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Fair Value Accounting and Market Conditions

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This paper analytically examines how market condition affects the effectiveness of fair value accounting (FVA). Fair value accounting has been one of the most controversial accounting subjects. The recent global financial crisis highlights the disparity between the views of its supporters who see it as panacea and its critics who consider it a Pandora's Box. The research on FVA, with the mixed findings, also failed to yield a conclusive outcome. In the history of financial reporting FVA has fallen in and out of favor with regulatory bodies several times. It appears that the changes in regulatory position towards FVA tended to occur in the aftermath of a major financial crisis, suggesting that the effectiveness of FVA is affected by the state of market conditions. Using a simple model tracking the performance of a portfolio over a two-period horizon under fair value accounting and historical cost accounting (HCA) regimes, respectively, this study finds that fair value accounting is more effective when the market volatility level is low and vice versa. The findings of this paper suggest a new dimension in future research of FVA and provide a possible reconciliation of the contradicting empirical results of the existing studies.

Keywords: Fair value accounting, accounting measurement, market efficiency, market volatility

1. Introduction

One of the most controversial changes in financial reporting is the reintroduction of market values as acceptable accounting measurements. Despite the growing acceptance by regulatory bodies and accounting standard setters in recent years, fair value accounting (FVA) remains one of the most contentious accounting issues. The 2007-2009 global financial crisis only highlighted the profound disparity between the views of the opponents and proponents of FVA. On the one hand, the opponents of FVA claim that FVA is pro-cyclical by allowing companies to over-extend their leverage in a boom and forcing write-downs and sell-offs in a bust, thus exacerbating the severity of a financial crisis. On the other hand, the proponents of FVA argue that by signaling opportunity when a market is improving and giving early warnings when the market is deteriorating FVA leads to superior business decisions. This study extends and contributes to the debate by examining the impact of market condition on the effectiveness of FVA.

A review of the history of financial reporting reveals that the acceptance of FVA has undergone several major changes over the years. FVA in its various manifestations was widely used in the US before mandatory financial reporting requirements. It fell out of favour and was abolished all together shortly after the Great Depression, partly due to the damaging role it was believed to have played in the Depression. FVA was reintroduced in the US GAAPs following the US Saving and Loan (S&L) crisis in late 1980's in which historical cost accounting (HCA) proved to have worsened the losses eventually suffered

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by the S&L industry. FVA was under major attack again during the recent global financial crisis triggered by the collapse of the US sub-prime mortgage market. The history of FVA seems to point to the possibility that FVA's performance is affected by the market conditions in which it is applied. That could possibly explain why the extant research on FVA, in which market conditions are typically not controlled for, has yielded the mixed findings.

This study analytically examines the impact of market condition on the effectiveness of FVA using a simple two-period model. At the beginning of the two-period cycle a certain amount of equity is invested in a portfolio with some assets that can be measured at either fair value or historical cost. The portfolio has predetermined leverage ratio and asset mix. The first period results are reported under FVA and HCA regimes, respectively. The portfolio is rebalanced accordingly based on the reported first period results and the predetermined leverage ratio and asset-mix. The portfolio is liquidated and the cumulative returns are determined at the end of the second period.

The model of this study measures the effectiveness of FVA as the excess cumulative returns of the portfolio under FVA over HCA. The analysis shows that the cumulative returns are greater under FVA only when the market volatility level is low. When the market is highly volatile the cumulative returns under FVA are less than those under HCA. If greater cumulative returns reflect the superiority of the interim investing and financing decisions which, in turn, reflect the quality of the interim accounting information these decisions are based on, then fair value accounting is more effective when market volatility level is low and vice versa.

This study contributes to fair value accounting research by offering a new perspective to interpret the contradicting findings of the extant research that could potentially lead to conciliation. More importantly, this study suggests a new direction to advance future FVA research. Information about the advantages and limitations of FVA under various market conditions can also be useful to regulatory agencies and accounting standard setters in their review and evaluation of the policies that rely on fair value measurements and the financial reporting standards that require the use of fair values.

The remainder of this paper is organized as follows: Section 2 reviews the evolution of FVA; Section 3 discusses the relationship between market efficiency and fair value; Section 4 describes the analytical model and the results of the analysis; Section 5 interprets the results of the analytical model; Section 6 provides some numerical examples; Section 7 discusses the validity and the limitations of the study; and Section 8 concludes by suggesting future research opportunities.

2. A Brief History of Fair Value Accounting

Unlike the common perception that FVA is relatively new, FVA has been widely used in the early-twentieth century in the period prior to the Great Depression and the development of mandatory accounting standards. During this period companies had significant latitude in selecting their own accounting practices. The use of "current values" or "appraised values" for long-term assets and upward revaluations of these assets were

common-place. Moreover, banking organizations were required for supervisory purposes to use market value for their investment security portfolios.

During the Great Depression, the crashing stock prices caused many financial institutions to fail. In 1938, former US President Franklin D. Roosevelt abolished the use of mark-to-market because it was believed that this accounting measurement technique contributed to the severity of the Depressions (Cascini & DeFavero 2011; Stein & Wesbury 2009). In the aftermath of the great Depression there was also a general move towards more "conservative" accounting and away from the use of "current values" or "appraised values" for long-lived assets. By 1940, the "market values", "current values" and "appraised values" were virtually extinct from financial reporting and "historical costs" became the norm.

The dominance of HCA encountered serious challenge during the US savings and loan crisis of the 1980s. In the late 1970s and early 1980s, interest rates were driven up by high inflation. Many savings and loans institutions were then in a position where they had to pay a higher rate of interest to compete for short-term deposits than they were earning on their existing long-term fixed-rate mortgage loans. If these savings and loan institutions had to sell their mortgage assets to repay their deposits they would have had to discount severely their mortgage assets. In some cases, the "current value" of their assets was less than the value of their liabilities, and these institutions were essentially economically insolvent. However, under the historic cost accounting model, these losses were not reflected in their financial statements. In effect, the historical-cost-based financial statements obscured underlying economic losses and allowed troubled financial institutions to go undetected. This led to various calls in the late 1980s and early 1990s for more use of market values in regulatory accounting for financial institutions (Epstein & Henderson 2011).

The change in the financial industry business environment during the 1980s also provided inducements for the progress of fair value accounting. Deregulation of interest rates during this period caused a change in the strategies of financial institutions and gave rise to the creation of many new financial instruments. To cope with the challenges of reporting an ever growing number of new financial instruments, accounting standards using fair value were being developed on an issue-by-issue basis in the next two decades. As a result the definitions of fair value and guidance for applying fair value measurements were dispersed among many accounting pronouncements that require fair value measurements. There various definitions and guidance were not always consistent. The Financial Accounting Standards Board (FASB) released Statement of Financial Accounting Standard (SFAS) No. 157, *Fair value Measurements* in September 2006 to provide a single definition of fair value and to establish a framework for measuring fair value and disclosure requirements about fair value measurements.

The issue-by-issue basis of developing accounting standards also resulted in a mixed accounting system in the treatment of financial instruments. Some instruments were valued at historical cost and others at fair value. As well, some fair value gains and losses were included in earnings and others were considered other comprehensive income and were excluded from the income statement. In December 2000, a multi-national joint

working group developed a proposal to use full fair value accounting (FFVA) for all financial instruments, with the objective to improve the quality, coherence and information content of financial statements.

Around the similar time that FFVA was gaining traction a global financial crisis was developing, triggered by the collapse of the US housing market. By 2007 many banks and financial institutions with large investments in sub-prime based assets found that the value of these investments plunged significantly. According to FVA, the losses due to the fall in market value must be recognized and the assets value must be written down. In order to maintain the required capital ratio and fend off margin calls under the circumstances, some companies were forced to sell off their assets at fire-sale prices which, in turn, further hastened their downward spiral. FVA was blamed by many for exacerbating the severity of the crisis (Flegn 2008; Robinson & Hronsky 2008; Young 2008; Heaton, Lucas, & McDonald 2009; Laux & Leuz 2009; Regassa & Wink 2010; Wagner & Garner 2010; McMahon 2011).

Under the pressure to suspend FVA, the US Congress ordered the Security Exchange Commission, in consultation with the Board of Governors of the Federal Reserve System and the Secretary of the Treasury, to conduct a study on the role FVA played in the crisis. In the meantime, the FASB issued a number of "interpretations" and "clarifications" to emphasize the provisions in SFAS No. 157 that allow the departure of fair values from the market prices when markets are "inactive" and transactions are "disorderly" (Level 3 fair value inputs). Similarly, the International Accounting Standards Board (IASB) issued an amendment to International Accounting Standard No. 39 *Financial Instruments – Recognition and Measurement* to allow reclassification of certain assets from held-for-trading to available-for-sale or held-to-maturity, giving companies the opportunity to avoid recognizing future fair value losses on these assets.

The investigation by the SEC resulted in the issuance of "Report and Recommendations Pursuant to Section 133 of the Emergency Economic Stabilizing Act of 2008: Study on Mark-to-Market Accounting". In this report, the FASB reaffirmed the soundness of fair value reporting, accepting that there is no convincing empirical evidence that fair value caused the 2007-2009 global financial crisis and concluding that "the crisis is primarily the result of bad operating, investing, financing decisions, poor risk management and in some instances, fraud" (Ryan 2008).

3. Fair Value and Market Efficiency

Fair Value is currently defined by the FASB and the IASB as "the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date". According to this definition fair value is simply the exit market price at the reporting date as long as the market is orderly. The definition does not assume that fair value represents the "intrinsic value" or "economic value". Rather, the implied "fairness" of this exit market price relies on the general belief that markets are efficient or the "market prices are generally the best available measure of economic value" (Heaton, Lucas, & McDonald 2010).

According to Fama's efficient market hypothesis (EMH) (Fama 1965) stock market efficiency causes existing share prices always to incorporate all publicly available relevant information. Stocks always trade at their true value or intrinsic value. However, the reality of capital market booms and crashes has largely discredited the idea that markets are efficient and that prices always reflect fair (intrinsic) value. For example, the Dow Jones Industrial Average (DJIA) fell by over 20 percent in a single day in the 1987 stock market crash, indicating that stock prices can seriously deviate from their true values.

Other finance theories such as behavioral finance and momentum theory offer alternative explanations for the performance of stock pricing and capital markets. Behavioral finance asserts that the market price often diverges from fair value because of various common cognitive biases among investors. Momentum theory posits that the commonly observed propensity for trending in prices is caused by the imperfect knowledge possessed by investors about the cause of their under-performing investments. As the losses grow, investors react by transferring funds to the out-performing investments, thereby amplifying the price changes that generate momentum (Vayanos & Woolley 2008). Momentum is incompatible with an efficient market and has been described by Fama and French (1993) as the "premier unexplained anomaly" in asset pricing.

If markets, hindered by imperfect human rationality and knowledge, typically operate with imperfect efficiencies, then whether the market prices are "the best available measure of economic value" (Heaton, Lucas, & McDonald 2010) should depend on the efficiency level of a particular market. In other words, the "fairness" of market price would depend on the degree of market efficiency and is subjected to empirical verification.

The existing empirical studies on fair value indeed find mixed results in the comparison of FVA and HCA. For instance, Herrmann et al. (2006) find that fair value measures for property, plant and equipment are superior to historical cost in predictive value, feedback value, timeliness, neutrality, representational faithfulness, comparability and consistency. In other words, among all the qualitatively characteristics of accounting information in the financial reporting conceptual framework, the only one favoring historical cost over fair value is verifiability. These findings clearly support the use of fair value measurements.

In contrast to Herrmann et al. (2006), Barth et al. (1995) finds that because fair value based bank earnings are more volatile, fair value will lead to more frequent violations of regulatory capital requirements. However, bank share prices reflect neither the incremental volatility in earnings nor the potential increase in regulatory risk associated with fair values. In addition, bank share prices reflect interest rates changes even though their investment securities' contractual cash flows are fixed, indicating that bank share prices are not affected by reported superficial fair value volatility but reflect the impact of changes in market interest rates even though it is not reported. Eng et al. (2009) find that the excess of fair value over original value (historical cost) of energy trading assets and energy trading liabilities is not relevant for valuation. They infer that since fair values are subject to management estimates and not verifiable, they constitute poor signals of worth and performance. Dechow et al. (2009) find evidence that indicates that managers use the flexibility available in FVA rules to manipulate the income from securitization activities to smooth earnings. The findings of these studies cast doubts about the advantages of FVA.

4. The Model and the Analysis

The model used in this study compares the effectiveness of FVA and HCA over a two-period investment horizon. At the beginning, a certain amount of equity is invested in a portfolio with some assets (investment assets) that can be accounted with either FVA or HCA. The portfolio has predetermined leverage ratio and asset-mix. Under the FVA regime the gains or losses of the investment assets, regardless realized or not, are recognized at the end of each period. Under the HCA regime only the realized gains and losses are recognized at the end of each period. Interim adjustment based on the reported accounting results takes place to restore the predetermined debt ratio and asset-mix. At the conclusion of the two-period investment cycle, the portfolio is liquidated and cumulative returns on investment are determined.

The effectiveness of FVA and HCA is determined by the cumulative two-period returns on investment under each reporting regime. This is based on the notion that greater cumulative returns reflect the superiority of the interim investing and financing decisions which, in turn, reflect the quality of the interim accounting information these decisions are based on, then greater cumulative returns signify a more effective accounting regime and vice versa. The detailed assumptions and mathematical derivation of the model are presented in the Appendix. The conclusion of the mathematical model analysis can be summarized as follows.

If the volatility level of the investment assets market is low the investment concludes with higher cumulative returns or lower cumulative losses under an FVA regime than under an HCA regime. The market is defined as of low volatility if the market price moves in each period in the same direction as the overall two-period price change in the model.

If the market volatility level is high the investment concludes with lower cumulative returns or higher cumulative losses under an FVA regime than under an HCA regime. The market for the investment assets is defined as of a high level of volatility if in one of the two periods the market price moves in the opposite direction as the overall two-period price change.

The model assumes certain entry and exit prices for the investment assets at the beginning and the end of the two-period horizon and allows the price to move freely in the interim. The degree of market volatility is thus measured as the relative positions of the interim market price in relation to the beginning (entry) and the ending (exit) prices. Under this assumption, in a market in which the price moves in each period in the same direction as the overall two-period price change the interim price change in the first period is **indicative** of the overall price change. An indicative market is relatively less volatile. On the other hand, in a market where in the first period the price moves in the opposite direction as the overall two-period price change the interim price is **contradictive** to the overall price change; in a market where the price in the first period moves in the same direction as the overall two-period price change but over-shoots and ends up reversing itself in the second period the interim price is **hyperactive**. Both contradictive markets and hyperactive markets are relatively more volatile.

5. Interpretation and Discussion

In An Up Market

In an up market, the market price of the investment assets increases overall during the two-period cycle. If the market is indicative the market price increases in both periods of this two-period cycle as well. The interim adjustment made to the portfolio based on FVA figures allows the company to recognize the first period gain on the investment assets and to leverage this gain for additional investment. Consequently, greater gain will be realized as the market price continues to rise in the second period due to the increased investment base. Under HCA, no interim gain on the investment assets would be recognized and no additional investment would be made. This scenario is consistent with the notion that HCA could cause under-utilization of the resources and hinder growth compared to FVA.

If the market is contradictive, the market price of the investment assets decreases in the first period. The resulting loss of the first period is recognized under FVA. The interim adjustment to the portfolio based on the FVA figures leads to the sale of part of the existing assets at a temporarily depressed price to maintain a sufficient capital ratio. When the market price rises in the second period, less gain will be realized because of the reduced investment base.

If the market is hyperactive, the market price of the investments increases above the eventual exit price at the end of the second period. The inflated gain of the first period is recognized under FVA. The interim adjustment to the portfolio leads the gain to be leveraged to purchase additional investments at a highly inflated price. When the market price falls in the second period, a greater loss will be realized because of the additional investment purchased at the much higher price. This scenario would be consistent with the criticism that FVA is pro-cyclical and helps to create booms and busts.

In A Down Market

In a down market, the market price of the investment assets decreases overall during the two-period cycle. If the market is indicative, the market price decreases in both of the periods. The loss from the investment assets in the first period is recognized at the end of the first period under FVA. The interim adjustments based on the FVA figures would require the sales of some of the existing investments and the payoff of some existing debt to maintain the required capital ratio. Consequently, a smaller loss will be realized in the second period as the price continues to fall due to the already reduced investment base. Under HCA, however, the unrealized loss on the investment assets in the first period would be hidden. This scenario illustrates the role of HCA in the US S&L crisis in the 1980s.

If the market is hyperactive, in the first period the market price decreases below the eventual exit price at the end of second period and recovers somewhat in the second period. The exaggerated loss of the first period is recognized at the end of the first period. To maintain sufficient capital ratio, part of the existing debt will be repaid by selling part of the existing investments at a severely depressed price. At the extreme, selling investments

at fire-sale price could drive the business to a premature bankruptcy. Even if the portfolio survives when the market price recovers in the second period not as much gain will be realized because of the reduced investment base. This scenario illustrates why FVA is blamed for exacerbating the severity of the recent global financial crisis. It is also why provisions are made in the fair value accounting models by both the FASB and the IASB to allow firms to abandon quoted market prices under certain market conditions and to estimate fair value by making adjustment to other market-based inputs or by using non-market- based inputs.

If the market is contradictive, the market price of the investment assets increases in the first period despite the overall decrease and reverses in the second period to end low. The unrealized gain on the investment assets is recognized under FVA and is leveraged to acquire more investments at an inflated price. When the market price falls in the second period, greater loss will be realized because of the additional amount invested. This could create a potentially disastrous consequence but little public debate has been focused on the effect of FVA when a market is overly exuberant. This is partly because intrinsic value is unobservable. It is far more difficult to discern an over-heated market than a depressed or inactive market *ex ante*. Another factor is that most parties involved benefit from overly exuberant market conditions, at least temporarily until the bubble bursts. People do not tend to complain as much about prosperity. Even after a market crash, the ensuing wrath tends to be directed more at the catastrophic descent than the preceding dangerous ascent.

6. Numerical Examples

In this Section numerical examples are given to illustrate the findings of the analytical model. The following numerical assumptions are made.

1) The predetermined asset mix is 60% of investment assets and 40% of other assets.
2) The investments can either be accounted for using HCA or FVA.
3) The predetermined debt ratio is 70%.
4) The rate of return on other assets is 7/4 of the interest rate on the debt. Therefore, the earnings from the other assets would be just sufficient to cover the cost of the debt.
5) The initial total assets are $100: $60 in investment assets and $40 in other assets.
6) The initial equity capital invested by the shareholders is $30, thus the debt at the beginning of the first period is $70.

In an up market, the price of the investment assets is assumed to end up 40% higher at the end of the two-period cycle. The interim market price is allowed to vary from 20% lower at the lowest to 60% higher at the highest of the initial price. The two-period cumulative returns under various market conditions in dollar amount under both FVA and HCA presented in Table 1.

Table 1: Numerical Examples of Differential Returns in an Up Market

Scenario	1	2	3	4	5	6	7	8	9
P_b	60	60	60	60	60	60	60	60	60
$P_{i\%}$ (as % of P_b)	80%	90%	100%	110%	120%	130%	140%	150%	160%
$P_{e\%}$ (as % of P_b)	140%	140%	140%	140%	140%	140%	140%	140%	140%
$RETURN_{FVA}$ ($)	15.0	20.7	24.0	25.6	26.0	25.4	24.0	22.0	19.5
$RETURN_{HCA}$ ($)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
$RETURN_{FVA-HCA}$	-9.0	-3.3	0.0	1.6	2.0	1.4	0.0	-2.0	-4.5

Where P_b is the entry price of the investment assets at the beginning of the two-period cycle; P_i is the interim price of the investment assets at the end of the first period; P_e is the exit price of the investment assets at the end of the two-period cycle; P_i% and $P_{e\%}$ are the interim price and exit price as percentage of the entry price. $RETURN_{FVA,}$ $RETURN_{FVA,}$ and $RETURN_{FVA-HCA}$ are return under FVA, HCA and differential returns of FVA over HCA, respectively.

As shown in Table 1, the two-year cumulative returns produced under FVA vary as the interim market price varies. However, the return produced under HCA is constant at $24.0 regardless of the changes in the interim price.

When the interim price is 120% (Scenario 5), the same as the average or the mid-point of beginning and the ending prices of the investment assets, FVA results in the highest two-year cumulative return at $26.0. As long as the interim price is higher than entry market price but lower than the exit market price (Scenarios 4, 5, and 6), FVA produces higher returns than HCA. When the interim price equals either the entry price or the exit price (Scenarios 3 and 7) FVA and HCA produce identical returns. When the interim price is either contradictive, i.e., falling below the entry price at the beginning (Scenarios 1 and 2), or hyperactive, i.e., rising above the exit price at the end of the two-year period (Scenarios 8 and 9), FVA results in lower returns than HCA.

The examples of differential cumulative returns under FVA and HCA in various market conditions when the market is down overall over the two-year period are presented in Table 2.

Table 2: Numerical Examples of Differential Returns in a Down Market

Scenarios	1	2	3	4	5	6	7	8	9
P_b	100%	100%	100%	100%	100%	100%	100%	100%	100%
P_i (as % of P_b)	40%	50%	60%	70%	80%	90%	100%	110%	120%
P_e (as % of P_b)	60%	60%	60%	60%	60%	60%	60%	60%	60%
$RETURN_{FVA}$ ($)	-30.0*	-30.0	-24.0	-21.4	-21.0	-22.0	-24.0	-26.7	-30.0
$RETURN_{HCA}$ ($)	-24.0	-24.0	-24.0	-24.0	-24.0	-24.0	-24.0	-24.0	-24.0
$RETURN_{FVA-HCA}$	-6.0	-6.0	0.0	2.6	3.0	2.0	0.0	-2.7	-6.0

*The portfolio become insolvent at the end of the first period and is liquidated prematurely.

Where P_b is the entry price of the investment assets at the beginning of the two-period cycle; P_i is the interim price of the investment assets at the end of the first period; P_e is the exit price of the investment assets at the end of the two-period cycle; P_i% and $P_{e\%}$ are the interim price and exit price as percentage of the entry price. $RETURN_{FVA,}$ $RETURN_{FVA,}$ and $RETURN_{FVA-HCA}$ are return under FVA, HCA and differential returns of FVA over HCA, respectively.

In a down market, the price of the investment asset at the beginning of the two- period cycle is assumed to be 100%. It falls by 40% during the two-period cycle. The interim price again varies from 60% lower to 20% higher than the initial price. Because the market is down, losses are generally realized. HCA produces a constant two-period cumulative loss of -$24.0 regardless of the interim market price.

Again, the price of the entry and exit prices of the investment assets serve as boundaries that define market conditions: a market is hyperactive if the interim price is below the exit price (Scenarios 1and 2); a market is contradictive if the interim price is above the entry price (Scenarios 8 and 9), the market is indicative if the interim price falls in-between (Scenarios 4, 5 and 6). The investment yields higher cumulative differential returns under FVA over HCA when the market is indicative; lower cumulative differential returns when the market is either hyperactive or contradictive.

7. Validity and Limitations

The analytical model of this paper is parsimonious with highly simplified assumptions. The effectiveness of FVA and HCA is narrowly measured as the relative cumulative returns resulting from the interim decisions based on the accounting figures.

The effectiveness of an accounting measure as defined in this study is not a typical feature evaluated in the literature of fair value accounting research. Prior studies have typically focused on the qualitative characteristics enumerated in the financial reporting conceptual framework such as predictive value and feedback value (e.g., Herrmann et al 2006) and capital-market-based measures such as information content and valuation relevance as well as various volatility indicators (e.g., Barth et al 1995and Eng et al 2009).

However, return on investment measures the effectiveness of resource allocation, which is one of the primary functions of accounting information. The objective and the main

contribution of this study are not to document specific advantages or limitations of FVA. Rather, it is meant to be thought provoking by arguing that the market condition is a missing control variable in the existing FVA studies. More importantly, it suggests a new direction for future studies to advance our understanding of FVA. To this end, this paper makes a valid argument that the level of market conditions is relevant to the understanding of the effectiveness of fair value accounting.

8. Conclusion

This paper analytically examines the effectiveness of FVA under different levels of market volatility. It finds that when the market volatility is low, i.e., the short-term market price change is in line with the long-term change (indicative market), FVA produces higher returns than HCA and, thus, is deemed more effective. However, when market volatility is high, i.e., the short-term change in market price gives the wrong indication of the long-term price movement (contractive or hyperactive), FVA produces lower returns and, thus, is deemed less effective. In conclusion, the effectiveness of FVA correlates with the level of market volatility.

This study contributes to fair value accounting research by offering a new perspective to interpret and possibly to reconcile the mixed results of the existing studies. More importantly, this study points to a new direction to further the inquiry of the relative effectiveness and valuation relevance of fair value accounting and other alternative accounting measurements such as historical cost. Information about the advantages and limitations of FVA under various market conditions can also be useful to regulatory agencies and accounting standard setters in their review and evaluation of the policies that rely on fair value measurements and the financial reporting standards that require the use of fair values.

This paper points out a number of future research possibilities. First, the results of existing studies can be reviewed and reinterpreted in the context of the possible effects of market conditions for possible reconciliation of the contradicting findings. Second, the information content, the valuation relevance and other conventional features of fair value measures can be examined while market conditions are controlled for. Third, the effect of FVA in overly exuberant markets, a scenario which has been largely ignored in existing studies of FVA and in the on-going debate, should be investigated as it could be of great interest to regulators and standard-setters in their efforts to improve financial policy and reporting requirements to prevent future crises. Lastly, the analytical model used in this study could be refined to accommodate more complex analysis.

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Song

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Appendix A - The Model and Analysis

Part 1: The Assumptions

1. A certain amount of equity ($0<E<1$) is invested at the beginning of a two-period horizon.
2. Debt (D) is obtained according to the predetermined debt ratio. $0 < D < 1$. For simplicity, it is assumed $E + D = 1$.
3. The portfolio contains two types of assets only: investment assets (A_I) and other assets (A_O). Where $0 < A_I < 1$, $0 < A_O < 1$ and $A_I + A_O = 1$.
4. The earnings from the other assets are in cash and are meant to be used to pay the interest on the debt at the end of each period. Assume constant rate of return of the other assets (r) and constant interest rate on the debt (i), thus $r * A_O = i * D$, i.e., the earnings from the other assets are just sufficient to cover the interest on the debt. $r > i$ means $A_O < D$, i.e., the use of the debt generates a positive leverage.
5. The market values of the other assets and the debt remain the same as the costs.
6. Under FAV the gain or loss on investment assets is recognized and accrued to the equity at the end of each period regardless if it is realized. Under HCA the gain or loss on investment assets is recognized only when realized at the end of the second period.
7. The beginning market price and the intrinsic value of the investments assets is P_b ($P_b > 0$); the interim market price (the price at the end of the first period) is P_i, ($P_i > 0$), and the ending unit price of the investments assets is P_e ($P_e > 0$);
8. No new equity is raised and no dividends are declared until liquidation. The debt and the two types of assets are adjusted at the end of the first period to restore the predetermined debt ratio and asset-mix.
9. The income tax is ignored.

Part 2: Fair Value Accounting for the Investment Assets

At the beginning of the first period, the balance sheet of the portfolio is:

$$A_I + A_O = D + E$$

The cash earnings from the other assets during the first period are used to pay the interest on the debt. Thus, the principle amounts of the other assets and the debt remain unchanged at the end of the first period. The price of the investment assets changes from P_b to P_i. The change in the value of investment assets are added to the equity at the end of the first period. The balance sheet at the end of the first period is:

$$A_I \times \frac{P_i}{P_b} + A_O = D + (E + \frac{P_i - P_b}{P_b} \times A_I)$$

At the beginning of the second, the debt is adjusted to restore the predetermined leverage ratio. The assets are rebalanced to restore the predetermined asset-mix. The balance sheet at beginning of the second period is:

$$(E+\frac{P_i-P_b}{P_b}\times A_I)\times\frac{A_O}{E}+(E+\frac{P_i-P_b}{P_b}\times A_I)\times\frac{A_I}{E}=(E+\frac{P_i-P_b}{P_b}\times A_I)\times\frac{D}{E}+(E+\frac{P_i-P_b}{P_b}\times A_I)$$

During the second period, the cash earnings from other assets again pay the interest on the debt. The price of the investment assets changes from P_i to P_e. The change in the value of investment asset is added to the equity at the end of the second period. The balance sheet at the end of the second period just prior to the liquidation is:

$$(E+\frac{P_i-P_b}{P_b}A_I)\frac{A_O}{E}+(E+\frac{P_i-P_b}{P_b}A_I)\frac{A_I}{E}\frac{P_e}{P_i}=(E+\frac{P_i-P_b}{P_b}A_I)\frac{D}{E}+(E+\frac{P_i-P_b}{P_b}A_I)(1+\frac{A_I}{E}\frac{P_e-P_i}{P_i})$$

Then liquidation takes place. The two-period cumulative return on the initial investment under FVA, R_{FVA}, is:

$$R_{FVA}=(E+\frac{P_i-P_b}{P_b}\times A_I)\times(1+\frac{A_I}{E}\times\frac{P_e-P_i}{P_i})-E$$

Part 3: Historical Cost Accounting for Investment Asset

At the beginning of the first period, the standardized balance sheet is identical to that in Part 2:

$$A_I+A_O=D+E$$

Since it is assumed that the cash earnings on other assets are paid out as the interest on the debt at the end of each period, the principle amounts of the other assets and the debt remain unchanged. Under historical cost accounting the changes in the market price of the investment assets are not recognized. Consequently, the balance sheet remains unchanged throughout the two-period cycle. At the end of the second period upon liquidation, the cumulated return on the initial investment, $R_{HCA,}$ is:

$$R_{HCA}=E+\frac{P_e-P_b}{P_b}\times A_I-E$$

$$=\frac{P_e-P_b}{P_b}\times A_I$$

Part 4: Comparison of the Returns under FVA and HCA

The difference between the two-year cumulative returns on investment under FVA and HCA is:

$$\Delta R = R_F - R_H$$

$$= [(E + \frac{P_i - P_b}{P_b} \times A_I) \times (1 + \frac{A_I}{E} \times \frac{P_e - P_i}{P_i}) - E] - \frac{P_e - P_b}{P_b} \times A_I$$

$$= \frac{(P_i - P_b) \times (P_e - P_i) \times (D - A_O) \times A_I}{P_b \times P_i \times E}$$

According to the assumptions, (D - A_O) > 0, A_I > 0, P_b > 0, P_i > 0, and E > 0 in the above equation.

Part 5: Interpretation of the Analysis Results

In An Up Market ($P_e > P_b$)

$P_e > P_b$ means that the market price of the investment asset increases over the two-period cycle. Under such condition ΔR > 0 if and only if $P_e > P_i > P_b$. $P_e > P_i > P_b$ means that the market price of the investment assets increases during both the first and the second period. The market is **indicative** of the long-term increasing trend. In an indicative market the cumulative return of the portfolio is greater under FVA.

In an up market, ΔR < 0 if $P_e < P_i$ or $P_i < P_b$. Note it is impossible for $P_e < P_i$ and $P_i < P_b$ to be true at the same time if $P_e > P_b$. $P_e < P_i$ means that the market price of the investment asset increases too much during the first period and ends up self-correcting in the second period for the excess increase. The market is **hyperactive** in relation to the long-term trend. $P_i < P_b$ means that the market price of the investment assets decrease during the first period contrary to the long-term trend and ends up reversing its direction in the second period. The market price is **contradictive** to the long-term trend. In both hyperactive and contradictive markets, the cumulative return of the portfolio is less under FVA.

In A Down Market ($P_e > P_b$)

$P_e < P_b$ means that the market price of the investment assets decreases over the two-period cycle. Under such a circumstance ΔR >0 if and only if $P_e < P_i < P_b$. $P_b > P_i > P_e$ means that the market price of the investment asset decreases during both the first and the second periods. The market price is **indicative** of the long-term decreasing trend. In an indicative market, the cumulative loss of the portfolio is less under FVA.

In a down market, $P_b < P_i$ means that the market price of the investment assets increases in the first period contrary to the long-term trend and ends up reversing its direction of

change in the second period. The market price is **contradictive** to the long-term trend. $P_i < P_e$ means that the market price of the investment assets decreases too much during the first period and ends up self-correcting in the second period. The market price is **hyperactive**. In both hyperactive and contradictive markets the cumulative loss of the portfolio is greater under FVA.