

A Review of the Value Relevance Literature

Leif Atle Beisland*

Faculty of Economics and Social Sciences, University of Agder, 4604 Kristiansand, Norway

Abstract: Value relevance research empirically investigates the usefulness of accounting information to stock investors. Accounting information is denoted as value relevant if there is a statistical association between the accounting numbers and market values of equity. This review provides a comprehensive study of the value relevance literature. The review focuses mainly on high-quality value relevance research from the last two decades, but it also covers seminal studies from the late 1960s. The primary focus is on research on U.S. financial data, but some international evidence is also presented. The articles are generally selected from top accounting journals. The review offers an introduction to the methodology employed within this research tradition and presents the main results from studies regarding the value relevance of the two summary measures used in financial reports, namely, earnings and book equity. Furthermore, the review describes studies on the development in value relevance over time and shows how value relevance from different accounting methods can be compared. Overall, the review provides in-depth information on the value relevance literature to readers who wish to familiarise themselves with this line of empirical accounting research.

Keywords: Capital markets, cash flow, accruals, earnings, value relevance.

1. INTRODUCTION

Active stock investors turn to financial statement analysis to ascertain the fundamental value of firms. They want to know what firms are worth so that they can evaluate the respective stock prices. In fact, one of the major objectives in financial reporting is to provide equity investors with information relevant for estimating company value. Value relevance research empirically analyses whether this goal is met. Is accounting information relevant for the investors who wish to estimate company value, or do investors primarily obtain the information they need from other sources? An extensive accounting literature seeks to answer a large number of aspects of this question, and this literature as a whole is referred to as the value relevance literature. The purpose of this study is to review the value relevance literature in order to give the reader a comprehensive understanding of the methodology, research questions, and empirical findings in this line of research.

Empirical research on the relations between capital markets and financial statements is generally referred to as capital market-based accounting research (CMBAR). This is a broad field of research that can be categorised into several subfields. Kothari [1] divides CMBAR into fundamental analysis and valuation, tests of market efficiency, and the role of accounting numbers in contracts and the political process. Beaver [2] employs the sub-categories market efficiency, Feltham-Ohlonson modelling, value relevance, analyst behaviour, and discretionary behaviour. Categorisation of CMBAR is largely a matter of preference, and value relevance research can be used as an example of this. Beaver [2]

views value relevance as a field of its own. It is, however, possible to consider value relevance as related to both market efficiency and fundamental analysis and valuation.

This paper is a descriptive study of a wide selection of value relevance research. It focuses on what the results from value relevance research *are*, and not what they *should have been*. It should be noted, however, that most standard setters view value relevance, along with other attributes, as an important characteristic of accounting information. Francis, LaFond and Olsson [3] suggest that increased value relevance is associated with lower cost of equity. This is attributed to investors perceiving value relevance as contributing to lower information risk. Lower information risk decreases imprecision in the estimates of the pay-off structure to investors based on available information. Simply put, lower risk means lower company cost of equity. From a macroeconomic perspective, lower cost of capital leads to increasing levels of investment. As such, value relevance might have real consequences for an economy. It is useful to keep such normative considerations in mind, even though the remainder of this paper almost exclusively focuses on *empirical* relationships. The literature in this area is vast, and it is by no means my intention to provide an all-embracing review of the research. I do, however, present a relatively large number of articles in order to give an *overview* of the value relevance literature. Modern CMBAR originated with Ball and Brown [4] and Beaver [5]. Both articles can be seen as a part of the value relevance literature, although the concept of value relevance, according to Barth, Beaver and Landsman [6], was not developed until 1993 [7]. I focus primarily on recent research, i.e., articles from the last twenty years. Many of the "modern classics" within value relevance research were actually produced during the nineties.

The articles discussed here were primarily selected from the most well-known and respected accounting journals,

*Address correspondence to this author at the Faculty of Economics and Social Sciences, University of Agder, 4604 Kristiansand, Norway; E-mail: leif.a.beisland@uia.no

including the Journal of Accounting Research, the Journal of Accounting and Economics, Contemporary Accounting Research, Accounting Review, the Journal of Accounting Auditing and Finance, and the Journal of Business Finance and Accounting, but I also comment on important results from other journals. No reference is made to unpublished working papers. This paper primarily focuses on research performed using U.S. data, but I also provide examples of value relevance studies from several other countries.¹ As the U.S. financial market is by far the world's largest, it should come as no surprise that modern CMBAR originated in the USA. A very large fraction of published value relevance research is still conducted using U.S. samples. These U.S. studies include most of the pioneering research that has been performed on value relevance.

