

**A Market Value Balance Sheet: Why and How**  
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During the next few years, a revolution may hit the financial and insurance industries as financial reporters overhaul the methods currently employed to evaluate companies' financial statements. While the insurance community has reported the position of companies using book value accounting for a major portion of this century, recent events (see Griffin in [1]) have motivated professionals to revisit their methods of accounting in order to more accurately reflect the market value of each company's holdings. To report marketable instruments at a close approximation of their market value while treating nonmarketable instruments in a consistent manner presents a theoretical challenge. The following paper presents a theoretical framework to approach this challenge.

### **History**

Griffin in [1] describes the current trends towards market value accounting, demonstrating that, with good management, stable surplus readily arises with market valuing of assets and liabilities, and illustrating how market value accounting could alert management to asset-liability mismatch risks. We illustrate the concerns with market value reporting by presenting a brief history of book value accounting. The following history constitutes a brief summary from which we can observe salient trends.

Early in this century, assets were carried on financial statements at their observed market values. Insurance liabilities were valued as expected cash flows discounted at regulatorily specified discount rates.<sup>1</sup> In this early period markets varied little, rising at a moderate rate on a total return basis. A company assuming no new premiums could look forward to a smooth growth pattern of assets, liabilities and surplus. Diagram 1 shows the relative values of a typical company's balance sheet over time in this fairly complacent environment. Since markets varied only moderately and were not viewed as potentially volatile, no one cared that the assets and liabilities were valued on different bases.

Then markets began to vary. The different valuing bases between the two sides of the balance sheet became apparent as assets fluctuated with market values but the liabilities did not. (See Diagram 2.) Any fluctuation in asset values dropped directly to surplus and created tremendously unstable statements of a company's net worth. The potential impact to the solvency of companies worried the public. At this time, banks were experiencing devastating runs as their depositors' faith deteriorated. The fear grew in the financial community that public loss of confidence would also spread to other sectors, namely insurance.

To reduce the risks to large leveraged institutions, the community decided to improve the

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<sup>1</sup> In an effort to simplify our discussion, we assume that our typical company has only assets with market values and only book liabilities.

public's confidence in these institutions by smoothing out the volatility associated with fluctuations in surplus. The accounting community altered their practices to value assets and liabilities on a similar basis so that their difference, surplus or net worth, would experience predictable growth patterns. Since valuing nonmarketable liabilities at market seemed almost paradoxical, valuing assets via a more stable formula appeared the more reasonable course. To this end, institutions began to carry their marketable securities "at book" on their balance sheets by ignoring the current value of an asset and instead valuing each security with a calculated book value which graded over time from its purchase price to its maturity value. This provided for asset values which would change over time in a manner similar to the liabilities.

This new method worked as desired. The market value of an asset was divorced from the value at which each company carried the asset and a typical balance sheet evolved smoothly over time as depicted in Diagram 3. The smoothed financials soothed the public's concern. Book value accounting even had intuitive appeal because the assets which amortized smoothly over time seemed quite indicative of the company's value as a "going concern" independent of the economic environment.

However, market volatility did not abate but instead intensified. Currently, the dominant perception maintains that these market fluctuations do not constitute short term aberrations which can be glossed over in the long run.<sup>2</sup> Furthermore, many in the community perceive that the difference between market values and book values, as depicted in Diagram 3, masks problems of a more fundamental nature. Specifically, the question arises: Do the assets of a company make good and sufficient provisions for its liabilities? In short, the current perception would have companies realize market fluctuations of assets on their financials. However, no one wishes to return to the potentially volatile surplus figures associated with market assets against book liabilities. (See Diagram 2) Therefore, we should develop a methodology to have both assets and liabilities track market values while allowing the well run company to exhibit stable surplus. We seek a well orchestrated relationship between markets, asset and liability values, and surplus as depicted in Diagram 4.

When creating a new accounting basis, the lessons to learn from history are:

1. Assets and liabilities should be valued on a similar basis,
2. Assets should track market values. We may not need to mark each asset to market individually, but the entire portfolio should track market movements.

To facilitate the acceptance of a new accounting basis, we add the following:

3. The new methodology should strongly resemble book value accounting.

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<sup>2</sup> Indeed, entire industries and markets have sprung up to directly or indirectly hedge market risks.

## Methodology

Current methodologies value securities as the present value of their future cash flows. The person performing the valuation must select two dimensions for this calculation: the discount rate(s) and the timing of the cash flows. Our idea for a market value balance sheet entails using market discount rates and cash flow assumptions appropriate for the valuation. The following two examples clarify the ideas.

### *Fixed Cash Flows:*

Suppose the cash flows to be valued are as follows:

Time:	1	2	3
Cash flow:	\$5	\$5	\$105

If this were a liability cash flow estimate, for a block of endowment insurance for example, then the value is a reserve value calculated by discounting at the valuation rate. A valuation rate of 6.5% would produce a reserve of \$96.03.

If this were a noncallable bond, then its discount rate would be the internal rate of return equating its purchase price with its present value of cash flows from purchase to maturity. For an IRR of 8.0% the book value would be \$92.27.

For market value accounting we would discount each cash flow by its appropriate spot rate. For example, if the Treasury and A corporate spot rates were as follows:

Time:	1	2	3
TSY:	3.5%	4.2%	4.6%
A corp:	4.0	4.6	5.0,

and if the liability were valued using the Treasury spot and the bond using the A corp spot then the liability reserve would be 101.18 and the bond's book value would be 100.08.

This example brings to the fore the first question of market value accounting: Which interest rates should be used for discounting? To remain responsive to market values, marketable instruments should be valued using yields appropriate to their credit quality. Thus, U.S. Treasury bonds should be valued using the Treasury rates, AAA corporates with the AAA rate, and so on.<sup>3</sup> However, it is not immediately clear with which rate we should use to

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<sup>3</sup> A secondary problem arises concerning how these yields should be calculated, but this problem lies outside the scope of this paper.

discount liability cash flows.<sup>4</sup> Five discount rates present themselves:

1. Average yield of the block of assets backing the liability.
2. Yield appropriate for the rating of the company holding the liability.
3. A yield associated with a basket of securities.
4. Some method which holds the spread to Treasuries constant throughout the life of the business.
5. Treasury rates with no spread.

The first and second options would produce differences between companies which are not desirable. For example, using the average yield of the backing assets to discount liabilities would produce lower reserves for companies with riskier portfolios. Similarly, using a yield appropriate to the companies rating would produce lower reserves for lower rated companies. Clearly both of these results are unsatisfactory and we should discard both approaches.

The third and fourth options do not have immediate counter-intuitive results associated with them. However, both encompass a fixed component over time, a spread or basket, and this inclusion introduces an arbitrary element into the calculations which is what we are attempting to prevent with market value accounting. Both approaches advocate using a liability discount rate greater than the Treasury rate which raises the question: what is the purpose of the spread over Treasuries? An asset's spread over Treasuries provides a price discount to compensate the buyer for the default risk of the issuer. Discounting liability cash flows with a spread would inappropriately provide a benefit to the company for the potential of its own default. A company's financial statements should not model its chance of default, let alone provide a reserve break for that chance. Stated differently, the only method which a company could employ to definitely offset a fixed liability is by backing it with Treasuries. We can therefore conclude that the rate appropriate for discounting liabilities is the risk-free Treasury rate.<sup>5</sup>

#### *Variable Cash Flows:*

Cash flows can vary for a variety of reasons. If the flows vary for nonfinancial reasons, such

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<sup>4</sup> Another problem arises concerning which yields to use for assets without market values. It seems clear that some estimate must be made of the credit-worthiness of the issuer of such debt to compute a book value.

<sup>5</sup> Discounting liabilities with Treasury yields while discounting assets with a spread over Treasuries will cause any variation in corporate spreads to impact surplus directly. Is this desirable? To maintain true market value accounting we would answer yes. To maintain stability of surplus we would answer no.

The spirit of market value accounting would suggest that these variations should flow to the bottom line. After all, investing in corporate bonds exposes the company to credit risk and market value accounting strives to illustrate all financial risks.

as death of an individual, then actuarial theory states that such flows should be valued using a conservative estimate of their expected values. Market value accounting should employ the same theory. However, if the cash flows vary because of market conditions, the valuation should be adjusted to consider these options. We consider a simple case of a option-variable cash flow.

Assume that the cash flows will be similar to our earlier example except that the larger payment may be provided in year two. Thus, the potential cash flows are as follows:

Time:	1	2	3
Cash Flow			
Option 1	\$5	\$5	\$105
Option 2	\$5	\$105	\$0

The cash flows will vary as one party elects to exercise its available options and it is crucial to consider which party has the option to change the cash flows. For example, consider if this were a liability cash flow in which the policyholder, not the company, decides which flow to use. In this case, the valuation will proceed by assuming that the policyholders will select the flows most advantageous to them. This example resembles the options available to an SPDA policyholder who can surrender at any time without penalties. A CARVM-type reserve appears appropriate and we therefore use the option which provides the highest reserve. For example, with a discount rate of 6.5%, Option 1 provides a 97.27 present value while Option 2 provides a 96.03 present value and therefore the reserve is \$97.27.

Under market value accounting, the discount rate used will change. Instead of using the fixed valuation rate, we discount using the Treasury rates. For the Treasury rates provided earlier, Option 1 has present value 101.18 while Option 2 has present value 101.54, and thus we accept \$101.54 as the reserve.

If the above cash flows were for an asset, for example a callable bond, in which the issuer rather than the bond holder selects the desired option, then the cash flows to use depend on the type of accounting being employed. As a gross generalization of current accounting (which has numerous exceptions), STAT accounting uses those cash flows which minimize the yield, TAX accounting maximizes the yield and GAAP accounting employs the most likely yield. This methodology can carry over directly to market value accounting each using the current market yields. STAT will use the cash flows which minimize the bond's value. TAX will use the cash flows which maximize the current income and therefore probably translates into maximizing the bond's current value. GAAP will provide some method for determining whether or not the bond will be called. Using the A-corporate rates from earlier, Option 1 has value 109.38 and Option 2 has value 100.78. Thus, with the above method the STAT value would be 100.78, the TAX value would be 109.38 and the GAAP value would

correspond to whichever cash flow seemed more probable.<sup>6 7</sup>

*Summary of Methodology:*

The following formalizes the methodology introduced in the two previous examples.

**Market Valuation Accounting Principles:**

1. Select market observed rates for discounting.
2. Use those cash flows appropriate for the type of valuation being performed.

The reader should note that the above principles of market value accounting do not require each asset to be carried at its market value. The details of the methodology should be developed to ensure that a company's assets in total track the market value of the portfolio.<sup>8</sup>

The above general principles would need further interpretation to be applied to assets and liabilities with characteristics different from corporate bonds.<sup>9</sup>

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<sup>6</sup> At first appearance, using the "more likely" estimate of GAAP might cause this number to vary tremendously as the bond valuation flips back and forth between price to call date and price to maturity date. Certainly, it would be undesirable for the carrying value to vary between two very different numbers like the 109.38 and 100.78 figures above. However, it can be shown that the GAAP value changes smoothly because the prices converge as we approach yields that would precipitate a change in the cash flow pattern used for pricing.

<sup>7</sup> For the case where the company selects which cash flow to employ, as in the case of the holder of a puttable bond or the carrying of a callable bond on the issuer's books, we may wish to use the cash flows with the highest market value for the company.

<sup>8</sup> We could accomplish this by requiring each company to calculate its market yield for discounting by solving for yields which equate the observed market values of the company's portfolio in aggregate with their market value discounted prices using the cash flows described above.

<sup>9</sup> Some alternate approaches to the general problem of valuing a stream of option-laden cash flows employ Monte Carlo simulations, the average of the present values over a large number of scenarios to calculate the market value. Scenario testing possesses several drawbacks. The methodology proposed in this paper would not demand tremendous computer time to implement, as scenario testing would. Also, the proposed method provides reasonably predictable changes from period to period with which to forecast income. In comparison, scenario testing would obfuscate the impact on income. Finally, the proposed methodology resembles current accounting sufficiently to permit rapid conversion to this methodology.

### Comments on this Methodology:

The above methodology places tremendous emphasis on the cash flows to use in discounting and this strong reliance on assumed cash flows presents both risks and opportunities for market value accounting. For example, CMOs which have negligible default risk but have widely fluctuating cash flows would use a Treasury or AAA yield to discount while varying their carrying value according to the scenario of cash flows used.<sup>10</sup> On the one hand, this places a heavy burden on the cash flow assumptions; they must incorporate the risks but not emphasize them to the extent that the accounting renders untenable an otherwise attractive investment. On the other hand, the impact on financial statements' potential variances in cash flows would encourage companies to more closely examine their holdings. So, this example simultaneously risks discouraging some economically sound investments but probably encourages prudent management. In this section, we explore some considerations to address before implementing market value accounting.

1. **Accounting Breaks.** By varying the severity of the cash flow assumptions, the conservatism of a valuation may be adjusted. For example, SPDAs are usually held with a CARVM reserve providing the highest reserve value. Essentially 100% of the policy holders are assumed to lapse at the time most disadvantageous to the company. After the financial community and the regulators become more comfortable with this particular product, this assumption could be relaxed to provide a reserve break to the company. For example, it could be assumed that only 90% of the policyholders lapse at the worst time and the rest at a later time. Accordingly, we could value other contracts, such as Universal Life policies, with similar lapse assumptions and mix these assumptions with more static non-interest sensitive assumptions such as mortality.

2. **CMOs.** Clearly the prepayment assumption on the underlying collateral of a CMO will greatly affect the carrying value of the instrument. However, this reliance also exists for current accounting. Either method should become more attuned to the specifics of each deal.<sup>11</sup>

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<sup>10</sup> An alternate methodology for CMO's might attempt to realize their cash-flow variance risk via a spread, e.g. a spread for PACs over Treasuries. Unfortunately, determination of such a spread would appeal to the cash flows of these securities and we are back to considering cash flows. In addition, using a general spread over Treasuries for specific types, like PACs, may blur the specifics of a particular issue. Prudence suggests that the valuation rules appeal to cash flows directly.

<sup>11</sup> In general for mortgage-backed securities, the entities which decide the methodology, e.g. FASB and the IRS, may wish to specify ranges of PSA or PSA patterns to consider from which to apply a selection criteria. For example, a range of PSA scenarios may be chosen:  $\pm 100$ ,  $\pm 200$  or  $\pm 300$  PSA from current speeds,  $\pm 10\%$  PSA cumulative for

**3. Combining Cash Flows.** Often a company buys different assets to offset each other. For example, a company may buy a PO strip which pays the Principal Only on an underlying collateral and an IO strip which pays Interest Only on a collateral. Provided that the underlying collateral of the PO and IO are similar, these two instruments together should perform comparably to the collateral. While carrying these on the financial statements, this relationship should be reflected. Thus, the STAT value of these two instruments which chooses the minimum present value over a variety of scenarios should combine the cash flows of these instruments before taking the minimum. Otherwise, the statement could reflect the minimum values of each from different scenarios, but it is not likely that both minimum values would simultaneously be realized.

More generally, a company might be allowed to net the cash flows of assets with their associated liabilities before choosing which scenario value to choose (before determining the minimum for example). This complicates the analysis. However, this complexity is quite worthwhile. Companies should be assessing their assets in groups along with their liabilities and any movement towards this analysis should be viewed positively.

**4. Sensitivity Testing.** By varying the initial yields used for discounting, the financials of a company may be stress tested. The analyst could test levels of interest rates, shapes of yield curves and spreads on independent trials. This could even be used as a new dimension for rating a company, e.g. a AAA rating requires no negative surplus for all interest rate movements of plus or minus 300 basis points.

**5. Surplus Levels.** Before implementing a new accounting method, the rules for valuing security and liability values, and surplus levels should be tested. New views of surplus may be required. For example, if we carry all liabilities on a basis similar to CARVM, i.e. to highest reserve, and carry all assets to lowest possible market value, and further stress test the financials for changes in interest rates, then how much surplus is required? While most people assume 4% is a healthy surplus level, perhaps less may be required in this most conservative valuation. Or another company with 10% surplus but the riskiest junk bonds might drop to negative surplus levels with even mild changes in corporate spreads. To test a new accounting method, research should sample historical financials of companies viewed to be quite sound, unsound and in between to witness that the methodology performs as

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each of 10 periods, and so on. Alternately, the entity could rely on the discretion of the accountant. From these scenarios, STAT could choose the lowest or the top of the lowest quartile, TAX could use the highest or highest in the second quartile, while GAAP could choose the median result. The requirements could vary according to the underlying collateral, imposing higher scenarios for those in- or close to being in-the-money mortgages. Tremendous flexibility exists depending on the amount of detail known about the instrument. These possibilities exist for current accounting methods as well as market value accounting.

desired.<sup>12</sup>

6. **Income statements.** The focus of this paper has been on creating a market value balance sheet. To finish the financials we must address the income statement. In current accounting, income measures the change of book and cash values over time. With market value accounting, the income should be split into two components: an aging component and a change-due-to-market-changes component. The first of these reflects the income over time given a static environment, while the latter reflects the variability due to the market. Unusual income variability due to market forces would be another signal that a company is incurring market risks. However, it cannot be emphasized too strenuously that for a well-managed company which matches its assets and liabilities, these market-volatility income factors will vary only mildly.

**Conclusion:**

We have presented the rudiments of a system for market value financials. This methodology:

1. treats assets and liabilities in similar manners,
2. provides that financial values of marketable instruments track observed market values,
3. mirrors current accounting and will permit direct translation of current practices,
4. permits off-setting risks to be considered together,
5. encourages active asset/liability analysis, and
6. offers warning signs for companies taking undue market risk.

The proposed methodology needs further development; in particular, the handling of specific assets and liabilities must be researched. The implications for a company's financials needs to be addressed and the techniques for evaluating financials will probably need to be adjusted. The design of a new accounting methodology must ensure that a balance is maintained between having financials which expose market risks and which also provide ample credit to sound practice. The trend towards a market value approach proceeds slowly but has strong momentum. A concerted research effort now would ensure that market value accounting, once it is implemented, rests on solid theoretical grounds.

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<sup>12</sup> At the surplus level, liabilities could be established to account for fixed but predictable expenses not directly associated with specific assets and liabilities. For example, we may forecast rent and salaries better in aggregate for the entire company than we would by squeezing these fixed assumptions into the expense portion of liability cash flows. (Of course, true unit and marginal expenses should still be analyzed with the liabilities.) This aggregate estimate of future fixed expense cash flows could be incorporated on the balance sheet as a new liability. Its book value would be the cash flows discounted at the Treasury rates.

## **Reference**

[1] Griffin, Mark W., "A Market Value Accounting Framework for Insurance Companies," The Financial Reporter. 15 March 1992. SOA.

DIAGRAM 1 -- Original Accounting View  
Static Market, Market Value Assets, Book Liabilities

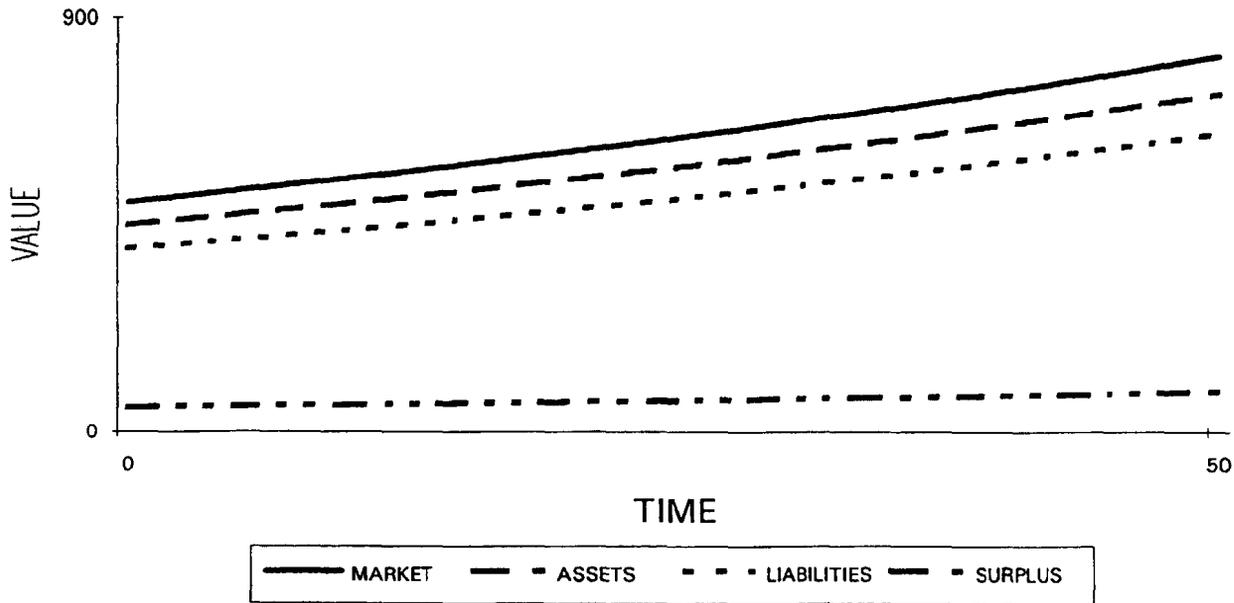


DIAGRAM 2 -- Original Accounting with Volatile Markets  
Volatile Market, Market Value Assets, Book Liabilities

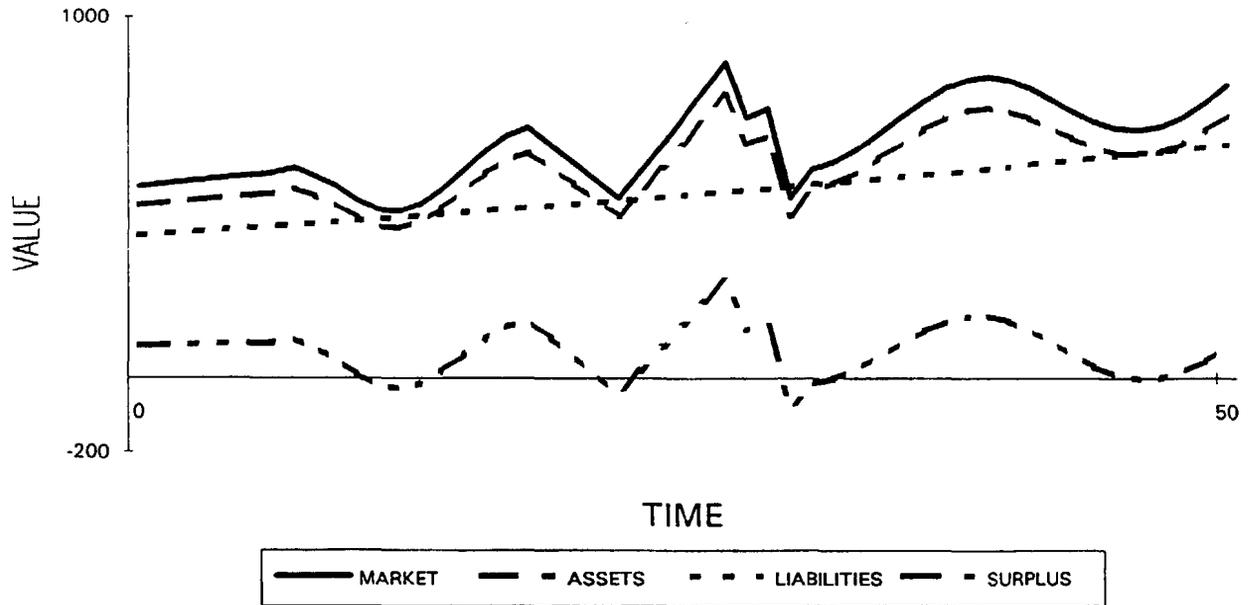


DIAGRAM 3 -- Current Accounting  
Volatile Market, Book Assets, Book Liabilities

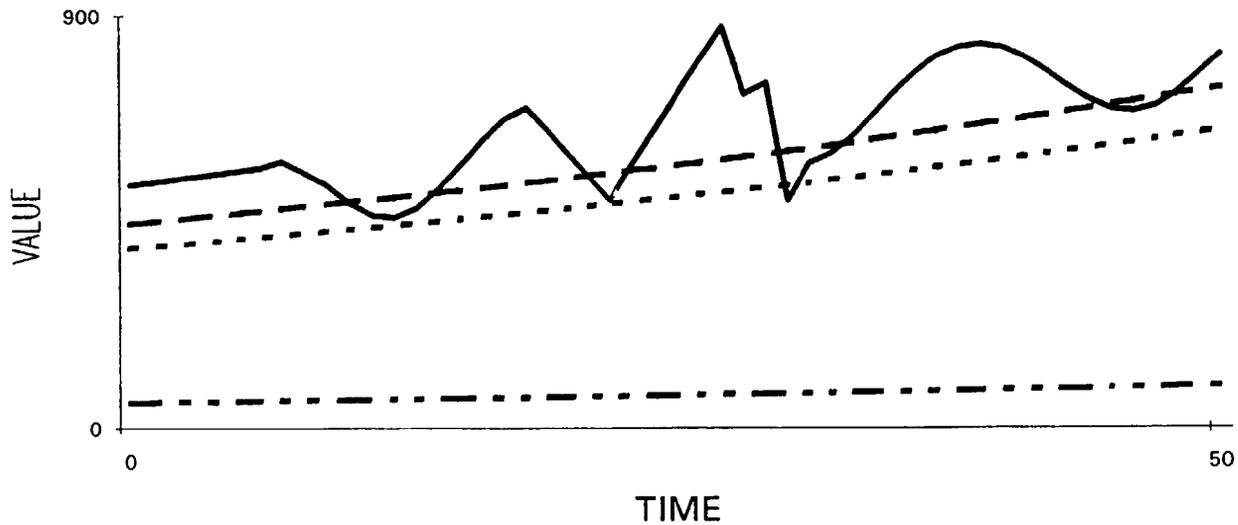


DIAGRAM 4 -- Market Value Accounting  
Volatile Market, Market Assets, Market Liabilities

