CAN ACCOUNTING RULES BE MADE NEUTRAL FOR BANK CAPITAL REGULATION?

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Abstract

This paper evaluates several methods which can possibly be used to minimize the pro-cyclical impact of accounting rules on bank capital regulation. Improving accounting rules cannot eliminate the pro-cyclicality problem as therecentlyproposed expected credit loss impairment model for historical cost accounting may be moving towards using information inputs for fair values. Limiting the trading activities accounted for by fair valuesmay reduce the pro-cyclicality. However, it cannot eliminate the impact of fair values in a liquidity crisis. The most effective method is to exclude the unrealized accounting gains or losses from regulatory capital. But it needs a report of capital ratios based on accounting measures to help regulators read the early warning signals emitted by the accounting information.

Keywords: Bank Capital Regulation, Leverage Ratio, Tier 1 Capital Ratio, Fair Value Accounting, Historical Cost Accounting, Financial Crisis, Pro-Cyclicality,Expected Credit Losses

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1. Introduction

Accounting rules has been found to be an important contributing factor to the pro-cyclicality of bank regulatory capital and may have played a significant role in initiating and promoting the current financial crisis (ECB, 2004; Shin, 2007; Plantin et al., 2008; American Bankers Association, 2008; FSA, 2009; FSF, 2009; BCBS, 2011; Andersen, 2011; Song, 2011).Therefore, if accounting rules can be made "crisis-neutral" and neutral for bank capital regulation(Haldane, 2011;Pozen, 2009), i.e. the impact of accounting rules on the pro-cyclicality of bank capital regulation is minimized, it may help promote financial stability. This paper will investigate the possibility and potential ways to make accounting rules neutral for bank capital regulation.

There are basically two kinds of accounting rules which banks use to measure and record different items on the balance sheet. The trading book items which include assets, liabilities and derivatives that can be traded on markets quickly and held for resale are measured using fair value rules under which items are marked to market each quarter using market prices in orderly transactions. The banking book items which contain assets and liabilities that may be relatively illiquid and expected to be held to maturity arerecorded using historical cost under which items are measured using the original transaction prices, with or without subsequent adjustments in forms of depreciation, amortization or impairment, with the exception that "available for sale"(AFS) assets are measured at fair value (FSA, 2009).Therefore, banks use the mixed attribute model foraccounting.

Regulators implement bank capital regulation by setting minimum capital requirements. For example, both Basel III and the U.S. Federal Banking Agencies set leverage ratio and risk-based capital requirements (BCBS, 2011; OCC, 2011).The leverage ratio is calculated using Tier 1 capital as the numerator and total assets which is adjusted for items deducted from Tier 1 capital as the denominator whereas the risk-based ratios are computed using Tier 1 capital, total capital and other components of capital as the numerators and risk-based assets as the denominators.

The pro-cyclicality of bank capital regulation arises from the risk-based capital requirements as they are computed based on internal risk models used by large banks which may be pro-cyclical and the risk profile of assets changes with the economic cycle (FSF, 2009). For example, the creditworthiness of borrowers may worsen during the recessions, resulting in higher capital requirement for banks which, in turn, reduces credit expansion and exacerbates the economic cycle (FSA, 2009).But leverage ratio is not subject to such pro-cyclicality. In fact, it is found that banks could report strong risk-based capital ratios while they were building up excessive leverage during this crisis (BCBS, 2011; Song, 2011).

Current accounting rules reinforce such pro-cyclicality of risk-based capital regulation. During good economic times, fair value accounting for trading books may fuel a self-reinforcing cycle of irrational exuberance as high asset prices will boost banks' accounting profits, bonuses and capital adequacy (Plantin et al.,2008;Wallison, 2008; FSA, 2009;Waymire and Basu, 2011). And historical cost accounting for banking books may record provisions which may be lower than expectedprovisions during the whole economic cycle and increase banks' profits and capital adequacy(Laeven and Majnoni, 2003; Turner, 2010). However, when the economy and the market turns down, fair value accounting may force banks to sell distressed assets as it demands the creditors to generate excessive collateral calls, and take away the time for banks'growth (Wallison, 2008;Epstein and Henderson, 2009; Wesbury and Stein, 2009;Waymire and Basu, 2011). And historical cost accounting may record provisions which may be higher than expected provisions during the whole economic cycle and decrease banks' profits and capital adequacy (Laeven and Majnoni, 2003; Turner, 2010).Song (2011) demonstrates that accounting rules can generate the pro-cyclicality for bothregulatory leverage ratio and Tier 1 capital ratio. During good times, when fair value accounting records assets price increases as gains and historical cost accounting recordstoo low provisions as losses, leverage ratio and Tier 1 capital ratio will increase. However, in bad times, when fair value accounting records assets price decreases as losses and historical cost accounting recordstoo high provisions as losses, leverage ratio and Tier 1 capital ratio will decrease. Therefore, by reinforcing the pro-cyclicality of regulatory capital and capital ratios, the pro-cyclicality of accounting can exacerbate the pro-cyclicality of regulatory capital standards for banks (Turner, 2010).

The pro-cyclical regulatory capital requirements for banks have a huge impact on financial stability and economic growth. When there is an upswing in the financial markets and the economy, banks report high regulatory leverage ratio and risk-based capital ratios, and they can extend lending and, therefore,accentuate the assets market boom and economic expansion. When there is a downswing, banks report low regulatory leverage ratio and risk-based capital ratios, and they have to cut lending and, therefore, elongate the assets market bust and economic recession. So it is very important to minimize the pro-cyclicality of the regulatory capital requirements for banks.

A number of ways have been designed to address the pro-cyclicality of bank capital regulation. For example, Basel III has introduced the leverage ratio, and promotedcountercyclical buffers and more forward looking provisions(BCBS, 2011). However, even if the regulatory capital requirements are neutral themselves, the linkage between accounting and regulatory capital ratios can make bank capital regulation pro-cyclical as Song(2011) has demonstrated that the leverage ratio can be pro-cyclical due to accounting rules. Thus, it is very important to make accounting rules neutral for bank capital regulation.

This paper will evaluate several methods which can possibly be used to neutralize financial reporting for bank capital regulation.The first method isto improveaccounting rules. For example,banks maybe allowed to reclassify financial instruments from fair value accounting to historical cost accounting as the Financial Accounting Standards Board (FASB) and the International Accounting Standards Board (IASB) did in 2008. And they may be required to useexpected credit losses to replace the incurred losses for the impairment model of the historical cost accounting approach. The secondmethodis to improve the business models for banks. For example,in the U.S. banks will not be allowed to engage inproprietary trading. And in the U.K.retail banking will bering-fenced from wholesale/investment banking.The third method is to improve the definition of regulatory capital requirements. For example, the average/smoothing of unrealized accounting gains or losses over a short period or a long-term may be used for regulatory capital calculations. Andpart or all of the unrealized accounting gains or losses may be excluded from regulatory capital.

Both the first and the second method do not fundamentally eliminate the pro-cyclicality of bank capital regulation due to accounting rules. However, the second method can reduce the pro-cyclicality by

limiting the trading activities accounted for by fair values. But the most effective method will be the third method which improves the definition of capital ratios. Here excludingthe unrealized accounting gains or losses from Tier 1 capital will have a small counter-cyclical impact on regulatory capital ratios, thereby eliminating the pro-cyclical impact of financial reporting on bank capital regulation.So in this way, the accounting rules can be made nearly neutral for bank capital regulation.

The analyses in this paper combine theoretical arguments withempirical evidence in the literature to evaluate these three main methods which are provided to minimize the pro-cyclical impact of accounting rules on banks' regulatory capital ratios. Therefore, this paper contributes to the recent intense debateamong supervisors and academics and a growing body of literature on the proper approaches to minimizing the pro-cyclicality of bank capital regulation and enhancingfinancial stability.

The remainder of the paper proceeds as follows. Section 2 examines the effect on bank capital regulation when accounting rules are improved. Section 3 analyzes the effect on bank capital regulation when the business models for banks are improved.Section 4 investigates the effect on bank capital regulation when the definition of regulatory capital requirements is improved. Section 5 concludes.

2.Improving accounting rules

In order to address the pro-cyclicality of financial reporting, some attempts have been made to improve accounting rules. One approach is to minimize the negative effect of fair value accounting on bank capital regulation associated with the credit crisis by easing back on fair value accounting rules.On October 13, 2008, the IASB issued amendments to IAS 39 and IFRS 7 to provide for the ability for European banks to reclassify financial instruments from fair value accounting to historical cost accounting in rare circumstances from July 1, 2008 (IASB, 2008; Fiechter, 2011). And on April 9, 2009, FASB issued FSP FAS 157-4 which gives banks more flexibility in determining fair value for illiquid assets and liabilities with a significant adjustment to transactions or quoted prices (FASB, 2009).As a result, some U.S. banks and many European banks re-classified huge amount of assets from the trading category to the held- to - maturity category (HTM) or loan and receivables, and from the Level 1 category to the Level 3 category[1]to avoid marking to the depressed market asset prices and contagion arising from accounting (Laux and Leuz, 2010; Fiechter, 2011;Bischof et al., 2011)[2]. This has significantly improved the regulatory capital ratios for these banks. However, a number of them still received government financial support (Fiechter, 2011;Bischof et al., 2011). Therefore, the easing of fair value accounting during the crisis may have made it much more difficult for regulators to evaluate the quality of bank regulatory capital as potential losses from trading activities may be obscured by provisioning practices (Haldane, 2011).

Moreover, allowing banks to reclassify financial instruments from fair value accounting to historical cost accounting under "rare circumstances" cannot minimize the pro-cyclicality generated by fair value accounting during the economic booms. Often the problem originates in the boom period as the bubble in assets market will inevitably correct itself "when risk aversion reaches its irreducible minimum, that is, when credit spreads approach zero" (Greenspan, 2010:pp.210). The correction of asset prices will have a negative impact on both banks and borrowers' net wealth, which in turn will slow bank lending and economic growth (Bernanke and Lown, 1991).

Fair value rules may be appropriate if market prices reflect the actual long-term values of financial assets and such prices can be obtained when these assets are sold by banks. Under such conditions, fair value accounting can report the actual performance and regulatory capital for banks. And it is reasonable that the application ofcurrent fair value accounting rules, such as the U.S. standards SFAS 157 andthe international standards IAS39, to financial assetsdepends on the cashflow characteristics of assets and the intentions of the holder. However, fair value accounting may not be reliablewhen there arehuge

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1Under SFAS No.157, the FASB created a fair value hierarchy which requires a disclosure for all items measured at fair value based on the degree to which the inputs are observable in the market: unadjusted quoted prices in active markets (Level 1), those other thanLevel 1 but observable inputs (Level 2), and significant unobservable inputs (Level 3).Under IFRS 13, the IASB will start similar disclosure requirements from 2013.

2Bischof et al. (2011) find that few U.S. banks used the reclassification option because the number of U.S. banks applying fair value accounting is small.

differences between market prices and the fundament values of financial assets (Penman, 2007). Indeed, there is some evidence that financial market prices can sustain their huge differences from their fundamental values for long periods of time (Shiller, 2000; Hirshleifer, 2001) and there is a significant positive relationship between fair values for Level 1, Level 2 and Level 3 net assets of large financial institutions and stock prices (Kolev, 2009). In such circumstances, a bank's business model may not be viable for the long-term, and this makes fair value rules inappropriate. Thus, under the new IFRS 9 which will replace IAS39 from 2015, financial assets are required to be reclassified between fair value accounting and historical cost accounting whena bank's business model objective for its financial assets changes.

However, such reclassification may create new problems. For example, when the assets market turns down, market prices for some instruments may be much lower than the long-term fundamental values, some banks may choose to hold the financial assets to collect the contractual cash flows rather than to sell the instruments prior to their contractual maturities to realise their fair value changes as originally planned, accounting rule changesmay improve banks' performance and regulatory capital. Other banks may continue to use fair value accounting, and their performance and regulatory capital may be much lower than that for the banks which have adopted reclassification.

On the other hand, when the assets market is in bubble, market prices for some instruments may be much higher than the long-term fundamental values, some banks may choose to sell the instruments prior to their contractual maturities to realise their fair value changes rather than hold the financial assets to collect the contractual cash flows, fair value accounting may improve the performance and regulatory capital for these banks. Other banks may continue to use historical cost accounting, and their performance and regulatory capital may be much lower than that for the banks which have adopted reclassification. Therefore, under both cases, the same assets may have different values for different banks which make it very difficult for investors and regulators to evaluate the relative performance of banks. Moreover, accounting rulesare not neutral as banks are encouraged to change their business models so that they can adopt the reclassification to improve their performance and regulatory capital.

Then, is it possible to design some rules that if the assets market price increases or decreases by a certain amount, i.e. if the assets market is not normal, fair value accounting should be rolled back or eased for all banks without considering their respective business models?It is hardto design such rules because it is difficult to claim that when asset price has changed by a certain amount, the assets marketwill definitely be in bubble or recession. Moreover, if a certain amount of change in assets price is defined as a bubble or a recession, it may act as an anchor for market expectations which may have a negative consequence for the market efficiency.And such rules may encourage banks to be less cautious about their business models as they can use them to hidden their bad performance. In addition, such option for accounting methods may undermine the confidence of investors in the quality of the accounting information for banks. It seems that it is nearly impossible to minimize the pro-cyclicality by improving fair value accounting rules.

How about historical cost accounting? The current accounting principles for the measurement of financial instruments at amortised cost such as IFRS and US GAAP are based on an "incurred loss" approach which recognizes impairment losses only when there is any objective evidence of impairment.This approach has the problem of delaying recognition of losses associated with loans and other financial instruments and introducing pro-cyclicality by slow provisioningduring economic downturns (Barth and Landsman, 2010). Therefore, one attempt made to improve historical cost accounting rules is the adoption of forward looking provisioning practices. Both FASB and IASB are initiating a change in the historical accounting standards toward an expected loss (EL) approach (IASB, 2011). Under the proposedmodel, for financial assets that are managed on an open portfolio basis, an entity shall recognise an impairment allowancewhich is based on expected credit lossesthat are estimated for the remaining expected weighted average life of the portfolio or the foreseeable future, considering all available information including "historical data, current economic conditions, andsupportable forecasts of future events and economic conditions" (IASB, 2011:pp.24).

The main objective for this improvement is to ensure that credit losses can be recognized earlier than in the incurred loss impairment model and that the allowance balance is sufficient to cover all estimated creditlosses for the remaining life of an instrument. However, whether this objective can be obtained and

the pro-cyclicality can be reduced depends on the accurateness of the expected losses estimated by banks. During good times, it is possible for banks to systematically underestimate expected losses (Jiménez and Saurina, 2006), and this may result in insufficient provisioning for expected losses if the economy turns bad earlier than expected. In such a period, bank capital ratios may be high and encourage excessive bank lending. However, during bad times, it is possible for banks to systematically overestimate expected losses, and this may result in too much provisioning which will lower regulatory capital ratios and constrain bank lending. In fact, this financial crisis has demonstrated that it is difficult for market participants and regulators to anticipate the economic cycles (Greenspan, 2010), and therefore, it is difficult for banks to make expected losses which are neutral for business cycles.

This approach actually will fundamentally modify historical cost accounting as the new impairment model is not based on historical losses but depends on expected losses which are estimated using more forward-looking information.It is argued that this approach will improve transparency and regulation (Laux, 2012). However, the expected loss model may make the accounting information less reliable and comparable than the incurred loss model because bank expectations are subject to market inefficiency which is demonstrated by this financial crisis (FSA, 2009). Moreover, as whether the expectations are appropriate is difficult to justify, it may provide room for bank managers to manage their books which may make it difficult for investors and regulators to evaluate the true quality of accounting information and regulatory capital ratios[3].

3. Improving the business models for banks

It seems that it is nearly impossible to remove the pro-cyclicality of accounting rules. However, there is some evidence that in general fair value accounting has played a much more obvious role than historical cost accounting in financial crises (Haldane, 2011).As the measurement principle should reflect the particular business strategy of an institution (Greenspan, 1990; Duke, 2009; Haldane, 2009), the significance of fair value accounting arises with the significant increase of large banks' capital market businesses in recent decades (Kohn,2008).Thus, the business models for banks can be improved to minimize the impact of fair value accounting. For example, if banks can reduce their trading book activities which are accounted for by fair values, the pro-cyclical impact of accounting rules may be reduced.

Indeed, to solve the problems of financial systems exposed during this financial crisis, the U.S. and U.K. governments have started to reform the business models for large banks. The "Volcker Rule" will prohibit the U.S. bank entities from engaging in proprietary trading and limit their investment in hedge funds and private equity funds starting from July 2012 and the Vickers report recommends the U.K. government to ring-fence retail banking and wholesale/investment banking by 2019. These regulations will definitely help reduce the impact of fair value accounting rules on the regulatory bank capital ratios as Song (2011) has documented that trading account profits and losses have contributed more to the changes inregulatory capital ratiosthan loan loss provisions for Citigroup and JPMorgan Chaseduring the period 2006 to 2008. If the impact of trading book activities on regulatory capital ratios is greater than that of banking book activities, then the change of banking book activities will follow the pattern of trading activities if banks have targeted capital ratios. This means that when trading activities expand because of huge profits, banking activities may also expand as a result of the improvement in capital adequacy. On the other hand, when trading activities shrink because of huge losses, banking activities may also shrink as a result of the deterioration in capital adequacy. That is why the separation of trading activities from banking activities will also help reduce the pro-cyclicality ofbanking book activities.

However, even if banks have no trading activities to be accounted for by fair values, there are otherfundamental problems associated with the key function of banks' business models(Haldane, 2011). For banking books, banks perform maturity transformation which enables the non-bank sector to hold shorter term assets than liabilitiesas they hold longer term assets than liabilities (FSA, 2009).This maturity transformation generates a maturity mismatch between the assets and liabilities in a bank's balance sheet.When there is a loss of confidence in banks which may arise from the deterioration of the perceived quality of assets or even rumours,the sources of funding for banks such as deposits and borrowings from the inter-bank markets or bond and other securitised credit marketsmay become

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3 There is evidence that banks tend to manage the provision for loan losses (Laeven and Majnoni, 2003; Laux and Leuz, 2010).

unstable, and this may create liquidity crises for banks. In such circumstances, banks may be forced to liquidate their assets which they may intend to hold to maturity originally. And historical cost accounting is no long viable for such transactions and market prices should be used instead(Haldane, 2011).Moreover, investors may also value banking books at market prices(Haldane, 2010). For some cases, even if market prices are used for all assets during the crisis, the actual capital adequacy and liquidity situation may still be quite different from that reported by accounting rules as indicated by the failures of Northern Rock and Lehman Brothers (Amel-Zadeh and Meeks, 2010).As liquidity is highly pro-cyclical (FSF, 2009), it is hard to minimize the role of fair values using historical cost.

So Basel III has developed two liquidity standards: liquidity coverage ratio (LCR) and net stable funding ratio (NSFR) to correct the liquidity mismatch problem and enhance the liquidity risk supervision (BCBS, 2010). LCR requires a bank to maintain an adequate level of high-quality liquid assets to meet its liquidity needs for 30 calendar days in severe stress conditions, and NSFR requires a bank to maintain certain amount of stable funding to meet the demand for the required amount of stable funding based on the liquidity characteristics of its assets and activities for one year in extended stress conditions(BCBS, 2010).However, the quality of these ratios still depends on the quality of accounting information for a bank's balance sheet. For example, LCR is affected by the values of Level 1, Level 2 and other assets, and NSFR is affected by the values of capital and loans and other assets. Therefore, whether these standards are effective remains to be tested.

Even if the liquidity supervision is effective and central banks can provide liquidity support for problem banks so that there are no liquidity crises in the future, banks may still be exposed to the volatility arising from asset prices. For example, many banks may have substantial transactions which are dominated in foreign currencies. The exchange differences arising from exchange rate changes will affect regulatory capitaland regulatory capital ratios. Moreover, if the home currency maintains an appreciation or depreciation trend for a long time, it may have a huge impact on banks' regulatory capital ratios[4].

Accounting for defined benefit pension plans is another area where fair value accounting may havea significant impact on bank capital regulation. The amended IAS19 which will be effective from 2013 removes the "corridor approach" and requires companies to include service and finance cost in profit or loss andremeasurements in other comprehensive income (OCI)[5].Such amendments requirea company to recognize a surplus or deficit in a defined benefit plan in its statement of financial position which is in line with the U.S. GAAP. This will enhance the impact of assets market prices on banks' regulatory capital ratios as the full impact of their changes on defined benefit pension plans will be reported in the financial statements.

As the business models of banks normally cannot eliminate such impact of exchange rates and/or defined benefits pension plans, it is very hard to minimize the pro-cyclicality of fair value accounting on regulatory capital. Moreover, as the expected loss impairment model is considered to replace the incurred cost impairment model, historical cost accounting is actually moving toward using fair values (Klumpes and Welch, 2011). So improving business models for banks to engage in banking book activities which apply historical cost accounting may not be the solution to neutralize accounting for bank capital regulation.

4. Improving the definition of regulatory capital requirements

A growing body of recent literature has put forward proposals to improve the definition of regulatory capital requirements to contain the problem of pro-cyclicality. Basically there are two approaches: one is that the unrealized accounting gains or losses which have been included in the current regulatory capital

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4 McKinnon and Ohno (2001) found that a sustained appreciation of Japanese Yen in the 1990s had generated a fear of deflation which had a huge negative impact on the Japanese economic growth and banks' profitability because of the near zero nominal interest rates resulted from the deflation.

5 Under the "corridor approach", if the accumulated unrecognised actuarial gains and losses from the defined benefit pension plan exceed 10% of the greater of the defined benefit obligation or the fair value of plan assets, the excess of that net gains or losses divided by the expected average remaining working lives of the participating employees is required to be recognised immediately as income or expense. And this approach may make it possible for a company to defer the recognition of gains and losses. However, under the amended standard, this option is removed.

ratio calculations will be included in the regulatory capital calculations using their average over a period of certain length; the other is that the unrealized accounting gains or losses which have been included in the current regulatory capital ratio calculations will be excluded in the regulatory capital calculations.The analyses here show that the second approach is more effective than the first one.

The first approach is argued to be able to mitigate the volatility of capital requirements. For example,Pozen (2009) proposes that the average unrealized gains or losses over two quarters could be used for regulatory capital calculations so that capital regulation will be less vulnerable to quarterly volatility. In this way, the improved regulatory capital ratios are decoupled from the current ratios which use quarterly unrealized gains or lossesreflected on the balance sheet and income statement. However, as financial market prices can sustain their huge differences from their fundamental values for long periods of time, such a short period average of asset prices can reinforce the pro-cyclicality. In fact, FSA (2009) finds that the Value-at-Risk based on short periods of historical observation (e.g. 12 months) has created strong pro-cyclicality into the calculation of trading risk and required capital.

Andersen (2011)finds that even when the risk parameters are based on a ten-year period, Basel II capital ratios still show the pro-cyclicality. So what is the optimal period for removing the pro-cyclicality? Andersen (2011) finds that the twenty-year-moving average may contain the cyclicality of Basel II risk-based capital ratios. But this finding is based on the Norwegian market, how about other markets?It may be inappropriate to implement this long-term smoothing/average technique across countries. In addition, such technique may reduce the transparency of a bank's underlying capital position which will make bank capital regulation less effective (IMF, 2008; Ve´ron, 2008).

In order to obtain the actual financial position of a bank, the second approach excludes the unrealized accounting gains or losses from regulatory capital calculations. And this will minimize or eliminate the pro-cyclical impact of accounting on bank capital regulation. There are some attempts made byregulators in this aspect. For example, Basel III has derecognisedall unrealized fair value gains or losses arising from changes in a bank's own credit riskin the definition of Common Equity Tier 1 capital (BCBS, 2011). And in the U.S.,the other than temporarily impairments (OTTIs) "related to factors other than credit loss" should be reported in accumulated other comprehensive income (AOCI)and excluded from Tier 1 capital (Board of Governors, 2011: HC-R-2 Line Item 2). However, as these fair value gains or losses account for only a small proportion of the fair value changes, Song (2011) proposes that the unrealized accounting gains or losses should be excluded from Tier 1 capital calculation so thatthe actual value of regulatory capital which can be used to absorb losses on a going concern basis will not be distorted because of the unrealized accounting profit or loss[6]. For example, the unrealized gains or losses associated with trading securities,loan loss provisions, goodwill impairments, exchange differences and defined benefit pension plans will be excluded from the regulatory capital calculations. Therefore, the pro-cyclicality of regulatory capital generated by accounting rules will be removed[7].

However, decoupling accounting from regulatory capital cannot eliminate the impact of accounting on regulatory capital ratios because the effects of these gains or losses on equity and assets are not decoupled. For example, under this approach, the changes ofleverage ratio show the properties of a counter-cyclical capital rule even though such changes are very small relative to those under current practices (Song, 2011).Moreover, as unrealized accounting gains or losses may change the capital requirements for the underlying exposures, risk-based capital ratios may change due to the change in risk-weighted assets. In fact, Tier 1 capital ratio may report a very small decline relative to the base period no matter whether there are unrealized gains or losses under this approach as risk-weighted assets increase, but it also showsthe properties of a counter-cyclical capital rule relative to the ratios under current practices(Song, 2011).

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6 In this crisis, market participants "looked almost exclusively to the amount of tangible common equity held byfinancial institutions in evaluating the creditworthiness and overall stability of those institutions" (Tarullo, 2011: pp.3).

7 Under this approach, the impact of the unrealized gains or losses arising from financial liabilities at fair value on leverage ratio is fully eliminated (Song, 2011). Laux (2012) suggests that this approach can be applied to accommodate the use of fair value accounting as the unrealized gains generated by this accounting approach in a boom can be excluded from regulatory capital.

However, this approach also has problems. As regulatory capital ratios calculated using this approach only reflects the actual capital adequacy at onespecific time point, it is argued to be a lagging indicator (Tarullo, 2011). And if the unrealized accounting gains or losses become true, the decisions made according to these ratios may be inappropriate as the capital adequacy position of banks may change significantly. For example, if the accounting losses realize in near future,current regulatory capital ratios may overestimate the capital adequacy for banks, leading to banks being undercapitalized.

To solve such problem, it may be useful for banks to report another set of regulatory capital ratios assuming that the unrealized accounting gains or losses are realized and present a reconciliation of the capital ratios based on accounting rules and those based on regulatory standards (Klumpes and Welch, 2011).And these accounting ratios may be used as an early warning indicator for possible developments of a bank's capital adequacy position (André et al., 2009). In addition,a recently initiated framework for reporting the valuation range of banks' assets at fair-value by U.K regulators can be used for capturing the uncertainty of regulatory capital ratios due to fair value accounting and disclosing the gap between this prudent calculation and the calculation based on values in the financial statements(Haldane, 2011; FSA, 2011). Moreover,the practice of regular stress testing and capital planning introduced in the U.S.,the higher loss absorbency requirements for global systematically important banks and the Basel III capital conservation and countercyclical buffers introduced by Basel Committee after the crisis may play a role in mitigating the downside risks induced by this approach.

5. Conclusions

The significant role of accounting in this financial crisis suggests that it is important to minimize the pro-cyclical impact of accounting on bank capital regulation in orderto achieve financial stability. A number of methods have been proposed to improve accounting rules, bank business models and regulatory capital requirements. The evaluation of these methods in this paper finds thatthey may have quite different impact on bank capital regulation and create some new undesirable risks.

The attempts made to improve accounting rules do not fundamentally eliminate the pro-cyclicality during the periods of asset market booms and recessions.As the option to reclassify financial instruments between fair value accounting and historical cost accounting depends on the business model tests, the relative advantage of using certain accounting rules during different stages of economic cycles may encourage banks to change business models. Thus, accounting rules cannot be made crisis-neutral. Theuse of expected credit losses to replace incurred losses for provisioning may introduce some newpro-cyclical effectto historical cost accounting as expected credit losses will be estimated using forward looking information which may also be very important to the formation of fair values.

The prohibition of certain trading book activities measured at fair values does reduce the impact of fair value accounting; however, maturity mismatch problems may make historical cost accounting invalid during a liquidity crisis and market valuesmay be the ultimate measurement. In addition,a bank's business models cannot eliminate the impact of fair values arising from the change of exchange rates and defined benefit pension plans.

Therefore, the final hope rests on the improvement of bank capital requirements.The use of average/smoothing of unrealized accounting gains or losses over a period in regulatory capital calculations does reduce the volatility of a bank's capital ratios; however, it is very hard to remove the cyclicality by choosing the right period for smoothing and the resulting capital ratios may not represent the true picture of a bank's capital adequacy.

However, the improvement of regulatory capital definition by excluding all unrealized accounting gains or losses may eliminate the pro-cyclical impact of accounting. It may also have a small counter-cyclical impact on regulatory capital ratios. But it may ignore the early warning signals emitted by the accounting gains or losses. So a report of capital ratios based on accounting measures alongside the regulatory capital ratios may help regulators and investors prepare for the potential development of a bank's capital position.

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