Fig. (1) outlines the structure of this paper. Section 2 defines the concept of value relevance and describes its theoretical foundation. Section 3 discusses research methodology applied in the analysis of value relevance. Sections 4 to 7 present four sub-categories of empirical value relevance research. Note that much of the value relevance literature can be easily placed into two or more categories. Some articles will therefore be cited several times. Section 4 describes the value relevance of earnings and other flow measures, such as the value relevance of elements from income statements or cash flow statements. The value relevance of earnings can be regarded as the primary focus of value relevance research. Hence, section 4 is the most comprehensive of this paper. Section 5 investigates the value relevance of balance sheet measures, i.e., equity and other stock measures. Section 6 analyses research on the development of value relevance over time. A very specific type of value relevance research focuses on the differing value relevance of alternative accounting methods or standards. This kind of research is reviewed in section 7. Section 8 concludes the paper.

2. THEORETICAL FOUNDATION AND A DEFINITION

Financial statements have a variety of applications. Management compensation and debt contracting are examples of applications of financial statements. However, this paper is solely devoted to equity investment. Value relevance research measures *the usefulness of accounting information from the perspective of equity investors*. Empirical research is based on valuation theory. Traditional financial theory states that the theoretical value of a company's equity, EV , is the present value of all future dividends² (d) or free cash flows to equity (FCE):

$$EV_0 = \sum_{t=1}^{\infty} \frac{E(d_t)}{(1+r_t)^t} = \sum_{t=1}^{\infty} \frac{E(FCE_t)}{(1+r_t)^t}$$

EV_0 = (theoretical) equity value

$E(d_t)$ = expected dividend

$E(FCE_t)$ = expected free cash flow to equity

r_t = discount rate

In this model, the expected dividend is budgeted as the free cash flow to equity. Several versions of this dividend and cash flow model exist. For instance, Feltham and Ohlson [9] show that under some fairly reasonable assumptions,³ equity value is today's value of net financial assets plus the present value of all future free cash flow from operating activities:

$$EV_0 = NFA_0 + \sum_{t=1}^{\infty} \frac{E(CFO_t)}{(1+r_t)^t}$$

NFA_0 = net financial assets (negative if debts exceed gross financial assets)

CFO_t = free cash flow from operating activities

Ohlson [11] shows that the dividend and cash flow model can be written solely as a function of accounting variables if we assume that the clean surplus relation (CSR) holds.⁴ The CSR requires that book equity only changes with net income and net capital withdrawals (net dividends) by owners:⁵

$$B_t = B_{t-1} + I_t - d_t$$

B_t = book value of equity

I_t = net income (earnings)

d_t = net dividends

Using this assumption, the residual income⁶ model can be derived:

$$EV_0 = B_0 + \sum_{t=1}^{\infty} \frac{E(I_t - r_t * B_{t-1})}{(1+r_t)^t}$$

The model says that the value of a company's equity is equal to the book value of equity plus the discounted value of future residual income. Residual (or abnormal) income is defined as the difference between accounting income and the required return on book value of equity and is computed using market-based company cost of capital. Note that the residual income model is always equal to the dividend model if one assumes that the CSR holds in the future. It does not matter if the CSR has not been valid historically.

These models are used by equity investors to estimate company value. One objective of financial reporting is to assist investors in equity valuation. For financial information

³ Specifically, the Financial Asset Relation (FAR) and the Financial Asset Marked-to-Market Relation (FAM) must hold. FAR says that all transfers to common equity holders are made through financial assets, and these assets are further influenced by financial income and free cash flows from operations. FAM says that the risk-adjusted expected financial income equals the riskless spot interest rate times the opening book value of financial assets [10].

