liu 2011). Therefore, balance sheet components are broadly disclosed in order of liquidity.

In particular, Adoption of fair value accounting in banks financial reports equips investors with the ability to anticipate firms' capacity of generating cash flow from the available supplied resources. Therefore reduction of information asymmetry in the financial market is expected to appear, intern led to an improvement of the quality of information among entities in the market.

One of the aftermaths of implementing fair value accounting is the increase in potential income; this expectation comes from the replacement of concepts of income. In fair value accounting, the concept of income becomes mixed-income instead of income produced. Another aftermath is the change in the concept of net capital as it takes a more economic context. In fact, the introduction of fair value converts liquid capital into its market value (Paea 2013). Accounting policies and explanatory notes should also play a key role in reducing information asymmetry and improving business value. For example, IAS 36 'Impairment of assets the value of impairment losses recognized or reversed the recoverable amounts'. In any case, users of financial statements should be informed of the valuation models used which are otherwise treated in the entity and are strictly confidential. IAS 37 'provisions, Contingent Liabilities and Contingent Assets' requires detailed information about contingent liabilities such as the estimation of their financial effects as well as uncertainty accompanied by outflows timing and amount.

IFRS 7 'disclosure' and IAS39 'Financial Instrument', the disclosures concerning the financial instrument appear to be even more detailed. It consists of a substantial range of information, ranging from basic issues such as the amount, nature and general terms of each financial instrument, fair value information and risk management policy, particularly with respect to the interest rate risk and credit. IAS 14 'Segment Reporting' sets standards for reporting and disclosing segment financial information.

For instance, different types of information are stated in IAS 14, the explicit purpose of such detailed information is to provide users with a better understanding of past performance, better risk and return assessment and more informed judgment on the banks as a whole. Consequently, after the adoption of IAS/IFRS, some of the information previously used exclusively for management audits is currently being offered on the market to improve the quality of public information (Picker et al. 2013). Adoption of these new standards raised the level of liquidity of capital and reduced the cost of borrowing this capital as empirical studies revealed. This change attracted cross-border investments due to more accessible capital associated with fewer costs in local markets.

Daske et al. (2008) investigated the influence of mandatory IFRS on liquidity under a sample of 26 countries entailing EU member states. Findings showed beneficial significance exclusively on countries providing strong legal and transparent enforcement. Limitations were that only one year of mandatory IAS/IFRS adoption was studied. Platikanova and Perramon (2012) explored the reaction of market liquidity from data before and after IAS/IFRS adoption covering four countries. Results showed a rise in liquidity levels for German and French companies, on the other hand, Swedish and UK firms showed mixed findings.

Theoretically having more informative and comparable financial reports due to the adoption of IFRS is expected to lessen the need for foreign expertise to analyze these financial reports; consequently, this should lead to more cross-border investments. Empirically Covrig, Defond, and Hung (2007) revealed in his study higher significance of foreign mutual fund ownership for voluntary IFRS implementers compared to GAAP in banks. Moreover, findings suggested a possibility of firms to attract foreign investments after implementing IFRS.

Chen, Ng, and Tsang (2014) investigated IFRS adoption in light of international cross-listing. Results confirmed slightly more significance to cross-list for countries mandatorily adopting IFRS. Also, firms located in places where IFRS adoption is mandatory are more likely to cross-list their securities in other countries obligating IFRS. The influence and benefits were less in countries with accounting practices different from IFRS due to less access to foreign capital and fewer disclosure requirements prior to IFRS adoption.

Boumediene, Nafti, and Boumediene (2014) The study examines the impact of the 2008 crisis on the information content of the 2006–2007 crisis and post-crisis French accounting data for 2009–2011. The results show that the financial crisis in 2008 helped to reduce the content of accounting data because of the lack of confidence in information published on international standards.

Therefore, regarding to the discussed studies; which are akin to liquidity of the market, cost of capital cross-border investments and the effect of the financial crisis with the adopting of IAS/IFRS standard, the study trying to address these improvements in accounting standards IAS/IFRS in consideration of financial crisis effects on Lebanese banks' performance, and to what extent these challenges have an effect on banks' profitability.

### **3. Data and methodology**

#### **3.1. Sample selection and data**

The Interests of choosing Lebanese banking sector to conduct this research upon rises from the significant accounting changes done during the last two decades. Particularly, interest in how the gradual implementation of these changes showed parallel gradual improvements in the performance of Lebanese financial system. These changes, as long as the adoption of new accounting standard IAS/IFRS compare with GAAP and the challenges of these changes within the financial crisis. This research paper aims for investigating the profitability of Lebanese banks covering time span starting from 2000Q1 till 2015Q4. The period is divided as pre-IAS/IFRS adoption, post-IAS/IFRS adoption, Post-IAS/IFRS adoption and pre-world crisis, and Post-IAS/IFRS adoption and post-world crisis.

