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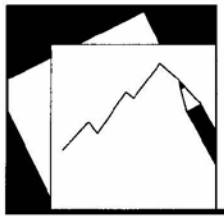

IMF Working Paper

Procyclicality and Fair Value Accounting

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Abstract

In light of the uncertainties about valuation highlighted by the 2007–2008 market turbulence, this paper provides an empirical examination of the potential procyclicality that fair value accounting (FVA) could introduce in bank balance sheets. The paper finds that, while weaknesses in the FVA methodology may introduce unintended procyclicality, it is still the preferred framework for financial institutions. It concludes that capital buffers, forward-looking provisioning, and more refined disclosures can mitigate the procyclicality of FVA. Going forward, the valuation approaches for accounting, prudential measures, and risk management need to be reconciled and will require adjustments on the part of all parties.

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I. INTRODUCTION

Since the 2007 market turmoil surrounding complex structured credit products, fair value accounting and its application through the business cycle has been a topic of considerable debate. As the illiquidity of certain products became more severe, financial institutions turned increasingly to model-based valuations that, despite increased disclosure requirements, were nevertheless accompanied by growing opacity in the classification of products across the fair value spectrum. Moreover, under stressed liquidity conditions, financial institutions made wider use of unobservable inputs in their valuations, increasing uncertainty among financial institutions, supervisors and investors regarding the valuation of financial products under such conditions.

It has been during this period that the procyclical impact of fair value accounting on bank balance sheets and, more specifically, the valuation of complex financial instruments in illiquid markets, came to the fore, raising questions on the use of market prices below "theoretical valuation" and the validity of "distressed sales." Financial products were fair valued despite concerns that the current market prices were not an accurate reflection of the product's underlying cash flows or of the price at which the instrument might eventually be sold. Sales decisions based on fair value pricing in a weak market with already falling prices resulted in further declines in market prices, reflecting a market illiquidity premium. Additionally, falling prices can, and did, activate margin calls and sale triggers that are components of risk management criteria, contributing further to the downward trend. As bank net worth is positively correlated with the business cycle, and as fair market values for collateral values fall, losses have been passed through to banks' capital.[2] The weakening of bank balance sheets and regulatory requirements for prudential capital replenishment has served to heighten concerns as to the future course of some markets, the health of banks and, more broadly, the financial system.

This paper reviews the principles and application of fair value accounting (FVA), the implications of its features and how these impact bank balance sheets. Using a simple model, it provides empirical support for the public discussions regarding the procyclicality of FVA on bank balance sheets. Utilizing representative bank balance sheets from a sample of actual institutions, it examines the application of FVA to banks' balance sheets during the course of a normal business cycle, as well as during extreme shocks, such as has recently occurred, to distill in what manner FVA may contribute to procyclicality. The paper examines the results obtained, discusses actual and proposed alternatives to FVA, and elaborates on policy implications going forward.

The paper finds that, while the application of FVA methodology introduces unwanted volatility and measurement difficulties, FVA nevertheless is the correct direction for

[2] Kashyap (2005).

proceeding as it provides as faithful a picture as possible of a bank's current financial condition—alternative techniques have their own shortcomings. Yet difficulties exist not only in determining FV prices in downturns and illiquid markets, but also during boom times in active markets when prices can overshoot and incorporate risk premia that inflate profits. Under such circumstances, market prices may not accurately reflect risks and can result in exaggerated profits that distort incentives (e.g., management compensation) and amplify the cyclical upturn. In rapidly evolving financial markets, inaccurate valuations may quickly alter the implications for solvency and more broadly, financial stability.

The paper emphasizes that FVA should be structured so that it contributes to good risk management and ensures that financial statements include adequate disclosure of valuations, methodologies, and volatilities such that inherent uncertainties are well understood. While the volatility of estimation errors in valuation techniques should be reduced as much as possible, genuine economic volatility should be faithfully reflected in financial statements and preserved by regulators and supervisors.[3] The paper concludes by providing some quantitative insight for regulators and supervisors to better assess the implications of FVA on bank balance sheets and capital, and puts forward proposals for dealing with issues of the volatility of FVA and FV classification. Importantly, it stresses the need for resolving the tensions between valuation approaches across risk managers, accountants, and prudential supervisors and regulators, so as to ensure that accounting frameworks do not unduly contribute to potential financial instability.

II. Fair Value Accounting Through the Business Cycle

A. Fair Value Accounting And Its Application

The current accounting framework

Both U.S. Generally Accepted Accounting Principles (U.S. GAAP) and International Financial Reporting Standards (IFRS) use a *mixed attributes model*, where different valuation criteria are applied to different types of assets and liabilities, depending on their characteristics and on management's intentions in holding them to maturity or not. In essence, both frameworks require FV valuation for financial assets and liabilities held for trading purposes and available-for-sale (AFS) assets, and all derivatives. Held-to-maturity (HTM) investments,[4] loans, and liabilities not fair valued are valued at amortized cost. Both frameworks provide a carefully specified option to fair value (FVO) certain financial assets and liabilities[5] that would normally be valued at amortized cost.

[3] Barth (2004) and Borio and Tsatsaronis (2005).

[4] Non-derivative financial assets with fixed or determinable payments and fixed maturity that an entity has the *intention and ability* to hold to maturity.

[5] Namely, when they are risk-managed on a FV basis, though differences remain between FAS159 and IAS39.

The mixed attributes model is intended to be as neutral as possible—without emphasizing one accounting principle over another. But, its uneven application to balance sheets produces accounting volatility and may not fully capture the effects of economic events in all instruments included in the banks' financial statements.

What is fair value?

IFRS and U.S. GAAP similarly define FV as the amount for which an asset could be exchanged, and a liability settled, between knowledgeable, willing parties, in an arm's length, orderly transaction. U.S. GAAP (FAS 157) is more prescriptive than IFRS because they consider that FV is an "exit" or "selling" price.[6] Both accounting frameworks prescribe a *hierarchy* of FV methodologies that start with observable prices in active markets (Level 1), using prices for similar instruments in active or not active markets or valuation models using observable inputs (Level 2), and moving to a mark-to-model methodology with unobservable inputs and model assumptions (Level 3).[7] The absence of market prices, trading activity, or comparable instruments' prices and inputs is a prominent feature of complex structured credit products, many of which are held off balance sheet. Consequently, both frameworks require extensive disclosures of information on the FV methodologies used, specific assumptions, risk exposures, sensitivities, etc.

Thus defined, FV does not require the presence of deep and liquid markets to be applied. FV can be estimated when a market does not exist, as FV valuation models comprise the expected, risk-discounted cash flows that *market participants* could obtain from a financial instrument at a certain point in time. While FV incorporates forward-looking assessments, it must also reflect *current market conditions,* measures of risk-return factors,[8] and incorporate all factors that market participants consider relevant, with firm-specific risk preferences or inputs kept to a minimum. Under this definition, two key issues underlying the FV methodology present a challenge—what constitutes an active market, and what can be considered an observable price or input.

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[6] Nevertheless, differences are disappearing given the international convergence to IFRS currently underway, led jointly by the International Accounting Standards Board (IASB) and the U.S. Financial Accounting Standards Board (FASB), which is aimed to achieve a single set of high-quality international accounting standards.

[7] This language is U.S. GAAP-specific and not IFRS, but it is used extensively in the banking industry and in financial statements of IFRS users as well.

[8] IFRS do not explicitly mention some risk factors (e.g., counterparty credit risk, liquidity risk), which may have added confusion to financial statement preparers during the 2007–08 turmoil. An International Accounting Standards Board Expert Advisory Group is currently working on this and other FV issues. The U.S. Financial Accounting Standards Board is reevaluating some disclosure requirements (e.g., credit derivatives) and has issued new standards (e.g., FAS 161 on derivatives and hedging). Both Boards are working jointly on FV issues and examining requirements for off-balance sheet entities, as well.

Forced or "fire" sales would not be valid determinants of market prices, because the accounting frameworks presume that a reporting entity is a *going concern* that does not need or intend to liquidate its assets, or materially curtail the scale of its operations. Yet, accounting standard setters have decided to leave to judgment (namely, of management, supervisors and auditors) how to determine "regularly occurring" or "distressed" sales, and when sales in thin markets, at heavy discounts, could be used for balance-sheets' FVA.[9] Consequently, market participants and supervisors would expect to see banks' external auditors use a very cautious approach to examining the prices and inputs used to FV financial instruments, in order to minimize late write-downs or write-offs and opportunities for management to "cherry-pick" the accounting treatment of financial instruments.

Disclosures of FVA

Both IFRS and U.S. GAAP mandate various disclosures, particularly when information other than market inputs is used to estimate FV. For example, IFRS 7 requires disclosure (i) if the transaction price of a financial instrument differs from its FV when it is first recorded in the balance sheet; and (ii) of the implications of using "reasonably possible alternative assumptions" to reflect the sensitivities of FV measurement.[10] IFRS 7 also contain reporting requirements that include the publication of sensitivity tests for individual items of the financial statements. Similarly, FAS 157 requires banks' balance sheets to be sufficiently clear and transparent as to fully explain to market participants, through quantitative and qualitative notes to the financial statements, the nature of the changes and the methodologies used, to name a few items.[11]

Although some U.S. and European Union (EU) financial institutions voluntarily provide such disclosures, neither IFRS nor U.S. GAAP require disclosure on the governance and management control processes[12] surrounding FV valuation.[13] Enhancement of disclosures in this direction could increase confidence in the banks' balance-sheets and lower investors' aversion to transact in instruments whose valuations may not be well understood.[14] This

[9] White papers prepared by the six largest international audit firms and other audit firms summarize guidance on what constitutes an active market, FV measurement in illiquid markets, and forced sales, CAQ (2007) and GPPC (2007). Further, on September 30, 2008, the U.S. SEC jointly with the U.S. FASB issued new guidance clarifying the use of FVA under the current environment and, on October 10, 2008, the U.S. FASB staff issued Staff Position No. 157-3 providing guidance on how to determine the FV of a financial asset when the market for that asset is not active.

[10] IFRS 7, "*Financial Instruments: Disclosures,*" became effective on January 1, 2007.

[11] For those financial assets measured at amortized cost, the entity must also disclose the FV in the notes to the statements.

[12] Including audit-related programs.

[13] The FSF recommends disclosures about price verification processes to enhance governance and controls over valuations and related disclosures. Disclosures regarding risk management governance structures and controls would also be welcome.

[14] Examples are the U.S. S.E.C. letters of March 2007 and March 2008 to major financial institutions outlining the nature of recommended disclosures and the most current letter of September 16, 2008.

would not necessarily indicate a need for more disclosures, but for a more appropriate composition, medium (e.g., websites), and frequency of disclosures.

Along this line, at the request of the Financial Stability Forum (FSF) a Senior Supervisors Group conducted a survey of disclosure practices for selected financial exposures, such as special-purpose entities and collateralized debt obligations, among others, and issued a report concluding that disclosure practices currently observed could be enhanced without amending existing accounting disclosure requirements.[15] The FSF is encouraging financial institutions to use these disclosure practices for their 2008 financial reports and urging supervisors to improve risk disclosure requirements in Pillar 3 of Basel II.

A preliminary reading of financial reports prepared for mid-2008 by some U.S., European Union and Canadian banks would show that U.S. banks are including more quantitative notes in their financial statements, as compared with their end-2007 reporting,[16] typically providing information on financial assets securitized, cash flows received on Special Purpose Entities (SPE) retained interests, assets in non-consolidated variable-interest entities (VIE), and maximum exposures to loss in consolidated and non-consolidated VIEs, with details broken down by instrument.

Volatility and procyclicality of FVA

Barth (1994 and 2004) argues that there are three potential channels through which FV may introduce volatility into financial statements. The first is the volatility associated with changes in the underlying economic parameters. The second is the volatility produced by measurement errors and/or changing views regarding economic prospects throughout the business cycle. As to the third, volatility may be introduced by relying on the "mixed attributes" model that applies FVA to certain instruments and amortized cost to others, reducing the netting effect that full fair valuation of assets and liabilities would produce.[17] Each of these sources of volatility is either explicitly or implicitly present in the simulation exercises examined later in the paper.