⁴ The idea of residual income valuation is, in fact, far older than the mid-nineties. The model is actually sometimes attributed to Preinrich [12], whereas Edwards and Bell [13] further develop the ideas. It was, however, not until the works of Feltham and Ohlson that the model gained its huge popularity.

⁵ Change in equity that is not a result of net dividends or bottom-line earnings is referred to as "dirty surplus." Value changes, for instance revaluations or changes in derivatives values, are sometimes recorded as an equity change rather than an earnings item. The equity may also be adjusted for exchange rate changes [14]. Such direct adjustments to equity are examples of dirty surplus items.

⁶ This model is also referred to as the residual earnings model. Earnings and income are used interchangeably in this paper, and both refer to the net accounting profit or loss reported in financial statements.

¹ Note that the references to international studies were collected from a wider range of journals than the ones listed above.

² The dividend model is often attributed to Williams [8].

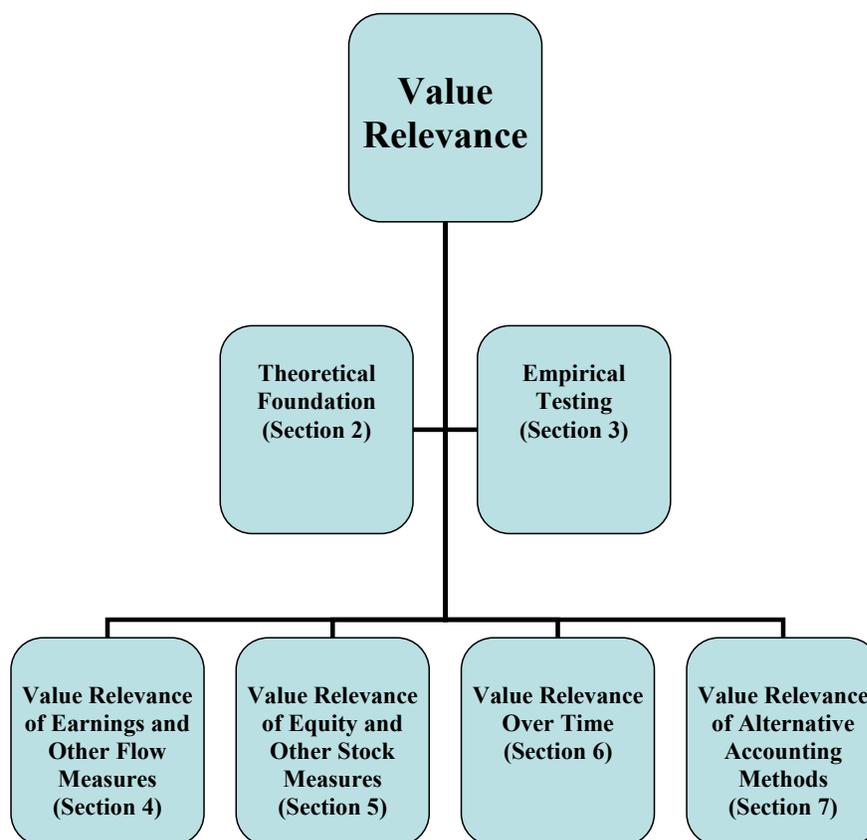


Fig. (1). Outlines the structure of the paper. The theoretical foundation of value relevance research is described in section 2. Section 3 discusses empirical testing within this field of research. The rest of the paper, sections 4 to 7, presents findings from four sub-categories of value relevance research.

to be value relevant, accounting numbers must be related to current company value. If there is no association between accounting numbers and company value, accounting information cannot be termed value relevant, and hence, financial reports are unable to fulfil one of their primary objectives. The construct of value relevance can be defined in a number of ways. Barth, Beaver and Landsman [6] simply state that “value relevance research examines the association between accounting amounts and equity market values” [6]. In a more thorough discussion of the construct, Francis and Schipper [15] offer four interpretations of value relevance. Interpretation one is that financial statement information influences stock prices by capturing intrinsic share values toward which stock prices drift. Under interpretation two, Francis and Schipper [15] state that financial information is value relevant if it contains the variables used in a valuation model or assists in predicting those variables, while interpretation three and four are based on value relevance as indicated by a statistical association between financial information and prices or returns. Consistent with Francis and Schipper’s [15] fourth interpretation of value relevance, I define value relevance as *the ability of financial statement information to capture and summarise information that determines the firm’s value*. I choose this definition because it best describes how empirical value relevance research is actually conducted. Value relevance research does not focus on *how* accounting information is used in valuation. Instead, this line of research asks if accounting information is able *ex post* to

explain variations in stock prices over time and/or between companies.