The data refers to asset quality, liquidity, and Capital adequacy ratios. The data source is the Bank Scope. We used data for banks that are operating in Lebanon for period span 2000Q1–2015Q4; the

period divided as reported in Table 1. In Lebanon, 49 commercial banks were 37 banks registered in Bank Scope. Due to data availability, we have considered 24 commercial banks (6 banks are listed in Beirut stock exchange) consolidated data. On average, selected banks have a market capitalization of about 82%, which reflects the value-relevance. This value-relevance assured by

Association of Banks in Lebanon, that the total consolidated assets of commercial banks operating in Lebanon are USD 179.9 billion at the end of July 2015, while USD 183.2 billion at the end of November. This is increased by 0.98% growth in four months of 2015, while increased by 9.8% from the end of July 2016 at the end of January 2017.<sup>1</sup>

We excluded banks with missing information under different accounting standards. In addition, the selected banks were retrieved from Bank Scope knowing that the banks classification is Alpha and Beta in addition to Gamma banks as reported in Table 2.

Descriptive statistics for the tested variables are presented in Appendix A Tables A1–A4. On average, the banks in our sample have a NIM of 0.83% pre-IAS/IFRS adoption, a NIM of 0.691% post-IAS/IFRS adoption, a NIM of 0.714%, post-IAS/IFRS pre-world crisis, and a NIM of 0.674% post-IAS/IFRS; post world crisis over the different divided period. The differences between mean and median of these divided periods, profitability measures indicate that profitability heterogeneity among the banks in our sample exists. Turning to the independent variables, on average, banks specific variables (as seen from the Min and Max values) asset quality and liquidity are high in the period of post-IAS/IFRS adoption, and post-IAS/IFRS pre-world crisis, compared with pre-IAS/IFRS adoption, which revealed the reflection of the market activity, since those accounting standard fair market value oriented. Meanwhile, banks specific variables (as seen from the Min and Max values) remain its trend in post-IAS/IFRS; post world crisis period. Furthermore, the correlation matrix and Variance Inflation Factor (VIF) was used in order to ensure that the results are not contaminated by multicollinearity. The reported results; (in Tables B1–B5 in Appendix B) confirm the absence of the multicollinearity in the different models.

Banks operating in Lebanon remain characterized by high liquidity, coherent solvency, and high capitalization, which protect the sector from local and foreign shocks. Capital requirement and bank profitability have been studied by many researchers higher capital requirements lower leverage and the risk of bank bankruptcies and the impact on profitability by the implementation of Basel and accounting standard changes requirements (Reda, Rjoub, and Alrub 2016).

As discussed in literature part, regarding the improvement in the accounting standards, which changes the recognition of the balance sheet and income statement items; such as (IAS 36 ‘Impairment of assets’ IAS 37 ‘provisions’, IFRS 7 ‘disclosure’ and IAS39 ‘financial instrument’). Therefore, we consider variables as proxies for credit risk transfer ‘asset quality’, funding ‘liquidity’, and regulatory capital arbitrage ‘capital adequacy’. Whereas, the Coincident Indicator reflects the economic activity movements as reported in Table 3. Definition of the variables according to Fitch Universal Format on BankScope as follows:

- (1) Net interest margin: ‘Our explanatory dependent variable is the net interest margin (NIM) ratio, which measures the efficiency of management in controlling their interest expense in order to increase banks’ profitability.’
- (2) Assets quality

**Table 1.** Period’s sample and models specification.

Models	Year specifications	Banks No
M1	From year 2000Q1 to 2004Q4 Pre-IAS/IFRS adoption (GAAP)	24
M2	From year 2005Q1 to 2015Q4 Post-IAS/IFRS adoption	24
M3	From year 2005Q1 to 2007Q4 Post-IAS/IFRS adoption, and pre-world crisis	24
M4	From year 2009Q1 to 2015Q4 Post-IAS/IFRS adoption, and post-world crisis	24

**Table 2.** The classification of banks is based on the size of deposits.

Banks classification	Explanation
Alpha set	Includes banks with \$ 2 Billion and over in deposits
Beta set	Includes banks with deposits from \$ 500 Million to \$ 2 Billion
Gamma set	Includes banks with deposits from \$ 200 million to \$ 500 million

Source: Central Council of Banque Du Liban website.

- (a) Loan loss provision/Equity: ‘the ratio indicates how much of the total portfolio has been provided for but not charged off. It is a loss provision expressed as percentages of equity. The higher the ratio, the poorer the quality of the loan portfolio.’
  - (b) Impaired loans/Gross loans: ‘these are the loan that may not be recovered and are not covered by equity. This indicates the weakness of the loan portfolio relative to the bank’s capital. The higher this percentage, the worse is the banks of position.’
- (3) Liquidity
- (a) Net loan/Deposits and short & long-term funding: ‘this often called reserves-to-deposits. In this ratio, all loans are considered equally illiquid. A higher ratio indicates a less liquid bank.’
  - (b) Liquid assets/Deposits and short & long-term funding: ‘this ratio can be considered as a deposit runoff ratio since it is a proxy for what percentage of customer deposits and short-term funding could be met if they were withdrawn suddenly. The higher this ratio, the more liquid the bank.’
- (4) Capital Adequacy
- (a) Total capital adequacy ratio: ‘under the Basel II and III frameworks, this ratio should be at least 8%. This ratio is a measure of the amount of a bank’s core capital expressed as a percentage of its assets weighted by its credit exposure.’
  - (b) Capital funds/Liabilities: ‘is defined as the sum of equity capital, hybrid capital and long-term subordinated debt. The higher the ratio, the better is the solvency position of the bank.’

