

## DO ACCOUNTING MEASUREMENTS MATTER?

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## INTRODUCTION

The global financial crisis of 2008 has made mark-to-market accounting a household name. While it was once relegated to the arcane lexicon of the financial world, mark-to-market accounting now commonly appears in the general press, and policy issues dominate discussions both on Wall Street and in Washington. Mark-to-market accounting even warranted discussion during the presidential campaigns, as it made its way into the Emergency Economic Stabilization Act of 2008. As the world's attention turns toward understanding the roots of a global financial meltdown, mark-to-market accounting has moved front and center in the policy debates. Indeed, it is impossible to discuss serious reforms of the financial sector without putting mark-to-market at the top of the list.

But it was not always this way. Haresh Sapra saw some fundamental tensions with mark-to-market accounting years before it landed on the international radar screen. Though the theoretical model serving as the foundation of Sapra's paper was published as recently as 2008, the initial draft circulated in working-paper form as early as 2004.<sup>1</sup> Sapra's foresight in picking a fundamentally important problem well ahead of the policy world allowed him to focus on novel economic issues, which still evade the current public debate. While there is much public outcry for relaxing mark-to-market accounting, there is very little careful analysis of the effects it may have. Sapra's thoughtful and serious analysis fills this gap in a graceful and elegant way.

Sapra's model examines two fundamental and straightforward questions: What are the costs and benefits of mark-to-market versus a historical-cost regime? When should policy makers adopt one regime over another? This approach is novel from the outset. For better or for worse, much of the current economic theory frontier is preoccupied with building elaborate, complex mathematical models rather than directly answering relevant economic questions. Sapra breaks from this tradition and seeks to address a highly relevant phenomenon in a straightforward way. His model is clean, precise, and tight. Sapra's main conclusion is that the damage from fair-

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<sup>1</sup> See Guillaume Plantin, Haresh Sapra & Hyun Song Shin, *Marking to Market: Panacea or Pandora's Box?*, 46 J. OF ACCT. RES. 435 (2008).

value accounting is large when the asset is illiquid, senior, or long-lived. This is a strong result, and it is a clear prediction. The model provides direct guidance to policy-makers who must decide when, and under what conditions, to use mark-to-market accounting.<sup>2</sup>

This paper illustrates the main ideas of Sapra's models in an even more abbreviated form than Sapra's own paper. It discusses why this abbreviation reveals a truly fundamental result. It then considers applications of mark-to-market accounting and concludes with a discussion of financial institutions' capital requirements.

### THE BASIC IDEA

Sapra presents two similar models of mark-to-market accounting. They each highlight slightly different pieces of the puzzle. By merging the two models, the benefits of highlighting the best of both worlds become apparent. This paper simplifies the structure somewhat to make the underlying economics more apparent.

The basic setup is the same. A financial institution (the firm) owns an asset at date 0, which it acquires at  $v_0$ . At date 0, the firm decides whether to hold or sell the asset, and the firm maximizes date 1 expected value. The value of the asset is uncertain, and realizes a value of  $v$  at date 1 (with probability  $1-d$ ) or date 2 (with probability  $d$ ). The firm can sell the asset for a price  $p$  in the marketplace. This illustration takes the price  $p$  to be exogenous, and does not model the market as a rational actor. This illustration simplifies the analysis, eliminates the pricing function, and focuses on the firm's problem.

Suppose the firm cannot sell the asset with certainty, but needs to find a buyer. Let  $\alpha$  be the probability of finding such a buyer. Therefore, the expected revenue from selling the asset is  $\alpha p$ . The firm's decision now is simply to hold or sell the asset. To formalize this, calculate the firm's "return to holding" as the benefits of holding, less the costs of holding. In this case, the costs are the opportunity costs of holding the asset, namely selling the asset. Therefore, the "return to holding" is simply the expected valuation of the asset less the expected revenue from selling the asset to the market. Under historical costs, the "return to holding" is

$$(1-d)v + d v_0 - \alpha p$$

The first two terms comprise the expected valuation of the asset, weighted by the probability  $d$ . Since there is only one unit of the asset, this equation is akin to a profit function for the firm. Observe that as the market

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<sup>2</sup> In this paper, the terms "mark-to-market accounting" and "fair-value accounting" will be used interchangeably.

price  $p$  rises, the "return to holding" falls, and therefore the firm is more likely to sell the asset. In other words, the firm's supply curve slopes upward (i.e. higher prices induce more selling). This confirms our standard intuition from microeconomics that higher prices draw more suppliers into the market.