3. EMPIRICAL TESTING

Section 3.1 discusses how models can be specified to analyse value relevance of accounting information. The typical statistical test methodology is regression analysis. There are, however, several econometric challenges related to the regression models most frequently applied in value relevance research. Some of these challenges are discussed in section 3.2. In addition, value relevance research generally assumes that financial markets are efficient. Section 3.3 examines test methodology that may be applied if the assumption of market efficiency is *not* met.

3.1. Model Specification

The main objective of value relevance research is to study the relationship between market values of equity and accounting variables, formally defined as:

$$MVE = f(AI) \quad (1)$$

MVE = market value of equity

AI = accounting information

Value relevance researchers are interested in how accounting information affects market values of equity. One may, for instance, study if one particular piece of accounting information is significantly related to the market value of

equity, or one may study how much variation in equity values is explained by accounting information. Such issues are typically tested using regression analysis. In particular, the first research question can be answered by studying the significance level of individual regression coefficients, while the second issue can be analysed through a study of the explanatory power of a regression model.

One of the most central regression specifications in value relevance research is the price regression. The price regression analyses the relationship between the market value of equity and the book value of equity. The regression is typically run on a per share basis:

$$P = \beta_0 + \beta_1 BVS + \varepsilon \quad (2)$$

P = stock price

BVS = book value per share

The residual income framework (see section 2) shows that stock values can be estimated as a function of the book value of equity and earnings. As such, earnings are often included as a second variable in the price specification:⁷

$$P = \beta_0 + \beta_1 BVS + \beta_2 EPS + \varepsilon \quad (3)$$

EPS = earnings per share

Equity valuation is an important exercise for all stock investors. However, once funds have been invested in a stock or a portfolio of stocks, the stock price per se is not necessarily of much interest. The focus is instead on the investment return. Assuming that the clean surplus relation holds (see the definition in section 2), the change in the book value of equity is equal to earnings if no dividends are paid. The value relevance research devotes much attention to how the change in the market value of equity is related to value creation as measured by the accounting system. This issue is typically studied by regressing the change in stock price, or specifically the stock return, on accounting earnings:⁸

$$R = \beta_0 + \beta_1 E + \varepsilon \quad (4)$$

E = earnings; typically scaled by total assets or the market value of equity

Specification (4) can be applied to study the timeliness of bottom-line earnings. The coefficient on earnings, β_1 , is often referred to as the earnings response coefficient, and it is understood as "the magnitude of the relation between stock returns and earnings" [1]. Value relevance researchers sometimes focus on unexpected return rather than the stock return itself. Unexpected return is computed by deducting expected return from raw stock return. Expected return can be estimated in several ways, for instance by using the market model or the Fama and French three-factor model [17, 18]. Unexpected stock return is regressed on unexpected earnings. Unexpected earnings are the difference between total earnings and expected earnings. Expected earnings can, for instance, be calculated from analyst forecasts [19, 20] or

from time-series models of earnings [21, 22]. The regression is then:

$$AR = \beta_0 + \beta_1 UE + \varepsilon \quad (5)$$

AR = abnormal return, i.e., stock return minus expected return

UE = unexpected earnings⁹

Note that there is no rigid definition of the earnings response coefficient. The coefficient β_1 from specification (5) is often referred to as the earnings response coefficient as well.

The regression specifications so far have implicitly assumed that aggregate accounting numbers like bottom-line earnings and book equity are the metrics of interest. However, these aggregated measures are sometimes disaggregated into components (see sections 4.3 and 5.1). Note also that value relevance can be analysed for financial statement information that is not part of an income statement or balance sheet. Such information includes, for instance, information from the notes or numbers from cash flow statements. Value relevance research includes time-series analysis and cross-sectional analysis as well as both at the same time, as in panel data analysis.