### 3.2. Methodology

The following section of the paper explains the econometrics tools used to assess and evaluate the influence of improvements in accounting standards on banks profitability in regards to 2007 financial crisis. Using the financial ratio namely; asset quality, liquidity, capital adequacy, and the coincident indicator as a proxy of external environment ‘economic activities’. In order to, control for individual heterogeneity ‘unobserved Banks-specific effects’; dynamic panel mechanism was used with observation each bank from 2000Q1 to 2015Q4. Also, panel method used to control the endogeneity of banks profitability (NIM). It also includes the lagged banks profitability (NIM) in the equation. This procedure of GMM dynamics estimator used to make adjustments, which were developed by Arellano and Bond (1991). The dynamic NIM equation expressed as follow.

$$Y_{i,t} - Y_{i,t-\theta} = \tau(Y_{i,t-\theta}) + \beta\psi_{i,t-\theta} + \varphi_i + \xi_t + \varepsilon_{i,t} \quad (1)$$

where  $Y_{i,t}$  NIM of bank I at year t, the independent factors are the initial NIM  $Y_{i,t-1}$ .  $\psi_{i,t-\theta}$  Represents bank determinants namely, interest credit risk (LLP), asset quality (NPL), and coincident indicator (co-index),  $\varphi_i$  represents an anonymous and fixed individual related influence that may possibly influence banks profitability,  $\xi_t$  Represent an anonymous time-related influence lastly  $\varepsilon_{i,t}$  exhibits stochastic error term. The linear functional model is implemented in order to diminish possible heteroscedasticity, Equation (1) can be structured as follow:

$$Y_{i,t} = \lambda(Y_{i,t-\theta}) + \beta\psi_{i,t-\theta} + \varphi_i + \xi_t + \varepsilon_{i,t} \quad (2)$$



**Table 3.** Ratio analysis by BankScope Fitch format.

Variable	Measure	Notation	Expected sign
Dependent variable profitability	$[(\text{interest income} + \text{dividend income}) - (\text{interest expense} + \text{dividend payment on limited life preferred shares})] \div (\text{Total Earnings Assets})$	NIM	
<i>Bank specification 'Independent Variables'</i>			
Asset quality	$(\text{Loan Loss Provision} \div \text{equity}) \times 100$	LLP	(±)
Asset quality	$(\text{Impaired Loans} \div \text{Gross loans}) \times 100$	NPL	(±)
Liquidity	$\text{Net Loans} \div (\text{Deposits} + \text{short\&longtermfunding} + \text{Subordinateddebt}) \times 100$	LOAN-TL	(-)
Liquidity	$\text{Liquid Assets} \div \text{Deposits} + \text{short\&longtermfunding} + \text{Subordinateddebt} \times 100$	LIQA-TL	(-)
Capital adequacy	$\text{Total Equity Capital} \div \text{Risk Weighted Assets} \times 100$	CAR	(-)
Capital adequacy	$\text{Capital Fund} \div \text{Liabilities} \times 100$	CAP-FUND	(-)
Coincident indicator	Is a statistical indicator used to mainly measure current patterns and forecast financial trend. Also used as an expectation tool of changes in stock trends or price patterns stock (world bank data base)	CO-Index	(±)

Source: The Fitch Universal Format on BankScope April 2009.

where  $\lambda = 1 + \tau$ , the NIM regression above bears challenges acquiring the value of the unobserved time and specifically related influencers if estimated. These influencers reflect the dynamic nature of the regression.

These estimators depend upon differencing regressions to control for anonymous influence. Previous observations of explanatory and lagged-dependent variables, known as internal instruments, are also in these estimators. To get rid of banks-related influence, Equation (2) is put in first difference form as follow;

$$y_{i,t} - y_{i,t-\theta} = \lambda(y_{i,t-\theta} - y_{i,t-2\theta}) + \beta(\psi_{i,t-\theta} - \psi_{i,t-2\theta}) + (\varepsilon_{i,t} - \varepsilon_{i,t-\theta}) \quad (3)$$

The use of instruments is obligatory to deal with the possibility of endogeneity of explanatory variables by construction the new error term,  $(\varepsilon_{i,t} - \varepsilon_{i,t-\theta})$ . It is correlated with the lagged dependent variable  $(y_{i,t-\theta} - y_{i,t-2\theta})$ . In other words, these tools advantage from previous observations of independent factors and from the lagged-dependent variable. Given that these tools rely on previous values, only current and future values of the dependent variable will be influenced by error term. Thus, while the relaxed strict heterogeneity assumes common assumptions, our instrumental variables method allows no variable  $\psi$  completely endogenous. Therefore, Arellano and Bond (1991) suggested that a differential equation of the second order serial correlation does not exist in the basic assumptions of the corresponding tests. Over-identification (a large number of instruments) model is expected at  $T \geq 8$ . Sargan test (Arellano and Bond 1991; Arellano and Bover 1995) to allow identification of the validity of excessive restrictions or instruments check. If the lagged values of explanatory variables are valid instruments, GMM estimation is consistent. To test the validity of the instrument as a whole, Sargan test is widely used. Second order a further test specification including the study of the first series related difference in the rest (Equation 3). To ensure the full specification of the model, serial correlation should be confirmed to confirm the first order, but in the second order serial correlation should be denied. Is a Known problem too many instruments in the GMM dynamic Panel data (Roodman 2009). According to Rodman, the number of instruments should be no more than N, which is the number of individuals. Otherwise, GMM will be inconsistent, and the ability to Sargan test can be reduced.