The mixed attributes model adopted by IFRS and U.S. GAAP has embedded volatility and procyclicality aspects.[18] On the one hand, historical cost accounting, applicable to HTM

[15]"Leading-Practice Disclosures for Selected Exposures," April 11, 2008. Twenty large, internationally oriented financial firms were surveyed (15 banks and five securities firms) as of end-2007.
[16]Canada has postponed adoption of the full International Financial Reporting Standards until 2011.
[17] Barth (2004) argues that mixed-attributes models impair the relevance and reliability of financial statements and that this constitutes one of the primary reasons behind hedge accounting. IAS 39 was aimed to alleviate mismatches in assets and liabilities valuations due to the mixed-attributes model and the complexities of hedge accounting.

[18] It should be noted that procyclicality of accounting and reporting standards existed prior to the recent attention to FVA. It has long been recognized that as the business cycle and market sentiment change, so too will valuations of assets and liabilities.

investments and loans, is less volatile and backward looking. When such an investment or loan is correctly priced at origination, its FV equals its face value. Over the life of the asset and until maturity, its reported stream of profits is stable and its carrying value is based on its value at origination. But if market conditions negatively affect these portfolios and there is evidence of a credit loss event and asset impairment, then the reporting values must be re-assessed and provisions for losses must be accrued or write-offs recorded. The latter is often a late recognition of excess risk taken earlier, in good times. In this sense, historical costs are subject to a backward-looking assessment of value (e.g., signs of loan distress) combined with procyclical provisioning, which often coincide with a downturn of an economic cycle, adding to stresses.

On the other hand, FVA introduces more volatility in earnings and capital during the life of an asset or liability than historical cost accounting and incorporates forward-looking assessments.[19] Gains and losses in fair-valued instruments generally affect the income statement and this increased volatility of FVA and resulting procyclical effects may create incentives for banks to restructure their balance sheets (e.g., lower loan originations, higher/lower securitization, introduce hedging, etc.).[20] Nevertheless, higher FV volatility, per se, would not necessarily be a problem if market participants are well informed and could correctly interpret the information provided in the financial statements. In this sense, increased volatility may be thought of as part of the process of fair valuing financial instruments, and a reflection of genuine economic volatility, not as a cause itself of procyclicality.

However, in some cases, the symmetrical treatment within FVA produces seemingly misleading results. For example, the use of FVA on a bank's own debt, where the price of the bank's bonds and notes falls due to a decline in its own creditworthiness, will result in a *gain* that must be recognized in the bank's financial statements, equal to the difference between the original value of the debt and its market price. As counter-intuitive as this situation may be, it is still a faithful representation of FV and is a signal to supervisors or other users of financial statements to have appropriate tools (e.g., prudential filters)[21] for understanding the implications of FVA and the impact on regulatory capital.

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[19] IFRS and U.S. GAAP accounting standards—and FVA is no exception—are applicable to reporting entities irrespective of their size or systemic importance.

[20] One intention of the FVO in both accounting frameworks is to enable entities to reduce accounting mismatches by applying FV on matching assets and liabilities.

[21] Bank supervisors use prudential filters as a tool to adjust changes in the (accounting) equity of a bank due to the application of the accounting framework, so that the quality of regulatory capital may be properly assessed. For example, when the gains that result from a deterioration in a bank's own creditworthiness (fair valued liability) are included in a bank's prudential own funds, they must be "filtered out" by the supervisor in order to determine the true amount of regulatory own funds..

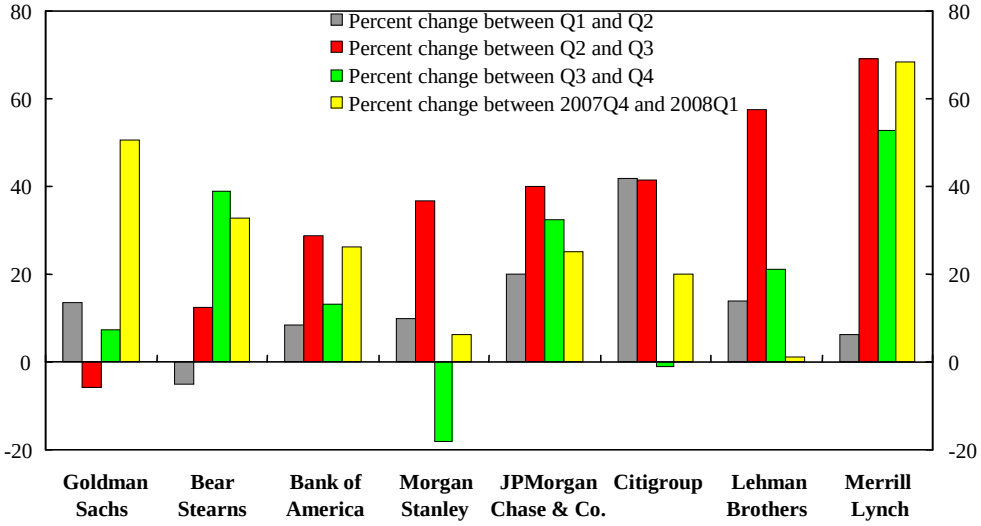
As valuation moves from market prices to mark-to-model valuation, FVA poses *reliability challenges* to which markets, particularly under distress, are sensitive.[22] These "subjective" *aspects* of FVA may compound market illiquidity or price spirals if they increase uncertainty around valuations. Both in the United States and the European Union, financial institutions' balance sheets are heavily represented in Level 2 instruments, a possible indication that financial institutions are biased towards using Level 2 methods due to their flexibility, as well as a desire to avoid "obscure" Level 3 assets and liabilities (Figures 1 and 2). Falling valuations can activate certain management decision rules that trigger the liquidation of certain assets or portfolios, adding additional stress. Hence, there is a need for good risk management practices to be consistent with FV mark-to-model valuations. Clear and transparent quantitative and qualitative notes to the financial statements regarding the nature of the changes and methodologies could enhance reliability of mark-to-model valuations.

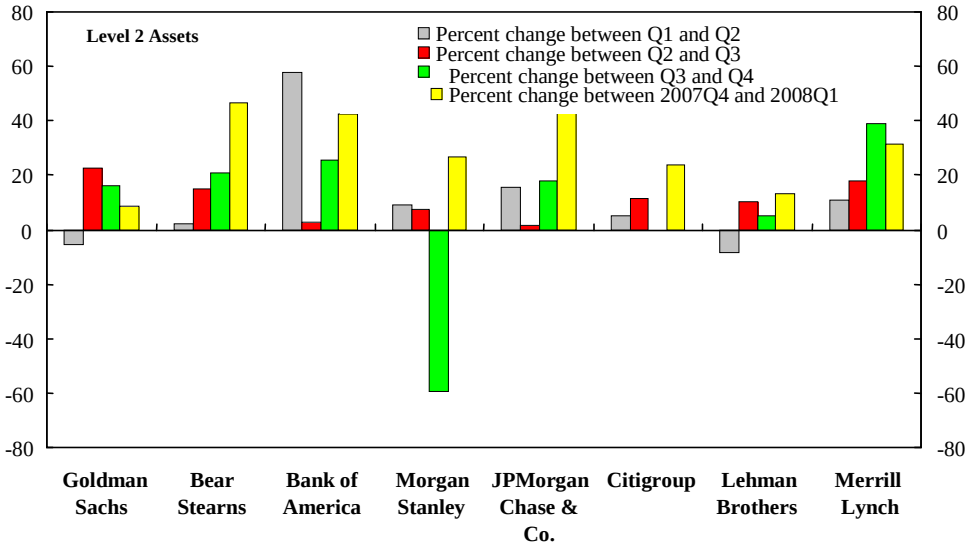
Although more volatile, FVA could play a role by partially mitigating the crisis if warning signals are heeded, thereby helping markets to recover earlier before damaging self-fulfilling downturns worsen. FVA that captures and reflects *current* market conditions on a timely basis could lead to a better identification of a bank's risk profile, if better information is provided. An earlier warning that can prompt corrective action by shareholders, management and supervisors allows for a timelier assessment of the impact of banks' risky actions on regulatory capital and financial stability. Moreover, since FVA should lead to earlier recognition of bank losses, it could have a *less* protracted impact on the economy than, for example, loan portfolios whose provisions for losses are usually made when the economy is already weak. Raising new capital at an earlier stage might enable banks to retain written-down assets or other assets originally not for sale on their balance sheets and, thus, to avoid asset price spirals.

On the prudential front, the negative impact of vastly lower valuations stemming from recent market conditions raises questions as to whether increases in regulatory capital may be needed for complex structured products, off-balance sheet entities (OBSEs), or other risks. Basel II, Pillar 2 guidance could encourage banks to put greater attention into FV during periods of falling or rising asset prices, so that they may better control for procyclical aspects of FVA. Pillar 3 disclosures could improve transparency of valuations, methodologies and uncertainties. Nevertheless, FVA can serve as an early warning system for supervisors to pursue closer scrutiny of a bank's risk profile, risk-bearing capacity and risk management practices.

[22] In principle, valuations are thus better aligned with the prevailing mark-to-model techniques used in risk management.

Figure 1. Selected U.S.-Based Financial Institutions: Change in Level 1, 2, and 3 Assets
(Percent changes: 2007Q1-2008Q1)





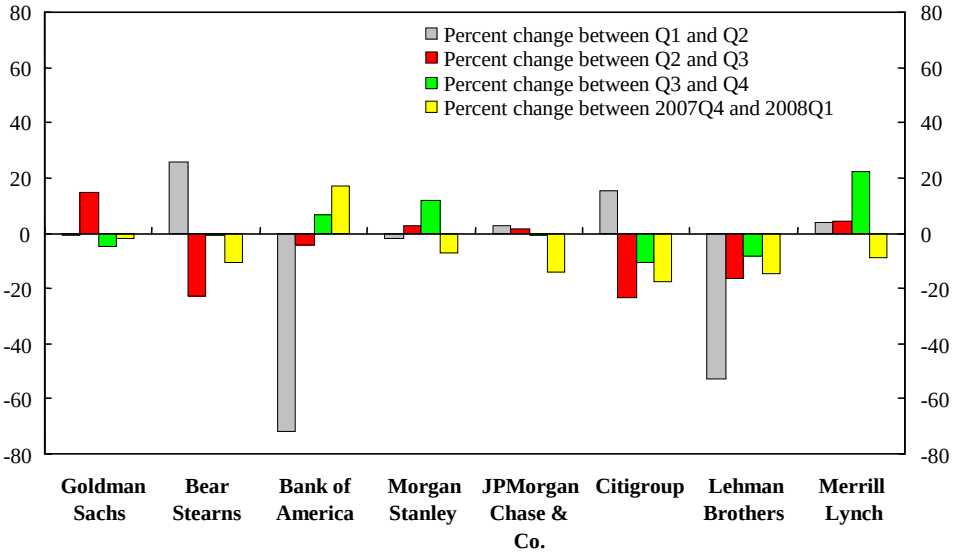
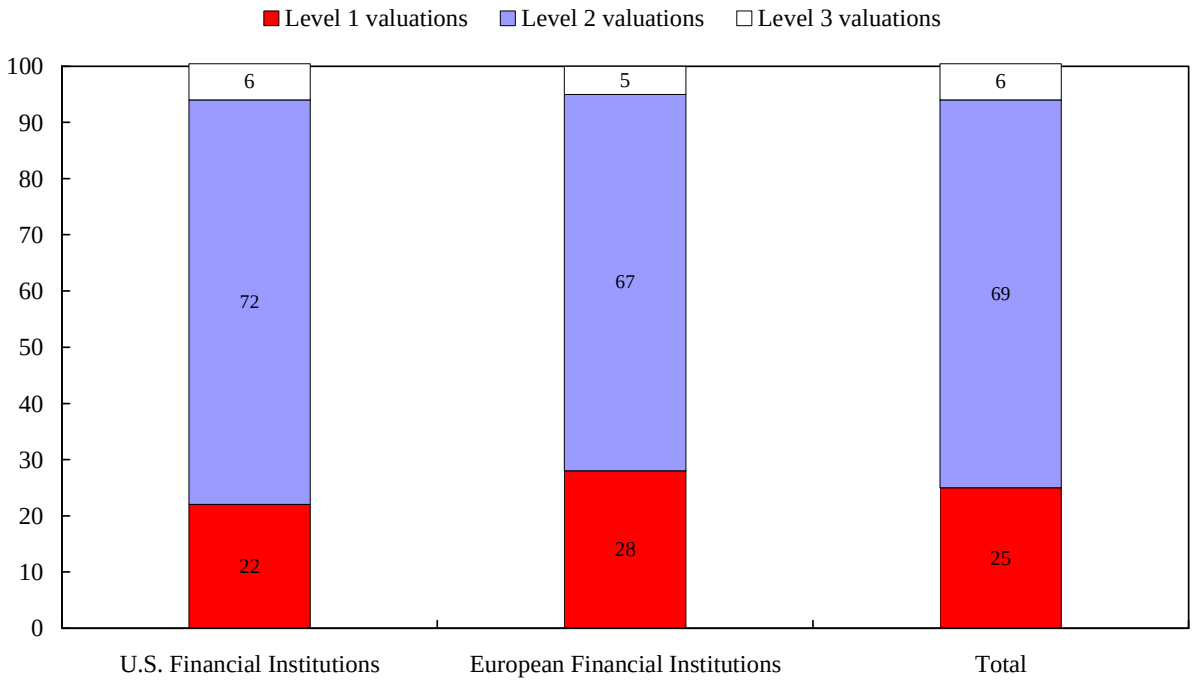


Figure 2. Aggregate Fair Value Hierarchy, End-2007
(In percent)



Source: Fitch Ratings.