The relationship between stock values or returns and accounting numbers can be examined for different time horizons. Research on stock price reactions over short periods of time is referred to as event studies, while analyses of long-term relationships are called association studies. Event studies typically analyse stock price behaviour centred on announcement dates for which the time window may be as short as a day or two. Association studies are not concerned with how fast the market reacts to new information, as their horizon ranges from three or four months to several years. This paper concentrates on association studies, though the distinction between the two in many cases is somewhat blurred.

3.2. Econometric Issues

Section 3.2.1 evaluates econometric challenges related to the price regression and the return regression, respectively. Section 3.2.2 discusses why researchers must be careful in some cases when employing explanatory power, R^2 , as a measure of value relevance.

3.2.1. Return vs Level Specification

Misspecified models can cause researchers to draw the wrong conclusions from their analyses. Econometric issues can therefore be an important challenge in much empirical research. An important and ongoing debate is connected to the difference between a price level specification (specifications (2) and (3)) and a price change (return) specification (specifications (4) and (5)) when investigating the relationship between market values of stocks and accounting values. This issue is thoroughly analysed by Landsman and Magliolo [23]. They present evidence that there is no single correct answer as to the "best" model specification. Instead, they argue that the decision of whether to select a price level

⁷ Earnings and book value multiples are frequently applied to calculate approximate equity values. Penman [16] shows how the two multiples can be combined in equity valuation. Specifically, Penman [16] calculates weights that combine capitalised earnings and book values into equity price. Regression specification (3) is in principle equal to Penman's valuation model.

⁸ The return specification can also be seen as a response to scale problems in the so-called level (or price) specifications; see section 3.2.1.

⁹ In their simplest form, unexpected earnings can be estimated as the change in earnings, ΔE .

or a price change specification is a joint function of the nature of the econometric properties of the data that cause ordinary least squares (OLS) assumptions to be violated and the economic model of equilibrium that is assumed.

The different properties of the two specifications necessitate that researchers need to be aware of the econometric strengths and weaknesses with the two specifications. Kothari and Zimmerman [24] claim that price models are better specified in that the estimated slope coefficients from price models, but not return models, are unbiased. Return models, however, more often meet the assumptions behind statistical tools, such as regression analysis. An example is useful to illustrate this. Current earnings include both a surprise component and an expected component. The latter is referred to as a stale component by Kothari and Zimmerman [24]. They maintain that this stale component is irrelevant in explaining current return and thus constitutes an error in the independent variable. This results in the slope coefficient in the return specification being biased towards zero. The price specification does not suffer from this problem, because the stock price reflects the cumulative information content of both components. Current earnings are, however, uncorrelated with the information about *future* earnings contained in the current stock price [see also 25]. This does not bias the estimated slope coefficient, but the price model has an uncorrelated omitted variable that reduces explanatory power. In addition, price models more frequently reject tests of heteroskedasticity. An important implication from these shortcomings is that researchers using price models must exercise more care in drawing statistical inferences. An additional advantage of the return model is that this model renders possible the use of a market model design, and the results can then be interpreted in terms of the capital asset pricing model (CAPM). Kothari and Zimmerman [24] point out that in the presence of value-irrelevant noise in earnings, both specifications yield downward-biased coefficient estimates.

Kothari and Sloan [26] acknowledge that ERCs from return specifications are biased downwards [compare 21, 27, 28], and they offer a solution to this problem. They reduce the bias by using a return measurement interval that includes a leading time period in addition to the current time period. Christie [29] observes an extremely important problem regarding level models. He claims that any variable correlated with size will be significant in regressions of equity values on accounting variables. The return specification controls for this scale effect by deflating all variables with the market value of equity. However, the market value of equity is not the only deflator used in capital market-based accounting research. In fact, when per share values are used for analysis, the total number of outstanding shares can be seen as a deflation factor or scale factor. In addition, many studies use the accounting value of assets as the deflation factor [30-32]. Barth and Kallapur [33] do not recommend deflation as a remedy for handling scale effects. They claim that including a scale proxy as an independent variable in a regression is more effective in both reducing heteroskedasticity and mitigating coefficient bias. Alternatively, Easton and Sommers [34] recommend market capitalisation as the most appropriate deflation factor. In other words, they recommend using a return specification. Easton and Sommers [34] claim that the search for alternative scale proxies is unnecessary. Their

analyses are based on the idea that market capitalisation is more than just a possible scale factor; rather, it *is* scale.