#### 4. Econometrics results and discussion

Measuring a bank's profitability during the improvement of the accounting standards, Net Interest Margin (NIM) is the most commonly used proxy, to measure the bank's profitability in these studies (Gunter, Krenn, and Sigmund 2013). In this section will discuss the GMM regression results as reported in Table 4, according to the changes in accounting standards that have been clarified after the adopted IAS/IFRS. And give an evidence explanation in term of the different recognition of the assets, liabilities, and equity in the bank's financial statement such as (IAS 36 'impairment of assets' IAS 37 'provisions', IFRS 7 'disclosure' and IAS39 'financial instrument'). In addition, an evidence explanation how these improvements that might has a negative/positive effect on banks operations and its financial indicators.

The effect of accounting standard changes concerning the assets quality ratio; Loan loss provision to equity (LLP). Under the pre-IAS/IFRS (GAAP) period, the results reveal that LLP is positive and statistically significant at the 1% level on the Lebanese bank profitability by 0.42%. This result is based on the division of income from loans hedged by collateral and customized to increase Tier II capital of the concerned bank. While, provisions had been allocated to debt provisioning required, which should not exceed 1.25%, the risk-weighted assets in the solvency ratio.<sup>2</sup> While, under the post-IAS/IFRS period without concerning the effect of the world crisis, LLP is found to be negatively and statically significant at the 5% level on bank profitability by  $-0.025\%$ , this negative impact is due to the improvement in accounting standard IAS/IFRS which overestimated the loss approximately by 0.40% compare with GAAP.

Moreover, in the adoption of the IAS/IFRS before the financial crisis 'pre-crisis' LLP is negatively and statically significant at 5% level by  $-0.09\%$  on the bank profitability which increased by 0.065%

**Table 4.** GMM model Estimation, dependent variable NIM.

Variables	Model 1		Model 2		Model 3		Model 4	
	Pre- IAS/IFRS		Post-IAS/IFRS		Post-IAS/IFRS, Pre-Crisis		Post-IAS/IFRS-& Post Crisis	
	$\beta$	z-S	$\beta$	z-S	$\beta$	z-S	$\beta$	z-S
C	0.2909	4.88***	0.0262	1.78	0.2421	2.00**	-0.0121	-0.36**
$\pi_{t-1}$	0.8609	61.71***	0.9126	98.24**	0.7687	30.44***	1.0341	79.29***
LLP	0.0042	8.83***	-0.00025	-0.79**	-0.0009	-0.70**	-0.0003	-0.76**
NPL	0.0011	5.00***	-0.00009	-0.79**	-0.0008	-4.08***	-0.0007	-1.96**
LOAN-TL	-0.0113	-5.44***	0.0035	4.95***	-0.0237	-4.77**	0.0068	5.55***
LIQA-TL	0.0037	2.48***	0.0015	5.25***	-0.0005	-1.04	-0.0025	-6.05***
CAR	-0.0027	-7.87***	-0.0006	-1.66**	-0.0046	2.17**	-0.0005	-0.84**
CAP-FUND	-0.0091	-1.67	-0.0057	-1.83	-0.0532	-3.56***	-0.0037	-0.65
CO-Index	-0.0035	-3.42***	-0.0003	-0.33	-0.0019	-0.77**	0.0005	1.54
Wald (joint)	Chi <sup>2</sup> (7) = 882.7		Chi <sup>2</sup> (7) = 153.2		Chi <sup>2</sup> (7) = 158.1		Chi <sup>2</sup> (7) = 637.8	
Wald (dummy)	Chi <sup>2</sup> (1) = 0.157		Chi <sup>2</sup> (1) = 0.326		Chi <sup>2</sup> (1) = 0.405		Chi <sup>2</sup> (1) = 3.404	
Sargan test <sup>a</sup>	Chi <sup>2</sup> (266) = 269.4**		Chi <sup>2</sup> (602) = 608**		Chi <sup>2</sup> (154) = 160**		Chi <sup>2</sup> (378) = 622**	
AR (1) <sup>b</sup>	Z = 2.726		Z = 3.909		Z = 1.973		Z = 3.237	
	P-v = 0.026		P-v = 0.014		P-v = 0.048		P-v = 0.021	
AR (2) <sup>b</sup>	Z = 2.656		Z = 3.015		Z = 1.934		Z = 3.183	
	P-v = 0.182		P-v = 0.134		P-v = 0.153		P-v = 0.105	

\*\* and \*\*\* denote significant level at 5% and 1% respectively.

<sup>a</sup>The test for over-identifying restrictions in GMM dynamic model estimation.