Off-balance-sheet entities and procyclicality

Recent market turmoil has heightened public awareness of the extensive use of off-balance-sheet entities (OBSEs) by financial institutions. With variations, both IFRS and U.S. GAAP have specific criteria to determine when instruments transferred to OBSEs should be consolidated on-balance-sheet. Any retained interest in securitized financial assets should be on-balance-sheet and accounted for at FV, usually in the trading book.

Mandatory disclosures on OBSEs are not prevalent. Their absence may have added to market confusion and contributed to procyclical behavior by helping to create a market perception that the banks were standing behind their OBSEs. Both the IASB and the U.S. FASB have different projects under way to improve OBSE disclosures and enhance the criteria for derecognition and consolidation of OBSEs. Examples are the IASB's consolidation and derecognition projects, and the FASB's changes to FAS 140 and Interpretation 46(R). The FASB's recently revised standard, FAS 140, will go into effect at the end of 2009.

Regardless, OBSEs require financial supervisors to revisit prudential reporting so that the integrity of banks' risk exposures can be better captured and explained, as well as adequately buffered (i.e., capital) to the satisfaction of supervisors.

Procyclicality in the Basel II framework

A key improvement in the Basel II framework is its enhanced risk sensitivity. Yet this very feature is associated with the unintended effect of heightening its procyclical propensity. Basel II recognizes possible business cycle effects and how they should be addressed in both

Pillar 1 (minimum capital requirements) and Pillar 2 (supervisory review process) of the framework. If Basel II is properly implemented, then greater risk sensitivity can lead banks to restore capital earlier in a cyclical downturn, thus preventing a build-up of required capital when it could amplify the cycle.

Under Basel II's Standardized Approach, risk weights are based on external ratings constructed to see through the cycle, so that cyclical effects are muted. It is in the internal-ratings-based (IRB) approaches that deterioration in credit risk feeds more directly into the capital requirements. The three main risk components in the IRB approaches (e.g., probability of default, loss given default, and exposure at default) are themselves influenced by cyclical movements and may give rise to a cyclical impact on banks' capital requirements. Basel II includes mitigating measures to address these concerns. Although Pillar 1 does not mandate the use of through-the-cycle models, it promotes estimates of risk components based on observations that "ideally cover at least one economic cycle," and whose validation must be based on data histories covering one or more complete business cycles. Sound stress testing processes must be in place that involves scenarios based on economic or industry downturns and include specific credit risk stress tests that take into account a mild recession to assess the effects on the bank's risk parameters.

Pillar 2 places the onus on both banks and supervisors to assess business cycle risk and take appropriate measures to deal with it. Banks are required to be "mindful of the stage of the business cycle in which they are operating" in their internal assessment of capital adequacy, perform forward-looking stress tests, address capital volatility in their capital allocation, and define strategic plans for raising capital. In turn, encouraging forward-looking credit risk assessments or higher provisioning for loan losses (that consider losses over the loans' whole life) is left to national supervisors.[23] Thus, where Pillar 1 does not adequately capture business cycle effects, supervisors should take remedial action under Pillar 2, including through additional capital buffers.

The capital disclosures required by Pillar 3 may assist markets and stakeholders in exercising pressure on the banks to maintain their capital levels throughout the full business cycle. In its recent report, "Enhancing Market and Institutional Resilience," the Financial Stability Forum called for the Basel Committee to develop Pillar 2 guidance on stress testing practices and their use in assessing capital adequacy through the cycle; examine the balance between risk sensitivity and cyclicality; and update the risk parameters and the calibration of the framework, if needed (Financial Stability Forum, 2008). In response, the committee is establishing a data collection framework to monitor Basel II's impact on the level and cyclicality of prudential capital requirements over time across member countries. The committee is expected to use these results to further calibrate the capital adequacy framework.

[23]The U.S. Financial Accounting Standards Board has a project under way to address provisioning and related credit risk disclosures.

B. Options for the Application of Fair Value Accounting to Mitigate Procyclicality

The procyclicality of FVA has prompted the search for options that allow financial institutions to cope with situations of market turmoil. Alternatives range from considering a wider selection of "observable" prices or inputs to a change in the accounting treatment of financial instruments, as follows:

Consensus pricing services

Consensus pricing services, often independent brokers and agencies, can provide price quotes for complex or illiquid financial instruments, often using prices based on their own sales of relevant instruments that allow them to observe price behavior and market-test their estimates. Through this approach, illiquid products could obtain a Level 2 price, potentially limiting valuation uncertainty and underpricing in downturns. However, difficulties may remain if there is a wide dispersion of values that do not reflect the features of the specific financial product or if banks contend that values do not reflect *market conditions*, thereby obliging banks to use internal valuation methodologies.

Valuation adjustments

Banks could estimate the "uncertainty" surrounding the price of certain assets and make a valuation adjustment to the carrying value of an instrument disclosed in the financial statements. Valuation adjustments would allow banks to work with less perfect prices that are corrected to reflect current market conditions. These estimates of "uncertainty" might incorporate the liquidity of inputs, counterparty risk, or any market reaction likely to occur when the bank's position is realized. Valuation adjustments could improve fair value measurements and discipline in reporting, yet they need close monitoring to ensure that this practice does not evolve into management "cherry picking," providing a means to evade a certain accounting fair value level classification, or improving the balance sheet.

Reclassifications

The transfer of assets from available-for-sale or trading to the held-to-maturity (HTM) category could avoid the volatility resulting from valuation changes amid a downward spiral. However, from an accounting perspective, reclassifications could be penalized by not allowing banks to revert to the trading book when markets rebound. Further, assets transferred from the trading category to HTM would be subject to impairment assessment (as they should were they moved into the AFS category). From a prudential standpoint, deteriorated HTM assets would require higher regulatory capital, while changes in AFS assets would be considered additional but not core capital. Allowing reclassifications—particularly if not fully disclosed—may postpone the weaknesses of the balance sheets, and promote cherry-picking elements of the accounting framework.[24]

[24] In mid-October 2008, the IASB amended IAS39 to allow some reclassifications of financial instruments held for trading or AFS to the HTM category, meeting certain criteria, with the desire to reduce differences between IFRSs and US GAAP.

Full fair value accounting

Recognizing the significant challenges that FVA poses, a *longer-term* alternative would be to adopt a full-fair-value (FFV) model for all financial assets and liabilities in a balance sheet, irrespective of an entity's intention in holding them. One single FV principle, with some limited exceptions, would reduce the complexity of financial instruments reporting, balance sheet window dressing, and cherry picking, and allow for more transparent representations of the financial condition of an entity. It could improve the comparability of financial information across balance sheets and enhance market discipline, but it would pose significant challenges for implementation, modeling capabilities, and auditing estimates.

Internal decision rules

Without searching for a FVA alternative, regulators could require banks to have internal decision rules based on FV that require a careful review of all the implications of changing FV and the specific occasions when such changes could trigger management decisions, so that that these decisions do not adversely affect regulatory capital or accentuate downward price spirals.

Smoothing techniques and circuit breakers

Smoothing asset prices and circuit breakers could be used as price adjusters to FVA to reduce excessive price volatility in the balance sheet. Smoothing techniques involve the averaging of asset prices over a given period. A circuit breaker imposes rules to stem the recognition of a fall in asset prices. However, both reduce the information content of financial statements by suspending equity at an artificially higher-than-fair-value calculated level.

The simulation exercises examine the following alternatives: FFV accounting, smoothing techniques, circuit breakers and reclassifications.

III. MODELING FVA THROUGH THE BUSINESS CYCLE USING SIMULATIONS

Using model simulations, this section assesses the effects that changes in financial instruments' fair value have on the balance sheet of three types of large, internationally active financial institutions—U.S. commercial banks, U.S. investment banks, and European banks—as well as more retail-oriented U.S. and EU banks (Table 1). The balance sheets of a sample of representative institutions were taken as of end-2006 to construct prototypical institutions. The simulations illustrate the impact of changes in valuations and, ultimately, on these representative banks' equity capital. The section also explores possible alternatives related to FVA and its current application—full fair value, smoothing techniques, circuit breakers and reclassifications—that aim to reduce its volatility on balance sheets (Box 3.4).

The first simulation serves as the baseline for subsequent scenarios and consists of tracking the evolution of the banks' balance sheets throughout a normal business cycle. Four scenarios

are applied to the normal cycle with the goal of gauging the degree to which fair valuations amplify fluctuations in balance sheet components, and more notably, on accounting capital.[25] The sources of increased cyclicality are (i) a bust-boom cycle in equity valuations; (ii) a bust-boom cycle in the housing market; (iii) a widening and then contraction of banks' funding spreads; and (iv) a bust-boom cycle in debt securities' valuations, all of which are calibrated using the most current cyclical movements (Table 3.2). As noted by Fitch (2008a and 2008b) among others, the sensitivities of FV measurements to changes in significant assumptions are particularly important when valuations are model-based and/or markets become highly illiquid. Specifically, the method by which an institution chooses to value components of its balance sheet constitutes one of the three main transmission channels through which FVA introduces volatility into the balance sheet.[26] The simulations help underscore this point and provide a sense of the magnitude of these effects. In addition, the simulations illustrate how a sudden tightening in banks' funding conditions, or changes in the liquidity conditions in securities markets, exacerbate cyclical fluctuations in balance sheets.

It is worth noting that from a cash flow perspective, the changes in assumptions underlying valuations (such as those made in the simulations below) may not necessarily be of future consequence to the reporting institution, as those gains and losses have not been *realized* and may never be. In this sense, the ensuing changes in regulatory capital produced by the updated valuations are somewhat artificial. With these considerations in mind, the simulation results should be interpreted as a simple exercise to gauge how changes in the underlying valuation parameters in the presence of FVA may lead to substantial fluctuations in banks' equity.

A. Data and Modeling Assumptions

This section presents the construction of the simulation exercises and reviews the assumptions underlying the various scenarios.

Banks' balance sheets

To accurately reflect the balance sheets of a representative large US commercial bank, a large US investment bank, a large European bank, and retail-oriented U.S. and European banks, the financial statements at end-2006 for these five banking groups were compiled from the institutions' Annual Reports and the U.S. Securities and Exchange Commission's

[25] See Enria et al. (2004), who examine the impact of several one-off shocks on the balance-sheet of a representative European bank under alternative accounting frameworks.

[26] Barth (2004).