Regardless of the econometric strengths and weaknesses of the various regression specifications, the choice of regression model in the end is governed by the *economic motivation* of the study. What issues do we seek to investigate, and what questions do we seek to answer? The pure econometric challenges of a model can often be controlled in empirical studies, and numerous possibilities exist to test the robustness of the conclusions. However, we cannot choose a model that is not in accordance with the research question of the study. Barth, Beaver and Landsman [6] offer an instructive explanation on how the economic motivation of the study should govern the choice between the two major models in value relevance research: “the key distinction between value relevance studies examining price levels and those examining price changes, is that the former are interested in determining what is reflected in firm value and the latter are interested in determining what is reflected in changes in value over a specific period of time” [6]. Thus, the research question is decisive. If one wants to examine the value relevance of equity and other balance sheet items, the price model is the obvious choice. However, if one has a change-oriented approach in which *value creation* is the main focus, a return regression is appropriate, since price models do not measure the arrival of information over a given period. Sometimes we want to make general statements about value relevance, for instance, regarding how value relevance develops over time (see section 6) or how value relevance is affected by new accounting standards (see section 7). One should then follow the recommendation of Kothari and Zimmerman [24] and use both functional forms [35]. This will also help ensure that the study’s inferences are not sensitive to the choice of the functional form.

3.2.2. The Use of R^2

In regression analysis, the coefficient of determination (that is, the explanatory power or simply R^2) measures the proportion of variance in the dependent variable explained by the independent variable(s). If stock prices or returns are regressed on accounting variables, R^2 is a measure of how much variation in stock prices or returns is explained by the accounting variables analysed. Hence, explanatory power is a measure of value relevance. The explanatory power from different samples is often compared to study the extent to which value relevance differs between samples. For instance, when analysing the development in value relevance over time, such comparisons are very common (see section 6). Comparisons of R^2 s based on samples from different industries, accounting standards, or across countries are also frequent. Brown, Kin and Lys [36] state that there are severe problems connected to between-sample comparisons of R^2 -levels, and these comparisons may be invalid. Specifically, scale effects present in price regressions increase R^2 , and this effect increases in the scale factor’s coefficient of variation. Thus, differences in R^2 , for instance, from samples drawn in different time periods may in part be driven by differences in the scale factor’s coefficient of variation. Brown, Kin and Lys [36] control for the scale effect by running deflated regressions. They acknowledge that several scale proxies could have been chosen, but they argue that price at time $t-1$

is the preferred choice. As such, they recommend using a version of the return regression.

Gu [37] states that scale effects are not the only reason why explanatory power is incomparable across samples. He shows that cross-sectional variation in the independent variable affects R^2 . Specifically, if two samples have exactly the same regression coefficient and residual variance, the R^2 of the samples will differ if the variance of the independent variable is different in the two samples. Gu [37] maintains that “the R^2 s could be different even though the economic relation is entirely intact for each and every observation in two samples” [37]. Gu’s [37] criticism applies to both the price regression and the return regression. He also shows that the behaviour of explanatory power is even more complicated in a multivariate setting. Explanatory power is then affected by the variance-covariance matrix that includes all independent variables. Gu [37] recommends using residual dispersion as an alternative measure of value relevance. However, the residuals are subject to scaling and, therefore, must be adjusted for scale. According to Gu [37], several possible adjustments exist. A relatively easy scale adjustment is to divide the estimated residual standard deviation by the mean absolute fitted values of the dependent variable.

3.3. Value Relevance and Market Efficiency

It should be noted that value relevance research is related to market efficiency research. When asking whether accounting information is value relevant, one is also asking whether stock investors use accounting numbers as an input for valuation. One does not ask, however, if the investors’ use of accounting information is *optimal*. This constitutes CMBAR on market efficiency, a subject that is not covered in this paper [see 38 for an example of this kind of research].¹⁰ Aboody, Hughes and Liu [39] do, however, combine in their study these two lines of research, namely, value relevance and market efficiency. They claim that even though value relevance researchers seem to implicitly draw the conclusion that the stock market is efficient in the semi-strong form¹¹, substantial evidence suggests that the market may not be completely efficient in its processing of public information. The purpose of their study is to analyse how possible market inefficiencies may influence conclusions drawn from value relevance research.

