Fair Value Accounting and Firm Valuation

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ABSTRACT

In this paper we analyze the consequences of fair value adoption in firm valuation. We use a simple version of Ohlson's valuation model where we additionally incorporate the economic cycle and examine some implications of conservatism versus fair value accounting. We then estimate the model's final valuation formula for companies in the financial sector, which is especially subject to fair value accounting, that report under either IFRSs or US GAAP. We place special emphasis on controlling for a major change in the degree of use of fair value accounting in standards SFAS 133 and IAS 39. Our results show evidence that fair value accounting reduces the extent and impact of accounting information not timely recognized, therefore reducing the level of managerial discretion and mitigating the use of accounting-motivated transaction structures. Also, we find evidence that under conservatism, the valuation coefficient associated to book value is upward biased and adoption of fair value accounting brings it closer to the "right" value implied by valuation models.

Keywords: IFRSs, US GAAP, conservatism, fair value accounting, procyclicality, financial sector.

JEL Classification: M41, G12.

1. INTRODUCTION

In an efficient market, the valuation criteria implicit in the firms' accounting standards should not affect the firm's market value, given that investors are able to understand and adjust for the possible effects of these standards in the accounting information available. However, this adjustment could be costly for the economy, since, for example, accounting information based on historical cost would need to be processed and analyzed.[1] Furthermore, over the past few years, we have witnessed the consequences that may result from improper accounting practices. First the debacles in corporate America and Europe in the early 2000s and, more recently, the financial and economic crisis have brought to the spotlight the importance of improving the level of transparency of the quantitative information reported by firms, in general, and banks, in particular.[2] For example, Tweedie (2008) forcefully posits that the recent credit crisis has mainly been a crisis of confidence, therefore better disclosures about valuations and the methodologies employed are necessary, since higher levels of transparency of quantitative information are necessary to reestablish this confidence.

In this context, the debate on fair value accounting (hereafter, FVA) versus more conservative accounting standards has resurfaced. In particular, FVA standards in the financial sector may have played a role in exacerbating the effects of the recent financial crisis.

First, FVA recognizes good news on a timelier basis, thus producing higher earnings, dividends and management compensation. During an upturn, therefore, it may generate perverse economic incentives that affect firms' business strategies. FVA, however, cannot be directly blamed for the effects generated: said incentives could be eliminated if the not-yet-realized gains coming from valuation of financial instruments at fair value were not taken into account for the calculation of compensation and dividends. Thus, malincentives may be reduced whereas the quality of earnings as an estimate of the economic rent would not be affected.[3]

Second, and possibly more important, FVA leads to stronger cyclicality of accounting variables: in the upturns of the economy fair value would allow for revaluation of assets -whereas conservative standards would not- and in the downturns only FVA would recognize bad news when fair value is above cost. More specifically, in the financial sector FVA applied to some financial instruments in the balance sheet would generate intensified cyclicality of capital requirements since regulatory capital requirements would tend to rise with downswings in the economy and to fall with upswings, thereby creating an overreaction to economic cycles. As in the case of management incentives, supervisors could solve this problem by using expected future losses –but not unrealized gains- in order to compute the capital requirements for a specific institution: this computation need not affect measures of accounting profit. In other words, FVA

[1] Also, still in some countries accounting information is used for valuation purposes in, for example, resolving judicial processes over the right "price" of shares (see, e.g., Fernandez, 2009).

[2] For example, SEC (2008) hinted that Bear and Stearns had an inadequate Model Review Process and Risk Management Staffing in the area of Mortgage Backed Securities and it did not complain with Basel II in mark disputes and capital requirements. Also, fair value accounting of mortgage securities has been pointed out as a contributing factor to the recent crisis

[3] For example, Russian utility company RAO Unified Energy System abolished its dividends (including mandatory preferred dividends) after reporting a record profit that was the consequence of fair value adjustments.

contains valuable information for risk management assessment and for the estimation of the economic rent generated, although it might not be the appropriate number for the analysis of capital requirements.

In this paper we give a first step in understanding the consequences of FVA and focus on the implications of the choice between fair value/conservative accounting standards for valuation analyses. We incorporate considerations of conservativeness and of the economic cycle into an accounting valuation model. We estimate the resulting valuation formula using data from a broad sample of firms in the financial sector, focusing on the Banking, Insurance and Trading subsectors. This industry –and subsectors- are quite relevant in that that they use fair value for more items and have been using it for a longer time span. Our data contain a sort of *natural experiment* since the two most widely used accounting systems (US GAAP and IFRS) were subject to similar changes in FVA at a similar date. This allows us to pool together companies from both systems and perform an event-type analysis. Our results indeed show that FVA adoption leads to higher value relevance of accounting measures, to more timely recognition of news or, alternatively, to a significantly reduced importance of "news not yet captured in accounting numbers" and to response coefficients of accounting variables closer to their "theoretical" values.

The rest of the paper is organized as follows. Section 2 briefly summarizes the recent literature on FVA and conservatism of accounting standards, with emphasis on the financial industry, which is the focus of the empirical analysis. Section 3 includes a brief history of FVA which emphasizes the fact that simultaneous application of FVA in IAS 39 and SFAS 133 provides with an identifying strategy for the empirical analysis. Section 4 develops a simple valuation model in the spirit of Ohlson (1995) which includes considerations on the economic cycle and conservatism and leads to a valuation formula which can be estimated empirically. Section 5 develops the details of the econometric methodology, describes our data set, and presents the findings of the empirical analysis. Section 6 concludes. An Appendix contains some of the more technical details.

2. CONSERVATISM AND FAIR VALUE ACCOUNTING: A BRIEF REVIEW OF THE LITERATURE

2.1 Conservatism vs fair value

Accounting conservatism has been traditionally understood, in its extreme definition, as "anticipate no profit, but anticipate all losses" (Bliss, 1924). More generally, conservatism is defined as the higher level of verifiability required for recognition of good versus bad news (Basu, 1997). Conservatism is present in every accounting system around the world and the degree of conservatism of accounting standards has even increased during the last decades.[4] Watts (2003a) points out various alternative explanations for this prevalence of conservatism: the effects of contracting with external parties (Houlthausen and Watts, 2001), shareholder litigation (Beaver, 1993, Watts, 1993, Kellog, 1984), tax implications (Watts, 1977, Watts and Zimmerman, 1979, Guenther et al., 1997, Shackelford and Shevlin, 2001), the responsibility of standards-

[4] See Basu (1997), Givoly and Hayn (2000) and Holthausen and Watts (2001), among others. See also Watts (2003b) for a more extensive survey of the literature on conservatism.

setters as accounting regulators (Zeff, 1972, Walker, 1992) and, finally the firm's own management, either because of the managers' risk preferences (Lubberink and Huijgen, 2001) or the incentives of management control to design a conservative reporting mechanism (Kwon et al., 2001). In this line, Bleck and Liu (2007) prove the superiority of the fair value regime as an incentive device in an agency setting. The use of historical cost allows bad managers to hide the consequences of ill-conceived strategies, whereas FVA enables a quicker reaction from shareholders.

The effects of the different levels of conservatism are noteworthy. First, Li (2009) shows that firms domiciled in countries with more conservative financial reporting systems have significantly lower cost of debt and equity. A second effect is an understatement of net asset values, that is, of the firm's book value. In fact, the book-to-market ratio (hereafter, BM) has been used as a measure of conservatism (see the seminal work of Feltham and Ohlson, 1995, and Ahmed et al., 2000, Beaver and Ryan, 2000, Givoly and Hayn, 2000, Joos and Lang, 1994, Roychowdhury and Watts, 2006, and Stober, 1996, among others). A third consequence of conservatism is a time-disconnect (lag or delay) between market and accounting information. In an efficient market, investors should be able to understand the implications of conservatism and to correct for them in their investment decisions. Thus, accounting conservatism leads to a weaker association between current earnings and current price changes and a stronger one with lagged price changes. Kothari and Sloan (1992), Beaver and Ryan (1993), Collins et al. (1994) and Ryan and Zarowin (2003), among others, provide evidence that returns predict future earnings. This is in line with Easton and Pae (2004), who show that firms may invest in positive NPV projects but book value and earnings do not capture this value until later periods.

An alternative to conservative standards, FVA has been gaining widespread acceptance among standard setters, international institutions and accounting researchers.[5] As opposed to cost-based accounting, which does not recognize good news and bad news whenever the fair value is still above cost, FVA recognizes all good and bad news related to asset values. FVA, therefore, incorporates all currently available information into accounting measures. SEC (2005) identifies two primary benefits of FVA. First, FVA mitigates the use of accounting-motivated transaction structures. Second, FVA may reduce reporting complexity. Additionally, FVA results in current earnings that are more informative about risk management (Zhou, 2009). A major disadvantage involves the estimate of fair value in inactive or illiquid markets: in these cases, estimation by management can be subject to discretion or manipulation (see, e.g., Aboody et al., 1999, and Barth et al., 1998, 2000).

2.2 Fair value accounting and the economic cycle

In the recent years, FVA has been blamed for generating higher volatility and, in particular, an increased procyclicality of accounting measures. Barth et al. (1995) report that fair value-based measures of net income are more volatile than historical cost-based measures. Barth (2004) suggests three main sources for this additional volatility. First, the true underlying economic volatility is reflected in changes in the fair value of assets and liabilities. Second, volatility arises from measurement error in estimates of fair value changes. Finally, volatility also stems from application of a mixed attribute

[5] Fair value accounting in FASB standards has been basically developed in SFAS 107, SFAS 115, SFAS 119, SFAS 123 and SFAS 133 and in IASB standards in IAS 32, IAS 39, IFRS 2 and IFRS 7.

model. The first source (called *good volatility* by Barth, 2004) is a natural consequence of application of fair value. The second and third sources (*bad volatility*) are more of a concern, and regulators should attempt to minimize the ratio of bad-to-good volatility.

It is the case that during upturns there are more incentives to follow FVA, since this accounting model recognizes good news on a more timely basis, and this produces higher earnings, compensations and dividends, as Caruana and Pazarbasioglu (2008) point out. In the upturns of the economy FVA would allow for revaluation of assets - whereas conservative standards would not- and in the downturns only FVA would recognize bad news when fair value is still above cost.

Laux and Leuz (2009) explain the pros and cons of FVA with regards to procyclicality. They recognize the concerns about FVA, but suggest that it is not clear that these concerns apply to FVA as stipulated by the accounting standards issued by IASB or FASB and that cost-based accounting is unlikely to be the remedy. Under FVA the level of discretion of accounting is much lower because there is no lagged accounting information that the market has to incorporate in order to estimate the risk and market value of the company. This lagged information would affect the way accounting variables are correlated to the economic cycle: under conservatism accounting information is less related to the economic cycle, so an analyst has less evidence on how the cycle is affecting a specific firm. In fact, conservatism is preferred by managers since it leads to more stable accounting numbers which would hide the consequences of ill-conceived strategies. Under FVA there is no deferred accounting information and persistence of accounting measures is lower whereas under conservatism accounting numbers are artificially stable and their persistence is likely to be higher. The market may be able to make the necessary adjustments to conservative information when valuing companies, but this adjustment is probably costly and inefficient.

2.3 Conservatism, fair value and cyclicality in the financial sector

The literature on the effects of the adoption of FVA for financial instruments has developed very recently and it concentrates exclusively on the financial industry, specifically on the Banking and Insurance subsectors, two of the main users of financial instruments. [6]

Plantin et al. (2008) analyze the costs and benefits of the two accounting regimes - historical cost vs. FVA- in a model that explains why, in general, a financial institution is exposed to increased volatility by the introduction of a mark-to-market regime. The institutions most affected in terms of induced artificial volatility are those whose portfolio consists of long-term, illiquid, and senior (i.e. limited upside risk, but a possible downside risk) assets. These are major characteristics of bank assets (loans) or insurance liabilities (in the reinsurance market), and so these two sectors -banking and insurance- become most relevant when analyzing the effects of FVA.

Additionally, FVA leads to stronger cyclicality of accounting variables of financial companies. In the financial sector FVA applied to financial instruments in the balance sheet would generate intensified procyclicality of capital requirements, that is, the

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[6] Landsman (2006) reviews the literature on fair value accounting for financial instruments. He stresses cross-country institutional differences and the importance of using FVA for financial reporting and bank regulation.

tendency for regulatory capital requirements to rise with downswings in the economy and to fall with upswings, thereby creating an overreaction to economic cycles. In this line, Sole et al. (2009) show that fair value may introduce unintended procyclicality, but it is probably still the preferred framework for financial institutions.

Aboody et al. (1999) find that revalued investments are consistently associated with share prices. This makes fair value more relevant for financial institutions in general and for banks in particular. Barth (1994) shows that fair values of investment securities are incrementally associated with bank share prices, even after controlling for book values of said investment securities. Barth et al. (1996), Eccher et al. (1996) and Nelson (1996) find that the fair values of investment securities are incrementally informative -relative to their book values- in explaining bank share prices, thus supporting the results in Barth (1994). The incremental volatility in income measures mentioned above, however, seems not to be reflected in bank share prices.

In the light of the above, the financial sector and its different subsectors appear as relevant candidates for empirical analyses on the effects of changes in FVA, a task that we take up in Sections 4 and 5.

3. IFRSs, US GAAP AND RECENT CHANGES IN FAIR VALUE ACCOUNTING

Given our interest in the analysis of the impact of FVA in firm valuation, we would ideally want use a *natural experiment* in order to describe the effects of changes in the conservatism of accounting standards. The recent history of standards setters provides us with several moments in time that are candidates for major changes in the degree of FVA.

Probably the first major move towards FVA was the issuance by FASB of SFAS 115 in 1993, which required FVA for marketable securities. The impact of this standard, however, may not have been too large except for financial trading firms where marketable securities represent a significant proportion of total assets. In any case, as we mention in the empirical section this date is too early in time to allow for a meaningful analysis.

We believe, however, that a similarly relevant movement was the move towards FVA of both IAS 39 by IASB and SFAS 133 by FASB. These two standards focused on FVA of all kinds of financial instruments with special emphasis on derivative securities, which were gaining special relevance in banks' balance sheets.

Standard IAS 39 from IFRS's read, as issued in 1998:

"***Greater Use of Fair Values for Financial Instruments***

13. This Standard ***significantly increases the use of fair values in accounting for financial instruments****, consistent with the direction the Board has given to the Joint Working Group to continue to study further the use of full fair value accounting for all financial assets and liabilities. This Standard changes current practice by requiring the use of fair values for:*

(a) *nearly all derivative assets and derivative liabilities (today these are often not even recognised, let alone measured at fair value);*

(b) *all debt securities, equity securities, and other financial assets held for trading (IAS 25 allows these to be reported at cost, lower of cost and market, or fair value, and practice today is mixed);*

…

Effective Date and Transition

*171. This International Accounting Standard becomes operative for financial statements covering financial years beginning **on or after 1 January 2001**. Earlier application is permitted only as of the beginning of a financial year that ends after 15 March 1999 (the date of issuance of this Standard). **Retrospective application is not permitted**."*

For US GAAP, standard SFAS 133 which took effect, similarly, on January 1, 2001 for calendar-year companies and on June 15, 2000 for fiscal-year companies, was described in a very similar manner:

*"**Accounting for Derivative Instruments and Hedging Activities***

*4. This Statement standardizes the accounting for derivative instruments, including certain derivative instruments embedded in other contracts, by requiring that an entity recognize those items as assets or liabilities in the statement of financial position and measure them at **fair value**.*

…

Effective Date and Transition

*48. This Statement shall be effective for all fiscal quarters of all fiscal years beginning after **June 15, 1999**. Initial application of this Statement shall be as of the beginning of an entity's fiscal quarter; on that date, hedging relationships shall be designated anew and documented pursuant to the provisions of this Statement. Earlier application of all of the provisions of this Statement is encouraged but is permitted only as of the beginning of any fiscal quarter that begins after issuance of this Statement. Earlier application of selected provisions of this Statement is not permitted. This Statement shall not be applied retroactively to financial statements of prior periods."*[7]

It is clear that balance sheets of companies in the financial sector were significantly affected by the required application of standards IAS 39 or SFAS 133. Therefore, in the empirical analysis we will use the move towards FVA of these two standards –which was finally effective in the same date- as a major change in the mix of conservatism versus FVA in the financial sector. If we look in greater detail at the different subsectors, however, there are two reasons why this impact may not have been so noticeable for companies in the Trading subsector. First, a percentage of the assets of these companies belongs to the investors and not to the trading firm but the assets that belonged to the trading firms were already affected by SFAS 115. Second, income generated by these firms was always accounted at fair value: management fees of this type of firms are generally charged to investors as a fixed percentage of total assets under management (*asset-based fee*); additionally, current worldwide mutual fund regulation usually allows management fees to be charged totally or partially on the

[7] The application date was lately postponed to June 15, 2000 and January 1, 2001.

returns obtained (*performance-based fee*).[8] Independently of the fee structure, however, income must be accounted for during the year in which the fee is generated, so it is not possible to defer it. We believe, therefore, that Trading firms were less affected by conservatism issues, and thus SFAS 133 or IAS 39 probably had a less noticeable impact for these firms. We comment in Section 5 possible implications for our analysis and show evidence in favor of our argument.

4. FAIR VALUE ACCOUNTING AND FIRM VALUE

In order to obtain an empirical framework appropriate for our analysis, we model the relationship between accounting information, firm value and the economic cycle using a derivation of Ohlson's (1995) model. Ohlson-type valuation models have been used in value relevance research and they can help assess the effects of accounting conservatism (Barth et al., 2001) and, more specifically, the effects of conservatism on the relation between accounting numbers and firm value (Stober, 1996, Barth et al., 1999, Beaver and Ryan, 2000). Given our above discussion, we explicitly incorporate the business cycle in an Ohlson-type model, and derive a valuation formula that can be estimated and will allow us to examine the effects of moves to increased FVA.

Ohlson's (1995) original model is based on adding some informational dynamics to the residual income valuation (RIV) framework. The model starts from a traditional discounted stream of expected future dividends,

$$p_t = \sum_{\tau=1}^{\infty} R^{-\tau} E_t[d_{t+\tau}]$$

where R=1+r, r is the discount rate, p_t is the (market) price of the company and d_t are dividends at time t. The (clean surplus) dynamics for the company's book value b_t are specified as $b_t = b_{t-1} + x_t - d_t$, where x_t are earnings at time t. By adding a transversality condition $\lim_{\tau\to\infty} R^{-\tau} E_t[b_{t+\tau}] = 0$ and a definition for abnormal earnings $x_t^a = x_t - rb_{t-1}$, one can get the RIV equation in terms of future expected abnormal earnings:

$$p_t = b_t + \sum_{\tau=1}^{\infty} R^{-\tau} E_t[x_{t+\tau}^a]$$

The key part of models 'a la Ohlson' lies in the dynamic behavior stipulated for abnormal earnings. We define our dynamics for abnormal earnings as:

$$\begin{aligned} x_{t+1}^a &= \omega x_t^a + v_t + e_{t+1} \\ v_t &= \gamma_2 v_{t-1} + \gamma_3 y_t + \eta_t \\ y_t &= \gamma_1 y_{t-1} + u_t \\ (e_t, u_t) &\sim iid(0,\Omega), \quad u_t \sim iid(0,\sigma_u^2) \end{aligned} \qquad (1)$$

The parameter ω measures the persistence of abnormal earnings. In an efficient sector this parameter will most likely converge to zero. In fact, Stigler (1963) already showed that persistence is directly related to efficiency of the markets: highly competitive

[8] Thus, mutual funds could charge both a fee based on the volume of assets, and an incentive fee based on the fund's performance. Indeed, all the country members of the International Organization of Securities Commissions, IOSCO, allow for this type of management fee. In spite of this legal possibility, in practice only a minority of mutual funds uses remuneration structures tied to the fund's return.

sectors should show low persistence of abnormal returns. Mueller (1977) reported evidence on this lower persistence of abnormal returns in highly competitive sectors.

The variable y_t captures the economic cycle, and it is an exogenous factor. The variable v_t is Ohlson's "other information". This variable captures news relevant for earnings but not yet incorporated into accounting measures (so news that affects period's *t+1* abnormal earning or, maybe, subsequent periods). The parameter γ_2 measures the persistence of such information. Note that we have incorporated an additional feature to the usual AR(1) dynamics of this variable by including the possibility that v_t is related to the economic cycle y_t.[9] This relationship, measured by parameter γ_3 may allow us to show some indirect evidence of conservatism. As mentioned in Section 2, earnings in more conservative accounting standards are less procyclical, since in good times not all good news are timely recognized and in the recent decades most periods have been expansionary. Thus, the v_t variable –which measures the part of earnings *not yet included* in accounting numbers- should be *more* procyclical in conservative standards, so we expect the parameter γ_3 to be positively related to conservatism, at least if the sample period includes a sufficiently long span of time so that the majority of the periods are expansionary. In short, we expect that under FVA v_t should be less persistent that under historical cost accounting -because of its composition, limited under FVA to surprises or innovations- and it should be less procyclical, i.e., it should have a lower correlation with the economic cycle. We analyze evidence on these two effects in Section 5.

Given the dynamics in (1) we can obtain a valuation formula that relates current price to accounting variables.[10] We substitute out for abnormal earnings in the RIV expression $p_t = b_t + E_t\left[\frac{1}{R}x_{t+1}^a + \frac{1}{R^2}x_{t+2}^a + \frac{1}{R^3}x_{t+3}^a + ...\right]$ and obtain

$$p_t = b_t + E_t\left[\frac{1}{R}\left(\omega x_t^a + v_t + e_{t+1}\right) + \frac{1}{R^2}\left(\omega x_{t+1}^a + v_{t+1} + e_{t+2}\right) + \frac{1}{R^3}\left(\omega x_{t+2}^a + v_{t+2} + e_{t+3}\right) + ...\right].$$

It is easy to show that

$$E_t\left[v_{t+j}\right] = \gamma_2^j v_t + \gamma_1\gamma_3\left(\frac{\gamma_1^j - \gamma_2^j}{\gamma_1 - \gamma_2}\right)y_t$$

After substitution and quite a bit of tedious algebra, the above reduces to the following valuation formula:

$$p_t = b_t + \frac{\omega}{R-\omega}x_t^a + \frac{1}{(R-\omega)}\frac{R}{(R-\gamma_2)}v_t + \frac{1}{R-\omega}\frac{R\gamma_3\gamma_1}{(R-\gamma_1)(R-\gamma_2)}y_t \tag{2}$$

where the third and fourth terms reflect the effect of the "other information" and of the economic cycle in the current firm value. We expect conservatism to show up in empirical analyses of this formula in several ways: first, less conservative standards could, as said above, be associated with a lower γ_3 in expansionary times, so the coefficient of y_t might be lower for less conservative standards. Second, we expect the

[9] We could have incorporated also a dependence of abnormal earnings on the economic cycle. This would lead to a response parameter of p_t to y_t in equation (2) which would be a combination of a direct effect through abnormal earnings and an indirect effect through v_t. This may be the reason why the results on y_t in Tables 5-8 are inconclusive. We opted for keeping the formula in (2) simpler and not including this dependence.

[10] Appendix 1 contains detailed derivations of all the formulas in this section.

increased use in FVA to lead to reduced significance of the term v_t, since the "information not yet incorporated into accounting" becomes less relevant if FVA is used. Finally, the coefficient associated to b_t should be closer to the theoretical value of one. Unconstrained estimation of (2) has usually led to coefficients on the book variable larger than one: under FVA, book value –which captures all good and bad news- tends to be higher than under historical cost. Thus, given that in an efficient market investors understand this difference and adjust for this information (so p_t is unaffected by accounting standards), a higher book value will produce a lower coefficient on b_t (closer to one). Consequently, introduction of FVA should lead to lower estimated coefficients on book values.

In the empirical analysis in Section 5 we do not attempt to give explicit structural interpretations of the parameters in (2), since the formula is based on the dynamic specification in (1), which is not necessarily "correct".[11] We have used the model, instead, to point out the expected effects of FVA introduction (a lower impact coefficient of v_t on p_t, a lower coefficient of b_t on p_t and, maybe, lower persistence and procyclicality of the v_t variable), and we focus on showing evidence of these effects without attempting to obtain estimates of the "true values" of the structural parameters.

5. EMPIRICAL ANALYSIS

This section presents the details of the econometric methodology, describes our data set, and presents the findings of the empirical analysis.

5.1 The measurement of v_t

Section 4 justified a valuation formula of the form

$$p_t = \beta_0 + \beta_1 b_t + \beta_2 x_t^a + \beta_3 v_t + \beta_4 y_t \qquad (3)$$

where the "reduced-form" coefficients β are a function of the structural parameters of the dynamics in (1). Before we can attempt to estimate equation (3), it has to be noted that only b_t and y_t are observed (although the latter must be proxied with some macroeconomic indicator). In other words, we need to obtain measures of x_t^a and v_t.

We follow, partially, the methodology in Dechow et al. (1999) to measure these two variables, although we extend their analysis in a direction which, interestingly, allows us to comment as well on some of the structural parameters of interest.

We first note that from the definition of earnings, we can back up a measure for abnormal earnings $x_t^a = x_t - r \cdot b_{t-1}$, given a value for the cost of capital r. Second, from the dynamic structure in (1) and the assumptions on the error terms, it follows that $v_t = E_t\left[x_{t+1}^a\right] - \omega x_t^a$ where E_t refers to the expectation given information up to time t. Taking also expectations in the equation of abnormal earnings $E_t\left[x_{t+1}\right] = E_t\left[x_{t+1}^a\right] + r \cdot b_t$. Thus, if we had some measure of the period t conditional expectation of period t+1 earnings we could obtain a measure of the conditional expectation of abnormal

[11] We use these dynamics in Section 5.1 in order to back out a measure for v_t. We stress the fact that this measure is, therefore, conditional on the dynamics in (1) and as such should the analysis in Section 5.1 and the comments on the results in Table 3 be understood.

earnings, from which later we can obtain v_t. Following Dechow et al. (1999) we use the consensus analyst forecast for period t+1 earnings (which we denote $f_t=E_t[x_{t+1}]$), so that $E_t\left[x_{t+1}^a\right]=f_t^a=f_t-r\cdot b_t$, which is, again, conditional on the value of r. In principle, then, a measure for the "other information" v_t could be obtained by

$$v_t=E_t\left[x_{t+1}^a\right]-\omega\cdot x_t^a=f_t^a-\omega\cdot x_t^a \qquad (4)$$

Note that in order to use this last equation one would need an estimate of ω, which must come from the dynamics of abnormal earnings. As Dechow et al. (1999) mention, this coefficient is indeed related to the first autocorrelation of abnormal earnings, but an autocorrelation that is conditional on the value of v_t. In other words, in order to estimate correctly v_t we need an estimate of ω, but in order to estimate ω correctly we need to know v_t. It is not difficult to see that direct estimation of the first autocorrelation of x_t^a – or of more complicated models such as those used by Dechow et al. (1999)- would not necessarily lead to a consistent estimate of ω in the context of the dynamics specified for x_t^a.[12] An alternative method, however, can be devised that leads to a correct measure of ω ("correct" in the sense that it is consistent with the dynamics in (1)) and that, additionally, allows us to back out estimates for v_t, γ_2 and γ_3.

The variable v_t is measured as a byproduct of the equation for abnormal earnings and some consensus forecast at period t for earnings of period t+1, $v_t=f_t^a-\omega\cdot x_t^a$. Our posited dynamics explicitly model the dynamic behavior of v_t as $v_t=\gamma_2 v_{t-1}+\gamma_3 y_t+\eta_t$. We can then substitute out the first expression into the second and express the dynamic behavior of v_t in terms of observable variables f_t^a, x_t^a and y_t:

$$f_t^a-\omega\cdot x_t^a=\gamma_2(f_{t-1}^a-\omega\cdot x_{t-1}^a)+\gamma_3 y_t+\eta_t$$

which can be transformed to yield

$$f_t^a=\omega\cdot x_t^a+\gamma_2\cdot f_{t-1}^a-\gamma_2\cdot\omega\cdot x_{t-1}^a+\gamma_3 y_t+\eta_t \qquad (5)$$

Under the usual assumptions on η_t, this equation can be estimated by nonlinear least squares and yield consistent estimates of ω, γ_2 and γ_3, from which v_t can then be recovered. Note that all these estimates, including the measurement of v_t, are conditional on the value assumed for r, and therefore some sensitivity analysis with respect to this parameter must be performed. Of course, more complicated dynamics of v_t and/or x_t^a will change both the valuation formula (2) and the nonlinear model (5). We believe, however, that the above is enough for the purposes of our analysis. Also, Bar-Yosef et al. (1996) investigate the appropriateness of the single lag information dynamic in a more general framework and find that a second lag achieves modest statistical significance.

In order to estimate (5) we collect analyst forecasts for earnings per share as a measure of f_t and earnings (x_t) and equity data (b_t) in order to obtain a measure of abnormal earnings (x_t^a). Section 5.2 explains the data sources in greater detail. Once v_t has been measured, the main valuation equation (3) can be estimated.

[12] It can be shown that, given the dynamic structure in (1), a sample estimate of the first autocorrelation of x_t^a –the first analysis in Dechow et al. (1999)- would converge in probability to $\omega+\frac{1-\omega^2}{1-\omega\gamma_2}\cdot\frac{\gamma_2\sigma_\eta^2+(1-\gamma_2^2)\sigma_{\varepsilon\eta}}{\sigma_\eta^2+(1-\gamma_2^2)\sigma_\varepsilon^2}$, which is equal to ω only if both γ_2 and the covariance between η and ε are equal to zero, two assumptions that are probably too restrictive.

5.2 Data

All observed variables in the analysis are firm-level variables except for GDP growth, which will account for the economic cycle in each firm's country of origin. GDP data come from the World Bank WDI database. The company data we employ are all observations (firm-year) from 1994 until 2007 from the Global Financial Services (Compustat) database of companies following either IFRSs or US GAAP.[13] We collect data on book equity, earnings per share, number of shares outstanding, market capitalization assets and liabilities and on the specific accounting standards used by the firm. We also identify the firm's country of origin. We take data at the end of each fiscal year. Accounting variables are converted to US dollars using the exchange rate at the end of the fiscal year. Exchange rates come from Compustat - Global currency. The earnings (EPS) forecasts for the following period come from the I/B/E/S database. We follow Dechow et al. (1999) and use the mean of the I/B/E/S consensus forecast of earnings for year t+1 measured during the first month following the announcement of earnings for year t.[14]

All of our tests use earnings measured after extraordinary items for two reasons. First, our sample includes IFRS firms. During the sample period the IASB -in its 2003 Improvements Project- decided to eliminate the concept of extraordinary items. No items may be presented in the statement of comprehensive income (or in the income statement, if separately presented) or in the notes as 'extraordinary items'. Therefore, in order to have consistent measures across standards we need to work with Net Income. Second, excluding extraordinary items from earnings violates the clean surplus assumption underlying the theoretical development of the RIV framework. If we exclude the extraordinary items, which are sometimes discretionary, we would bias upward the persistence parameter (ω).

Following our discussion in Section 3, we focus our analysis on the financial services industry and identify companies from three separate "subsectors": Banking, Insurance and Trading. Another subsector, Real Estate, had to be eliminated due to lack of sufficient observations. The industry classification has been made by SIC code following French's 49-industry classification.

Tables 1 and 2 show some descriptive statistics of the data classified by subsector (Table 1) and by accounting standards (Table 2). As it can be seen, the companies do not differ much across subsector, except for the fact that companies in Trading are significantly larger than in the other subsectors. This is also the case for Banks and Insurance firms that follow US GAAP, which are significantly larger than their IFRSs counterparts.

In order to be able to assess the implications of FVA adoption (or, alternatively, of a reduction in conservatism), we employ the following empirical strategy. We consider that the full sample contains two distinct subperiods: the first, which we call *pre-fair value* contains the years 1994-2000; the second, called *post-fair value*, corresponds to

[13] It must be noted that in some countries financial firms may follow either IFRSs or US GAAP. Specifically, some financial firms from Bermuda, Canada, Cayman Islands, Germany, Great Britain, Hong Kong, Ireland, Israel, Singapore, South Africa, Spain, Switzerland, Thailand and USA follow US GAAP.

[14] Alternatively we have used the median consensus forecast and similar results are obtained.

2001-2007. This split is based on actual adoption of the FVA requirements of IAS 39 and SFAS 133, which were generally implemented in 2001, as mentioned above. The fact that the application of both standards coincided in 2001 and that it applied to assets that figured prominently in the balance sheets of financial companies justifies the use of this year as the point of a major increase in FVA or a decrease in accounting conservatism. An alternative break date could be 1993, the year of application of SFAS 115. In order to avoid the possible effect of this second alternative break date, we begin our sample in 1994. In any case, a breakpoint data of 2001 is preferable to 1993 for three reasons: first, standards SFAS 133 and IAS 39 still apply to a significant enough amount of financial firm assets; second, the 2001 date allows for enough observations on both sides of the break date; third, the simultaneous application of the new standards in 2001 allows for pooling of IFRS and US GAAP firms. We incorporate this "breakpoint" consideration by using a dummy variable that controls for the year (*post*, equal to one if $t>2000$) in the estimation of equations (5) and (3). We expect this variable to capture significant changes both in the dynamic behavior of v_t –through possible changes in γ_2 or γ_3- and in the response coefficients of p_t to accounting variables b_t, x^a_t and v_t.

We estimate the equations using three different subsamples: we first include only data on the Banking subsector, which contains the largest number of companies. We subsequently include Insurance and Insurance and Trading. As mentioned in Section 2.3, the Trading financial subsector contains the companies which, because of the nature of their activity, have traditionally been more subject to FVA regulations -they were most affected by SFAS 115- and the firms which were less affected by accounting conservatism, since their main income comes from the fees charged, which are generated and accounted for during the year. Thus, we expect inclusion of the Trading companies to lead to affect the results, most likely lowering the significance of the changes measured by the post-2000 variable.

5.3 Results of the analysis

The results of our main analysis are shown in Tables 3-8. We first measure v_t through estimation of several variations of equation (5). We mentioned before that the value of the cost of capital r is a necessary input in order to calculate x^a_t and operationalize the analysis. Table 3 presents the estimation of the coefficients in equation (5) conditional on r=0.12 (as in Dechow et al., 1999), but we show in Table 4 a thorough sensitivity analysis for the estimate of ω as a function of r. Columns labeled "1" in Table 3 present a baseline analysis. Given our expectation for structural changes in 2001, we interacted the dummy $post_t$ with gdp growth to control for the lower procyclicality of fair value standards (Columns labeled "2"). A third specification includes the possibility of changes in γ_2 (see Columns "3"). Some of the results are worth noting. First, the estimates of abnormal earnings persistence (ω) are not significantly different from zero, and in any case their magnitude is quite low. As it can be seen in Table 4, this result is not sensitive to the value assumed for r and it does not change across subsamples. In other words, abnormal earnings in the financial sector have very little, or zero, persistence. This result is in line with the high level of competition in the sector, although it could be a consequence of the deflator used in the analysis. Results with the variables not-deflated by assets show persistence parameters of higher magnitude, although still non-significant. Note that this also implies that the dynamic specification used for estimation of ω does not influence our measurement of v_t, so we take the point estimate from the simpler specification (Column "1") in the analysis of the valuation equation. Second, indeed there seems to be a significant change in 2001 in the procyclicality of v_t. The coefficient of the interaction between $post_t$ and GDP growth is significant (in the Banking and Insurance subsample: the result for Banking is consistent but not statistically significant), of negative sign and of a magnitude very similar to the estimate for the first period. In other words, v_t becomes almost unrelated to the cycle after adoption of FVA standards in 2001, a result that is in line with our postulated hypothesis. The fact that this result stays when Trading companies are added to the analysis, but significance of the change in the coefficient is reduced also goes quite in line with our hypotheses: Trading companies were more heavily subject to FVA before 2001, so including them in the analysis should lead to results that are less statistically significant, which is exactly what we observe.[15] Third, no clear pattern arises regarding changes in the persistence of v_t, so FVA does not seem to have a clear-cut effect on the persistence of the "other information."

The results in Table 3 are quite robust to changes in the value of r (a complete table is available upon request): estimates of ω (Table 4) do not vary significantly, although the other persistence parameters do change, as it is to be expected from the construction of x_t^a (which depends on b_t, which is a very persistent variable). Thus, possible misspecifications of the dynamics of v_t or of r are not likely to affect the measure for v_t used in the estimation of equation (3).

We now proceed to estimate the main valuation equation (3). As mentioned before, we pool data for all companies from the different countries that follow either IFRSs or US GAAPs. This suggests the existence of a complex covariance structure of the error term.[16] We therefore estimate the equation by OLS but present a correction for the standard errors. In particular, we use the two-way-cluster robust standard errors described in Gow et al. (2009), using as the clusters the country and year. This allows us to correct, at least partially, for cross-sectional (country) and time-series (year) dependence. The equation finally estimated is:

$$\frac{p_{firm,t}}{aa_{firm,t}} = \beta_0 + \beta_1 \frac{b_{firm,t}}{aa_{firm,t}} + \beta_2 \frac{x^a_{firm,t}}{aa_{firm,t}} + \beta_3 \frac{v_{firm,t}}{aa_{firm,t}} + \beta_4 gdp_t + \varepsilon_{firm,t} \qquad (6)$$

where $p_{firm,t}$ is market value of a firm at the end of fiscal year t, $b_{firm,t}$ is book value of that firm in year t, $x^a_{firm,t}$ is an estimate of abnormal earnings of the firm in year t, $v_{firm,t}$ is an estimate of the "other information" not yet captured by accounting numbers, $\varepsilon_{firm,t}$ is the error on firm in year t, gdp_t is GDP growth in the country to which the firm belongs in year t and $aa_{firm,t}$ measures average total assets of the firm in year t, which we use as a deflator in the regression in order to solve the scale effect problem (see, e.g., Barth and Clinch, 2005, or Easton and Sommers, 2003). We include interactions of the $post_t$ dummy with the main accounting-based variables.[17] Table 5 presents estimates of a baseline equation, where no dummies are included and the cost of capital r is set to

[15] These results should, in any case, be taken with some caution, given the "crude" measure used for the cycle variable. Still, it is surprising that the result is statistically significant and quite robust to the value of r.

[16] In the previous analysis we basically cared about the point estimate of ω, so we placed no emphasis on whether the standard errors in the nonlinear least squares estimation were correct.

[17] Our specific clustering prevents us from including the interaction of the post dummy with gdp growth.

0.12. As it can be seen, firm valuation seems to be quite significantly linked to accounting variables, especially b_t and v_t, and there is mild evidence of cyclicality in valuation. This latter effect, however, disappears in the more comprehensive analyses of Tables 6-8. Indeed, coefficients on cyclical variables are rarely significant in settings such as this –there is an obvious measurement problem- and tend not to offer much insight (see, for example, Pérez et al, 2009, for a recent example) once accounting variables are included. Thus, we do not stress much the results on cyclicality of valuation, although we do believe that the results commented in Table 3 were indeed quite noticeable.[18]

Tables 6-8 contain the results of the main analysis that allows for post-2001 changes in the response coefficients of the accounting variables. Sensitivity to the value assumed for the cost of capital r is explicitly assessed in the tables, although the results are quite robust to the choice of r. Several findings are worth mentioning. First, the regressions have very high explanatory power for all subsamples. Indeed, company valuation seems to be closely associated to accounting variables. Second, the effects of including the post-2001 dummy are quite strong for the Banking and Banking and Insurance subsamples:

a) As predicted, the coefficient on v_t is significantly lower in the post-2001 period. In other words, after adoption of FVA the information contained in the variable v_t is much less relevant for valuation. Interestingly, and also in line with our predictions, for the full sample (that includes Trading) the significance of this change in response coefficients is much less clear: Trading companies were more subject to FVA before 2001, so the *pre-post* analysis is less able to uncover significant differences.

b) The coefficient on book value decreases after 2001. This result is, again, expected: it suggests that less conservatism leads to faster incorporation of good news into book values and, therefore, to a higher book value. This must be reflected in a response coefficient that is closer to the theoretical value of one.[19] We must keep in mind that market value contains the same information independently of whether book value is computed under a higher or lower level of conservatism. Hence, the consistently lower response coefficient to b_t is likely capturing the effect of FVA. This finding is in agreement with the literature that has used book-to-market ratios as measures of conservatism.

c) The coefficient on abnormal earnings increases after 2001. Thus, market valuation seems to react more strongly to current abnormal earnings. We did not have strong priors as to this effect: it seems to suggest that investors pay more attention to abnormal earnings under FVA than under historical cost, which may stem from a higher quality of the abnormal earnings number after FVA adoption.

[18] Interaction of the post-2001 dummy with gdp growth does not lead to significant results either, at least in the feasible OLS regression, which further justifies the valuation equations as they are shown in Tables 6-8.

[19] This expected result must still hold even though in the estimation we deflate book value by average assets: an increase in book value due to good news under FVA is fully incorporated in the numerator but only in "half" of the denominator. Thus, book value deflated by average assets must still be higher under FVA than under historical cost.

All in all, and taken with the caution of any empirical analysis, our results seem to be quite supportive of the effects of FVA increases (or decreases in conservatism): accounting variables more readily incorporate new information, the extent of information not incorporated is much reduced (lower response coefficient to book value, lower cyclicality of v_t and much lower importance of this variable in valuation) and accounting-based variables (book and earnings) are more strongly associated with valuation in the direction that the theoretical models suggest.[20]

6. CONCLUSIONS

Fair value accounting has become a hot topic in the recent years, both because of developments in international accounting policy –should international accounting standards be homogenized? What is the optimal mix of conservatism/FVA?- and because of the possible role of fair value in the latest financial crisis.

We have taken a first step in understanding the effects of moves towards increased use of FVA. We make use of a moment in time in which two accounting standards, IAS 39 and SFAS 133, moved to FVA, a fact which had a significant impact on financial firms. We look at the changes that were brought about by adoption of these standards in the relationship between market values and accounting measures of financial firms. For this purpose, we use a version of Ohlson's valuation model in which we place special emphasis on the behavior of the "other information" variable, that is, a variable which captures the news relevant for earnings but not yet incorporated into accounting measures. The conclusions of our analysis are quite strong and, we believe, robust to possible misspecifications of some assumptions (the cost of capital). We show that after adoption of FVA standards the quantity and importance of the deferred accounting information is much lower, and this information itself is less procyclical (i.e. other accounting variables do incorporate in a timelier manner cyclical effects). Also, both book values and (abnormal) earnings become linked to valuation in a manner that is more consistent with valuation models. First, the coefficient associated to book value, as predicted, is lower under FVA: in expansionary contexts, book values are higher under FVA, thus leading to lower response coefficients. The fact that the response coefficient to book values may be positively related to conservatism is in line with previous literature which has used book-to-market ratios as proxies for the level of conservatism. Second, the coefficient on abnormal earnings also increases after FVA adoption, although the significance of this increase depends on the assumptions about the cost of capital.

Before making some final considerations, we comment on a few limitations of our analysis. First, we make explicit use of a structural model but we do not take a structural approach to coefficient interpretation. In fact, we believe this is probably the most reasonable course of action. The structure of the model –especially the dynamics in (1)- is admittedly simple, so a structural interpretation of estimated parameters is subject to misspecification of the model. The direction and changes in the main relationships implied, however, are still valid and informative, and we have focused on these, without

[20] Results on an alternative robustness analysis that uses Tobin's q as dependent variable rather than market prices are available upon request. These results are strongly in support of our conclusions, but we opted not to include them in this paper for reasons of coherence with the framework of Section 4.

trying to "read too much" into the model. Second, in our empirical analysis we do have some data limitations, such as the limited availability of information from IFRS companies –not only accounting, but also market and analyst data- or the admittedly crude measures of the economic cycle. Still, the main results obtained are significant and quite robust.

Taking our results one step ahead, we believe we have shown evidence consistent with the idea that FVA adoption may reduce the level of managerial discretion by decreasing the probability of using the deferred good news in order to compensate future bad news. The reduction in the importance of v_t means that investors have better information on how the economic cycle is affecting the firm's activity, since there is much less scope for volatility of accounting numbers to be actively "managed" or stabilized: given the increased procyclicality that FVA brings about in accounting variables, transparency and quality of these accounting numbers is enhanced, thus reducing artificial smoothing practices which have usually led to lower value relevance and a smaller correlation between the firm's accounting statements and the economy.

Our paper opens up several lines for future research. The empirical analysis has been based on the financial industry –and subsectors- since it is in that sector where FVA takes a more prominent role. Applications of similar analyses to other sectors will most likely increase our understanding of the role played by FVA in the value relevance of accounting variables. We have explicitly omitted from our analysis data on the years of the recent financial crisis. Future analysis of these recent data –once the dust settles- will most certainly lead to more clear conclusions on cyclical effects, especially regarding economic downturns. Examination of other valuation models –or of more sophisticated dynamics or better measurements of the main variables involved- may also qualify or complement our results.

Finally, as we briefly mentioned in the introduction, our paper offers evidence that could be relevant for regulators. The recent accounting literature has shown that smoothing affects the quality of earnings in the banking sector. However, the issue of the higher level of procyclicality induced by FVA still remains. If regulators aim to develop adequate capital requirements in the context of FVA, expected future losses should probably be considered. A possible solution that would not affect the quality of earnings would be to create a certain level of reserves – not provisions – based on general macroeconomic conditions. These "anti-cyclical reserves" would only affect the structure of capital of the entity but not the quality of accounting numbers, but would serve as a buffer during economic downturns. Thus, the level of earnings management would decrease and earnings quality would improve. In other words, from a regulatory point of view, the decrease in v_t generated by FVA would be compensated with an increase of anti-cyclical reserves.

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Table 1
Summary Statistics

The table is based on all sample observations (firm-year) of companies following IFRSs or US GAAP from 1994 until 2007 from Global Financial Services (Compustat) with EPS estimates in I/B/E/S database. The industry classification has been made by SIC code following French's 49-industry classification. Descriptives are provided for the sample of Banking firms (Panel A), Banking and Insurance firms (Panel B) and Banking, Insurance and Trading firms (Panel C). N: number of observations; Size: Market value deflated by average assets; Book: Shareholder's equity deflated by average assets; abearning: abnormal earnings from Ohlson's model deflated by average assets; $v_t(B)$: other information variable from Ohlson's model, deflated by average assets, Banking firms; $v_t(BI)$: other information variable from Ohlson's model, deflated by average assets, Banking and Insurance firms; $v_t(BIT)$: other information variable from Ohlson's model, deflated by average assets, Banking, Insurance and Trading firms.

Panel A: Banking firms						
Variable	**N**	**Mean**	**Median**	**Min**	**Max**	**Std Dev**
Size	846	0.25	0.20	0.00	2.44	0.22
Book	846	0.11	0.09	0.01	0.94	0.08
abearning	846	-0.01	0.00	-0.49	0.11	0.21
$v_t(B)$	846	0.00	0.00	-0.09	0.52	0.02
Panel B: Banking and Insurance firms						
Variable	**N**	**Mean**	**Median**	**Min**	**Max**	**Std Dev**
Size	924	0.27	0.20	0.00	2.44	0.25
Book	924	0.12	0.09	0.01	0.94	0.11
abearning	924	-0.01	0.00	-0.49	0.11	0.21
$v_t(BI)$	924	0.00	0.00	-0.09	0.52	0.02
Panel C: Banking, Insurance and Trading firms						
Variable	**N**	**Mean**	**Median**	**Min**	**Max**	**Std Dev**
Size	1,255	0.45	0.23	0.00	12.11	0.22
Book	1,255	0.20	0.10	0.01	1.08	0.08
abearning	1,255	-0.01	0.00	-0.49	0.36	0.21
$v_t(BIT)$	1,255	-0.00	-0.00	-0.19	1.12	0.02

Table 2
Summary Statistics by Accounting Standards

The table is based on all sample observations (firm-year) of companies following IFRSs or US GAAP from 1994 until 2007 from Global Financial Services (Compustat) with EPS estimates in I/B/E/S database. The industry classification has been made by SIC code following French's 49-industry classification. The Table reports number of observations and median values for firms following IFRSs (Panel A) and for firms following US GAAPs (Panel B). N: number of observations; B: Median values for banks; BI: Median values for banks and insurance firms; BIT: Median values for banks, insurance and trading firms. Size: Market value deflated by average assets; Book: Shareholder's equity deflated by average assets; abearning: Abnormal earning from Ohlson's model deflated by average assets; v_t: other information variable from Ohlson's model deflated by average assets.

Panel A: Firms following IFRSs						
Variable	**N**	**B**	**N**	**BI**	**N**	**BIT**
Size	101	0.16	113	0.16	168	0.28
Book	101	0.08	113	0.08	168	0.11
abearning	101	0.00	113	0.00	168	0.00
v_t	101	0.00	113	-0.00	168	-0.00
Panel B: Firms following US GAAPs						
Variable	**N**	**B**	**N**	**BI**	**N**	**BIT**
Size	745	0.25	811	0.21	1,087	0.23
Book	745	0.11	811	0.09	1,087	0.10
abearning	745	-0.01	811	0.00	1,087	0.00
v_t	745	0.00	811	0.00	1,087	-0.00

Table 3
Dynamics of the "other information" variable: parameter estimates and changes in parameters

The table is based on all sample observations (firm-year) of companies following IFRSs or US GAAP from 1994 until 2007 from Global Financial Services (Compustat) with EPS estimates in I/B/E/S database. The industry classification has been made by SIC code following French's 49-industry. B, BI and BIT denote subsectors Banking, Banking and Insurance and Banking, Insurance and Trading, respectively. The following equations have been estimated:

$$(1)\ \frac{f_{it}^a}{aa_{it}} = \gamma_0 + \omega\frac{x_{it}^a}{aa_{it}} + \gamma_2\left(\frac{f_{it-1}^a}{aa_{it}} - \omega\frac{x_{it-1}^a}{aa_{it}}\right) + \gamma_3 gdp_t + \eta_{it}$$

$$(2)\ \frac{f_{it}^a}{aa_{it}} = \gamma_0 + \gamma_{0,2}post_t + \omega\cdot\frac{x_{it}^a}{aa_{it}} + \gamma_2\left(\frac{f_{it-1}^a}{aa_{it}} - \omega\frac{x_{it-1}^a}{aa_{it}}\right) + \gamma_3 gdp_t + \gamma_{3,2}post_t \times gdp_t + \eta_{it}$$

$$(3)\ \frac{f_{it}^a}{aa_{it}} = \gamma_0 + \gamma_{0,2}post_t + \omega\frac{x_{it}^a}{aa_{it}} + \gamma_2\left(\frac{f_{it-1}^a}{aa_{it}} - \omega\frac{x_{it-1}^a}{aa_{it}}\right) + \ldots$$

$$\ldots + \gamma_{2,2}\left(post_t \times \frac{f_{it-1}^a}{aa_{it}} - \omega post_t \times \frac{x_{it-1}^a}{aa_{it}}\right) + \gamma_3 gdp_t + \gamma_{3,2}post_t \times gdp_t + \eta_{it}$$

where f^a_{it} is the "abnormal" expected earning of firm *i* at time *t+1* ($f^a_{it}= f_{it} - rb_{it}$) from the consensus analyst forecast f_{it} for that firm, x^a_{it} measures abnormal earnings of that firm in period *t* ($x^a_{it} = x_{it} - rb_{it-1}$), gdp_t is the gdp growth on the specific country to which firm *i* belongs in year *t* and $\eta_{i,t}$ is an uncorrelated error form firm *i* in year *t*; $post_t$ is a dummy that takes value equal to one from 2001 to 2007 and zero from 1994 to 2000. All accounting variables are deflated by aa_{it}, which measures total assets of the firm *i* in year *t*, in order to control for the scale effect. The cost of capital r has been assumed to be 0.12. Only companies for which consensus analyst forecasts are available for at least two consecutive years can be included in the estimation. All variants of the equation are estimated via nonlinear least squares.
* Significant at 10%, ** Significant at 5%, *** Significant at 1%.

	B			BI			BIT		
	(1)	**(2)**	**(3)**	**(1)**	**(2)**	**(3)**	**(1)**	**(2)**	**(3)**
ω	0.001	0.001	0.001	-0.000	-0.000	-0.000	-0.000	0.000	0.008*
γ_2	0.011**	0.012**	0.006	0.018***	0.018***	0.018*	0.054***	0.056***	0.000
$\gamma_{2,2}$			0.009			0.001			0.072***
γ_3	-0.023	0.118	0.119	-0.005	0.278***	0.278***	-0.031	0.221*	0.234*
$\gamma_{3,2}$		-0.054	-0.053		-0.207**	-0.207**		-0.182	-0.182
N	556	556	556	584	584	584	753	753	753
R^2 (%)	1.4	5.1	5.2	1.9	8.3	8.3	4.6	5.9	7.0

Table 4
Persistence parameter under different costs of capital

The table is based on all sample observations (firm-year) of companies following IFRSs or US GAAP from 1994 until 2007 from Global Financial Services (Compustat) with EPS estimates in I/B/E/S database. The industry classification has been made by SIC code following French's 49-industry classification. The following equation has been estimated by nonlinear OLS in order to obtain the persistence parameter (ω):

$$\frac{f_{it}^{a}}{aa_{it}} = \gamma_0 + \omega \frac{x_{it}^{a}}{aa_{it}} + \gamma_2 \left(\frac{f_{it-1}^{a}}{aa_{it}} - \omega \frac{x_{it-1}^{a}}{aa_{it}} \right) + \gamma_3 gdp_t + \eta_{it}$$

where f^{a}_{it} is the "abnormal" expected earning of firm i at time $t+1$ ($f^{a}_{it} = f_{it} - rb_{it}$) from the consensus analyst forecast f_{it} for that firm, x^{a}_{it} measures abnormal earnings of that firm in period t ($x^{a}_{it} = x_{it} - rb_{it-1}$), gdp_t is the gdp growth on the specific country to which firm i belongs in year t and η_{it} is a white noise error form firm i in year t. All accounting variables are deflated by aa_{it}, which measures total assets of the firm i in year t, in order to control for the scale effect. r: cost of capital; $\omega(B)$: persistence parameter for Banking firms; $\omega(BI)$: persistence parameter for Banking and Insurance firms; $\omega(BIT)$: persistence parameter for Banking, Insurance and Trading firms.

r	$\omega(B)$	$\omega(BI)$	$\omega(BIT)$
5%	-0.0041	-0.0100	-0.0037
6%	-0.0022	-0.0060	-0.0027
7%	-0.0011	-0.0037	-0.0014
8%	-0.0004	-0.0022	-0.0005
9%	-0.0000	-0.0014	-0.0001
10%	0.0002	-0.0009	0.0001
11%	0.0003	-0.0005	0.0000
12%	0.0005	-0.0003	-0.0000
13%	0.0006	-0.0001	-0.0001
14%	0.0007	0.0000	-0.0001
15%	0.0008	0.0001	-0.0001
16%	0.0008	0.0002	-0.0001
17%	0.0008	0.0003	-0.0001
18%	0.0008	0.0003	-0.0001
19%	0.0008	0.0003	-0.0001
20%	0.0009	0.0004	-0.0001

Table 5
Model estimation

The table is based on all sample observations (firm-year) of companies following IFRSs or US GAAP from 1994 until 2007 from Global Financial Services (Compustat) with EPS estimates in I/B/E/S database. Panel A reports OLS estimates and Panel B OLS with two-way cluster-robust standard errors using country and year as clusters. The industry classification has been made by SIC code following French's 49-industry classification. The following equation is estimated:

$$\frac{p_{it}}{aa_{it}} = \beta_0 + \beta_1 \frac{b_{it}}{aa_{it}} + \beta_2 \frac{x^a{}_{it}}{aa_{it}} + \beta_3 \frac{v_{it}}{aa_{it}} + \beta_4 gdp_{it} + \varepsilon_{it}$$

where p_{it} is market value of firm *i* at the end of fiscal year *t*, b_{it} is book value of firm *i* in year*t*, $x^a{}_{it}$ measures abnormal earnings of firm *i* in year *t*, v_{it} is Ohlson's "other information" variable of firm *i* in year *t*, gdp_{it} is the gdp growth on the specific country the firm *i* belongs to, in year *t*, aa_{it} is average total assets of firm *i* in year *t*, used as deflator in the regression in order to solve the scale effect problem, and ε_{it} is a white noise error on firm *i* in year *t*. The cost of capital r has been set at 0.12. The equation is estimated via OLS and OLS clustered on country and year following Gow et al. (2009). B: results for the subsample of Banking firms. BI: results for the subsample of Banking and Insurance firms. BIT: results for the complete sample (Banking, Insurance and Trading). * Significant at 10%, ** Significant at 5%, *** Significant at 1%.

Panel A: OLS						
Firms	β_0	β_1	β_2	β_3	β_4	**R^2 (%)**
B	0.01	1.92***	0.03	2.11***	1.11***	59.53
BI	0.02	1.68***	0.03	2.53***	1.30***	63.86
BIT	-0.01	2.23***	-0.07	4.76***	0.61	43.21
Panel B: OLS with two-way cluster-robust standard errors						
Firms	β_0	β_1	β_2	β_3	β_4	**R^2 (%)**
B	0.01	1.92***	0.03***	2.11**	1.11	59.53
BI	0.02	1.68***	0.03**	2.53**	1.30**	63.86
BIT	-0.01	2.23***	-0.07	4.76	0.61	43.21

Table 6
Banking: Differences in pre and post Fair Value Accounting

The table is based on all banks (firm-year observations) following IFRSs or US GAAP from 1994 until 2007 from Global Financial Services (Compustat) with EPS estimates in I/B/E/S database. This table reports OLS with two-way cluster-robust standard errors using country and year as clusters. The industry classification has been made by SIC code following French's 49-industry classification. The following equation is estimated:

$$\frac{p_{it}}{aa_{it}} = \beta_0 + \beta_1 \frac{b_{it}}{aa_{it}} + \beta_2 \frac{x^a{}_{it}}{aa_{it}} + \beta_3 \frac{v_{it}}{aa_{it}} + \beta_4 gdp_{it} + \beta_5 US_{it} + \beta_6 post_t \times \frac{b_{it}}{aa_{it}} + \beta_7 post_t \times \frac{x^a{}_{it}}{aa_{it}} + \beta_8 post_t \times \frac{v_{it}}{aa_{it}} + \varepsilon_{it}$$

where p_{it} is market value of firm *i* at the end of fiscal year *t*, b_{it} is book value of firm *i* in year*t*, $x^a{}_{it}$ measures abnormal earnings of firm *i* in year *t*, v_{it} is Ohlson's "other information" variable of firm *i* in year *t*, gdp_{it} is the gdp growth on the specific country the firm *i* belongs to, in year *t*; US_{it} is a dummy that takes value equal to one if firm *i* follows US GAAP and zero if it follows IFRSs; $post_t$ is a dummy that takes value equal to one from 2001 to 2007 and zero from 1994 to 2000; aa_{it} is average total assets of firm *i* in year *t*, used as deflator in the regression in order to solve the scale effect problem, and ε_{it} is a white noise error on firm *i* in year *t*. * Significant at 10%, ** Significant at 5%, *** Significant at 1%.

Cost of Capital	β_0	β_1	β_2	β_3	β_4	β_5	β_6	β_7	β_8	R^2 (%)
5%	0.05	1.83***	0.04***	4.46***	0.01	-0.00	-0.81***	6.40***	-3.26***	66.96
6%	0.05	1.87***	0.04***	4.48***	-0.01	-0.00	-0.74***	5.84***	-3.19***	66.34
7%	0.05	1.92***	0.03***	4.51***	-0.01	-0.00	-0.68***	5.28**	-3.13***	65.73
8%	0.05	1.97***	0.03***	4.52***	-0.01	-0.00	-0.63***	4.74**	-3.06***	65.15
9%	0.05	2.02***	0.03***	4.54***	-0.01	-0.01	-0.58***	4.24**	-3.00***	64.63
10%	0.05	2.07***	0.03***	4.55***	-0.01	-0.01	-0.55***	3.79*	-2.95**	64.15
11%	0.05	2.12***	0.02***	4.57***	-0.00	-0.01	-0.53***	3.39*	-2.90**	63.73
12%	0.06	2.17***	0.02***	4.58***	0.01	-0.01	-0.51***	3.03*	-2.86**	60.08
13%	0.06	2.22***	0.02***	4.59***	0.02	-0.01	-0.50***	2.72	-2.82*	63.03
14%	0.06	2.27***	0.02***	4.60***	0.02	-0.01	-0.50***	2.44	-2.79**	62.74
15%	0.06	2.32***	0.02***	4.61***	0.03	-0.02	-0.50***	2.19	-2.76**	62.50
16%	0.06	2.37***	0.02***	4.62***	0.04	-0.02	-0.51***	1.98	-2.74**	62.28
17%	0.06	2.41***	0.02***	4.62***	0.05	-0.02	-0.52***	1.79	-2.71**	62.09
18%	0.06	2.46***	0.02***	4.63***	0.06	-0.02	-0.53***	1.62	-2.69**	61.92
19%	0.06	2.51***	0.01***	4.63***	0.07	-0.02	-0.54***	1.47	-2.68**	61.77
20%	0.06	2.56***	0.01***	4.64***	0.08	-0.02	-0.56***	1.34	-2.66**	61.64

Table 7
Banking & Insurance: Differences in pre and post Fair Value Accounting

The table is based on all banks and insurance companies (firm-year observations) following IFRSs or US GAAP from 1994 until 2007 from Global Financial Services (Compustat) with EPS estimates in I/B/E/S database. This table reports OLS with two-way cluster-robust standard errors using country and year as clusters. The industry classification has been made by SIC code following French's 49-industry classification. The following equation is estimated:

$$\frac{p_{it}}{aa_{it}} = \beta_0 + \beta_1 \frac{b_{it}}{aa_{it}} + \beta_2 \frac{x^a{}_{it}}{aa_{it}} + \beta_3 \frac{v_{it}}{aa_{it}} + \beta_4 gdp_{it} + \beta_5 US_{it} + \beta_6 post_t \times \frac{b_{it}}{aa_{it}} + \beta_7 post_t \times \frac{x^a{}_{it}}{aa_{it}} + \beta_8 post_t \times \frac{v_{it}}{aa_{it}} + \varepsilon_{it}$$

where p_{it} is market value of firm i at the end of fiscal year t, b_{it} is book value of firm i in year t, $x^a{}_{it}$ measures abnormal earnings of firm i in year t, v_{it} is Ohlson's "other information" variable of firm i in year t, gdp_{it} is the gdp growth on the specific country the firm i belongs to, in year t; US_{it} is a dummy that takes value equal to one if firm i follows US GAAP and zero if it follows IFRSs; $post_t$ is a dummy that takes value equal to one from 2001 to 2007 and zero from 1994 to 2000; aa_{it} is average total assets of firm i in year t, used as deflator in the regression in order to solve the scale effect problem, and ε_{it} is a white noise error on firm i in year t. * Significant at 10%, ** Significant at 5%, *** Significant at 1%.

Cost of Capital	β_0	β_1	β_2	β_3	β_4	β_5	β_6	β_7	β_8	R^2 (%)
5%	0.06	1.49***	-0.01	6.59***	0.32	-0.02	-0.35***	3.67***	-4.86***	69.32
6%	0.06	1.56***	-0.00	6.60***	0.31	-0.02	-0.36***	3.51***	-4.84***	69.15
7%	0.06	1.63***	0.01	6.60***	0.30	-0.02	-0.37***	3.34***	-4.82***	68.97
8%	0.06	1.69***	0.01	6.61***	0.29	-0.02	-0.38***	3.17***	-4.79***	68.78
9%	0.06	1.76***	0.01**	6.61***	0.28	-0.02	-0.39***	2.99***	-4.76***	68.59
10%	0.07	1.83***	0.01**	6.62***	0.28	-0.02	-0.40***	2.82**	-4.73***	68.41
11%	0.07	1.89***	0.01***	6.62***	0.27	-0.02	-0.42***	2.66**	-4.71***	68.23
12%	0.07	1.96***	0.01***	6.62***	0.27	-0.02	-0.44***	2.50**	-4.68***	68.05
13%	0.07	2.03***	0.01***	6.62***	0.27	-0.02	-0.46***	2.34**	-4.66***	67.89
14%	0.07	2.09***	0.01***	6.62***	0.27	-0.02	-0.48***	2.20**	-4.63***	67.73
15%	0.07	2.16***	0.01***	6.62***	0.27	-0.02	-0.51***	2.06**	-4.61***	67.58
16%	0.07	2.23***	0.01***	6.62***	0.28	-0.02	-0.54***	1.93**	-4.59***	67.44
17%	0.07	2.29***	0.01***	6.62***	0.28	-0.02	-0.56***	1.81**	-4.57***	67.31
18%	0.06	2.36***	0.01***	6.62***	0.28	-0.02	-0.60***	1.69**	-4.56***	67.19
19%	0.07	2.43***	0.01***	6.62***	0.29	-0.02	-0.63***	1.59**	-4.54**	67.08
20%	0.07	2.49***	0.01***	6.63***	0.29	-0.02	-0.66***	1.49*	-4.52**	66.97

Table 8
Banking, Insurance and Trading: Differences in pre and post Fair Value Accounting

The table is based on all banks, insurance and trading companies (firm-year observations) following IFRSs or US GAAP from 1994 until 2007 from Global Financial Services (Compustat) with EPS estimates in I/B/E/S database. This table reports OLS with two-way cluster-robust standard errors using country and year as clusters. The industry classification has been made by SIC code following French's 49-industry classification. The following equation is estimated:

$$\frac{p_{it}}{aa_{it}} = \beta_0 + \beta_1 \frac{b_{it}}{aa_{it}} + \beta_2 \frac{x^a{}_{it}}{aa_{it}} + \beta_3 \frac{v_{it}}{aa_{it}} + \beta_4 gdp_{it} + \beta_5 US_{it} + \beta_6 post_t \times \frac{b_{it}}{aa_{it}} + \beta_7 post_t \times \frac{x^a{}_{it}}{aa_{it}} + \beta_8 post_t \times \frac{v_{it}}{aa_{it}} + \varepsilon_{it}$$

where p_{it} is market value of firm i at the end of fiscal year t, b_{it} is book value of firm i in year t, $x^a{}_{it}$ measures abnormal earnings of firm i in year t, v_{it} is Ohlson's "other information" variable of firm i in year t, gdp_{it} is the gdp growth on the specific country the firm i belongs to, in year t; US_{it} is a dummy that takes value equal to one if firm i follows US GAAP and zero if it follows IFRSs; $post_t$ is a dummy that takes value equal to one from 2001 to 2007 and zero from 1994 to 2000; aa_{it} is average total assets of firm i in year t, used as deflator in the regression in order to solve the scale effect problem, and ε_{it} is a white noise error on firm i in year t. * Significant at 10%, ** Significant at 5%, *** Significant at 1%.

Cost of Capital	β_0	β_1	β_2	β_3	β_4	β_5	β_6	β_7	β_8	R^2 (%)
5%	-0.11	1.97***	0.35***	12.33***	-0.65	0.15**	-0.17	0.27	-7.83*	45.80
6%	-0.12	2.10***	0.25***	12.42***	-0.51	0.15*	-0.23	-0.10	-7.87*	45.59
7%	-0.12	2.22***	0.19***	12.48***	-0.41	0.15*	-0.29*	-0.33	-7.90*	45.56
8%	-0.12	2.35***	0.16***	12.52***	-0.33	0.14*	-0.37**	-0.46	-7.93*	45.62
9%	-0.12	2.48***	0.13***	12.54***	-0.28	0.14*	-0.46**	-0.54	-7.96*	45.72
10%	-0.12	2.60***	0.11***	12.56***	-0.23	0.14*	-0.54***	-0.57	-7.98*	45.84
11%	-0.12	2.73***	0.09***	12.58***	-0.20	0.14*	-0.63***	-0.59	-8.00*	45.96
12%	-0.12	2.86***	0.08***	12.59***	-0.18	0.14*	-0.71***	-0.60	-8.03*	46.07
13%	-0.12	2.98***	0.07***	12.60***	-0.16	0.14*	-0.80***	-0.60	-8.04*	46.18
14%	-0.12	3.11***	0.06***	12.61***	-0.14	0.14*	-0.89***	-0.59*	-8.06*	46.29
15%	-0.12	3.23***	0.05***	12.62***	-0.13	0.14*	-0.98**	-0.58*	-8.08*	46.38
16%	-0.12	3.36***	0.04***	12.62***	-0.12	0.14*	-1.06**	-0.56*	-8.09*	46.47
17%	-0.12	3.49***	0.04***	12.63***	-0.11	0.14*	-1.15**	-0.55*	-8.10*	46.55
18%	-0.12	3.61***	0.04***	12.63***	-0.10	0.14*	-1.24**	-0.53**	-8.11*	46.63
19%	-0.12	3.74***	0.03***	12.64***	-0.09	0.14*	-1.32**	-0.52**	-8.12**	46.70
20%	-0.12	3.87***	0.03***	12.64***	-0.09	0.13*	-1.41**	-0.50**	-8.13*	46.76

APPENDIX 1. Derivation of the main formula

We show the main derivations for (2). We start from the RIV implied expression for current price:

$$p_t = b_t + E_t\left[\frac{1}{R}\left(\omega x_t^a + v_t + e_{t+1}\right) + \frac{1}{R^2}\left(\omega x_{t+1}^a + v_{t+1} + e_{t+2}\right) + \frac{1}{R^3}\left(\omega x_{t+2}^a + v_{t+2} + e_{t+3}\right) + \dots\right]$$

The terms that involve e_{t+j} are all zero in expectation, so we can ignore them since they enter linearly. Simple iteration of the formula for abnormal returns yields:

$$E_t\left[\omega x_t^a\right] = \omega x_t^a$$

$$E_t\left[\omega x_{t+1}^a\right] = E_t\left[\omega x_t^a + v_t\right] = \omega x_t^a + v_t$$

$$E_t\left[\omega x_{t+2}^a\right] = E_t\left[\omega x_{t+1}^a + v_{t+1}\right] = \omega^2 x_t^a + \left(\omega v_t + E_t[v_{t+1}]\right)$$

$$E_t\left[\omega x_{t+3}^a\right] = E_t\left[\omega x_{t+2}^a + v_{t+2}\right] = \omega^3 x_t^a + \left(\omega^2 v_t + \omega E_t[v_{t+1}] + E_t[v_{t+2}]\right)$$

...

$$E_t\left[\omega x_{t+j}^a\right] = E_t\left[\omega x_{t+j-1}^a + v_{t+j-1}\right] = \omega^j x_t^a + \left(\sum_{i=0}^{j} \omega^{j-i-1} E_t[v_{t+i}]\right)$$

which can then be substituted into the valuation formula. Collecting terms in x_t^a, v_t, v_{t+1}, etc., we obtain:

$$p_t = b_t + \left[\frac{1}{R}\omega x_t^a + \frac{1}{R^2}\omega^2 x_t^a + \frac{1}{R^3}\omega^3 x_t^a + \dots\right] + \left[\frac{1}{R}v_t + \frac{1}{R^2}\omega v_t + \frac{1}{R^3}\omega^2 v_t + \dots\right] + \dots$$

$$\dots + E_t\left[\frac{1}{R^2}v_{t+1} + \frac{1}{R^3}\omega v_{t+1} + \frac{1}{R^4}\omega^2 v_{t+1} + \dots\right] + E_t\left[\frac{1}{R^3}v_{t+2} + \frac{1}{R^4}\omega v_{t+2} + \frac{1}{R^5}\omega^2 v_{t+2} + \dots\right] + \dots =$$

$$= b_t + \frac{\omega}{R-\omega}x_t^a + \frac{1}{R-\omega}\left(v_t + \frac{1}{R}E_t\left[v_{t+1}\right] + \frac{1}{R^2}E_t\left[v_{t+2}\right] + \dots\right)$$

We need to evaluate now the terms $E_t\left[v_{t+j}\right]$. Given the behavioral equation for v_{t+1}, we can find the expected value of any term as a function of current v_t and y_t. We use the basic result that $E_t\left[y_{t+j}\right] = \gamma_1^j y_t$ and the fact that innovations η_t are assumed to be zero in expectation to find that:

$$E_t\left[v_{t+1}\right] = E_t\left[\gamma_2 v_t + \gamma_3 y_{t+1} + \eta_{t+1}\right] = \gamma_2 v_t + \gamma_3 \gamma_1 y_t$$

$$E_t\left[v_{t+2}\right] = E_t\left[\gamma_2 v_{t+1} + \gamma_3 y_{t+2} + \eta_{t+2}\right] = \gamma_2\left(\gamma_2 v_t + \gamma_3\gamma_1 y_t\right) + \gamma_3 \gamma_1^2 y_t$$

$$E_t\left[v_{t+3}\right] = E_t\left[\gamma_2 v_{t+2} + \gamma_3 y_{t+3} + \eta_{t+3}\right] = \gamma_2\left(\gamma_2^2 v_t + \gamma_2\gamma_3\gamma_1 y_t + \gamma_3\gamma_1^2 y_t\right) + \gamma_3\gamma_1^3 y_t$$

...

$$E_t\left[v_{t+j}\right] = E_t\left[\gamma_2 v_{t+j-1} + \gamma_3 y_{t+j} + \eta_{t+j}\right] = \gamma_2\left(\gamma_2^{j-1} v_t + \gamma_3\gamma_2^{j-2}\gamma_1 y_t + \gamma_3\gamma_2^{j-3}\gamma_1^2 y_t + \gamma_3\gamma_2^{j-4}\gamma_1^3 y_t + \dots + \gamma_3\gamma_1^{j-1} y_t\right)$$

$$+ \gamma_3\gamma_1^j y_t = \gamma_2^j v_t + \gamma_3\left(\gamma_2^{j-1}\gamma_1 + \gamma_2^{j-2}\gamma_1^2 + \dots + \gamma_1^j\right)y_t = \gamma_2^j v_t + \gamma_3\gamma_1\left(\gamma_2^{j-1} + \gamma_2^{j-2}\gamma_1 + \dots + \gamma_1^{j-1}\right)y_t$$

The series inside the parentheses can be summed:

$$\gamma_2^{j-1} + \gamma_2^{j-2}\gamma_1 + \dots + \gamma_1^{j-1} = \gamma_1^{j-1}\left(\left(\frac{\gamma_2}{\gamma_1}\right)^{j-1} + \left(\frac{\gamma_2}{\gamma_1}\right)^{j-2} + \dots + 1\right) = \gamma_1^{j-1}\left(\frac{1-\left(\gamma_2/\gamma_1\right)^j}{1-\left(\gamma_2/\gamma_1\right)}\right) =$$

$$= \frac{\gamma_1^j - \gamma_2^j}{\gamma_1 - \gamma_2}$$

Thus yielding the expression

$$E_t[v_{t+j}] = \gamma_2^j v_t + \gamma_3\gamma_1 \frac{\gamma_1^j - \gamma_2^j}{\gamma_1 - \gamma_2} y_t = \gamma_2^j v_t + \gamma_3\gamma_1 \frac{\gamma_1^j - \gamma_2^j}{\gamma_1 - \gamma_2} y_t$$

Recalling

$$p_t = b_t + \frac{\omega}{R-\omega} x_t^a + \frac{1}{R-\omega}\left(v_t + \frac{1}{R} E_t[v_{t+1}] + \frac{1}{R^2} E_t[v_{t+2}] + \ldots \right)$$

we can now plug in the above expression and find:

$$p_t = b_t + \frac{\omega}{R-\omega} x_t^a + \frac{1}{R-\omega}\left(v_t + \frac{1}{R}(\gamma_2 v_t + \gamma_3\gamma_1 y_t) + \frac{1}{R^2}\left(\gamma_2^2 v_t + \gamma_3\gamma_1 \frac{\gamma_1^2 - \gamma_2^2}{\gamma_1 - \gamma_2} y_t \right) + \ldots \right) =$$

$$= b_t + \frac{\omega}{R-\omega} x_t^a + \frac{1}{R-\omega}\left(v_t + \frac{1}{R}\gamma_2 v_t + \frac{1}{R^2}\gamma_2^2 v_t + \ldots \right) + \ldots$$

$$\ldots + \frac{\gamma_3\gamma_1}{(R-\omega)(\gamma_1-\gamma_2)}\left[\frac{1}{R}(\gamma_1-\gamma_2) y_t + \frac{1}{R^2}(\gamma_1^2-\gamma_2^2) y_t + \frac{1}{R^3}(\gamma_1^3-\gamma_2^3) y_t + \frac{1}{R^4}(\gamma_1^4-\gamma_2^4) y_t + \ldots \right] =$$

$$= b_t + \frac{\omega}{R-\omega} x_t^a + \frac{1}{R-\omega}\frac{R}{R-\gamma_2} v_t + \frac{\gamma_3\gamma_1}{(R-\omega)(\gamma_1-\gamma_2)}\left[\left(\frac{\gamma_1}{R} + \frac{\gamma_1^2}{R^2} + \frac{\gamma_1^3}{R^3} + \ldots \right) - \left(\frac{\gamma_2}{R} + \frac{\gamma_2^2}{R^2} + \frac{\gamma_2^3}{R^3} + \ldots \right) \right] y_t =$$

$$= b_t + \frac{\omega}{R-\omega} x_t^a + \frac{1}{R-\omega}\frac{R}{R-\gamma_2} v_t + \frac{\gamma_3\gamma_1}{(R-\omega)(\gamma_1-\gamma_2)}\left[\frac{\gamma_1}{R-\gamma_1} - \frac{\gamma_2}{R-\gamma_2} \right] y_t =$$

$$= b_t + \frac{\omega}{R-\omega} x_t^a + \frac{1}{R-\omega}\frac{R}{R-\gamma_2} v_t + \frac{R\gamma_3\gamma_1}{(R-\omega)(\gamma_1-\gamma_2)}\left[\frac{(\gamma_1-\gamma_2)}{(R-\gamma_1)(R-\gamma_2)} \right] y_t =$$

$$= b_t + \frac{\omega}{R-\omega} x_t^a + \frac{1}{R-\omega}\frac{R}{R-\gamma_2} v_t + \frac{1}{(R-\omega)}\frac{R\gamma_3\gamma_1}{(R-\gamma_1)(R-\gamma_2)} y_t$$

which is the final valuation formula in the text.