Macrothink Institute™

Asian Journal of Finance & Accounting
ISSN 1946-052X
2017, Vol. 9, No. 2

A Literature Review on Ohlson (1995)

Pooja Kumari

Research Scholar, Indian Institute of Technology, Kharagpur (India)

E-mail: pooja.kumari@vgsom.iitkgp.ernet.in

Chandra SekharMishra

Associate Professor, Indian Institute of Technology, Kharagpur (India)

E-mail: csmishra@vgsom.iitkgp.ernet.in

Received: July3, 2017 Accepted: August2, 2017 Published: December 1, 2017

doi:10.5296/ajfa.v9i2.11492 URL: https://doi.org/10.5296/ajfa.v9i2.11492

Abstract

This paper presents the review of the literature focussed on Ohlson, J.A., 1995. (Earnings, book values and dividends in security valuation. Contemporary Accounting Research 11, 661—687). Firstly an overview then theoretical and empiricalresearch directly related to this work are presented, based on articles cited this work. Further, some bibliometric facts about the study are added. The bibliometric analysis is based on twelve reputed journals of accounting: Journal of Accounting Research, Journal of Accounting and Economics, The Accounting Review, Contemporary Accounting Research, Review of Accounting Studies, Journal of Business Finance and Accounting, Accounting Horizons, The European Accounting Review, Journal of Accounting Auditing and Finance, Accounting and Business Research, A Journal of Accounting, Finance and Business Studies and The International Journal of Accounting. Our findings of bibliometric facts come up with most influenced author, university and country by Ohlson (1995) and followed by keyword analysis.

Keywords: Ohlson (1995); Theoretical review, Empirical review; Bibliometric facts, Keyword analysis

1. Introduction

The active investor is usually interested in reported financial statements and their analysis to evaluation the fundamental value or the exact worth of the firm. On the other side, According to International Accounting Standard Board (1989), the primary aim of financial reporting is to offer relevant accounting information to the participants of thecapital market. So that they can use it for investment decision-making. Basically, Ohlson (1995) given a firm valuation concept linking these two sides.

In this paper, we have reviewed the literature revolves around the landmark study of Ohlson (Ohlson, J.A., 1995. Earnings, book values, and dividends in security valuation. Contemporary Accounting Research 11, 661—687) which comes under the area of capital market-based accounting research (Kothari, 2001). This work got immediate recognition with avery high number of citation. According to google scholar till date, the number of citation of this study is around 5000 and according to Scopus, it's around 1300. The top accounting and financial journals are paying attention to this study. Even in previous bibliometric studies, this study is found among most cited work in the field of financial accounting andcome into sight with multiple topics or methods (Chan & Liano, 2009; Dunbar & Weber, 2014). The approach we adopted for this review involves a study of the literature using Ohlson (1995) as a base study. We have reviewed previous literaturebased on assumptions, theory, and results ofOhlson (1995). Then, we have discussed the theoretical and empirical evaluation, criticism and appraisal of this study so far. Thereafter, we have investigated some bibliometric facts about O'95 to verify qualitative findings.

The primary objective of this review is to construct an academically valuable work for doctoral students, researchers, and academicians. This study extends the previous comprehensive explanation and discussion by Lundholm (1995) and Lo & Lys (2000).Becausein their studiesthey haveprovided basic concept and doubts about Ohlson (1995) in-depth. The most of the papers reviewed in this study are from last two decades. In accumulation to contribute the detailed review of research on Ohlson(1995) (hereafter O'95).We have discussed the origin of important ideas and development. Basically, we havediscussed the theoretical studies on development and addition in O'95. Since validation of a theory is incomplete without empirical analysis. Therefore, we included some studies based on empirical analysis also. Theaim of thisstudy is to provide hostile explanations for the findings from the literature. This study leads towards unresolved questions and direction for further research.

Basically, O'95 belongs to the area of capital market-based accounting research (CMBAR). This areastudies the relation between accounting information and capital market (Kothari, 2001). This area of research was embarked by Ball & Brown (1968) and Beaver (1968). They found anassociation between abnormal return and stock prices in the months before and after the dates of earning announcement and unexpected increment in the trade volume of securities during the week of earnings announcements.Thereafter numerous theoretical and empirical research work has been carried out to investigate this relation from different prespectives (Beaver & Dukes, 1972; Foster, 1977; Bathke & Lorek,1984;

Lev, 1989; Livnet & Zerowin, 1990; Lev & Thiagarajan, 1993). Then O'95 found mathematical validation of this relation with some assumptions and recognized as a seminal work. However, continuously this work has been criticized as well as supported by different authors. Even a number of expansion and improvements were proposed in the original model (Feltham&Ohlson, 1995, 1996; Ohlson, 1999, 2005, 2009; Ohlson & Juettner-Nauroth, 2005). We have consciously decided to emphasis on O'95 model because two reasons. First, it is extensively used valuationmodel in thecapitalmarket-based accounting literature. Second its high rate of citation.

The outline of the review is as follows: Section 2 consist theoretical background of O'95andpresents basic assumptions and the model.The subsections of this section are focussed towardstheoretical literature on every assumption and addition inO'95. Section 3 presents empirical studies based on O'95. Section 4 provides some bibliometric facts about O'95. Section 5 consist summary, limitations, and conclusions.

2. Theoretical background and summary of O'95 Model

The O'95 study is famous by the name of residual income valuation model andconnected firm valuation with residual income. Although Ohlson (1995), Bernard (1995) & Biddle et al. (1997) concluded that the idea of residual income valuationemerged long back, ButO'95deserve acknowledgment for successful structured and rigorous presentation of residual income valuation model (Kothari, 2001).

Early Financial valuation theories state that the value of the firm's equity is the present value of all future dividends, or free cash flows to equity, which defines themarket value of thefirm and helps in decision making. O'95 determined the market value of thefirm in association with accounting values. There were three central assumptions in O'95i.e. First assumptions considered an economy with risk neutrality, homogenous beliefs of individual and non-stochastic interest rates, which results in no inter-temporal arbitrage price. Second assumptions consideredclean surplus relation (hereafter CSR) among book value, income, and dividend. The third assumption referred as linear information dynamics (hereafter LID).

According to thefirstassumption, themarket value of the firm is equaled to the present value of all expected future dividend (PVED), with the given consideration of non-stochastic interest rates, risk neutrality, and homogeneous beliefs. This assumption leads towards Dividend discount model (DDM) for valuation of equity.

$$MV_t = \sum_{i=1}^{\infty} \frac{E(d_{t+i})}{(1+r)^i} \quad (1)$$

Where MV_t = Market value of Equity at date t;$E(d_{t+i})$ = Expected dividend received at date t+i; r =Discount rate assumed to be constant.

The second assumption imposes the CSR as present year book value equals to previous year book value plus earnings minus dividends. And this relationship is expressed as follow:

$$B_t = B_{t-1} + x_t - d_t \quad (2)$$

Where B_t= Book value of equity at date t; x_t= Earnings for period t;d_t = dividends paid at date t.

Further, in this assumption the right-hand side is primitive in order that dividend hasa negative effect onpresent year book value but has no effect on present earnings.

Normalearnings of the firm can be defined as the multiplication of previous year-end book value and cost of capital of the firm. Then after deducting this normal earning from actual earning of current year results as abnormal earning of the firm.

$$x_t^a \equiv x_t - rB_{t-1} \tag{3}$$

Where x_t^a = abnormal earnings for the period t.

A simple algebraic calculation with eq. 2 & 3 yields with this expression:

$$d_t = x_t^a + (1+r)B_{t-1} - B_t \tag{4}$$

And then from this expression, the value of dividend replace with d_{t+i} in eq 1. This ultimately results with Residual income valuation (hereafter RIV).

$$MV_t = B_t + \sum_{t=1}^{\infty} \frac{E(x_{t+i}^a)}{(1+r)^i} \tag{5}$$

This model implies that the value of the firm is equals to the sum of thebook value of equity and the present value of expected abnormal earnings. The particular fact of O'95model is that it will not be affected by the choices of accounting as in Lundholm (1995).

The third and the most important assumption is linear information dynamics, which explains the time series behavior of abnormal earnings. LID establishes a linkage between firm's intrinsic value and current information.

According to O'95 LID is the time series behavior of abnormal earnings can be express as follows:

$$x_{t+1}^a = \omega_{11}x_t^a + v_t + \varepsilon_{1t+1} \tag{6}$$

$$v_{t+1} = \gamma v_t + \varepsilon_{2t+1} \tag{7}$$

Where:x_t^a = abnormal earnings for the period t; v_t = other information; ω_{11} = Persistence parameter of abnormal earnings $(0 \leq \omega_{11} < 1)$; γ = persistence parameter of other information $(0 \leq \gamma < 1)$; $\varepsilon_{1t}, \varepsilon_{2t}$ = Error terms.

In above expression, O'95 assumed that abnormal earnings follow persistent and autoregression, a first-degree AR (1) process. And there is another variable i.e. other information, which also affects future abnormal earnings.

Then, O'95 combine RIV with LID and come up with the given valuation function:

$$MV_t = B_t + \alpha_1 x_t^a + \beta_1 v_t \tag{8}$$

Where $\alpha_1 = \frac{\omega_{11}}{1+r-\omega_{11}}$ &$\beta_1 = \frac{1+r}{(1+r-\omega_{11})(1+r-\gamma)}$

Next, we discuss the literature or comments given by different authors with reference to O'95. It consists assumptions, concepts, and results of O'95 being questioned or supported by furtherliterature.

2.1 Assumption 1: Risk neutrality, non-stochastic interest rates, andhomogeneous beliefs

Since the work of O'95investigated how equities can be price based on accounting data. This literature assumes risk neutral investors to keep the things simple and to avoid the issue of pricing risk.Sorisk-free rate was considered as adiscounting factor. But because of this assumption, the model lacks the theoretical foundation in case of stochastic interest rate (Feltham &Ohlson, 1999). Then a general theoretical version of the model was given by Feltham and Ohlson (1999). In risk formula, they incorporated stochastic interest rate to calculate discount factor and satisfies the claims of modern finance theory.

Further Ang& Liu (2001) extended Feltham & Ohlson (1999) and have given an affine model integrates stochastic interest rates and risk aversive investors which yielda non-linear association between book value and market value. Gode & Ohlson (2004) assimilatedO'95 valuation framework with time-varying interest rates. They have assumed risk neutral market and did not include any risk adjustment. However, Lyle et al. (2013) extended Feltham and Ohlson (1999) and considered dynamic expectations for systematic risk in the market. They have suggested to include firm fundamental variables and unobservable covariance in the cost of capital. Whereas, Know (2001) considered asymmetrically informed investors and found that accounting values are associated with market values. Even in an empirical study, Kirkulak & Balsari (2009) concluded that inflation-adjusted rates can create different risk assessment for the firm but inflation adjusted rates were not proofed to be the substitute, it can only be the complementary to historical cost rates.

2.2 Assumption 2: Clean surplus relationship (CSR)

This assumption described clean surplus relation is an accounting system in whichcurrent year book value is equal to previous year book value plus earnings minus dividend, and capital contribution is considered as a negative dividend. Dividend payment affects current book value negatively but not current earnings O'95. This assumption was the only constraint on the accounting system in O'95.Brief & Peasnell (1996) reviewed the supporting and opposing literature of CSR for income recognition. Supporting literaturesuggests that income should not include non-persistent items because these items do not have predictive ability, for example, increase or decrease in shareholders' equity.Stark (1997) concluded that in CSRclean surplus earnings have a central role in firm valuation and forecasting of clean surplus earnings, only if the valuation coefficient of book value and dividend are equal. In this condition combined information of book value and dividend is adequate for valuation, instead of separate information.

CSR is required to get RIV from PVED.With given CSR, RIV model is equivalent to DDM. Rejecting RIV model means putting question on DDM. So RIV model cannot be

eliminated,and same is with its assumptions of PVED and CSRbecause there is no specific direction given in RIV model for the calculation of endless series of expected abnormal earnings. However RIV modelneed impossible data requirement for empirical testing (Lo & Lys, 2000).

Ohlson & Juettner-Nauroth (2005) expressed the role of earnings per share in equity valuation without assuming CSR. They replaced book value with next period capitalized earnings and entail only successive abnormal earnings growth to estimatefirm valuation. Further, the model given by Ohlson & Juettner-Nauroth (2005) have found comparatively more consistent in the markets where clean surplus deviations are wide-ranging, but the estimated value of the firm may differ from the actual market value because of various different assumptions of CSR in two model (Lai, 2015).In addition to CSR deviation, Ohlson (2005) and Ohlson & Gao (2006) concluded that in O'95 book value shows negative bias in thelinewith conservatism. However, Ohlson & Juettner-Nauroth (2005) model exempted book value, which is more consistent. Because possibly in one particular way forecasted earnings are not steadily biased. Further, Skogsvik & Juettner-Nauroth (2013) also concluded that Ohlson & Juettner-Nauroth (2005) model is more reliable than O'95 model under some restrictions of positive expected conservatism bias.

In spite of benefits of dropping the CSR assumptions and including conservatism bias of book value in that place, penman (2005) concluded that measuring value after dropping book value can cause loss of information given in balance sheet. Balance sheet information's helps to increase the precision of forecasting of earnings. Furthermore, In Ohlson & Juettner-Nauroth (2005) model, the value of the firm is fixed with forecasted capitalized future earnings, which comprises transitory earnings and results to greater forecasting error in future earnings.

Moreover (Lo & Lys, 2000) calculated the difference between comprehensive income and reported income in CSR and concluded that the actual difference is dirty surplus. Usual examples of dirty surplus flows are minimum pension liability adjustment, profit& loss on securities available for sale, currency conversion and profit and loss on revaluation of theasset. The practice and study of dirty surplus accounting are growing from years even examined in a temporary manner, basically coming up as a debatable accounting topic (Barker, 2004).O'95 is eye catching because it relates firm value with accounting data. But how far it is true that O'95 really needs accounting in horse sense of the name? The answer would be no for the real existing accounting system. Yes, CSR which satisfies accounting system can do this. But satisfying CSR will not result in the accounting system for which a common accountant think of (Lo & Lys, 2000).Frankel & Lee (1998) reframed CSR in expressions of comprehensive income i.e. change in equity book value less capital contribution, especially for dirty surplus items. So it is concluded that what O'95 required articulation between book value and earnings within CSR.

2.2 Assumption 3: Linear information dynamics

LIDmodeling is the biggest contribution of O'95 model (Dechow, 1999). LID propose the time-series performance of abnormal earnings and the other information variable through two

equations given above. Eq. 6 consist first information dynamics in which structure of AR (1) process for abnormal earnings is attractive, easy to understand, parsimonious and constant with empirical observations. This micro look discloses some implied assumptions (Lo & Lys, 2000). Eq. 7 consist second information dynamics in which structure of AR (1) process for other information's is simple and elusive (Lo & Lys, 2000). But O'95 have not provided much discussion on this information dynamics. The implication of LID equations consist some boundaries: Abnormal earnings follow first-degreeautoregressioni.e. AR(1) process; with one lag other information starts to be integrated into earnings; and then gradually the effect of other information follows an AR (1) process. Further Leccadito & Veltri (2014) applied regime switching model instead of AR (1) for abnormal earnings to assess thenon-linear relationship between financial variables and concludes that regime-switching model is able to give improved predictive ability over AR (1) process.

O'95 show that the value of the equity can be symbolized as a linear function of book value and earnings. However, various studies questioned on this linearrelation (Burgstahler & Dichev, 1997; Zhang, 2000; Biddle et al., 2001) and indicated that linear valuation function is not grabbing the full effect of book value and earnings on equity value. Burgstahler & Dichev (1997) found that the effect depends upon the level of these variables, also found that non-linear and convex valuation function. Further, Zhang (2000) extendedO'95 by including endogenous investment decision and concluded that with endogenous investment decision equity value is shown to be non-linear in book value and equity. Hao et al. (2011) tested their results empirically and shows how earnings and book value of equity are needful for investment growth valuation in non-linear relation. Biddle et al. (2001) proposed an investment dynamics into O'95 model, under which capital investment is followed by profitability and found that the future abnormal earnings will be non-linear rather than alinear function of current abnormal earnings. Whereas, Ashton et al. (2003) proved this non-linear relation with adaptation and recursion value of equity.

According to Yee (2000), theUnconditionalexpectation of abnormal earnings, other information, and disturbance termmakes abnormal earnings unconditionally zero.This results to, zero unconditional goodwill so that firm can earn only average cost of capital and expected net present value will be zero. Thus, this model does not use for selection of project. The way to solve this is to allow for a constant term to make it with positive expected abnormal earnings.

Myers (1999) calculated intrinsic value of firms on the basis of present accounting data and future estimated LID parameters of O'95model based on annual past time-series data and Concludes that in this way intrinsic value does not describe stock price superior tobook value of equity. Using Myers (1999) approach Callen & Morel (2001), revised LID hypothesis and includes AR (2) structure in abnormal earnings and found that the intrinsic value on the revised structure basis is not superior tointrinsic value based on the AR (1) structure. Dechow et al. (1999) and Myers (1999) were weak in estimation of thecost of capital to calculate abnormal earnings (Morel, 2003) and corrected this drawback by estimating risk premium and firm level persistence parameters, which allows them to changecross-sectional wise cost of capital. She also examined the predictive ability of O'95 by risk premium and earnings

persistence parameters from both earnings dynamics and valuation equation and concluded that both are not consistent with O'95.

Many studies discussed conservatism with LID (Feltham &Ohlson, 1995; Myers, 1999; Ashton & Wang, 2013; Clubb, 2013; Skogsvik & Juettner-Nauroth, 2013). From valuation model approach Feltham & Ohlson, (1995) asserted analytically that future cash flow of firm cannot be altered through conservative accounting policies, and ultimately does not affect the market value of the equity. Further, Ashton & Wang (2013) found a link between linear unobserved and unbiased accounting system given in OM and conservatively biased reporting system. Whereas, Skogsvik & Juettner-Nauroth (2013) examined how information dynamics can force O'95 to bring conservatively biased accounting numbers in model and conclude that the linear dynamics of abnormal earnings are associated with the time series behavior of conservative biases. Clubb (2013) investigated that dividend displacement is visible in linear abnormal earnings dynamics when forecast dividend is associated with apositive coefficient.

LID is the exact innovation of O'95 where abnormal earnings and other information variable track an autoregressive process with mean-revert to zero. This innovation is actually worthyfor theanalytic purpose, but it raises a general question of why abnormal earnings and other information variables are expected to mean-revert to zero (Gregory et al., 2005).

3. Empirical studies based on O'95

In order to check the validity of O'95 model number of empirical studies have been done on different markets and from different aspects. Here in this section, we have focused on most discussed empirical studies in theprevious literature. The empirical testing and ability of O'95 model have been analyzed through two different links i.e. Valuation links and predictive link. Valuation link is used to assess the fundamental value of the firm by the use of valuation function (Eq. 8). Predictive linkassesses the forecasting capacity of the model to predict future abnormal earnings (Eq 6&7) (Giner & Lniguez, 2006).

O'95 is a landmark study in accounting research not only because it associate accounting numbers with stock prices in a systematic manner but it also widely accepted in empirical studies (Collins et al., 1999; Morel, 2003; Barth et al., 2005;). According to Callen & Morel (2001), three prominent reasons appear behind it. First, the alternative modelsare not emphasizing on primitive accounting information. Second through CSR assumption, O'95 brings income statement into the picture of firm valuation. Third in O'95 the value of the firm is derived from actual accounting variables i.e. book value and earnings, over which empirical research have a reasonable advantage. On the other hand,researchershave also found some loopholes in empirical testing of O'95 in both cross-sectional (Dechow et al., 1999) and time-series (Myers, 1999) model. Partly their studies rejected the model as an inadequate explanation of stock prices. Their conclusions raised different limitations of O'95 such as various assumptions of O'95 and the other information variable.

In anempiricalaspect, the major limitation of O'95 is its "other information" a scalar variable in both predictive as well as valuation link (Dechow et al. 1999). "Other information" causes

loss of concreteness because this variable is unspecified.Many researchershave dropped this variable for empirical testing (Callen & Morel, 2001; Ota, 2002). This grounds to theempirical content of Model. Although "other information" is not directly recognizable, one can assume it by its expected influence Ohlson (2001). Whereas, some researchers have taken analyst forecast as a base to define "other information" variable (Dechow et al., 1999; McCrae & Nilsson, 2001; Gregory et al., 2005; Giner and Iniguez, 2006; Choi et al., 2006).

Table1. Prior empirical studies tested validity of O'95

Author	Country	Sample	Link	Other information	Methodology
Myers (1999)	USA	1975-1996	Predictive & Valuation	Order Backlog	Time-series
Dechow et al. (1999)	USA	1976-1995	Predictive & Valuation	Based on analyst forecast	Cross-sectional
Barth et al. (1999)	USA	1987–1996	Predictive & Valuation	Ignored	Time-series
McCrae & Nilsson (2001)	Sweden	1987-1997	Predictive & Valuation	Based on analyst forecast	Cross-sectional
Canel& Morel (2001)	USA	1969-1996	Predictive & Valuation	Ignored	Time-series
Ota (2002)	Japan	1964-1996	Predictive & Valuation	Ignored	Time-series
Gregory et al. (2005)	UK	1976–2000	Predictive & Valuation	Based on analyst forecast	Cross-sectional
Barth et al. (2005)	USA	1987–2001	Predictive & Valuation	Fitted value based on valuation function.	Cross-sectional
Giner and Iniguez (2006)	Spain	1992-1999	Predictive & Valuation	Based on analyst forecast	Pooled cross-section/ time-series regression
Choi et al. (2006)	USA	1950-1995	Predictive & Valuation	Based on analyst forecast	Pooled cross-section/time-series regression
Leccadito&Veltri (2014)	USA	1980–2011	Predictive & Valuation	Ignored	Time-series

Table 1 consists the key features of the prior empirical literature which verify the success of O'95 Model. Most of the studies have been done inthe USA. Both predictive and valuation link have been analyzed in these studies by using respective valuation functions. On the subject of valuation link, empirical studies show that stock prices are undervalued in all the markets. In many empirical studies the inclusion of "other information" variableprovides more accurate results(Myers, 1999; Dechow et al., 1999; McCrae & Nilsson, 2001; Gregory et al., 2005; Barth et al., 2005; Giner & Iniguez, 2006; Choi et al., 2006). However in some studies, the "other information" variable was dropped for thesake of simplicity (Barth et al., 1999;Canel& Morel, 2001; Ota 2002;Leccadito&Veltri, 2014).

For methodology, no clear priority has been given in theliterature. Myers (1999), Barth et al. (1999), Canel & Morel (2001), Ota (2002), and Leccadito & Veltri (2014) have tested the model on time series data basis and Dechow et al. (1999), McCrae & Nilsson (2001), Gregory et al. (2005), and Barth et al. (2005) used cross-sectional data for testing. Whereas Giner &I niguez (2006) and Choi et al. (2006) used pooled time-series cross-sectional regressions.

These empirical studies were precise to empirical testing of O'95. Apart from these studies number of other studies has been done to find value relevance of accounting information in different markets with O'95 Model (Collins et al., 1997; Francis & Shipper, 1999;Brown et al., 1999; Lev &Zarowin, 1999; Kim &Kross, 2005; Ballas, &Hevas, 2005; Balachandran & Mohanram, 2011; Shrivastava, 2014).

4. Bibliometric facts about O'95

As we have discussed earlier O'95 is one of the most cited work in accounting literature from last two decades. In this section, we will discuss some bibliometric facts about O'95. We have consideredcitation-based analysis to recognize the diversified influence of O'95 in accounting research. We have identified various subsequent accounting or non-accounting research work influenced by O'95. This work will provide a foundation for future research in order to connect O'95 with different sub-fields and helps to find research gaps and questions. It will provide afactual base to find the web of links between O'95 and other sub-fields so that one can think of different angles to analyze these links. Generally, bibliometric studies provide a language for academic communication because these studies suggest what should be read by students and researchers and how to structure research work. So this study is planned to provide a worthy guide to Ph.D. scholars and researchers want to work on this specific field of accounting literature.

Our process is based on articles in which O'95 was cited in following twelve journals from 1995 to 2015: Journal of Accounting Research (JAR), Journal of Accounting and Economics (JAE), The Accounting Review (TAR), Contemporary Accounting Research (CAR), Review of Accounting Studies (RAS), Journal of Business Finance and Accounting (JBFA), Accounting Horizons (AH), The European Accounting Review (TEAR), Journal of Accounting Auditing and Finance (JAAF), Accounting and Business Research (ABR), A Journal of Accounting, Finance and Business Studies(ABACUS) and The International Journal of Accounting (TIJA). We refer these articles as "citing papers". This process results intotal 449 citing papers. We prepared individual author, university affiliation to authors, and country list to identified most indulgedindividual author, university affiliation to authors, and country worked on O'95 model. Then we have prepared the list of all keywords in cited papers and divided those keywords under different subfields.

This process results in various beneficial features. First, it helps to identify various subfields of accounting influenced by O'95, such as firm valuation, earning management, value relevance of accounting information, etc. Second, it is not limited to journal articles, conference papers, notes and speeches are also included. Finally by grouping keywords in different subfields of accounting research, we provide a base to connect various subfields with one another through O'95.

The main benefit of citation based study is quantitative parameters to measure the impact of a particular work on successive research. However, citations are not the perfect parameter to measure theimpact of particular work. Because citation could be affected by self-citation or criticism of that particular work. Citations are also affected by planned actions by authors like authors may try to cite the work of renowned researchers. Brown & Gardner (1985) discussed

these issues and concluded that while citation-based studies are not perfect but can be a beneficial tool to measure theimpact of published work.

Citation-based studies havean extended history (Garfield, 1972, 1979). In accounting also, we have some examples of this kind of studies (Bonner et al., 2006; Chan et al., 2009; Oler et al., 2010; Dunbar & Weber, 2014). Some studies identified most influential journals (Chen et al., 2009; Bonner et al., 2006), development in accounting research (Oler et al., 2010), andmost influential authors in different fields of accounting research (Dunbar & Weber, 2014) through citation-based studies. Even Dunbar & Weber (2014) concluded that O'95 is one of the most influential study in thefinancial topical area.

4.1 Sample Selection

We have selected following twelve journals: JAR, JAE, TAR, CAR, RAS, JBFA, AH, TEAR, JAAF, ABR, ABACUS, TIJA. We selected JAR, JAE, TAR, CAR and RAS because they usually count as the top journal of accounting (Bonner et al., 2006, Chen et al., 2009; Oler et al., 2010). To confirm that we are taking sufficient sample of citing papers,we added some prestigious and specialized journals in financialtopical area i.e. JBFA, AH, TEAR, JAAF, ABR, ABACUS, and TIJA. Because, according to Dunbar & Weber (2014), O'95 also comes under financial topical area. We have collected articles from these twelve journals from 1995 to 2015 through Scopus and web of sciences. Then we have selected the articles in which O'95 was cited from all twelve journals. This process results with 449 citing papers with given number of citing papers (Fig. 1) from specific journals.

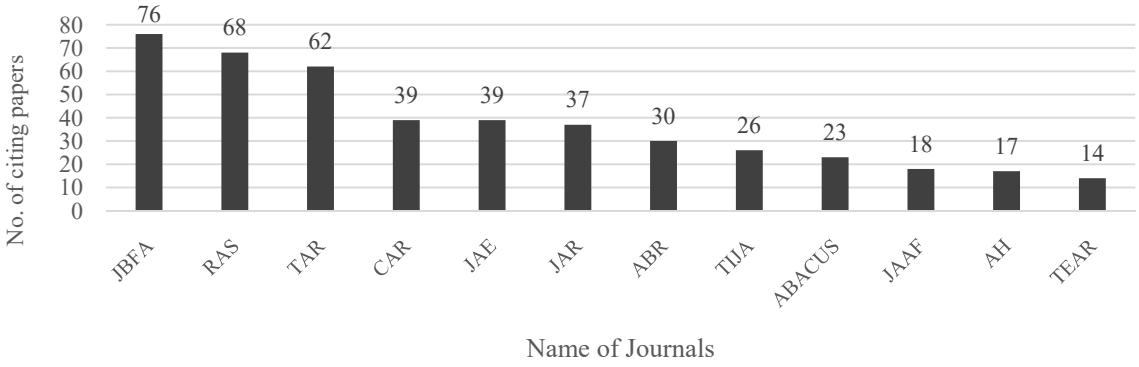

Figure 1. Journal-wise number of citing papers

Note:, Journal of Business Finance and Accounting (JBFA), Review of Accounting Studies (RAS), The Accounting Review (TAR), Contemporary Accounting Research (CAR), Journal of Accounting and Economics (JAE), Journal of Accounting Research (JAR), Accounting and Business Research (ABR), The International Journal of Accounting (TIJA), A Journal of Accounting, Finance and Business Studies (ABACUS), Journal of Accounting Auditing and Finance (JAAF), Accounting Horizons (AH), and The European Accounting Review (TEAR).

Thereafter we compiled the list of individual authors, university, country and keywords of these 449 citing papers. Finally, we have used this dataset to decide most influenced

individualauthors, university affiliation of author's, and country by O'95. We have grouped keywords under specific subfields to know the most influenced subfield of thefinancial topical area by O'95.

4.2 Descriptive statistics

Figure2 summarize a year-wise number of citing papers, cited O'95. The average rate of citation over the period is 21.38 per year.

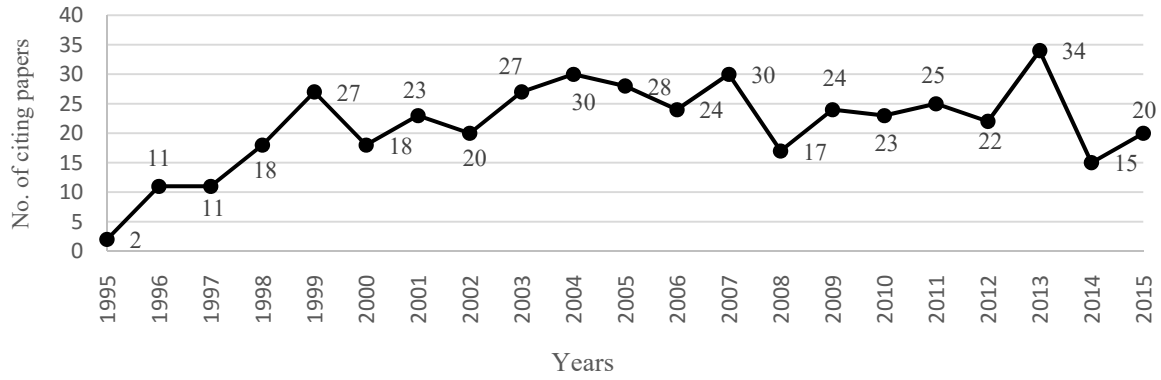

Figure 2.Year-wise number of citing papers

Table 2. Shows the 5 mostinfluenced individual author, university and country byO'95 in descending order. For every paper, we have counted one for every author in that paper. We escaped Ohlson, J.A. from the list because of self-citation issue. University and country list shows which university andcountryare working most on O'95 based work.

Table 2. Authors, Universities, and Country with the corresponding number of citing papers.

Author	No. of citing papers	University	No. of citing papers	Country	No. of citing papers
Landsman, W.R.	14	Stanford University &Lancaster University	24	USA	258
Barth, M.E.	12	The University of North Carolina	21	UK	77
Penman, S.H. &Sougiannis, T.	10	New York University	20	Canada	36
Beaver, W.H.	9	University of Toronto	14	Australia	29
Wang, P.	8	Hong Kong University of Science and Technology	11	Hong Kong	20

Landsman, W.R. is most influenced author by O'95. He cited O'95 in his 14 papers followed by Barth, M.E. with 12 papers and Penman, S.H. &Sougiannis, T. with 10 papers each. Asthe university list is concern, it constitutes the given authors comes under specific affiliated university. SoStanford University & Lancaster University are the universities working most in O'95 based work with 24 numbers of citing papers. Followed by The University of North Carolina and New York University with 21 and 20 numbers of citing papers respectively. As far as the country list is concern, it constitutes the given affiliated university comes under

specific country. So United States is working most on O'95 based work with 258 citation papers, followed by UK and Canada with 77 and 36 citing papers respectively.

In keywords analysis,a total count of 647 keywords has been identified. Then we identified the number of repetition of every keyword, which results with 147 different keywords. Then we grouped different keywords under 25 different subfields given in table 2 with number of keywords count under a specific subfield.

Table 3. Subfields with the corresponding number of keywords count

Subfields	Number of keywords count
Valuation	86
Earnings management	61
Value relevance	53
Residual income model	42
Forecasting	39
Cost of capital	31
Financial reporting & analysis	30
Capital markets	28
Corporate governance	23
Linear information dynamics	22
Intangible assets	22
Accruals & Cash flow	22
Conservatism	20
IFRS	20
Stock risk, return, and price	19
Information content	18
Clean/Dirty Surplus	15
Disclosure	12
Fair value	12
Book value	12
Profitability	11
Growth	10
Dividend	9
Tax	6
Interest rates	4
Others	20
TOTAL	647

Table 3, the keywords analysis provides an overview that how the use of O'95 is diversified in different subfields. The most affected subfield is Valuation followed by earnings management and value relevance.

4.3. Results and Discussion

Descriptive statistical results shown in theprevious section emerged with some observations. First, the keywords section highlights the diversified use of O'95 in various subfields. The several list comprises the level of influence of O'95 on individual authors work, University, and country. Many of these subfields are connected by researchers with O'95 for theoretical contributions that are related to thefinancial topical area. While other subfields are useful for empirical contribution in this area. New researchersshould be conscious that it is necessary to widen their horizon of financial topical research area in different subfields.

Second, the citing papers list is dominated by JBFA, RAS, TAR, CAR and JAE. Which is similar to previous findings, usually being considered in top journals of accounting (Glover et al. 2012). Third, precisely universities of US and UKare highly passionate to work on improvement and development in O'95.

5. Summary and Conclusion

In this paper, we first reviewed the theoretical and empirical studies based on O'95. We have discussed theoretical improvements associated with each assumption of O'95and empirical testing of the model for far. We observed that O'95encompassed the literature on valuation of firm through accounting information. The acceptance of the model can be justified by successive theoretical studies discussed on O'95. Linear information dynamics is observed one of the major input of O'95 and this dynamics have potentials to future research for more accurate prediction of abnormal earnings. Whereas, CSR and"other information" variable are the major limitations of the model. Even from theempirical point of view, the model lacked its validity because of required practical possibility of CSR in accounting and undefined "other information" variable. Future research is needed to fix this variable in order to make this model more robust for valuation purpose.Finally, we conclude that the research on O'95 is moving towards robustness, and more extensions are required to fix some more issues like conservatism, clean surplus, other information, etc. The success of O'95 can also be verified by bibliometric facts of O'95 like average rate of citation in reputed journals of accounting research.

As far as the bibliometric analysis is concerned about O'95through citing papers analysis we find thatLandsman, W.R., Stanford University & Lancaster University, and United states are at the top among individual authors, University, and Country list in respective categories. And through keywords count analysis we find the diversified involvement and use of O'95 in various subfields. Valuation, Earning management, and Value relevance are the most affected subfield by O'95.

The primary limitation of this study is that the bibliometric facts are limited to citing papers of given twelve journals.The scope to extend our work for future research isthrough comparison of alternative valuation model with respect to theoretical, empirical, and bibliometric facts.

References

Ang, A., & Liu, J. (2001). A general affine earnings valuation model. *Review of Accounting Studies*, *6*(4), 397-425. https://doi.org/10.1023/A:1012497814339

Ashton, D., & Wang, P. (2013). Valuation Weights, Linear Dynamics, and Accounting Conservatism: An Empirical Analysis. *Journal of Business Finance & Accounting*, *40*(1-2), 1-25. https://doi.org/10.1111/jbfa.12001

Balachandran, S., &Mohanram, P. (2011). Using residual income to refine the relationship between earnings growth and stock returns. *Review of Accounting Studies*, *17*(1), 134-165. https://doi.org/10.1007/s11142-011-9168-1

Ball, R., & Brown, P. (1968). An Empirical Evaluation of Accounting Income Numbers. *Journal of Accounting Research*, *6*(2), 159. https://doi.org/10.2307/2490232

Ballas, A. A., &Hevas, D. L. (2005). Differences in the valuation of earnings and book value: Regulation effects or industry effects? *The International Journal of Accounting*, *40*(4), 363-389. https://doi.org/10.1016/j.intacc.2005.06.007

Barker, R. (2004). Reporting Financial Performance. *Accounting Horizons*, *18*(2), 157-172. https://doi.org/10.2308/acch.2004.18.2.157

Barth, M., Beaver, W., Hand, J., & Landsman, W. (1999). Accruals, Cash Flows, and Equity Values. *Review of Accounting Studies*, *4*(3/4), 205-229. https://doi.org/10.1023/A:1009630100586

Barth, M. E., Beaver, W. H., Hand, J. R., & Landsman, W. R. (2005). Accruals, accounting-based valuation models, and the prediction of equity values. *Journal of Accounting, Auditing & Finance*, *20*(4), 311-345. https://doi.org/10.1177/0148558X0502000401

Bathke Jr, A. W., &Lorek, K. S. (1984). The relationship between time-series models and the security market's expectation of quarterly earnings. *Accounting Review*, 163-176. http://www.jstor.org/stable/247293

Beaver, W. H., & Dukes, R. E. (1972). Interperiod tax allocation, earnings expectations, and the behaviour of security prices. *The Accounting Review*, *47*(2), 320-332. http://www.jstor.org/stable/244755

Beaver, W. H. (1968). The information content of annual earnings announcements. *Journal of Accounting Research*, 67-92. https://doi.org/10.2307/2490070

Bernard, V. L. (1995). The Feltham-Ohlson Framework: Implications for Empiricists*. *Contemporary Accounting Research*, *11*(2), 733-747. https://doi.org/10.1111/j.1911-3846.1995.tb00463.x

Biddle, G. C., Bowen, R. M., & Wallace, J. S. (1997). Does EVA® beat earnings? Evidence on associations with stock returns and firm values.*Journal of Accounting and Economics*, *24*(3), 301-336. https://doi.org/10.1016/S0165-4101(98)00010-X

Biddle, G. C., Chen, P., & Zhang, G. (2001). When capital follows profitability: Non-linear residual income dynamics. *Review of Accounting Studies*, *6*(2), 229-265. https://doi.org/10.1023/A:1011666926073

Bonner, S. E., Hesford, J. W., Van der Stede, W. A., & Young, S. M. (2006). The most influential journals in academic accounting. *Accounting, Organizations and Society*, *31*(7), 663-685. https://doi.org/10.1016/j.aos.2005.06.003

Brief, R., &Peasnell, K. (1996). *Clean Surplus: a Link between Accounting and Finance.* ISBN: 0-8153-2215-8

Brown, S., Lo, K., & Lys, T. (1999). Use of R 2 in accounting research: measuring changes in value relevance over the last four decades. *Journal of Accounting and Economics*, *28*(2), 83-115. https://doi.org/10.1016/S0165-4101(99)00023-3

Burgstahler, D. C., & Dichev, I. D. (1997). Earnings, adaptation and equity value.*The Accounting Review*, 187-215. http://www.jstor.org/stable/248552

Callen, J. L., & Morel, M. (2001). Linear accounting valuation when abnormal earnings are AR (2).*Review of Quantitative Finance and Accounting*, *16*(3), 191-204. https://doi.org/10.1023/A:1011255602608

Chan, K. C., &Liano, K. (2009). Threshold citation analysis of influential articles, journals, institutions and researchers in accounting. *Accounting & Finance*, *49*(1), 59-74. https://doi.org/10.1111/j.1467-629X.2007.00254.x

Chan, K. C., Seow, G. S., & Tam, K. (2009). Ranking accounting journals using dissertation citation analysis: A research note. *Accounting, Organizations and Society*, *34*(6), 875-885. https://doi.org/10.1016/j.aos.2008.12.002

Choi, Y. S., O'Hanlon, J. F., & Pope, P. F. (2006). Conservative Accounting and Linear Information Valuation Models*. *Contemporary Accounting Research*, *23*(1), 73-101. https://doi.org/10.1506/7Y8H-C8PP-8HFR-831W

Clubb, C. D. (2013). Information dynamics, dividend displacement, conservatism, and earnings measurement: a development of the Ohlson (1995) valuation framework. *Review of Accounting Studies*,*18*(2), 360-385. https://doi.org/10.1007/s11142-012-9211-x

Collins, D. W., Maydew, E. L., & Weiss, I. S. (1997). Changes in the value-relevance of earnings and book values over the past forty years. *Journal of Accounting and Economics*, *24*(1), 39-67. https://doi.org/10.1016/S0165-4101(97)00015-3

Collins, D. W., Pincus, M., &Xie, H. (1999). Equity valuation and negative earnings: The role of book value of equity. *The Accounting Review*, *74*(1), 29-61. https://doi.org/10.2308/accr.1999.74.1.29

Dechow, P. M., Hutton, A. P., & Sloan, R. G. (1999). An empirical assessment of the residual income valuation model. *Journal of Accounting and Economics*, *26*(1), 1-34. https://doi.org/10.1016/S0165-4101(98)00049-4

Dunbar, A. E., & Weber, D. P. (2013). What influences accounting research? A citations-based analysis.*Issues in Accounting Education*, *29*(1), 1-60. https://doi.org/10.2308/iace-50603

Feltham, G. A., &Ohlson, J. A. (1995). Valuation and clean surplus accounting for operating and financial activities*. *Contemporary Accounting Research*, *11*(2), 689-731. https://doi.org/10.1111/j.1911-3846.1995.tb00462.x

Feltham, G. A., &Ohlson, J. A. (1999). Residual earnings valuation with risk and stochastic interest rates.*The Accounting Review*, *74*(2), 165-183. https://doi.org/10.2308/accr.1999.74.2.165

Foster, G. (1977). Quarterly accounting data: Time-series properties and predictive-ability results.*The Accounting Review*, 1-21. http://www.jstor.org/stable/246028

Francis, J., &Schipper, K. (1999). Have financial statements lost their relevance?. *Journal of Accounting Research*, *37*(2), 319-352. https://doi.org/10.2307/2491412

Frankel, R., & Lee, C. M. (1998). Accounting diversity and international valuation. Ann Arbor,1001, 48109-1234.

Garfield, E. (1972, November). *Citation analysis as a tool in journal evaluation.* American Association for the Advancement of Science. http://www.elshami.com/Terms/I/impact%20factor-Garfield.pdf

Garfield, E. (1979). Is citation analysis a legitimate evaluation tool?.*Scientometrics*,*1*(4), 359-375. https://doi.org/10.1007/BF02019306

Giner, B., &Iñiguez, R. (2006). An empirical assessment of the Feltham-Ohlson models considering the sign of abnormal earnings. *Accounting and Business Research*, *36*(3), 169-190. https://doi.org/10.1080/00014788.2006.9730020

Gode, D., &Ohlson, J. (2004). Accounting-based valuation with changing interest rates. *Review of Accounting Studies*, *9*(4), 419-441. https://doi.org/10.1007/s11142-004-7791-9

Gregory, A., Saleh, W., & Tucker, J. (2005). A UK Test of an Inflation‐Adjusted Ohlson Model. *Journal of Business Finance & Accounting*, *32*(3-4), 487-534. https://doi.org/10.1111/j.0306-686X.2005.00602.x

Hao, S., Jin, Q., & Zhang, G. (2011). Investment growth and the relation between equity value, earnings, and equity book value. *The Accounting Review*, *86*(2), 605-635. https://doi.org/10.2308/accr.00000028

Kim, M., &Kross, W. (2005). The ability of earnings to predict future operating cash flows has been increasing—not decreasing. *Journal of Accounting Research*, *43*(5), 753-780. https://doi.org/10.1111/j.1475-679X.2005.00189.x

Kirkulak, B., & Balsari, C. K. (2009). Value relevance of inflation-adjusted equity and income. *The International Journal of Accounting*, *44*(4), 363-377. https://doi.org/10.1016/j.intacc.2009.09.007

Kwon, Y. K. (2001). Book value, residual earnings, and equilibrium firm value with asymmetric information. *Review of Accounting Studies*, *6*(4), 387-395. https://doi.org/10.1023/A:1012445830268

Kothari, S. P. (2001). Capital markets research in accounting. *Journal of Accounting and Economics*,*31*(1), 105-231. https://doi.org/10.1016/S0165-4101(01)00030-1

Leccadito, A., &Veltri, S. (2015). A regime switching Ohlson model. *Quality & Quantity*, *49*(5). https://doi.org/10.1007/s11135-014-0088-6

Lev, B., &Thiagarajan, S. R. (1993).Fundamental information analysis. *Journal of Accounting Research*, *31*(2), 190-215. https://doi.org/10.2307/2491413

Lev, B., &Zarowin, P. (1999). The Boundaries of Financial Reporting and How to Extend Them (Digest Summary). *Journal of Accounting Research*, *37*(2), 353-385 .https://doi.org/10.2307/2491413

Lev, B. (1989). On the usefulness of earnings and earnings research: Lessons and directions from two decades of empirical research. *Journal of Accounting Research*, 153-192. https://doi.org/10.2307/2491070

Lai, C. (2015). Growth in residual income, short and long term, in the OJ model. *Review of Accounting Studies*, *20*(4), 1287-1296. https://doi.org/10.1007/s11142-015-9320-4

Livnat, J., &Zarowin, P. (1990).The incremental information content of cash-flow components. *Journal of Accounting and Economics*, *13*(1), 25-46. https://doi.org/10.1016/0165-4101(90)90066-D

Lo, K., & Lys, T. (2000). The Ohlson model: contribution to valuation theory, limitations, and empirical applications. *Journal of Accounting, Auditing & Finance*, *15*(3), 337-367. https://doi.org/10.1177/0148558X0001500311

Lundholm, R. J. (1995). A Tutorial on the Ohlson and Feltham/Ohlson Models: Answers to Some Frequently Asked Questions*. *Contemporary Accounting Research*, *11*(2), 749-761. https://doi.org/10.1111/j.1911-3846.1995.tb00464.x

Lyle, M. R., Callen, J. L., & Elliott, R. J. (2013). Dynamic risk, accounting-based valuation and firm fundamentals. *Review of Accounting Studies*, *18*(4), 899-929. https://doi.org/10.1007/s11142-013-9227-x

McCrae, M., & Nilsson, H. (2001). The explanatory and predictive power of different specifications of the Ohlson (1995) valuation models. *European Accounting Review*, *10*(2), 315-341. https://doi.org/10.1080/713764600

Morel, M. (2003). Endogenous parameter time series estimation of the Ohlson model: Linear and nonlinear analyses. *Journal of Business Finance & Accounting*, *30*(9-10), 1341-1362 .https://doi.org/10.1111/j.0306-686X.2003.05444.x

Myers, J. N. (1999). Implementing residual income valuation with linear information dynamics. *The Accounting Review*, *74*(1), 1-28. https://doi.org/10.2308/accr.1999.74.1.1

Ohlson, J. A., &Juettner-Nauroth, B. E. (2005). Expected EPS and EPS growth as determinantsof value. *Review of Accounting Studies*, *10*(2-3), 349-365. https://doi.org/10.1007/s11142-005-1535-3

Ohlson, J. A. (1995). Earnings, book values, and dividends in equity valuation*. *Contemporary Accounting Research*, *11*(2), 661-687. https://doi.org/10.1111/j.1911-3846.1995.tb00461.x

Ohlson, J. A. (1999). On transitory earnings. *Review of Accounting Studies*, *4*(3-4), 145-162. https://doi.org/10.1023/A:1009653114699

Ohlson, J. A. (2005). On Accounting-Based Valuation Formulae*. *Review of Accounting Studies*, *10*(2-3), 323-347 .https://doi.org/10.1007/s11142-005-1534-4

Ohlson, J. A. (2009). Accounting Data and Value: The Basic Results*.*Contemporary Accounting Research*, *26*(1), 231-259. https://doi.org/10.1506/car.26.1.8

Ohlson, J. A., & Gao, Z. (2006). Earnings, earnings growth and value. *Now Publishers Inc*. https://doi.org/10.1561/1400000001

Oler, D. K., Oler, M. J., &Skousen, C. J. (2010). Characterizing accounting research. *Accounting Horizons*, *24*(4), 635-670. https://doi.org/10.2308/acch.2010.24.4.635

Ota, K. (2002). A test of the Ohlson (1995) model: Empirical evidence from Japan. *The International Journal of Accounting*, *37*(2), 157-182. https://doi.org/10.1016/S0020-7063(02)00150-4

Penman, S. H. (2005). Discussion of "On Accounting-Based Valuation Formulae" and "Expected EPS and EPS Growthas Determinants of Value". *Review of Accounting Studies*, *10*(2-3), 367-378. https://doi.org/10.1007/s11142-005-1536-2

Srivastava, A. (2014). Why have measures of earnings quality changed over time? *Journal of Accounting and Economics*, *57*(2), 196-217. https://doi.org/10.1016/j.jacceco.2014.04.001

Skogsvik, K., &Juettner-Nauroth, B. E. (2013). A note on accounting conservatism in residual income and abnormal earnings growth equity valuation. *The British Accounting Review*, *45*(1), 70-80. https://doi.org/10.1016/j.bar.2012.12.001

Stark, A. W. (1997). Linear information dynamics, dividend irrelevance, corporate valuation and the clean surplus relationship. *Accounting and Business Research*, *27*(3), 219-228. https://doi.org/10.1080/00014788.1997.9729546

Yee, K. K. (2000). Opportunities knocking: residual income valuation of an adaptive firm. *Journal of Accounting, Auditing & Finance*, *15*(3), 225-266. https://doi.org/10.1177/0148558X0001500303

Zhang, G. (2000). Accounting information, capital investment decisions, and equity valuation: Theory and empirical implications. *Journal of Accounting Research*, *38*(2), 271-295. https://doi.org/10.2307/2672934