Aboody, Hughes and Liu [39] evaluate how market inefficiency effects cause biases in inferences drawn from traditional value relevance studies. They offer an adjustment procedure that corrects for this bias and adjusts for delayed market reactions in the stock market. Specifically, they multiply stock prices with the ratio of one plus the actual stock return to one plus the required rate of stock return, both measured in a future period τ . In their empirical analysis, when τ is set to 12, 24 and 36 months, Aboody, Hughes and Liu [39] find that regression coefficients on both earnings and book values of equity increase significantly compared to coefficients generated by the traditional method with no adjustment. This is also the case when earnings are replaced

by residual income. The result holds for both level and return regressions, while the magnitude of differences in coefficient estimates is largest for return regressions. For the level regressions, the differences are small in magnitude and unlikely to be significant in an economic sense. The adjustment procedure of Aboody, Hughes and Liu [39] has, however, not become standard in the value relevance literature. Still, it is sometimes applied to test the robustness of empirical findings [40, 41].

4. THE VALUE RELEVANCE OF EARNINGS AND OTHER FLOW MEASURES

The majority of the value relevance literature is concerned with how accounting measures influence the *change* in the market value of equity, i.e., the stock return. The metric of interest is generally bottom-line earnings. Section 4.1 describes some general research on the value relevance of earnings and includes a brief review of the groundbreaking empirical research from the late 1960s. The coefficient describing the relationship between earnings and stock prices is, as outlined in section 3, referred to as the earnings response coefficient (ERC). Much research on the determinants of ERCs has been performed in the two last decades. A review of this research is included in section 4.2. Section 4.2 also shows that value relevance is not necessarily constant across all earnings levels. Several studies suggest that the return-earnings association is non-linear. Section 4.3 documents that various earnings components may have different levels of value relevance. In fact, a large amount of empirical research finds that the valuation of earnings differs across earnings items.

4.1. Earnings

Section 4.1.1 briefly reviews the classical studies of Ball and Brown [4] and Beaver [5]. Section 4.1.2 presents an overview of studies on the value relevance of bottom-line earnings. The section discusses why the association of stock returns with aggregate earnings is often weaker than one would expect based on a theoretical perspective.

4.1.1. The Breakthroughs

Ball and Brown’s [4] article is often viewed as the origin of modern CMBAR. This paper is an event study in which Ball and Brown look at abnormal returns in the months before and after earnings announcement dates. They conclude that income is an informative number, capturing half or more of all the information about an individual company that becomes available during a year. However, the annual income report is not a very timely medium, since most of its content (85%-90%) is captured before the earnings announcement date.¹² Ball and Brown [4] report that earnings announcements do not appear to cause any unusual jumps in stock prices. Still, the study suggests a certain under-reaction in stock price movements at the time of the announcement. This under-reaction creates a post-earnings announcement drift that appears to be most pronounced in cases of negative income surprises.

¹⁰ Piotroski’s [38] study suggests that it is possible to earn abnormal returns based on a simple strategy of investing in financially strong high book-to-market firms.

¹¹ Semi-strong form efficiency implies that all public information is calculated into a stock’s share price.

¹² The immediate response of stock prices to earnings announcements is a research issue that seems to never go out of fashion. For instance, Caylor, Lopez and Rees [42] study whether the value relevance of earnings is conditional on the *timing* of earnings information.

The conclusions of Ball and Brown [4] are supported in general by another foundational article in CMBAR. Beaver [5] concludes that the information content of income is significant. His evidence indicates a dramatic increase in the trade volume of stocks during the week of earnings announcements. In addition, the magnitude of the stock price changes during the week of announcements is much larger than the average during the non-report period. Both results suggest that earnings announcements lead to a change in the probability distribution of future returns for investors, and hence, the earnings report has information content.

4.1.2. Some Important Results from More Recent Research

The value relevance of earnings is typically studied by regressing the stock return on accounting earnings (4) or the abnormal stock return on unexpected earnings (5). The ERC measures the sensitivity of the stock price to earnings. However, specifications (4) and (5) are not equivalent. The first specification tests the general sensitivity of stock prices to the magnitude of reported earnings. The second specification focuses on the unexpected or unusual parts of stock price changes and earnings.¹³ The latter specification is inspired by the CAPM framework; the empirical counterpart of CAPM, the market model, is often used to estimate abnormal returns. Since unexpected earnings are non-observable variables in financial markets, one must use proxies for this figure. The yearly change in earnings is sometimes applied as a proxy for unexpected earnings. This is consistent with earnings following a random walk [21, 43, 44].

As shown in section 2, the theoretical background for this kind of empirical research is the valuation models from finance theory. The value of a company is assumed to be the present value of future dividends or cash flows. If one conducts a level regression using stock price changes as the dependent variable and earnings innovations as the right-side variable, one expects the ERC to equal $1+1/r$ if the earnings change is regarded as permanent and if one assumes that there is a one-to-one relationship between earnings innovations and net cash flow innovations. In this case, r is the company cost of capital. According to valuation theory, one permanent extra dollar in earnings should increase the value of the stock by one dollar (that is, the effect of an extra dollar this year) plus the present value of one dollar in all future years.¹⁴ For instance, if the company cost of capital is 10%, the ERC should theoretically equal 1.1. If, however, the earnings innovation is regarded as transitory, an ERC of 1 would be expected.

The size of the ERC has been subject to extensive research. Some researchers claim that earnings seem to be a worse predictor of returns than one would expect. This conclusion is drawn from the low empirical estimates of the ERC and low R^2 's generated from regressions of earnings on stock returns [45]. Many explanations for this phenomenon have been put forward in prior research. Although the list is

not exhaustive, these explanations include: low earnings persistence [21, 46], a lack of timeliness of earnings due to strict requirements regarding objectivity and verifiability of accounting numbers [28], conservative accounting [44, 47], misspecification of statistical models [20, 35, 48-50], inadequately short measurement intervals for returns and earnings [51], aggregation of earnings items [30, 52-55], and earnings management [56, 57].

Poor return-earnings associations and small ERCs due to a lack of earnings persistence is a matter investigated by Kormendi and Lipe [21]. They conclude that current earnings innovations contain information about future as well as current equity benefits. However, in accordance with other research, they do not find that stock returns are excessively sensitive to earnings innovations. A lack of timeliness for accounting numbers may also be an explanation for the low return-earnings association. Timeliness can be defined as the extent to which current period accounting income incorporates current period economic income [58]. To provide timely information for equity investors is not the sole purpose of accounting figures. For instance, most accounting standards have strict requirements regarding the objectivity and verifiability of accounting numbers. Collins, Kothari and Shanken [28] show that such objectives may reduce the timeliness of earnings and hence reduce the association between earnings and stock returns.

Easton, Harris and Ohlson [51] investigate the effects of data aggregation on the return-earnings association. They hypothesise that although a lack of timeliness may be the case in the short-run, the correlation between returns and earnings will increase if one looks at long-term data. Easton, Harris and Ohlson [51] find that if return intervals are expanded and earnings are aggregated over these longer time intervals, the return-earnings association improves dramatically. Hayn [49] states that the result of the accumulation can be attributed to losses being almost absent as earnings are aggregated over several years; see section 4.2.

The misspecification of statistical models is suggested as another one of the explanations for a poor return-earnings association. Beaver, McAnally and Stinson [50] claim that low ERCs are due to earnings and prices behaving as if they were both endogenously determined. They use a simultaneous equations approach to mitigate this bias and obtain sensitivity coefficients that are larger than those obtained from single equation approaches. Liu and Thomas [25] also maintain that low coefficients and disappointing explanatory power is a matter of model specification. Liu and Thomas [25] develop a multiple regression model in which further explanatory variables are included in the analysis in order to reflect information contained in forecast revisions and discount rate changes occurring during the year. Relative to simple regression models, the multiple regressions significantly improve explanatory power and increase the estimated ERCs. