



# **MARK-TO-MARKET REGULATORY ACCOUNTING**

James Annable & Britton Lombardi

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## ABSTRACT

*Mark-to-market (M-to-M) accounting is demonstrated to be an inappropriate asset valuation-standard for use by the Federal Reserve in its regulation of financial-services firms. The paper argues that the Fed must reject the M-to-M method in favor of an accounting system that is coherent with its pursuit of legally mandated macroeconomic objectives. Especially in periods of severe disturbances as exemplified by the 2008-09 financial crisis, M-to-M valuation standards work at cross-purposes with well-designed central-bank stabilization policies. The inconsistency not only exists, it is also shown to be important. The use of M-to-M regulatory capital valuation standards can greatly damage the effectiveness of Federal Reserve monetary interventions.*

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The accounting profession has long been pushing financial-services regulators in the United States toward the comprehensive use of some version of mark-to-market (M-to-M) accounting standards. M-to-M's appeal is rooted in the Efficient-Market Hypothesis (EMH), which has been the analytical anchor of the rigorous study of finance for almost a half century. Eugene Fama (1970) originally defined an efficient financial market as producing security prices that always fully reflect available information.<sup>1</sup> Fama hypothesized that real-world financial markets do in fact use all available information and are, therefore, efficient. The case for M-to-M accounting

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<sup>1</sup> See Eugene Fama, "Efficient Capital Markets: Review of Theory and Empirical Work," *Journal of Finance*, 25:383-417. Full-information security prices in turn reflect the asset's fundamental value, i.e., the net present value of its future cash flows, discounted by its risk characteristics.

generally rests on the EMH, from which it follows that mark-to-market asset valuations always reflect market-efficient pricing.<sup>2</sup>

Accountants promote the EMH, along with its handmaiden M-to-M asset valuation, in part because it provides a broadly accepted, coherent, and well-named rationale for many of the choices that have to be made in any valuation methodology. The analytic respectability of the EMH facilitates the design and implementation of a practical accounting system. Moreover, the increasing acceptance of the M-to-M approach by the Federal Reserve and other financial-service regulators partly resulted, prior to the wake-up call provided by the 2008-09 financial crisis, from their belief that there is no superior alternative to the EMH for explaining asset-price behavior and, consequently, to M-to-M valuation standards to account for that behavior.

This paper argues that acceptance of M-to-M accounting by the Fed in its financial regulatory functions is a fundamental mistake. Even allowing Fama's efficient-market hypothesis, M-to-M accounting can be shown to be inappropriate for important Fed regulatory applications and, in those applications, should be rejected. The investigation is divided into four parts. The first constructs a simple analytical framework that will be used throughout the paper. In the second, some useful complications, featuring Frank Knight's venerable distinction between priceable risk and unpriceable uncertainty, are introduced. The third section presents the main analysis, demonstrating the conflict between M-to-M asset valuation and the need for coherence in overall policymaking by the Federal Reserve. Especially in distressed economic circumstances, such as the 2008-09 financial crisis that threatened depression and consequently huge losses in employment, income, and wealth, the use of M-to-M accounting by the regulatory arm of the central bank badly damages the effectiveness of well-designed economic interventions by its macro-stabilization arm. Finally, there is a conclusion.

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<sup>2</sup> Fama's Efficient-Market Hypothesis can be decomposed into three parts. First, investors are both rational (i.e., using all available information) and capable of valuing financial assets rationally. Second, even if some investors are not rational, their trades are randomly distributed around rational pricing, causing the dispersion to net to zero. Third, even if irrational trades are correlated, rational arbitrageurs eliminate their influence on asset prices. Indeed, effective arbitrage is the lynchpin of the EMH. Behavioral-finance scholars have posed significant challenges to all three assertions, and the consequent debate has dominated the literature. It is important to understand that the on-going, familiar conflict, while interesting, has no relevance to this paper. Its argument that the Fed must, in its regulation of banks, reject M-to-M valuation standards is wholly independent of EMH validity.

## I. A SIMPLE CONDITIONAL-STATEMENT MODEL

*Rational investor behavior.* Some definitions facilitate the analysis. Posit the existence of a notional baseline composite bank-equity price index (denoted by  $P^B$ ) that embodies full information about the determinants of valuation *except* for current-period innovations in investor expectations about the future state of the macro economy.<sup>3</sup>

Notional efficient-market pricing of the bank-equity index (denoted by  $P^E$ ) is defined such that:

$$(1) \quad (\Delta P^E \mid \Delta M^I=0) = \Delta P^B = \Delta P^T,$$

where  $\Delta$  denotes the change operator,  $M^I$  represents investor expectations about the macro economy, and  $P^T$  stands for the actual market transaction price for the composite equity. Expression (1) is read: “The change in the efficient-market price ( $P^E$ ), given that investor expectations about the state of the macroeconomy are unchanged, equals the change in the baseline price ( $P^B$ ) as well as the change in the market transaction price ( $P^T$ ).” Equality among the movements in  $P^T$ ,  $P^E$  and  $P^B$  is conditional on both the EMH ( $\Delta P^E = \Delta P^T$ ) and unchanged investor expectations for the state of the macro economy ( $\Delta P^E = \Delta P^B$ ).

*Inherent pro-cyclical.* The analysis is made more interesting by positing that investor expectations about the macroeconomy deteriorate sufficiently to assign a non-trivial probability to the collapse of aggregate demand along the lines of the 1930s Great Depression ( $\Delta M^I = \delta$ ).<sup>4</sup> By definition, both efficient-market and transaction asset prices ( $P^E$ ,  $P^T$ ) must fall, while the baseline price ( $P^B$ ) remains unaffected.<sup>5</sup>

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<sup>3</sup> Investor macro expectations ( $M^I$ ) are plausibly calibrated to be monotonically increasing in investor satisfaction with the future performance of the overall economy. Throughout the analysis, expected changes in macro conditions are from a full-employment baseline, with which the central bank is satisfied.

<sup>4</sup> The illustrative use of depression, characterized by the chronic collapse of production, employment, nominal income, nominal profits, and capacity utilization as well as persisting price deflation, is consistent with the remainder of the analysis which seeks to elucidate Fed policy coherence in the context of the 2008-09 financial crisis.

<sup>5</sup> The expressions  $|\Delta P^T|$  and  $|\Delta P^E|$  denote the respective absolute values of the change in the market-transaction price and the efficient-market price. It is analytically convenient to posit throughout that  $\Delta P^B = 0$ .

$$(2) \quad (\Delta P^E | \Delta M^L = \delta) = \Delta P^T < \Delta P^B, \text{ such that } |\Delta P^T| = |\Delta P^E| > \Delta P^B.$$

It follows that EMH asset pricing and M-to-M accounting are inherently procyclical. The long-standing empirical debate in the literature is whether the actual (typically large) size of the procyclical volatility of equity transaction prices, especially given stationary fluctuations in aggregate demand, is consistent with full-information asset pricing. While that debate is interesting, it is not relevant to this paper. It is important to remember throughout that the argument being developed here is independent of the validity of Fama's efficient-market hypothesis.

## II. SOME COMPLICATIONS

This section introduces some useful complications into the analysis. Economic efficiency is more complex than simply using all available information. Market outcomes also depend on how market participants organize and use the information they have.

*Risk versus uncertainty.* An important issue is whether investors can assign full-information probabilities to each possible state of the macroeconomy. Frank Knight (*Risk, Uncertainty, and Profit* (1921)) famously analyzed the important distinction between risk, requiring informed priors on the likelihood of each outcome, and uncertainty, which cannot support the known distributions that characterize risk.

Highly stressed macroeconomic environments (e.g.,  $\Delta M^L = \delta$ ) confront investors with unpriceable uncertainty, leading to breakdowns in trading markets.<sup>6</sup> During the recent 2008-09 instability in the United States, many market participants assigned a non-trivial possibility to a 1930s-class depression. The assessment was, perhaps, not an unreasonable response to frozen financial markets, virulently collapsing total spending, and doomsday comments from the most powerful

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<sup>6</sup> 1930s-class depressions are characterized by substantial price deflation that cannot be accommodated by nominal (especially debt) contracts and only very slowly accommodated by nominal wages. As has been noted, the inevitable result is a collapse in wealth, employment, income, profits, and investment. Bankruptcy and other forms of debt default would be rampant, government debt would increase dramatically and unsustainably, the safety net would shrink, and excess economic capacity would become chronic. If that scenario is assigned a non-trivial probability, how can investors be anything but uncertain? Moreover, how can macro policymakers be anything but totally focused on avoiding the extreme outcome?

and respected stabilization policymakers (as they attempted to motivate an effective public response). Given that depressions are infrequent, poorly understood, and largely idiosyncratic in their origins, investor understanding of their incidence and severity is governed by unknowable uncertainty rather than predictable risk.

*Rational decision-making.* Inherently cataclysmic depressions predictably distort cost-benefit decision-making. The problem is that even a small probability of depression translates into such a large expected loss that any plausible expected return from lending or investing cash is overwhelmed. The rational response to a macro environment that admits a nontrivial likelihood of the huge losses associated with depression/deflation is to stop buying assets, preserving cash, until a convincing market bottom has been established. Buyer inaction, postponing lending or investment, becomes the rational choice.<sup>7</sup> Such episodes of market uncertainty additionally provide low-risk opportunities for short-sellers, generating even greater trading-market downward instability. It follows that market asset pricing of our composite bank equity is subject to extreme departures from its baseline pricing.

### III. CENTRAL-BANK POLICY COHERENCE

The Federal Reserve is empowered to create (or destroy) money, influencing total spending and the future course of the economy. Central-bank policymakers expect their monetary policy to produce a particular state of the macroeconomy (denoted by  $M^{\text{FR}}$ ). This paper argues that, in order for the Fed's overall policymaking to be coherent, it must use  $\Delta M^{\text{FR}}$ , rather than  $\Delta M^{\text{I}}$  (investors' expectations of changes in macroeconomic conditions), in its regulatory financial-asset valuations.

It follows that, if  $\Delta M^{\text{FR}} \neq \Delta M^{\text{I}}$ , Federal Reserve's stabilization policies lack credibility with investors. Real-side credibility is ultimately rooted in public (especially investor) beliefs with respect to the Fed's capacity and commitment to effectively stabilize employment growth near its low-inflation-regime NAIRU.<sup>8</sup> Such policy credibility is the lesser-known companion to the

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<sup>7</sup> See Nancy Stokey, *The Economics of Inaction: Stochastic Control Models with Fixed Costs* (Princeton: Princeton University Press, 2009) for a careful analysis of rational inaction in complex economies.

<sup>8</sup> NAIRU is defined as the non-accelerating inflation rate of unemployment.

central bank's inflation-policy credibility (i.e., its commitment to that low-inflation regime). Each of the Fed's (jobs and inflation) objectives is mandated by law.

Posit an asset-valuation standard for bank equity ( $P^R$ ) that is consistent with the Fed's stabilization policy. If the central bank is seeking to prevent deterioration in the macro economy,  $\Delta M^{FR}=0$  is consistent with its monetary policy. In such circumstances, the coherent valuation standard will move in tandem with baseline pricing ( $P^B$ ):

$$(3) \quad (\Delta P^R \mid \Delta M^{FR}=0) = \Delta P^B.$$

A practical accounting problem results from the absence of a fully credible real-side monetary policy. The Fed's coherent asset-valuation standard ( $P^R$ ) can move independently of investor expectations of the macro situation ( $M^I$ ). Recall that the EMH implies:

$$(4) \quad \Delta P^T = (\Delta P^E \mid \Delta M^I = \delta) < \Delta P^B.$$

Given that  $\Delta M^{FR}=0$  and  $\Delta M^I = \delta$ , it follows that:

$$(5) \quad \Delta P^T = \Delta P^E < \Delta P^B = \Delta P^R.$$

In distressed macro circumstances, when the effectiveness of Fed real-side counter-cyclical macro interventions is most critical, the use of M-to-M accounting is inherently inconsistent with the Fed's (incompletely credible) stabilization program.<sup>9</sup>

The Fed's coherence problem with respect to M-to-M accounting is more than technical. The inconsistency can be extremely important in practice. In badly stressed macroeconomic conditions (given  $\Delta M^I \neq \Delta M^{FR}$  and  $\Delta P^T = \Delta P^E < \Delta P^B = \Delta P^R$  aggravated by buyer-inaction in equity markets), an accounting decision to use  $P^T$  to value financial-institution regulatory capital forces substantial

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<sup>9</sup> It is interesting that, according to the evidence (e.g., the 2008-09 equity-market collapse), rational investors in those stressed macro circumstances either did not understand the Fed's stabilization policy or did accept its efficacy. Dismissing the Fed's stabilization capacity and commitment cost investors who sold near the 2009 market bottom – and there were a lot of them – a great deal of money. Much is made of the stabilization value of the central bank's credibility with respect to maintaining low product-price inflation. The evidence makes clear that the *Fed's real-side credibility* (which is apparently not very robust) also has great value, potentially preventing substantial welfare loss associated with asset-market instability. The degree to which the Fed can enhance its real-side credibility would decrease the stabilization damage caused by M-to-M accounting.

contraction of banks' balance sheets.<sup>10</sup> The difficult adjustment further depresses asset prices and induces deep cutbacks in existing loans along with the virtual elimination of new lending. The collective response greatly accelerates the decline in total spending.

Meanwhile, the Fed's stabilization policy (well illustrated by the 2008-09 crisis) is seeking the opposite outcome, i.e., to halt and reverse contracting aggregate demand. Given M-to-M regulatory accounting, its efforts confront the hard macro fact that expansionist monetary policy has virtually no chance of success if banks are broadly and substantially liquidating assets. Macro stabilization is the primary function of the central bank, making indefensible the shackling of its regulatory function to accounting standards that damage the effectiveness of its monetary policymaking. The stakes in the accounting-coherence problem are very large indeed.

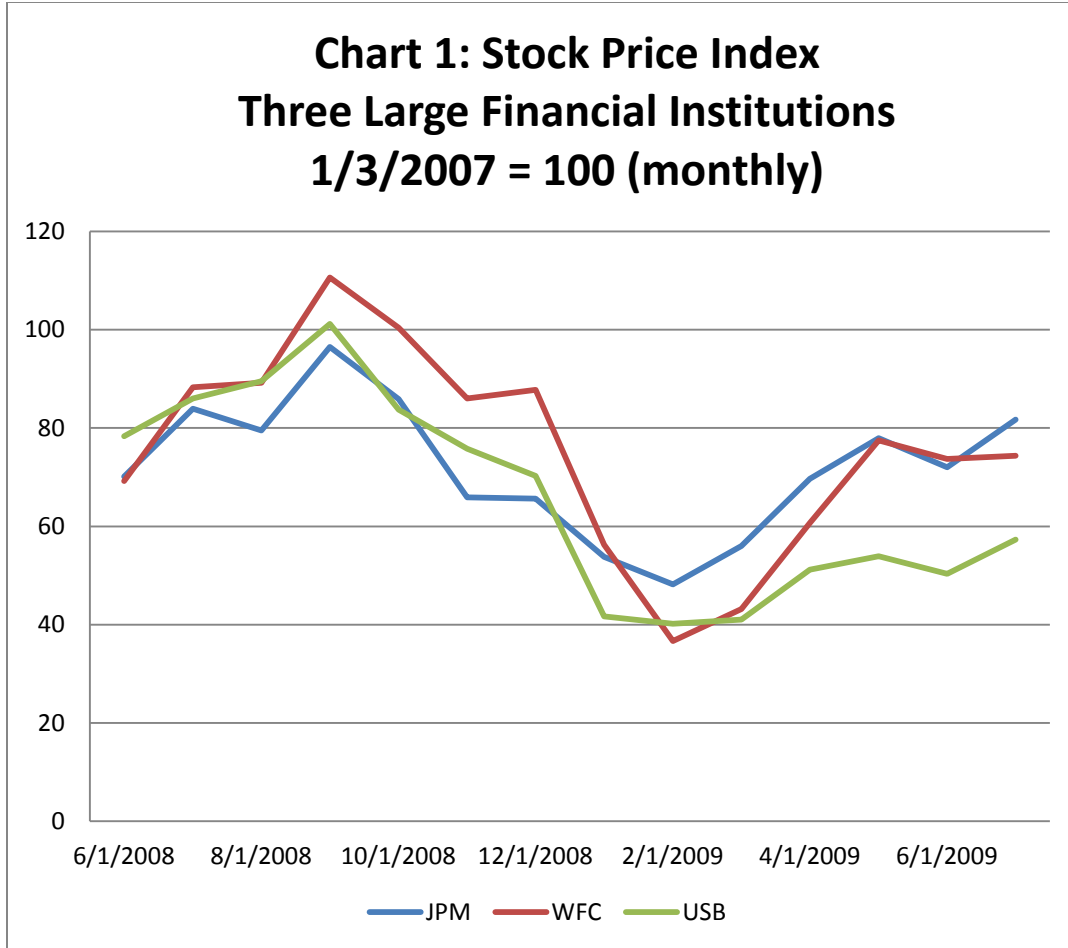
Continuing to use the 2008-09 stabilization crisis to illustrate the systemic problem, Chart 1 depicts the extreme over-shooting (from the perspective of coherent Fed policymaking) of three large-bank equity prices as investors assigned non-trivial probabilities to depression. Equity prices for JP Morgan Chase (JPM), Wells Fargo (WFC), and U.S. Bankcorp (USB) plummeted (by 50 percent or more in less than six months), as the market bet against the Federal Reserve successfully preventing an economic collapse. There can be little doubt that the Fed's real-side policymaking lacked credibility in financial markets. However, once the macro policy was successfully halted and reversed the contraction in aggregate demand in the first half of 2009, the stock prices rebounded substantially. During the interim, market-transaction equity pricing ( $P^T$ ) was clearly inconsistent with Fed stabilization policy.<sup>11</sup>

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<sup>10</sup> Adjustments are motivated by regulations that fix the level of assets that can be supported by a given level of regulatory capital. It is irrational for banks to attempt to raise new capital in distressed circumstances ( $\Delta M^L = \delta$ ).

<sup>11</sup> To reiterate, in deteriorating macro circumstances, the only way to induce  $P^T = P^E = P^R$  is to make the Fed's real-side policy credible. Continuing threats, including domestic and European debt crises, have motivated persisting doubts about Fed stabilization policy. Also notable, given this paper's analysis, the principal virtue of M-to-M asset valuation, i.e., investor transparency, has become less persuasive. If the Fed (in stressed macro environments such as 2008-09) has "insider" information that its policies are well-designed and effective, it has an investor-transparency responsibility not to use, and therefore propagate-by-example, misleading M-to-M accounting.





It is useful here to reiterate the paper's fundamental message. *In the absence of full credibility of Federal Reserve monetary policy, mark-to-market valuation of bank regulatory capital must be inconsistent with, and damaging to, its stabilization policies.* Fed policy incoherence is inherently inefficient, can be extremely costly, and should not be tolerated with the central bank.

#### Alternatives to Mark-to-Market Accounting

The foregoing analysis of Fed policy-consistent regulatory accounting, given a dramatic deterioration of investor expectations ( $\Delta M^I = \delta$  versus  $\Delta M^{FR} = 0$ ), implies the appropriate valuation standard to be  $P^R \approx P^B$ . Generally, given weak real-side Fed stabilization credibility, the most efficacious, conservative, readily-available regulatory accounting system is rooted in assets' current performance, emphasizing internal cash flows. In normal circumstances, when the macro

economy is experiencing relatively stable growth, cash-flow accounting largely corresponds to the M-to-M alternative. In stressed circumstances, given substantial stationary macro instability, cash-flow accounting more closely tracks  $P^B$ , which in turn is more consistent with the Fed's primary macro-stability responsibilities than are M-to-M valuations. The alternative valuation methodology is well understood, having long been used by regulators to assess the safety and soundness of bank balance sheets.<sup>12</sup>

#### IV. CONCLUSION

The impetus for this paper, like so much of the current rethinking of financial regulation, is the 2008-09 macroeconomic crisis and the Federal Reserve policy response. The problem is captured by a simple thought exercise: In late 2008 when frozen financial markets had induced a virulent breakdown in total spending, posit that the Fed's valuation standard of bank regulatory capital was shifted to the mark-to-market methodology. The consequent sharp contraction in bank balance sheets would have placed *huge* further downward pressure on aggregate demand, easily sufficient to overwhelm the viability of the central bank's stabilization effort. Overall welfare loss, measured in depression-sized losses in employment and wealth, would have greatly exceeded the actual losses in the 2007-09 recession. It requires an unhealthy capacity to ignore lessons of history (in particular, to ignore the difference between relatively modest and huge damage to economic well-being) to dismiss the need to debate, understand, and limit the role of M-to-M accounting in well-designed banking regulation.

The message has been that the Federal Reserve must pursue overall policy consistency. Especially in stressed macro environments like 2008-09, during which it is overwhelmingly important for monetary policy to be effective, M-to-M accounting fundamentally works at cross purposes with the central bank's primary stabilization responsibilities. The use of M-to-M valuation standards in the Federal Reserve's calibration of regulatory capital must be rejected.

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<sup>12</sup> The alternative valuation methodology for large bank regulatory capital should be augmented with state-of-the-art stress testing. That innovation in regulation proved its worth in the 2008-09 financial crisis.

Implementing that rejection requires care. Effective accounting systems must inspire confidence. If the central bank continues its default approach of permitting M-to-M valuation to increasingly become the operational standard for its regulation policies, implicitly planning to switch to more policy-coherent accounting if confronted by stressed macro conditions, the timing of such a methodology shift will cause already stressed investors to suspect a cover-up of significantly deeper bank problems, further aggravating the economic instability. The move to a reliably policy-coherent regulatory valuation standard needs to be accomplished when the economy is not distressed, investors are less suspicious, and only after the case against M-to-M accounting is effectively made (in venues such as this conference) and has become broadly understood. The importance of this paper is its early role in making the case for rejecting M-to-M accounting in Federal-Reserve regulatory applications, on the powerful grounds that it lacks coherence with monetary-stabilization policy, to the global accounting community.