<sup>b</sup>Arellano-Bond test that average auto-covariance in residuals of order 1, and 2 is 0 ( $H_0$ : no autocorrelation).

compared with the period of the post-IAS/IFRS without concerning the financial crisis. It is likely that under the period of post-IAS/IFRS before the financial crisis shows the LLP turn back to its trend which is negatively and statistically significant at 5% level by  $-0.03$  as in the period under post-IFRS without concerning the financial crisis. This result is assured by IAS30 represents the disclosure in the financial statements of banks, and paragraph 12 of IAS37 states that all provisions are contingent because they are uncertain in timing or amount within this standard the contingent will be confirmed only by the occurrence or non-occurrence which affect the value of the provision. Accordingly, the negative sign of this association is consistent with the various recognition of the provision according to different accounting standards, and with empirical literature such as Menicucci and Paolucci (2016). The empirical results show that higher-risk Lebanese banks tend to show lower returns after the adoption of IAS/IFRS. To this end, Lebanon banks should devote more attention to managing credit risk, as evidenced by the failure of financial institutions to identify impaired assets and create reserves to reduce them. Efforts to reduce these problems would be strengthened by improving the transparency of the financial system that would help financial institutions to effectively assess credit risk. The findings show that the Lebanese banks would improve profitability by examining and monitoring more effective credit risk and thus improving forecasts of future risk levels.

Meanwhile, the trend of the impaired loan to gross loan (NPL) under the pre-IAS/IFRS (GAAP) period, the reported result shows that there is a positive and statistically significant relationship between NPL and bank profitability by 0.11%. While, under the post-IAS/IFRS period without concerning the effect of the world crisis is statically significant at the 5% level on bank profitability by  $-0.009\%$  which is the adoption of IAS/IFRS increased the loss approximately by 0.11%, which exposes the capital ratio of bank would be as a result of the capital that written off. This indicates the weakness of the loan portfolio relative to the bank's capital. Moreover, in the adoption of the IAS/IFRS and before the financial crisis 'pre-crisis' NPL is negatively and statically significant at 5% level by  $-0.08\%$  on the bank profitability, which increased by 0.071% compared with the period of the post-IAS/IFRS without concerning the financial crisis. This result consistent of paragraph 20 of IFRS7 recognize the expenses, gain or losses under comprehensive income which has effect in the NIM ratio.

It is likely that under the period of post-IAS/IFRS before the financial crisis shows the NPL turn back to its trend, which is negatively and statistically significant at 5% level by  $-0.07$  as same as in the period under post-IAS/IFRS without concerning the financial crisis. This result ensured from paragraphs' 25–30 of IFRS7 fair value estimation for financial assets and liabilities and IAS 36 'Impairment of assets' the value of impairment losses recognized or reversed the recoverable amounts. According to IFRS, 'Impaired Loans' is deemed to be the best measure for estimating the effectiveness of management in the identification of impaired loans; the most significant risk faced by banks (Nimer et al. 2011). The negative relationship between assets quality ratios (LLP and NPL) and profitability, after the adoption of IAS/IFRS, is due to the greater provision indications, which assesses a possible loan loss in the future or it could also show a timely recognition of bad banks' loan (Heffernan and Fu 2010). This increases the provisioning cost and declines the interest revenue. In turn, this indicates the weakness of loans portfolio relative to the bank capital and the management of the exposure of credit risk transfer.

The effect of accounting standards changes concerning the liquidity. Net loans to total liabilities (LOAN-TL), under the pre-IAS/IFRS (GAAP) period, the reported result shows that there is negative relationship and statistically significant between LOAN-TL and bank profitability by  $-0.113\%$  at 1% significant level. While, under the post-IAS/IFRS period without concerning the effect of the world crisis is positive and statistically significant at the 1% level on bank profitability by  $0.35\%$  which is the adoption of IAS/IFRS increased approximately by  $0.24\%$  due to the recognition of contingent liabilities under IAS37 state that a present obligation that fails either of the recognition criteria must not be recognized by the entity.

Moreover, in the adoption of the IAS/IFRS before the financial crisis 'pre-crisis' LOAN-TL is a negatively and statically significant at 5% level by  $-2.37\%$  on the bank profitability which increased by 2% compared with the period of the post-IAS/IFRS without concerning the financial crisis. It is likely that under the period of post-IAS/IFRS after the financial crisis shows that LOAN-TL turns back to its trend which is positively and statistically significant at 1% level by  $0.68\%$  as same as in the period under post-IAS/IFRS without concerning the financial crisis. This indicates that loans decrease the chances of achieving higher profitability as the relationship is insignificant, in the adoption of the IAS/IFRS pre-crisis. This negative impact on bank's profitability after the adoption of the IAS/IFRS pre-crisis, consist with Kosmidou et al. (2008). While LOAN-TL has a positive relationship after the adoption of IAS/IFRS post-crisis, this indicates that the banks have slightly enough reserves-to-deposits. Furthermore, this ensures the value-relevance of the improvement in the accounting standards that shows the recovery of the bank's performance after the financial crisis, which increased the chances of achieving higher profitability by increasing the deposits are transformed into loans. This reflects the market activity (fair market value).

Meanwhile, the Liquid assets to liabilities (LIQA-TL) which includes 'cash and balances with other banks, trading securities, available-for-sale securities', securities with maturity less than three months and unearned income from securities were clarify under IFRS7 'paragraph' 39 liquidity risk state that 'maturity analysis for financial liabilities that shows the remaining contractual maturities'. In addition, managing adventure actually pushes certificate of deposits (CDS) spreads. An argument of the emphasis of CDS growth on its variability or level of activity in the market can be given. Hence increase in management's risk tolerance was significantly (Dias 2017).

This liquidity indicator is designed to ensure that when a bank maintains an adequate level of high-quality liquid assets that can be converted to cash, it is more important than any individual liquidity ratio and indicates the net asset value available to borrowers and depositors. The higher the indicator, the more liquid and solid the bank will be. Under the pre-IAS/IFRS (GAAP) period, the reported result shows that there is a positive relationship and statistically significant at 1% level, between LIQA-TL and bank profitability by  $0.37\%$  consistent with Nassar, Martinez, and Pineda (2014). This can be explained as, highly liquid assets, banks are more resilient against unexpected shocks and circumstances. In addition, two factors assigned by BDL are mandatory for all banks. Banking in Lebanon reflects financial solidity and high liquidity. This situation is robust due to the Lebanese minimum regulatory liquidity ratio requirements by the BDL. In which net liquidity to total

liabilities must be 10% or more. In addition, this strong liquidity position is due to the requirement for central bank reserve requirements, which are set at 25% for domestic currency deposits, while for all other deposits are 15%. While under the post-IAS/IFRS period without concerning the effect of the world crisis is positive and statically significant at the 1% level on bank profitability by 0.15% which is the adoption of IAS/IFRS increased the liquidity of the assets approximately by 0.22%. Moreover, in the adoption of the IAS/IFRS before the financial crisis 'pre-crisis' LIQA-TL has no effect on the bank profitability. It is unlikely that under the period of post-IAS/IFRS after the financial crisis shows the LIQA-TL is negatively and statistically significant at 1% level by  $-0.25\%$ . Also, the recognition of contingent liabilities under IFRS3 'paragraph 39' which state that a present obligation whose fair value is reliably measured must be recognized by the acquirer at its acquisition date fair value. Concerning the negative relationship between the level of liquidity ratios (LOAN-TL and LIQA-TL), and the bank's profitability after the adoption of IAS/IFRS pre-crisis. This indicates increasing the bank's loans portfolio, and they have to pay upper costs for their funding provisions (Menicucci and Paolucci 2016). In this case, very elevated liquidity ratios could imply that the liquid assets of the banks are not tied up on total liabilities in the long-run, and enough reserves-to-deposits. For these reasons, the improvement in the accounting standards IAS/IFRS fair market value oriented, they should differentiate between the adequate level of liquidity and excessive level of liquidity, because holding an excessive level of liquidity can impact on lower profitability, maintaining a balance between outflows and inflows is rational.

The effect of accounting standards changes concerning the capital adequacy. The Capital Adequacy Ratio (CAR) assesses the bank's capital in the light of its risk-weighted assets. However, the RWA includes financial stability and is intended to show whether the available funds to the banks are sufficient to offset the risks incurred. Under the pre-IAS/IFRS (GAAP) period, the reported result shows that there is a negative relationship and statistically significant between CAR ratio and bank profitability by  $-0.27\%$  at 1% significant level consistent with Güneş (2014) on banks profitability. Also, under the post-IAS/IFRS period without concerning the effect of the world crisis is negatively and statically significant at the 1% level on Lebanese bank profitability by  $-0.06\%$  which is the implementation of IAS/IFRS, CAR ratio which is the weighted risk reduced approximately by 0.21%. Moreover, in the adoption of the IAS/IFRS before the financial crisis 'pre-crisis' CAR ratio is negatively and statically significant at 5% level by 0.46% on the bank profitability which increased by 0.4% compared with the period of the post-IAS/IFRS without concerning the financial crisis, which reflects the effects of fair value in the market. It is likely that under the period of post-IAS/IFRS after the financial crisis shows the CAR ratio turn back to its trend which is negatively and statistically significant at 5% level by  $-0.05\%$  as same as in the period under post-IAS/IFRS without concerning the financial crisis.

Meanwhile, total equity capital to liabilities (CAP-FUND) results show there is a negative and statically significant effect on bank profitability under the period of post-IAS/IFRS and pre-crisis, due to the Hybrid capital, which is a form of debt that has been replaced by equity. Accordingly, the negative estimated relationship between capital adequacy ratios (CAR and CAP-FUND) and bank's profitability after the adoption of IAS/IFRS. Due to the dynamic movement of the market activity increase the bank's core capital expressed significant by increasing or decreasing the bank's profitability of its assets weighted by its credit exposure. This guarantees no solvency of an individual bank amid a period of stress, and induces better market discipline and makes better capital allocations (Golin and Delhaise 2013). Meanwhile, leads to high leverage of equity funding, increase the cost of capital and also due to pro-cyclical aftermath tend to amplify economic cycles.

The effect of accounting standards changes concerning the economic activity. Coincident index is a proxy of economic activity, under GAAP period. The result reveals that there is a negative and statistically significant relationship between economic activity index and the bank profitability by  $-0.35\%$  at 1% significant level. This indicates that it might be due to the fact of the estimated value of the financial assets at the historical cost by using amortized cost basis. While there is no significant effect of the economic activity index in post-IAS/IFRS period without concerning the effect of the financial crisis. In contrast, The economic activity index has a significant crucial role during the adoption of IAS/IFRS pre-crisis approximately by  $-0.19\%$  at 5% significant level whereas it's reduced

by 0.16% compared with the period pre-IAS/IFRS (GAAP). These results are due to the increase in the cost capital in the adoption period, and the debate over (fair value measurement IFRS13) cost of disposal is incremental cost directly attributable to the disposal of any assets or cash-generating unit, excluding finance cost and income tax expenses. Where the value in use is the present value of the future cash flows expected to be derived from an assets or cash-generating unit.

The changing in the accounting standards, led to an underestimated of the value 'market to market' financial assets or the changing in the accounting standards might be laying or prolonging the crisis which reduces the confidence of the market participants. Also assured in 'paragraph 12' of IAS36 listed the source of information relating to the external environment such as, assets valued might be declined more than would normally be expected during the period due to changes in expectation concerning the operation of the entity, entity's environment/market, interest rate when the market rate of return increased during the period whereas used to assessing present value of future cash flow, and market capitalization when carrying amount of the net assets of the entity greater than the market capitalization of the entity. So will be overstated value for market liquidity lead to loss recognition. Distinctly, the result shows that there is no relationship between the economic activity index and bank profitability in the post-IAS/IFRS after the financial crisis which indicates that the Lebanese bank's performance turns back to their trend which is approved the value relevance of accounting information under improvement in Accounting Standards (Karğın 2013).

## 5. Conclusion and policy implications

This paper investigates the influence of IAS/IFRS implementation on Lebanese banks profitability, and how the improvement in the accounting standards might cure or prolong the impact of the financial crisis. The main result reveals that assets quality has a positive impact on bank profitability pre-post IAS/IFRS. Conversely, it's negative under IAS/IFRS and insured that maintained the trend of asset quality, liquidity and capital adequacy after the financial crisis. Also, it clarifies the effect of economic activity (CO-Index) during of IAS/IFRS improvement which confirms the importance of fair value measurements (IFRS 3) in which reflected the external environment 'economic activity' on the banks performance.

In the post-IAS/IFRS adoption opposed that fair value accounting had any contribution to the financial system pro-cyclicality. The period post-IAS/IFRS pre-crisis, profits were significantly overstated under fair value accounting methods. Also, it means that loss of capital may have been overstated which leading to a destruction of capital. Therefore, a vicious cycle confirmed decreasing asset prices steered to accounting write-down. The write-down headed to obligatory assets sales by institutions needing to meet capital adequacy requirement, hence decline in overall asset prices. Furthermore, other-than-temporary impairment standards for available-for-sale and held-to-maturity securities as being particularly 'destructive' this force banks to take a compulsory charge against earnings as a consequence their beliefs in momentary 'market irrationality'. Advocators of fair value accounting, agree with alterations in the market can be recognized by market-to-market accounting. Yet they argue that these market cycles are a fact of life and that the appliances of fair value accounting do not improve this cycle. Moreover, supporters confirm fair value accounting standards grant 'up-ahead warning' signals to reveal any market's irritation and inflated asset value. This led to earlier recognition of obstacles and helped alleviate the crisis.

The focus of this study aimed at micro-based risks, issues accompanied with IAS/IFRS and IAS/IFRS conversions but benefits of IAS/IFRS out span to also reach management. In other words impact of IAS/IFRS conversions on management expands potential goals for Banks management. Ease of access to foreign capital and cross-border acquisitions help management decision makers and widen their scope of choices. Therefore, the expected loss impairment model of IFRS 9 is expected to significantly impact regulatory capital by raising stipends of loss on financial instruments. Consequently, in terms of Risk Weighted Assets, this should reduce retained earnings and lessen core capital.

## Notes

1. Association of Banks in Lebanon Research & Statistics Department, the Economic Letter; July 2015, and January 2017.
2. Banque Du Liban, Basic circulars No 73 and 76.

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## Appendix A: Descriptive Statistics

**Table A1.** Descriptive statistics From year 2000Q1 to 2004Q4 Pre-IAS/IFRS adoption.

Variables	Obs	Mean	Median	Std. Dev	Min	Max
NIM	480	0.830	0.691	0.554	-0.02	3.37
LLP	480	4.528	2.909	8.049	-8.485	50.183
NPL	480	20.356	14.936	20.390	-12.244	113.758
LOAN-TL	480	8.429	7.131	6.497	2.468	50.253
LIQA-TL	480	11.591	9.968	7.812	2.620	62.108
CAR	480	7.016	2.001	9.747	-0.49	104.108
CAP-FUND	480	2.478	5.095	1.410	-0.453	10.033
CO-Index	480	37.366	36.522	2.896	32.615	42.820

**Table A2.** Descriptive statistics From year 2005Q1 to 2015Q4 Post-IAS/IFRS adoption.

Variables	Obs	Mean	Median	Std. Dev	Min	Max
NIM	1056	0.691	0.636	0.287	0.029	2.571
LLP	1056	2.028	1.114	4.788	-13.493	32.306
NPL	1056	11.334	5.588	18.653	-3.716	232.485
LOAN-TL	1056	8.026	7.337	3.219	-1.025	24.246
LIQA-TL	1056	11.849	9.143	14.962	0.027	98.151
CAR	1056	5.358	3.730	4.189	-7.76	31.56
CAP-FUND	1056	2.730	2.208	1.354	0.085	8.749
CO-Index	1056	57.174	62.381	9.949	42.398	69.476

**Table A3.** Descriptive statistics From year 2005Q1 to 2007Q4 Post-IAS/IFRS adoption, and pre-world crisis.

Variables	Obs	Mean	Median	Std. Dev	Min	Max
NIM	288	0.714	0.669	0.320	0.229	1.751
LLP	288	2.416	1.308	5.181	-6.416	35.630
NPL	288	15.905	6.413	28.723	-3.759	231.858
LOAN-TL	288	7.425	6.539	3.420	2.735	20.937
LIQA-TL	288	12.162	9.773	13.115	0.027	98.351
CAR	288	6.494	5.650	4.115	-0.880	30.65
CAP-FUND	288	2.643	2.186	1.266	0.085	6.545
CO-Index	288	43.475	42.985	1.118	42.398	46.154

**Table A4.** Descriptive statistics From year 2009Q1 to 2015Q4 Post-IAS/IFRS adoption, and post-world crisis.

Variables	Obs	Mean	Median	Std. Dev	Min	Max
NIM	672	0.674	0.618	0.278	0.029	2.315
LLP	672	2.016	1.148	4.802	-13.493	23.513
NPL	672	9.415	5.096	12.382	-0.158	54.545
LOAN-TL	672	8.317	8.287	3.084	-1.025	24.246
LIQA-TL	672	11.755	8.832	15.812	1.783	91.909
CAR	672	4.774	3.440	4.159	-7.76	24.61
CAP-FUND	672	2.775	2.220	1.408	1.216	8.749
CO-Index	672	64.163	64.046	4.064	53.695	69.476

## Appendix B: VIF and correlation matrix

**Table B1.** Variance inflation factor.

Variables	VIF model 1 <sup>†</sup>	VIF model 2 <sup>†</sup>	VIF model 3 <sup>†</sup>	VIF model 4 <sup>†</sup>
LLP	1.16	1.35	1.52	1.38
NPL	1.28	1.26	1.17	1.88
LOAN-TL	1.39	1.98	2.43	2.00
LIQA-TL	1.67	2.39	1.70	1.30
CAR	1.87	1.45	1.35	1.52
CAP-FUND	1.87	1.69	2.09	1.60
CO-Index	1.17	1.12	1.05	1.08
Mean VIF	1.49	1.61	1.62	1.54

<sup>†</sup>Variance Inflation Factor less than 3 insure variables are not contaminated by multicollinearity.

**Table B2.** Correlation Matrix of model 1.

	NIM	LLP	NPL	LOAN-TL	LIQA-TL	CAR	CO-Index
NIM	1.00						
LLP	0.097	1.00					
NPL	0.074	0.179	1.00				
LOAN-TL	-0.766	0.278	0.268	1.00			
LIQA-TL	0.768	0.163	0.122	0.741	1.00		
CAR	-0.460	0.233	0.088	0.458	0.659	1.00	
CAP-FUND	-0.699	0.213	-0.118	0.598	0.507	0.257	1.00
CO-Index	-0.023	-0.065	-0.025	-0.113	0.156	0.112	-0.089

**Table B3.** Correlation Matrix of model 2.

	NIM	LLP	NPL	LOAN-TL	LIQA-TL	CAR	CO-Index
NIM	1.00						
LLP	-0.094	1.00					
NPL	-0.248	-0.123	1.00				
LOAN-TL	0.417	0.077	0.285	1.00			
LIQA-TL	0.601	-0.195	0.361	0.596	1.00		
CAR	-0.267	0.263	0.102	0.200	0.372	1.00	
CAP-FUND	-0.602	0.147	0.048	0.547	0.500	0.290	1.00
CO-Index	-0.070	0.021	-0.146	0.135	-0.007	-0.201	0.031

**Table B4.** Correlation Matrix of model 3.

	NIM	LLP	NPL	LOAN-TL	LIQA-TL	CAR	CO-Index
NIM	1.00						
LLP	-0.067	1.00					
NPL	-0.142	-0.075	1.00				
LOAN-TL	-0.481	0.373	0.139	1.00			
LIQA-TL	-0.422	-0.044	0.107	0.523	1.00		
CAR	-0.149	0.416	-0.093	0.361	0.226	1.00	
CAP-FUND	-0.704	0.284	-0.124	0.653	0.503	0.334	1.00
CO-Index	-0.148	-0.106	-0.079	0.069	0.017	-0.067	0.009

**Table B5.** Correlation Matrix of model 4.

	NIM	LLP	NPL	LOAN-TL	LIQA-TL	CAR	CO-Index
NIM	1.00						
LLP	-0.156	1.00					
NPL	-0.401	-0.178	1.00				
LOAN-TL	0.403	-0.048	0.522	1.00			
LIQA-TL	-0.682	-0.241	0.643	0.623	1.00		
CAR	-0.329	0.193	0.231	0.158	0.438	1.00	
CAP-FUND	-0.554	0.111	0.218	0.486	0.489	0.289	1.00
CO-Index	0.006	0.157	-0.033	0.067	0.004	-0.089	-0.040