10-K filings.[27] Individual bank balance sheets were then used to construct a weighted average for each type of institution, and the resulting representative balance sheets (Table 1).

Table 1 indicates the line items that were fair valued in the simulations.[28,29] Not all the items in the balance sheet were fair valued in the simulations: items that are typically not available for sale (e.g., securities in the banking book) and items that fall under the "other" categories were held constant.[30]

[27] The filing period was chosen to be December 2006 in order to obtain balance sheets that are relatively recent, while at the same time do not reflect too closely banks' balance sheet structure in the run-up or fall-out of the 2007-08 US sub-prime meltdown.

[28] For simulation purposes, all banks were assumed to be newly established, so that all balance sheet items are at FV at the start of the simulations. Thus, the shocks applied to the baseline reflect only the pure impact of the shocks, and not a combination of the imposed shock plus any initial deviations from fair value.

[29] IAS 39 prevents the valuation of demand deposits at a value less than face value, even if a significant portion of these display economic characteristics of a term deposit. Consequently, deposits remain at face value in the exercise.

[30] Despite being a central element in the 2007–08 turmoil, an explicit breakdown of credit derivative exposures was unavailable in the 2006 reports. Some mortgage backed securities were included in the debt securities category.

Table 1. Balance Sheet of Representative U.S. and European Financial Institutions
(In percent of total assets, as of December 31, 2006)

		U.S. Commercial Banks	U.S. Investment Banks	European Banks	U.S. Retail-Oriented Banks	European Retail-Oriented Banks
Financial assets						
Securities						
Debt securities		21.82	27.85	15.71	14.96	17.72
Trading book	FV[1]	21.82	27.85	14.98	5.09	16.59
Banking book[2]		—	—	0.73	9.87	1.13
Shares		6.73	7.50	6.55	0.64	2.96
Trading book	FV[1]	6.73	7.50	6.32	0.47	2.96
Banking book[2]		—	—	0.23	0.17	—
Derivatives (trading)		2.67	5.28	14.71	1.19	4.44
Interest rate swaps		1.48	1.87	7.76	...	...
Other derivatives		1.20	3.41	6.96	...	...
Loans						
Corporate/Consumer		10.11	5.63	23.77	23.00	25.84
Short-term (fixed rate) <1 year	FV[1]	4.72	2.82	11.88	6.84	12.92
Medium-term (>1 year <5 year)		3.66	2.82	3.57	10.97	3.88
Fixed rate	FV[1]	0.72	1.41	1.78	1.71	1.94
Variable rate	FV[1]	2.94	1.41	1.78	9.26	1.94
Long-term (>5 year)		1.73	n.a.	8.32	5.19	9.04
Fixed rate	FV[1]	0.46	n.a.	4.16	2.03	4.52
Variable rate	FV[1]	1.27	n.a.	4.16	3.16	4.52
Mortgages		16.51	n.a.	6.54	37.44	26.43
Fixed rate	FV[1]	12.83	n.a.	1.40	29.09	10.78
Variable rate	FV[1]	3.68	n.a.	5.14	8.35	15.65
Other assets		28.60	43.27	20.93	17.34	5.41
Financial liabilities						
Debt securities/equity (trading)	FV[1]	4.68	8.68	12.77	0.01	12.71
Derivatives (trading)		3.20	5.49	15.34	0.96	3.47
Interest rate swaps		2.09	1.73	7.84	...	...
Other derivatives		1.10	3.76	7.49	...	...
Short- and long-term financial liabilities/Bonds	FV[1]	18.25	27.21	10.35	19.56	18.97
Other liabilities		65.26	51.52	56.23	69.72	61.16
Of which: deposits and interbank borrowing		42.44	3.72	24.88	60.12	56.72
Net equity[3]		7.65	3.71	2.86	9.75	4.36

Sources: Annual reports; and the U.S. Securities and Exchange Commission's 10-K filings.
Note: Columns may not add to 100 percent as some balance sheet items are not displayed in the table.
[1]Valued at fair value.
[2]Annual statements showed negligible or zero holdings for the sampled U.S. banks.
[3]Net equity in percent of total (nonrisk-weighted) assets.

Valuation of assets and liabilities under fair value

Loans and debt securities are valued at their expected net present value (NPV), which takes into account the probability of default and the loss given default of each instrument. In other words, the value of a given security (or loan) with a maturity of T years is given by the expression

$$NPV = \sum_{t=1}^{T} \frac{E(CF_t)}{(1+\delta_t)^t},$$

where δ_t is the discount rate for year t, and $E(CF_t)$ is the expected cash-flow for year t factoring in the possibility that the security (or loan) defaults:

$$E(CF_t) = [PD_t \cdot (1+r_t) \cdot N \cdot (1-LGD_t)] + [(1-PD_t) \cdot r_t \cdot N] \text{ for all } t < T, \text{ and },$$

$$E(CF_T) = [PD_T \cdot (1 + r_T) \cdot N \cdot (1 - LGD_T)] + [(1 - PD_t) \cdot (1 + r_T) \cdot N].$$

where PD_t stands for probability of default,[31] r_t is the interest rate on the loan, N is the notional amount of the loan, and LGD_t is the loss-given-default.

Under FV, traded shares are valued at their market price. Since the detailed composition of the shares portfolio of banks was not available, it was assumed that banks hold a generic type of share which represents the *Standard & Poor's* 500 Stock Market Index. Therefore, the number of shares for each type of bank was obtained by dividing the value of their shares portfolio at end-2006 by the value of the *S&P* 500 Index at the same date.

Characterization of the business cycles

To simplify the analysis, the paper considers a stylized business cycle consisting of four periods representing different points in a typical business cycle: trend, trough, peak, and back to trend. Each point in the business cycle is characterized by a different probability of default (PD) on securities and loans. To construct the normal business cycle, the PDs on loans and debt securities were assumed to change with the pulse of the cycle, increasing during economic downturns and decreasing during upswings. To isolate the effect of the evolving PDs on valuations, the baseline simulation abstracts from changes in interest rates during the cycle and initially assumes a flat yield curve.

In principle, different classes of securities and loans may have different PDs and evolve differently throughout the cycle. For simplicity, however, this paper assumes that all securities and loans have the same PD and display the same cyclical behavior, except for the scenario of the bust-boom cycle in real estate, where a different PD for mortgages is assumed. In addition, loans are assumed to be bullet instruments, whose principal is repaid in full upon maturity. The specific values for these PDs were derived from Nickell *et al.* (2000), who investigate the dependence of securities rating transition probabilities on the state of the economy.[32] The probabilities of default at different stages of the business cycle were computed using their estimated transition matrices at different points in the cycle (Table 2).[33]

To compute the net present value (NPV) of loans and securities, it is also necessary to have a measure of losses in the event of default. Thus, loss-given-default (LGD) rates were taken from the BIS's *Fifth Quantitative Impact Study QIS-5 (cf.* BIS, 2006), and equal 20.3 percent for mortgage loans and 46.2 percent for corporate loans. To isolate the effect of the evolving

[31] Strictly speaking, PD_t is the conditional probability of default at time *t*. That is, the probability that, conditional on not having defaulted before, a loan defaults on period *t*.

[32] See also Pederzoli and Torricelli (2005), Bangia *et al* (2002), and Altman *et al* (2005).

[33] It should be noted that the Quantitative Impact Study 5 (QIS-5) estimated the PD for a group of G-10 (ex-US) banks' retail mortgage portfolio at 1.17 percent, very close to the estimate of 1.18 percent for the trend period used here.

PDs, the LGD rates were held constant through the cycle (except in the bust-boom cycle in the housing market and in the downward price spiral for debt securities).[34]

Table 2. Parameter Values for Each Simulation
(In percent)

		Business Cycle Trend Points	Business Cycle Trough Points	Business Cycle Peak Points
Normal cycle	PD for all loans and securities	1.18	1.40	0.73
	LGD for mortgages	20.30	20.30	20.30
	LGD for loans[1] and securities	46.20	46.20	46.20
	Stock market index	100.00	100.00	100.00
Stock market cycle	PD for all loans and securities	1.18	1.40	0.73
	LGD for mortgages	20.30	20.30	20.30
	LGD for loans[1] and securities	46.20	46.20	46.20
	Stock market index	100.00	80.00	120.00
Real estate market cycle	PD for mortgages	1.18	5.29	0.73
	PD for loans[1] and securities	1.18	1.40	0.73
	LGD for mortgages	20.30	30.50	20.30
	LGD for loans[1] and securities	46.20	46.20	46.20
	Stock market index	100.00	100.00	100.00
Funding spreads cycle	PD for all loans and securities	1.18	1.40	0.73
	LGD for mortgages	20.30	20.30	20.30
	LGD for loans[1] and securities	46.20	46.20	46.20
	Stock market index	100.00	100.00	100.00
	Change in spreads (in basis points)	0.00	58.66	-58.66
Debt securities valuation cycle	PD for all loans and securities	1.18	1.40	0.73
	LGD for mortgages	20.30	20.30	20.30
	LGD for loans[1]	46.20	46.20	46.20
	Stock market index	100.00	100.00	100.00
	LGD for debt securities	46.20	67.30	25.10

Sources: IMF staff estimates; Nickell and others (2000); and BCBS (2006a).
Note: PD = probability of default; LGD = loss given default.
[1] Loans excluding mortgages.

Characterization of the economic shocks

The first scenario considered is a bust-boom cycle in stock market valuations where, concurrent with a normal cycle, share prices initially plummet by 20 percent during the downturn of the economic cycle and then surge to a level that is 20 percent above the original level, to ultimately return to their trend value (Table 3).[35]

The second scenario is a bust-boom cycle in the housing market, in which mortgage default rates and LGD rates dramatically increase during the downturn, and then rebound during the recovery. In this scenario, PDs of mortgage loans increase to 5.29 percent in the trough of the

[34] Although this may be a less realistic assumption than allowing LGDs to evolve through the cycle, the qualitative results of the simulations would not be altered.

[35] The initial price of the representative stock held by banks was normalized to the value of the S&P 500 Index at end-2006, which closed at 1,418 on December 29th, 2006.

cycle—a magnitude which is commensurate with the recent meltdown in the U.S. housing market.[36] Additionally, the reduction in house values—and thus the expected decline in recoveries—was factored in through a 50 percent increase in the LGD rate over the average values reported in the QIS-5 (i.e., from 20.3 percent to 30.5 percent).

To simulate the cycle in funding conditions, the paper assumes that during the business cycle trough, banks' cost of funding increases by 58.7 basis points. This increase in spreads was obtained by computing the average rise in Libor-OIS spreads for U.S. and European banks during the summer of 2007. Conversely, to analyze the effects of ample liquidity conditions, the simulation assumes that banks' funding costs decrease by the same amount during the cycle peak.

To construct the scenario of distressed securities markets and then recovery, it was assumed that the LGD rates for debt securities sharply increase during troughs and decrease by the same amount during peaks.[37] During the cycle trough, the LGD rate for debt securities increases to 67.3 percent[38] from its initial base of 46.2 percent. Subsequently, the simulation applies the same shock magnitude (but reversed sign) to the LGD during the cycle peak—that is, LGD decreases to 25.1 percent.

[36] To estimate the PDs during the 2007–08 U.S. housing crisis, it was assumed that 100 percent of foreclosures and 70 percent of delinquencies beyond 90 days end up in default. These percentages are then combined with the respective PDs to yield an overall estimated PD of 5.29 percent for all mortgages. See UBS (2007); data source: Merrill Lynch, April 2008.

[37] The rationale behind this characterization of distressed markets follows Altman et. al (2005) in that during times of distress, the demand for securities declines hence reducing both the market price and the recovery rate (i.e., the inverse of LGD) of securities. See Acharya et al. (2007), Altman et al. (2005), and Bruche and González-Aguado (2008) for papers discussing the link between distressed markets and increases in LGD rates.

[38] Derived from Bruche and González-Aguado (2008).

Table 3. Equity-to-Assets Ratio through the Business Cycle
(In percent)

U.S. Commercial Banks

	Baseline	Period 1	Period 2	Period 3	Period 4
	Business-cycle trend	Business-cycle trough	Business-cycle trend	Business-cycle peak	Business-cycle trend
Normal cycle	7.6	7.5	7.6	7.9	7.6
Bust-boom cycle in share prices	7.6	6.3	7.3	9.1	7.6
Bust-boom cycle in real estate	7.6	5.4	7.6	7.9	7.6

U.S. Investment Banks

	Baseline	Period 1	Period 2	Period 3	Period 4
	Business-cycle trend	Business-cycle trough	Business-cycle trend	Business-cycle peak	Business-cycle trend
Normal cycle	3.7	3.8	3.7	3.6	3.7
Bust-boom cycle in share prices	3.7	2.3	3.4	5.0	3.7
Bust-boom cycle in real estate	3.7	3.8	3.7	3.6	3.7

European Banks

	Baseline	Period 1	Period 2	Period 3	Period 4
	Business-cycle trend	Business-cycle trough	Business-cycle trend	Business-cycle peak	Business-cycle trend
Normal cycle	2.9	2.8	2.9	3.0	2.9
Bust-boom cycle in share prices	2.9	1.6	2.6	4.2	2.9
Bust-boom cycle in real estate	2.9	1.9	2.9	3.0	2.9

Source: IMF staff estimates.

B. Simulation Results

The simulations highlight three key points regarding FVA and its potential regulatory and financial stability implications: (i) strong capital buffers are crucial to withstand business cycle fluctuations in balance sheet components, especially when FV is applied more extensively to assets than liabilities; (ii) fair valuing an expanded set of liabilities acts to dampen the overall procyclicality of the balance sheet; and (iii) when combined with additional liquidity shortages in financial markets, the FVA framework magnifies the cyclical volatility of capital.

The effects of economic shocks under full fair value

In the normal cycle, fair valuing both sides of the balance sheet produces fluctuations that are mild compared to the bust-boom scenarios below (Figure 3), an intuitive result.[39] However, it is worth noting that, in the case of the representative U.S. investment bank, equity behaves in a countercyclical manner due to the strong effect of fair valuing the liabilities. Under full FV (FFV), the value of the bank's liabilities declines as economic activity weakens and probabilities of default (PDs) rise, mitigating the decline in equity. This effect arises because of the asset/liability structure of the investment banks' balance sheet, which consists of a large proportion of financial liabilities that are fair valued. Liabilities at FFV, as is done by some U.S. investment banks, can introduce an element of countercyclicality by serving as an implicit counter-balancing hedge to the fair valuation of assets.[40,41] This phenomenon has raised related concerns by some market observers who regard with unease a bank's ability to record revaluation gains as its own creditworthiness weakens and the price of its own debt declines.[42] The presence of gains that are a construct of the particular technique chosen for valuation, signals the need for clear disclosure of underlying assumptions to avoid misrepresentation of financial statements.

In both the bust-boom cycles in equity valuations and in the housing market, the European banks exhibit the largest deviations from trend. For the equity price shock, despite roughly comparable magnitudes of equity shares across the three banks' portfolios, a combination of two effects are at work. First, there is the countercyclical effect of the relatively greater proportion of FV liabilities for investment banks. Second, the European bank has a lower capital base and thus the relative size of valuation changes to normalized equity capital is larger. In the housing market scenario, the European bank exhibits wider fluctuations, despite the fact that the U.S. commercial bank holds a much larger fraction—about two-and-half times greater—of its loan portfolio in mortgages. In both scenarios, the lower capital base of the European bank vis-à-vis the U.S. commercial bank is a key element. Similar results in terms of capital-to-assets ratios are presented in Table 3.3, but reflect a less dramatic impact

[39] The results are presented in terms of the evolution of banks' normalized equity through the cycle—that is, at each point in the cycle, banks' equity is divided by their initial level of equity (i.e., at end-2006). All figures for this section are presented at the end.

[40] Note however that this result reflects only one element of countercyclical forces, as "other liabilities" represents about 50 percent of the balance sheet and can potentially introduce additional countercyclicality.

[41] Chapter 4 of IMF (2008) examines procyclicality of leverage ratios of U.S. investment banks, finding their extreme variation across the cycle. Note this is consistent with the scenario conducted later in this paper where funding spreads vary through the cycle, producing the same procyclicality found in IMF (2008).

[42] See Guerrera and White (July 8, 2008). Additionally, Barth *et al* (2008) suggest that these counterintuitive effects are attributable primarily to incomplete recognition of contemporaneous changes in asset values.

on European banks.[43] More generally, a bank's balance sheet would evolve through the cycle—contracting in downturns and expanding in upturns—such that it would restore a bank's capital adequacy ratio, a result that is not testable in this simple framework.

The recent events have raised two interesting scenarios regarding increased funding costs and a downward spiral in the valuation of debt securities. Sudden changes in bank's ability to obtain funding largely exacerbate the fluctuations in balance sheets (Figure 4). This exercise underscores the significance of general liquidity conditions in driving balance sheet fluctuations, and how the FVA framework recognizes these changes promptly. Interestingly, the countercyclical behavior observed in the U.S. investment banks' equity disappears. In fact, the U.S. investment bank is hardest hit by both the tightening of funding conditions and the distress in securities markets. This should not be surprising given that, contrary to the U.S. commercial and European banks, the U.S. investment bank does not rely on deposits—which are not fair valued—to fund its activities. Note, too, that these simulations do not account for structured credit products or the OBSEs that were so central too much of the 2007–08 turmoil and would likely increase the procyclicality of the balance sheets. Such a deterioration of banks' balance sheets could affect market confidence and overall share prices, which in turn could generate additional volatility in banks' balance sheets.

The results presented thus far have focused on the balance sheets of large internationally active institutions. Comparatively, the more retail-oriented banks tend to have larger loan and mortgage portfolios and rely more extensively on deposits for their funding.[44] To illustrate the effects of these two structural characteristics, simulations comprising the cycle in funding spreads and the bust-boom cycle in real estate were conducted for all banks, excluding the representative U.S. investment bank. The results corroborate the supposition that the more retail-oriented institutions are less vulnerable to changes in funding conditions than their internationally active counterparts (Figure 5). Conversely, the retail-oriented banks are harder hit by a bust in the housing market than the internationally active banks.

The effects of mixed-attributes models

Using two versions of the mixed-attributes model, this exercise shows how the degree to which financial institutions apply FV to their assets and liabilities affects the extent to which there can be offsetting volatility effects. Table 4 shows that financial institutions apply FV differentially. But what is not shown in the table is the extent to which the vast majority of banks continue to use amortized cost to value their loan portfolio. Thus, for the purposes of the simulations, two variations of the model are considered: (i) "financial liabilities and

[43] Some portion of the lower equity position in European banks may stem from differences in IFRS versus U.S. GAAP accounting treatments (*cf.* Citi 2008, *Financial Times*, 2008).

[44] Note, however, that retail-oriented European banks also have a larger fraction of debt securities and financial liabilities than the larger European banks.

bonds" are valued at amortized cost throughout the cycle; and then (ii) in addition, "loans" and "mortgages" are also valued at amortized cost.[45]

Table 4. Application of Fair Value by U.S. and European Banks, 2007
(In percent of total balance sheet)

Financial Institutions	Assets at Fair Value on a Recurring Basis	Liabilities at Fair Value on a Recurring Basis	Return on Equity
JPMorgan Chase & Co.	41	16	12.86
Citigroup	39	22	3.08
Bank of America	27	6	10.77
Goldman Sachs	64	43	31.52
Lehman Brothers	42	22	20.89
Merrill Lynch	44	33	-25.37
Morgan Stanley	44	27	9.75
Credit Suisse	64	39	17.88
Société Générale	46	32	3.36
Royal Bank of Scotland	45	31	15.13
BNP Paribas	65	55	16.98
Deutsche Bank	75	48	18.55
UBS	54	35	-10.28
HSBC	40	25	16.18
Barclays	52	39	20.50
Crédit Agricole	44	24	10.67

Sources: Fitch; and Bloomberg L.P.

Figure 6 underscores the idea that the asymmetric application of a mixed-attributes model, where FV is applied more extensively to value assets than liabilities, has the effect of increasing the procyclical behavior of the balance sheet. In other words, the fluctuations in equity—for all types of institutions and for all the scenarios considered—are larger when a smaller fraction of liabilities are fair valued (compare with Figure 3., the results under FFV). Thus, the benefits intended by the introduction of the FVO, which were to reduce the accounting volatility of the mixed attributes methods and the need for FV hedge accounting techniques, are lessened. This supports an expanded application of FV, rather than a reduced application, as some would like to propose. Bear in mind, however, that the application of FV to banks' own debt may produce revaluation gains as the value of liabilities declines on their balance sheet and that this should be properly disclosed.

This simulation highlights that the greater the imbalance of the mixed attributes application to assets and liabilities, the greater is the accounting volatility. When financial instruments

[45] In effect, valuing these instruments at amortized cost would produce comparable results to being classified as HTM.

are valued at a historical cost that does not represent the current market conditions, an accurate picture of a bank's equity becomes blurred and the informational content of the accounting statements weakens. Historical costs have low information content for investors who rely on current financial figures as a basis for investment decisions. For a regulator, making an accurate assessment of the health of a bank, and formulating the appropriate regulatory response, becomes increasingly difficult.

The second simulation (not shown), where financial liabilities plus loans and mortgages are all valued at amortized cost, showed the range of fluctuations diminished further than in the above simulation. Thus, although the wider application of the mixed attributes model can reduce fluctuations in the balance sheet, the cost comes in the form of a further reduction in up-to-date information.

Smoothing techniques and circuit breakers on reporting prices

Simulations using proposed alternatives to smooth balance sheet volatility show that a smoothing/averaging technique for falling asset prices blurs the bank's capital position, in magnitudes varying by the amount and period over which the averages are calculated. Smoothing techniques and other impediments to allowing valuations to adjust, so called "circuit breakers," make it harder for regulators and investors to accurately assess the financial position of a bank as it hides the economic volatility that should be accounted for in the balance sheet.

To illustrate, two simulations were conducted, each averaging share prices over different lengths. The first simulation uses a two-period average, whereas the second simulation is extended to three periods. As shown in Figure 7, the longer the averaging length, not surprisingly, the smoother is the path of the balance sheet. Notably, the application of a smoothing technique might reduce the occasion for "forced" sales, as it could avoid sale triggers in some cases. Accordingly, this could lessen a downward price spiral in the market for a financial product by avoiding forced sales, but comes at the expense of a reduction in the informational content of financial statements and potentially lengthening the resolution period.

Similarly, concepts such as a circuit breaker, whereby rules stem the recognition of a fall in asset prices, mask the underlying equity position by suspending equity at an artificially higher level than under FV and, more generally, may hamper price discovery. However in this case, the cycle may be extenuated even longer than with a smoothing technique because the circuit breaker can maintain the same value for a given period, while the smoothing is a rolling average that is updated during each period of the cycle. Additionally, this measure is asymmetrically applied, as the circuit breaker has generally been proposed for when valuations are falling. Even though not a preferred technique, for symmetry, one could apply circuit breakers during "bubble" periods to stop the artificial inflation of equity. If not, asymmetric treatment of valuations may create perverse risk-taking incentives for managers

as long as financial institutions are able to benefit from the upside in valuation while the downside would remain capped.

The effects of a changing yield curve

Yield curve effects are introduced to the baseline scenario to evaluate how the change in interest rates over the cycle affects the balance sheet.[46] The paper follows Keen (1989) and assumes the following stylized facts regarding the cyclical behavior of yield curves:[47] (i) both short and long term rates tend to decline during business cycle downturns and to rise during expansions; and (ii) short rates tend to rise more relative to long rates during expansions (i.e., the yield curve flattens) and to fall more relative to long rates during recessions (i.e., the yield curve steepens) (Figure 8).[48]

The influence of interest rates tends to dominate the effect of the change in PDs, such that the interest rate effect dampens the magnitude of procyclical equity fluctuations for the European bank, and even becomes countercyclical for the U.S. commercial bank (Figure 9). For the U.S. investment bank, the change in interest rates renders the evolution of equity procyclical, rather than countercyclical, as in the baseline simulation. This reversal in behavior is due to the fact that the U.S. investment bank has a slightly larger share of FV liabilities than assets being revalued when interest rates change.[49] But this also highlights the European banks as an intermediate structure between the investments banks and retail bank characteristics. Regardless of the balance sheet structure, changes to interest rates and other monetary policy tools can dampen procyclical influences, suggesting countercyclical monetary policy could have the beneficial outcome of also helping to counteract the effects of the asset valuation cycles on banks' equity. Note, however, these simulations do not allow the financial institutions to respond to policy changes, and thus these results, while informative, should be taken with caution.