Now consider what happens under mark-to-market accounting. The analysis is similar, but the valuation of the asset changes. Rather than holding the asset at its historical cost at date 2, the firm now holds the asset at its current market price. Therefore, the firm's "return to holding" is

$$(1-d)v + dp - \alpha p$$

As before, this is the expected valuation of the asset less the expected revenue from selling the asset. Notice that if  $d$  is larger than  $\alpha$ , the increase in  $p$  causes the "return to holding" to rise, thereby making the firm *less* likely to sell the asset. So as prices rise, supply decreases. In other words, supply slopes downward. This inversion of the supply curve is the unique result of mark-to-market accounting.

The main difference between the returns to holding under historical cost and mark-to-market accounting is the valuation of the asset at date 2. Under historical cost, the asset is valued at  $v_0$ , independent of the current market price. Therefore, the effect of price on the firm's profit function flows only through the expected revenue from sales. Mark-to-market accounting, on the other hand, forces the firm to value the asset on its balance sheet at the market price  $p$  at date 2. In that way, the price has a twin effect on the firm's profits. First, through the expected revenue  $\alpha p$ , and second, through its expected valuation  $dp$ . If  $d$  is interpreted as the duration of the portfolio, and the probability is that the asset will pay off at a later date, then an interesting case occurs when the duration exceeds the probability of finding a buyer for the asset ( $d > \alpha$ ). If this is the case, observe that the firm's "return to holding" increases in price, causing the supply curve to invert. Valuing the asset at its market value introduces price into both the benefit and cost sides of the firm's profit function, which challenges standard economic intuition.

This slight simplification of Sapra's model directly illustrates the main result of his paper:<sup>3</sup> the effect of mark-to-market on the supply curve. It is common knowledge that market prices are not constant but rather rise and fall over time. As such, a direct consequence of mark-to-market accounting is that it makes the firm buy or hold assets when prices are rising and sell assets when prices are falling. This exacerbates the business cycle and can lead to increases in volatility of asset prices. In contrast, historical cost accounting encourages firms to sell when prices rise and buy or hold when

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<sup>3</sup> See Plantin, Sapra & Shin, *supra* note 1.

prices fall, thereby reducing asset price volatility. While mark-to-market has received a wide array of public criticism, this criticism has been vague and does not precisely illustrate the reasons why mark-to-market accounting may not be optimal. Sapra's model does this in a clean and comprehensible way.<sup>4</sup>

Sapra's result may only seem relevant to the specific context of financial markets, but it demonstrates a more general point. When firms value their own assets at market prices, it can reverse our standard intuition about supply and demand. Two examples from the housing sector illustrate this point.

#### APPLICATIONS TO HOUSING SUPPLY AND DEMAND

For years, economists have wondered why housing does not seem to follow the laws of supply and demand like other goods and services. For example, we observe that when house prices fall, potential buyers are less likely to enter the market, contrary to a downward sloping demand curve. When prices rise, existing home owners are less likely to sell their home, contrary to an upward-sloping supply curve. This inversion in the supply and demand curves for housing has persisted for years.

Sapra offers a simple explanation for this puzzle; valuing the asset at its market price can cause the standard supply curve to invert. In the example above, when prices fall, a potential home buyer is unlikely to buy because doing so would mark his portfolio (which will now include the house) at this low value. Indeed, the house is not simply a good that is consumed and discarded. Rather, it is an investment, which must be valued at some price. Similarly, when prices rise, an existing homeowner is less likely to sell because his portfolio grows in value. Again, this arises because his wealth is "marked-to-market," in that he is valuing his assets, primarily his house, at their market values.

#### APPLICATION TO BANKRUPTCY LAW

Another application of Sapra's paper<sup>5</sup> to the housing market lies in Chapter 13 bankruptcy law. The current law gives special treatment to houses, relative to other assets in bankruptcy proceedings. This practice

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<sup>4</sup> There are two possible extensions with respect to  $\alpha$ . The first is to simply observe that under either regime, as the probability of finding a buyer increases, the firm is more likely to sell. This confirms the intuition that selling is more possible in thicker markets. But a more interesting case is to suppose that  $\alpha$  varies with  $p$ . Specifically, as the price of the asset rises, it is more difficult to find a buyer. This models the demand side of the market. A natural question is to see how the incentives to buy or sell change under mark-to-market versus historical cost under a more general specification  $\alpha(p)$ .

<sup>5</sup> See Plantin, Sapra & Shin, *supra* note 1.

emerged from the political clout of the mortgage-lending community in 1979, which effectively lobbied for historical cost accounting rather than mark-to-market accounting in personal bankruptcy proceedings.

To understand this, consider the following example: Suppose a debtor owns an asset at value  $v$  at date 0. Over time, he slips into bankruptcy because of deteriorating, external economic conditions. These conditions force the value of the asset downward to a current market price  $p$  at date 1. The debtor is effectively underwater on his asset because  $p < v$  at date 1. The debtor is worse off because of the economy, and can no longer pay the debts on his assets. As such, he slips into Chapter 13 bankruptcy, where the judge must now decide the valuation of the asset. The judge can either choose to value the asset at its historical cost of  $v$  or at its current market price of  $p$ , reflecting a price from resale.

The quirk in the bankruptcy code is that if the asset is a house, the judge values the asset at  $v$ , whereas if the asset is anything other than a house, the judge values the asset at  $p$ . This asymmetric treatment of housing emerged from the political efforts of lender-lobbyists who sought to value homes at historical cost because house prices fall in times of economic distress, and therefore, the historical cost exceeds the mark-to-market price. As such, the debtor effectively owes more on the house under historical cost than mark-to-market accounting. Therefore, shifting from mark-to-market accounting to historical cost in bankruptcy makes the debtor worse off and the creditor better off. It is effectively a transfer from the debtor to the creditor. To compensate for the transfer, the lenders agree to issue mortgages at lower rates *ex ante*. Thus, historical cost accounting effectively lowers the price of housing in the market. This is yet another way the federal government subsidizes the consumption of housing, along with a myriad of other ways.<sup>6</sup> Because all other assets are marked-to-market, the current bankruptcy law leads individuals to over-consume housing relative to other assets. This leads to a distortion in asset consumption since the government artificially depresses the cost of purchasing a house relative to other assets.

During the buildup of the sub-prime mortgage crisis of 2007, a proposal circulated around Congress to "cram-down" mortgages to the current market value (i.e. to shift from historical cost to mark-to-market accounting in Chapter 13 bankruptcy proceedings for houses). In this scenario, the debtor would owe a smaller amount on the house in bankruptcy, taking the current market price, rather than the higher historical cost. This would effectively transfer wealth in the reverse direction from the creditor to the debtor. Lenders would be worse off in the short term, but over time interest rates on future mortgages would rise. Rectifying the Bankruptcy Code

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<sup>6</sup> Raymond C. Niles, *Eighty Years in the Making: How Housing Subsidies Caused the Financial Meltdown*, 6 J.L. ECON. & POL'Y 165 (2010).

through the cram-down provision would remove the distortion in asset consumption mentioned above.

Sapra's analysis is relevant to this problem and provides an additional twist. If the cram-down provision becomes law, and houses are now marked-to-market, this may have an effect on incentives for homeowners before they enter bankruptcy. In particular, the homeowner is more likely to sell his home as the price of the home falls and he approaches bankruptcy. The application of Sapra's model is not a perfect fit because the debtor does not realize the full value of the house at date 1 since he is in bankruptcy court. But the general implication is still novel. Mark-to-market accounting induces more selling as prices fall but may introduce additional incentives on the decision to buy or sell that may have perverse effects. A full bankruptcy model will be necessary to tease out which effect dominates others.

While U.S. law generally does not allow for different legal rules for different markets, it does give judges discretion when implementing these laws to take into account regional variation. Were these judges to read Sapra's paper,<sup>7</sup> they would realize that cram-down works better when assets are more liquid. Therefore, in thick housing markets, such as the market for condominiums in a major city, the judge should be more willing to cram-down the value of the house to its market price. But in thinner housing markets, such as the market for multi-million dollar estates, the judge should be less willing to cram-down the value of the house to its market value, and should rely more on its historical cost.

#### CAPITAL REQUIREMENTS AND FAIR-VALUE ACCOUNTING

Sapra's paper<sup>8</sup> focuses on the economic effects of mark-to-market accounting, yet the majority of public attention remains focused on the banking sector. The question is not whether the banks should hold or sell their assets, but rather on the condition of the banks in economic downturns. Mark-to-market accounting pegs balance sheets to market prices, thereby making the balance sheet of the banks pro-cyclical. As such, the balance sheet grows during economic expansions and shrinks during recessions.

The consequences of this hinge on the capital requirements of the banks. In the U.S., the various federal regulators (the Federal Reserve, the Office of Supervision, the Office of the Comptroller of the Currency, and the Federal Deposit Insurance Corporation) all regulate the banks using some definition of a capital requirement, which is a ratio of equity over assets. Under mark-to-market accounting, during recessions, asset values fall and the balance sheets of the banks shrink, thereby forcing the banks

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<sup>7</sup> See Plantin, Sapra & Shin, *supra* note 1.

<sup>8</sup> *Id.*

close to their capital requirement. If this happens, there is not only the risk that the government will take over the banks, but that the banks' credit ratings will suffer and their credit default swap spreads will explode. All of this can immediately cause the market to lose confidence in the bank, causing the bank's stock price to fall. In the worst case, this could lead to a run on the bank.

The public outcry to this problem has focused on the accounting piece of the puzzle. The banks themselves have lobbied the government to relax mark-to-market accounting during recessions so they can mark their assets to their higher historical costs rather than their current market values. While this would solve the problem of running close to the capital requirement, it has other negative side effects. In particular, changing the accounting distorts the transparency of the bank. When the economy eventually recovers, should we expect the regulators to enforce mark-to-market accounting, thereby changing the accounting rules once again?

A better approach is to leave the accounting fixed but to adjust the capital requirements. In other words, use the accounting to maximize transparency, and adjust the capital requirement to guarantee financial stability. The Financial Stability Forum has proposed counter-cyclical capital requirements that rise and fall depending on the macroeconomic conditions.<sup>9</sup> So rather than keeping the capital requirement fixed at, say an 8% ratio of equity-to-assets, the capital requirement would be pegged to some market indicator. This, no doubt, may raise a host of additional complications (i.e. the choice of the indicator) and may create additional incentive problems induced by a varying capital requirement. But, it is a cleaner way to handle the problem, rather than changing the accounting.

Sapra wrote his paper well before the issue of capital requirements and fair-value accounting hit the financial press. Nonetheless, I would like to see an extension of Sapra's model to deal directly with this issue and answer the following questions: What are the economic tradeoffs of using a counter-cyclical capital requirement? Does this induce additional moral hazard problems? How does this affect the decisions of the banks to hold or sell their assets?

#### RECENT CHANGES IN ACCOUNTING RULES

Shortly after Sapra's initial *Journal of Accounting Research* paper<sup>10</sup> was published in May 2008, the global financial crisis kicked into high-gear, stimulating a flurry of concern, public outcry, congressional pressure, and world attention on mark-to-market accounting standards. Fair-value

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<sup>9</sup> FIN. STABILITY FORUM, REPORT OF THE FIN. STABILITY FORUM ON ENHANCING MARKET AND INSTITUTIONAL RESILIENCE 15 (2008), [http://www.financialstabilityboard.org/publications/r\\_0804.pdf](http://www.financialstabilityboard.org/publications/r_0804.pdf).

<sup>10</sup> See Plantin, Sapra & Shin, *supra* note 1.

accounting has long been atop the agenda in the monthly meetings of the President's Working Group on Financial Markets, convened by the U.S. Treasury Secretary and composed of all the major U.S. financial regulators. But it was not until the passage of the Emergency Economic Stabilization Act in October 2008 that mark-to-market accounting reached the full attention of Congress.<sup>11</sup> In that bill, Congress requested that the Securities and Exchange Commission (SEC) study mark-to-market accounting for the next ninety days and report its findings to Congress.

On December 30, 2008, the SEC released its mark-to-market study.<sup>12</sup> The study revealed several key points. First, the use of fair-value in financial reporting was not new, but rather had been in place for quite some time.<sup>13</sup> Second, Financial Accounting Standard 157 did not expand on the items required or permitted to be measured at fair-value, but rather provided additional guidance and consistency on existing fair-value measures.<sup>14</sup> Third, the thrust of the report argued that economics, rather than accounting, played the major role in the bank failures of 2008.<sup>15</sup> The SEC, in particular, analyzed twenty-two banks and broker-dealers over a three year period, and found the primary source of the problems were economic rather than accounting failure (poor risk management, shoddy credit reporting, lax lending standards, etc.).<sup>16</sup>

On March 12, 2009, the Chairman of the Financial Accounting Standards Board (FASB) confirmed the SEC's conclusion in his testimony before Congress.<sup>17</sup> Chairman Herz reported to Congress that FASB itself analyzed institutions closed by the Federal Deposit Insurance Corporation between January 25, 2008, and October 31, 2008.<sup>18</sup> This analysis confirmed both of the SEC's conclusions that, first, fair-value accounting was used in a limited context, and second, the primary source of the problems rested on poor economics rather than inaccurate accounting.<sup>19</sup> Finally, Chairman Ben Bernanke of the Federal Reserve testified to Congress on February 25,

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<sup>11</sup> Emergency Economic Stabilization Act, 12 U.S.C. § 5201 (2008).

<sup>12</sup> See OFFICE OF THE CHIEF ACCOUNTANT, DIV. OF CORPORATE FIN., U.S. SEC. & EXCH. COMM'N, REPORT AND RECOMMENDATIONS PURSUANT TO SECTION 133 OF THE EMERGENCY ECON. STABILIZATION ACT OF 2008: STUDY ON MARK-TO-MARKET ACCOUNTING (2008), <http://www.sec.gov/news/studies/2008/marktomarket123008.pdf>.

<sup>13</sup> *Id.* at 34-38.

<sup>14</sup> *Id.* at 3, 79.

<sup>15</sup> *Id.* at 97.

<sup>16</sup> *Id.* at 98, 101, 125.

<sup>17</sup> See *Mark-To-Market Accounting: Practices and Implications: Hearing Before the Subcomm. on Capital Mkts., Ins., & Gov't Sponsored Entities of the H. Comm. on Fin. Servs.*, 111th Cong. 10-12 (2009) (statement of Robert H. Herz, Chairman, Fin. Accounting Standards Bd.), [http://www.fasb.org/testimony/03-12-09\\_full\\_text.pdf](http://www.fasb.org/testimony/03-12-09_full_text.pdf).

<sup>18</sup> *Id.* at 11.

<sup>19</sup> *Id.* at 10.



2009, that "the basic idea of mark-to-market accounting is very attractive . . . and . . . a good principle in general."<sup>20</sup>

So has Sapra's analysis fallen on deaf ears? Absolutely not. While the major regulators are unwilling to dismantle the entire regime of fair-value measurement, they are more careful with respect to its particular problems. This is broadly consistent with Sapra's analysis. Moreover, these regulators are all acutely aware of the interaction between mark-to-market accounting and liquidity, which is exactly the centerpiece of Sapra's model. In Ben Bernanke's words, "[T]he accounting authorities have a great deal of work to try to figure out how to deal with some of these assets which are not traded in liquid markets."<sup>21</sup>

In fact, FASB's staff position number FAS 157-c, released on March 17, 2009, provides guidance to determine whether a market is inactive and whether a transaction is distressed. This guidance involves determining whether price quotes are based on current information and how they vary over time, the number of recent transactions, the level of publicly released information of the market, abnormally wide bid-ask spreads, and abnormal liquidity risk premiums. If the market is in fact inactive and the transaction distressed, then FAS 157-c requires the financial institution "use a valuation technique other than one that quoted price without significant adjustment."<sup>22</sup> Though this is not a wholesale suspension of mark-to-market accounting, it is a slight relaxation of mark-to-market accounting under certain well-defined circumstances. Thus, Sapra's analysis has woven its way not only into the public discourse, but also into real policy, proving that the ideas and the intuitions of the underlying model both have practical relevance and validity within a broad policy community.

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<sup>20</sup> *Id.* at 9 (citing *Monetary Policy and the State of the Econ., Part 1: Hearing Before the H. Comm. on Fin. Servs.*, 111th Cong. (2009) (statement of Ben Bernanke, Chairman, Bd. of Governors of Fed. Reserve Sys.)).

<sup>21</sup> *Id.* at 9-10 (citing *Monetary Policy and the State of the Economy, Part 1: Hearing Before the H. Comm. on Fin. Servs.*, 111th Cong. (2009) (statement of Ben Bernanke, Chairman, Bd. of Governors of Fed. Reserve Sys.)).

<sup>22</sup> FINANCIAL ACCOUNTING STANDARDS BD., DETERMINING WHETHER A MARKET IS NOT ACTIVE & A TRANSACTION IS NOT DISTRESSED 5 (2009), [http://www.fasb.org/fasb\\_staff\\_positions/prop\\_fsp\\_fas157-c.pdf](http://www.fasb.org/fasb_staff_positions/prop_fsp_fas157-c.pdf).