[46] Although this simulation is subject to the Lucas critique in that bank behavior is assumed not to change in response to policy adjustments, it provides some insights into the interaction between FVA and interest rates.

[47] See Piazzesi and Schneider, (2006) and Keen (1989).

[48] Interestingly, the addition of changes in the yield curve counteracts the effect of the evolution of PDs. The drop in the yield curve in the downturn results in higher valuations and thus counterbalances the downward effect of the PDs, while the positive effect on valuations stemming from lower PDs is counterbalanced by a higher yield curve in the upturn.

[49] This simulation abstracts from the effect of revaluing interest rate swaps. Unfortunately, it was not possible to obtain a sufficiently complete and consistent dataset on these instruments to include them in the simulation. Nevertheless, preliminary results using available data on interest rate swaps showed similar qualitative results.

IV. Conclusions and Policy Recommendations

The financial turmoil that started in July 2007 unveiled weaknesses in the application of some accounting standards[50] and with the valuation and reporting of certain structured products. While these weaknesses may have contributed to the current crisis, they also provide an opportunity to better understand them.

The paper finds that, despite concerns about volatility and measurement difficulties, FVA is the appropriate direction forward and can provide a measure that best reflects a financial institution's current financial condition, though various enhancements are needed to allow FVA to reinforce good risk management techniques and improved prudential rules. Nevertheless, the application of FVA makes more transparent the effects of economic volatility on balance sheets that, under certain risk management frameworks, could exacerbate cyclical movements in asset and liability values. Exaggerated profits in good times create the wrong incentives. Conversely, more uncertainty surrounding valuation in downturns may translate into overly tight credit conditions, and negatively affect growth at a time when credit expansion is most needed. This is not to say that alternative accounting frameworks, such as historical cost accounting, avoid such fluctuations, but rather that FVA recognizes them as they develop. Regardless, accounting frameworks are not meant to address the market-wide or systemic outcomes of their application, as they are applied only to individual institutions. Nevertheless, much of the controversy surrounding FV stems more from the risk management and investment decision rules using FV outcomes, rather than the framework itself. Delinking the interaction of FV estimates from specific covenants, such as sales triggers, margin calls or additional collateral requirements during downturns, or compensation tied to short-term profits during upturns, are options that could mitigate the procyclical impact of FVA.

Overall, the simulations confirmed a number of issues in the ongoing FVA debate and underscored three key points regarding FVA and its potential regulatory and financial stability implications: (i) strong capital buffers and provisions make an important contribution to withstanding business cycle fluctuations in balance sheets, especially when FVA is applied more extensively to assets than liabilities; (ii) when combined with additional liquidity shortages in financial markets, the FVA framework magnifies the cyclical volatility of capital; and (iii) fair valuing an expanded set of liabilities acts to dampen the overall procyclicality of the balance sheet. However, the latter may also give rise to the counterintuitive outcome of producing gains when the valuation of liabilities worsens. This is of particular concern when a deterioration in a bank's own credit worthiness, and the subsequent decline in value of own debt, results in profits and a false sense of improvement in the bank's equity position.

[50]Although the weaknesses are related more to issues of OBSEs, consolidation, and derecognition, than to FV.

Proposals for alternative accounting methods, such as historical cost or simplistic mechanisms to smooth valuation effects on bank balance sheets, reduce the transparency of a financial institution's health by blurring the underlying capital position. While these techniques may avoid sale triggers incorporated in risk management covenants and limit downward price spirals, the measurement variance introduced by such techniques can increase uncertainties regarding valuations. The loss of transparency makes it more difficult for all users of financial statements, for example, for supervisors to conduct adequate oversight of financial institutions and recommend appropriate regulatory measures to deal with prudential concerns, and for investors who will demand increased risk premia in the face of uncertainty.

Policy proposals

Most proposals should aim to deal with the *use* of FV estimates to lessen the volatility that FVA can introduce to the balance sheet. Assessments of provisioning and capital adequacy should take better account of the business cycle. Improved transparency can be achieved not necessarily by more disclosures, but better disclosures. Financial, accounting and regulatory bodies are already providing guidance and recommendations in this direction.

- The simulations support the relevance of establishing a capital buffer that looks through the cycle, augmenting the capital position during boom cycles to withstand the burden on capital that stems from economic downturns. Although a partial analysis, the simulations show that FVA can introduce financial statement volatility and provide a first indication that buffers of around 2-4 percent of additional capital would help banks weather normal cyclical downturns, whereas higher buffers—on the order of 30–40 percent extra capital—would be needed to offset more severe shocks. Recognizing that these estimates do not reflect concurrent changes in risk-weighted assets, they nevertheless provide an initial estimate of the magnitude of the needed capital buffer, as well as the direction for further analysis. Note that these are not adjustments to FV calculations, per se, but are adjustments meant to help mitigate the impact on bank balance sheets. Consideration to making other changes to the accounting framework so that the FV calculations themselves obviate the need for these other adjustments would be useful at this juncture.

- Broadening the current narrow concept of provisions to incorporate additional methods of retaining income in upswings could provide a way of better offsetting balance sheets' procyclical effects, for not-fair-valued assets. It is generally agreed that provisions protect against expected losses and capital protects against unexpected losses. A build-up of provisions better linked to the expected volatility, higher risks and potentially larger losses of an asset, could better anticipate the potential negative effects on the balance sheet that would be reflected through the cycle, as long as the build-up does not provide a way for smoothing or manipulating earnings. Coordination between accounting standard setters and supervisors would be needed to effect such changes.

- Similarly, the use of forward-looking provisioning, [51] combined with a supervisor's experienced credit judgment in assessing the probability of default, loss given default and loan loss provisioning,[52] could mitigate the procyclical forces on the balance sheet. The recognition of credit losses in the loan portfolio earlier in a downward cycle would lessen an accompanying decline in bank profits and the potential for a squeeze in credit extension that could contribute to a further downward economic trend. Similarly, on the upside, dividend distributions should only come from realized earnings that are not biased by upward cyclical moves.

- From an oversight perspective, the simulations underscore the importance of understanding the cyclical implications of FVA. An enhanced role for prudential supervisors will be needed to ensure close inspection of a bank's risk profile and risk management practices, and make appropriate recommendations for augmented capital buffers and provisions, as needed. A comprehensive bank supervisory framework should include stress tests of FV positions through the business cycle. Similarly, auditors will have a critical role to play in ensuring credibility, consistency and neutrality in the application of FVA, and overall in supporting market confidence rather than appearing to augment procyclicality by encouraging lower valuations during a downturn. A closer collaborative framework among audit and accounting standard setters and supervisors would be highly beneficial for markets and financial stability.

- In light of the different dynamics through the financial cycle and the doubts that can surround valuations, FV estimates should be supplemented by information on a financial instrument's price history, the variance around the FV calculations, and management's forward-looking view of asset price progression and how it will impact the institution's balance sheet. Reporting a range within which the FV price could fall would help users of financial statement to better understand and utilize the volatilities with which they are dealing. FV estimates should be supplemented with detailed notes on the assumptions underlying the valuations and sensitivity analyses, so that investors can conduct their own scenario analyses and determine whether the FV price is representative of market conditions.

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[51] Forward-looking provisioning denotes provisions based on the likelihood of default over the lifetime of the loan, reflecting any changes in the probability of default (after taking into account recovery rates). Dynamic (or statistical) provisioning can be considered an extension of forward-looking provisions with reliance on historical data on losses for provisioning calculations. Conceptually, dynamic provisioning would entail that during the up-side of the cycle, specific provisions are low and the statistical provision builds up generating a fund; during the downturn, the growth in specific provisions can be met using the statistical fund instead of the profit and loss account. Enria al (2004) and Bank of Spain (www.bde.es).

[52] Basel Committee on Banking Supervision (2006b) and IAS 39.

- More refined disclosures could meet the expanding needs of various users, including investors, supervisors, and depositors, in a common framework of disclosure. For example, a series of shorter reports that would be available on websites[53] and issued more frequently (e.g., quarterly)[54] and cater to a narrower group of user's needs could highlight the most relevant information, with a particular emphasis on risk developments. Further, the volatility associated with a FV balance sheet may mean that the balance sheet is no longer the primary medium for evaluating bank capital. Market participants and supervisors may increasingly turn to cash flow statements, income and equity statements and risk measures to provide enhanced information and these statements must evolve in response to users' needs.

- Albeit of a simple structure and subject to isolated shock scenarios, the simulations point to the fact that the application of FV to both sides of the balance sheet would introduce a countercyclical component that may cushion some of the financial shocks that can result in large swings in bank equity. This result, however, arises in the shock scenarios, in part, from a deterioration in the own-debt values as risk premia rise on the liability side of the balance sheet. This logically compensates for the deterioration of the asset side during a downturn. From the viewdpoint of assessing the riskiness of the financial institution or its future prospects, the result can be viewed as paradoxical, as it can hardly be regarded as a positive factor for the financial institution to have its own-debt values deteriorate. The simulations also illustrate how a bank's response to a particular shock varies substantially depending on the specific balance sheet structure and thus there is a need to discern the source of the cyclicality through additional disclosures.

A key challenge going forward will be to enrich the FVA framework so that market participants and supervisors are better informed, in order to promote market discipline and financial stability. The fragmented solution that currently exists between the accounting, prudential and risk management approaches to valuation is insufficient and must be reconciled. Importantly, this will require adjustments on the part of all three disciplines to resolve these tensions.

[53] FASB's XRBL project for financial institutions would provide data on-line in about three years, as discussed in the IMF April 2008 edition of the *Global Financial Stability Report* (IMF 2008b).

[54] This would be separate from U.S. SEC 10-Q filings.

Figure 3. Simulation of Full Fair Value

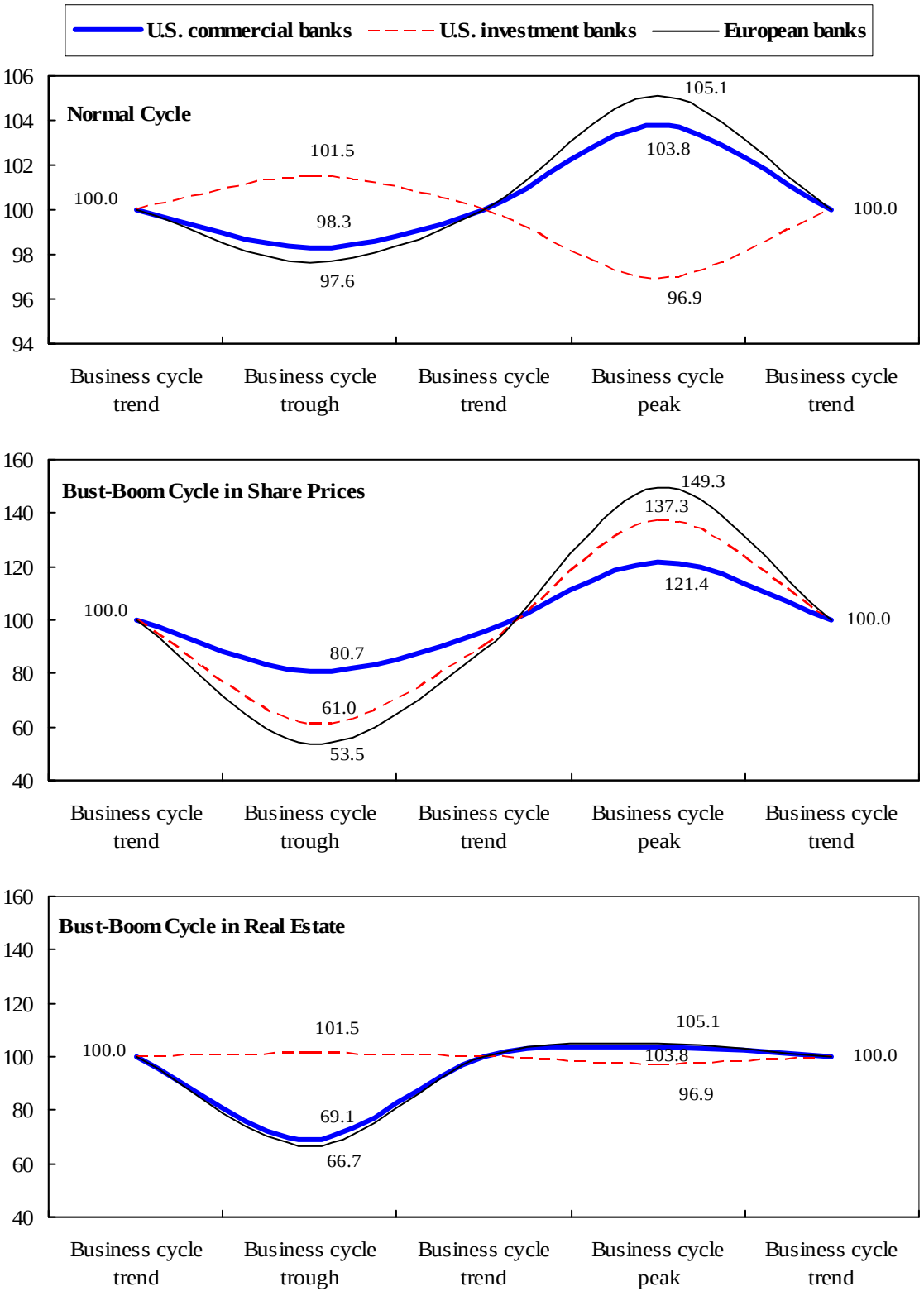


Figure 4. Simulation of Full Fair Value: Changes in Funding Conditions and Financial Market Distress

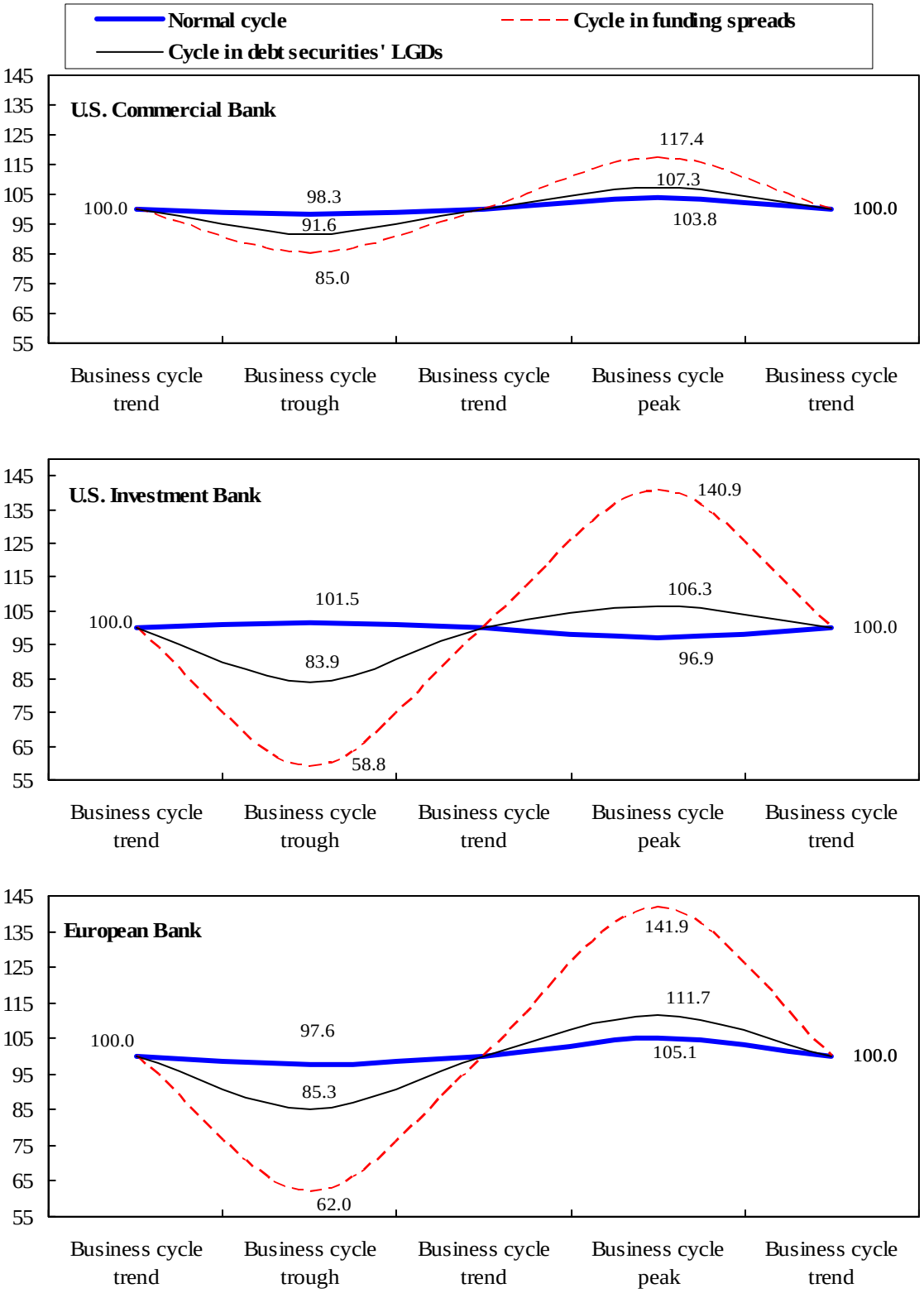


Figure 5. Simulation of Full Fair Vaue: International versus Retail-Oriented Banks

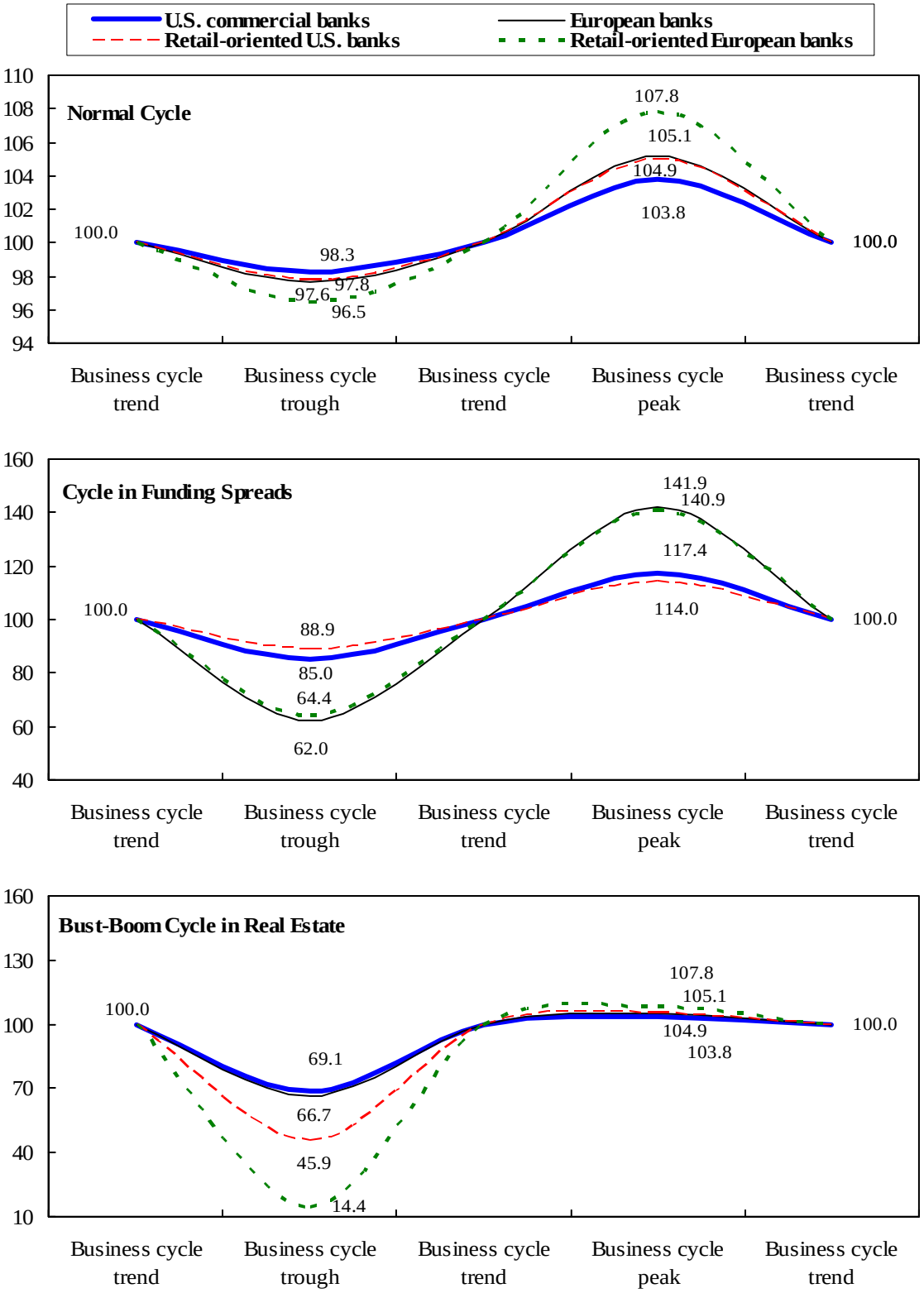
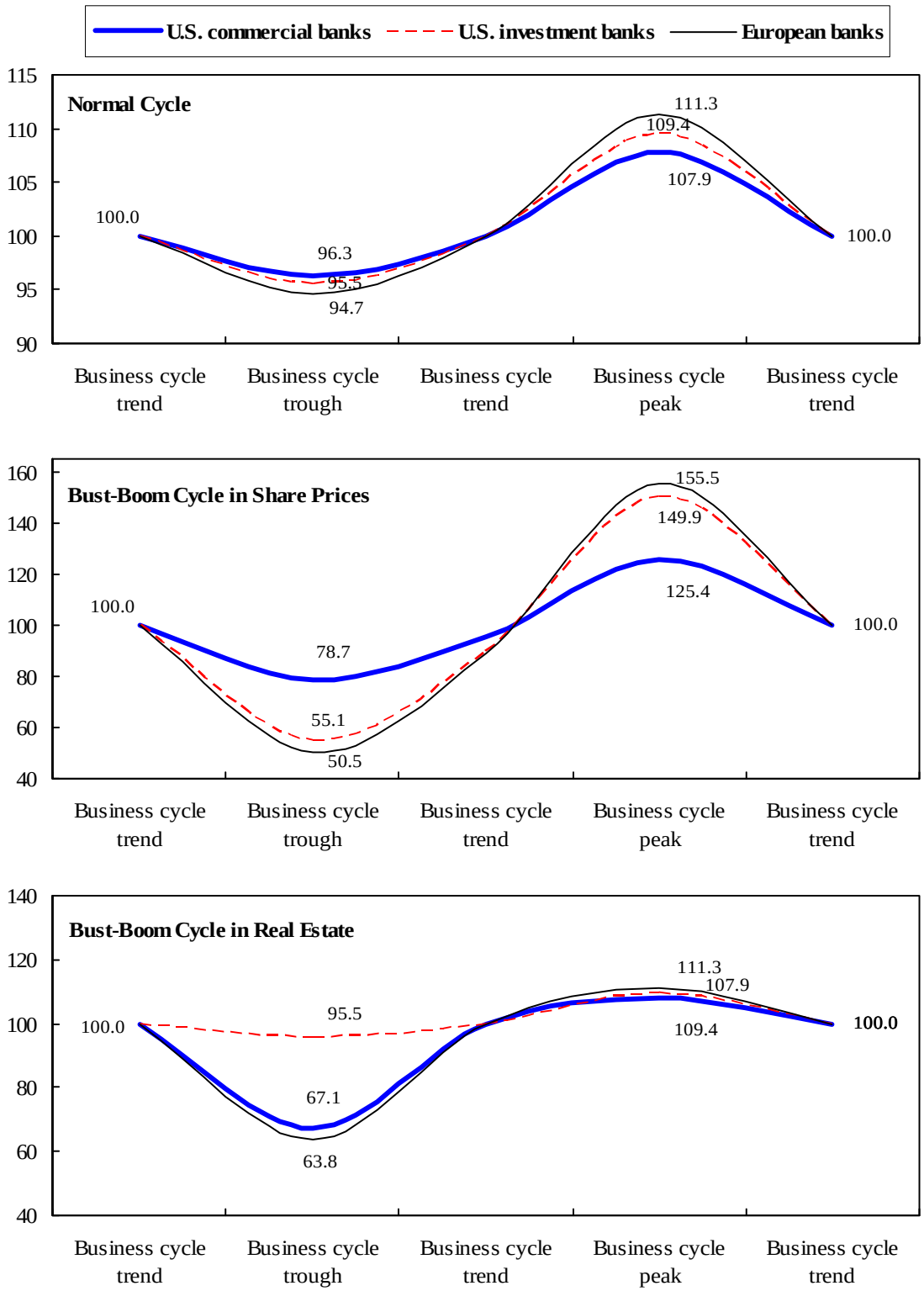


Figure 6. Simulation of Partial Fair Value 1/



1/ Includes short-term and long-term financial liabilities valued at amortized cost.

Figure 7. Simulation of Smoothing Techniques

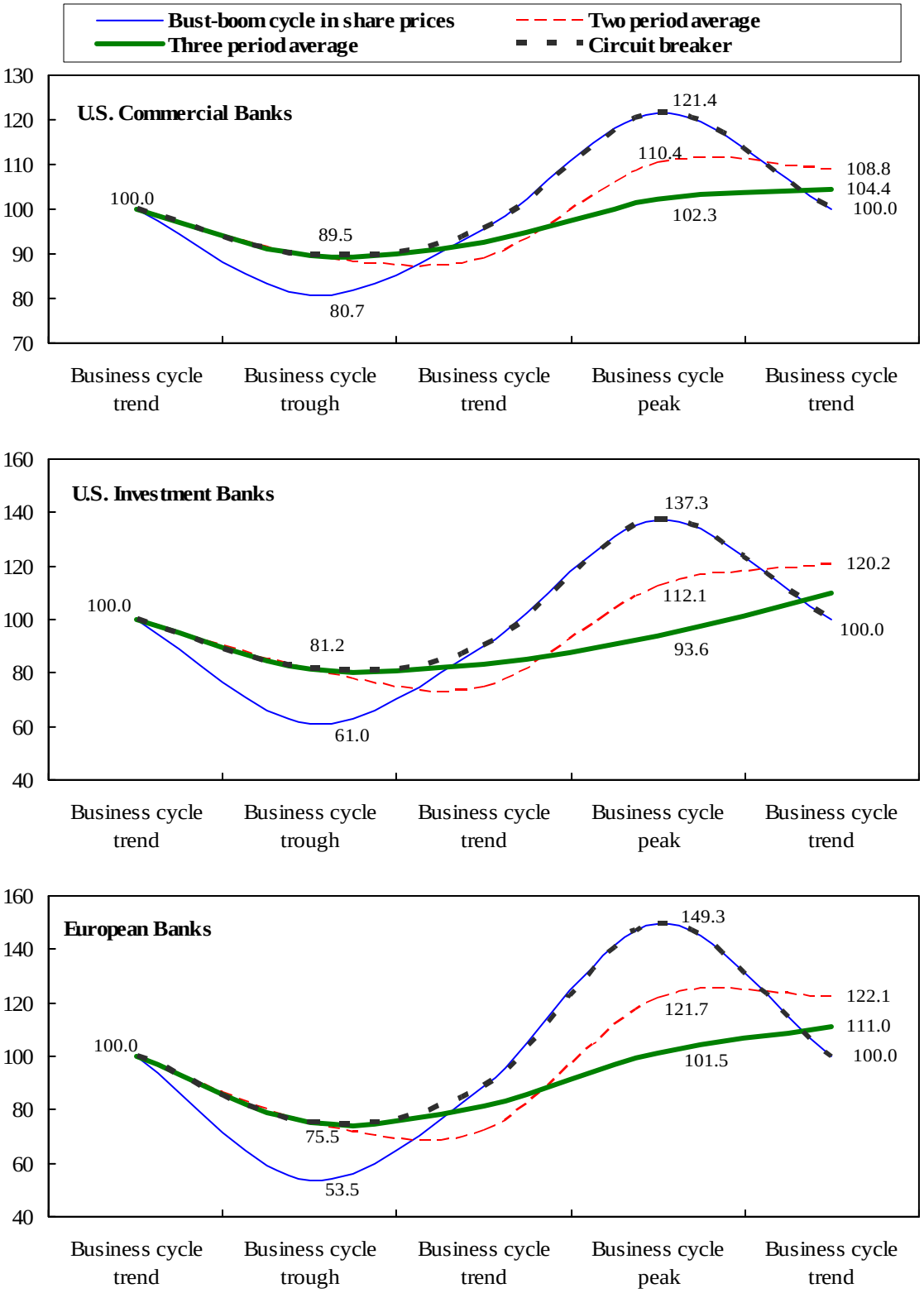


Figure 8. Yield Curves and Business Cycles
(In percent)

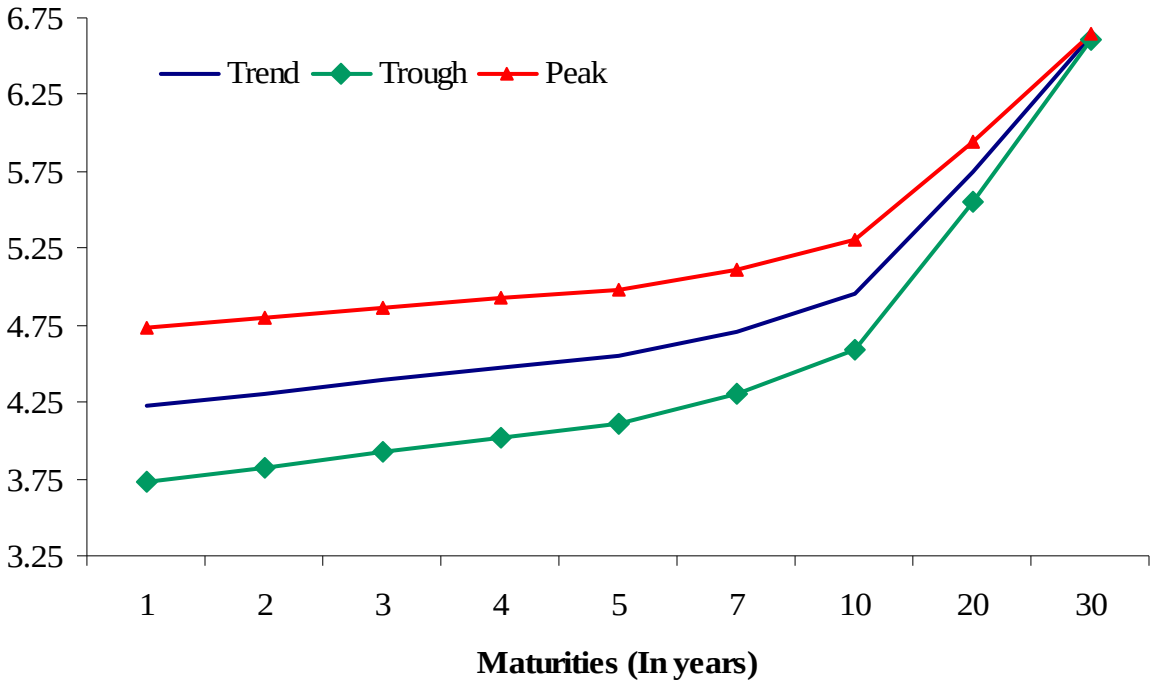
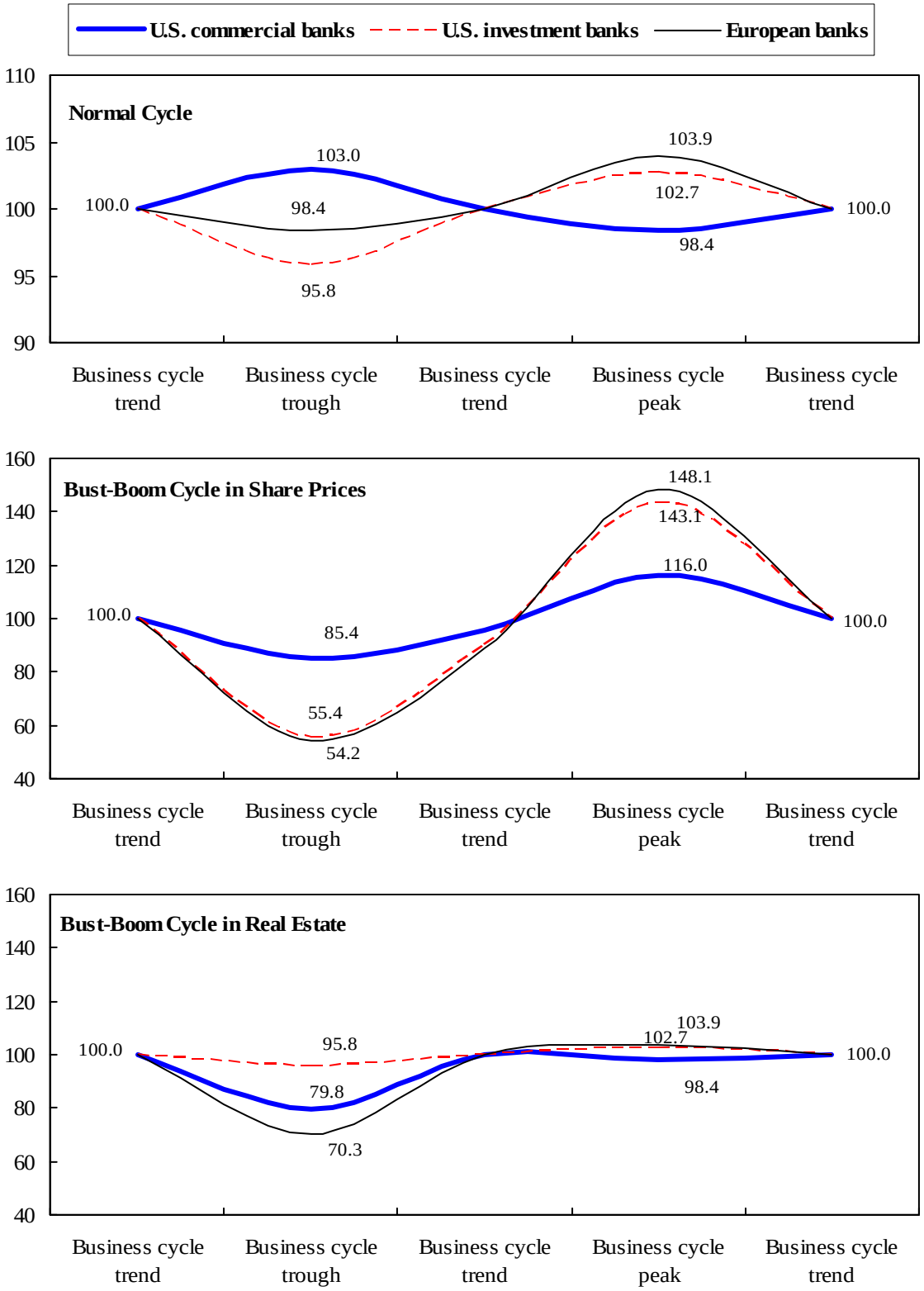


Figure 9. Simulation of Full Fair Value with Upward Sloping Yield Curve



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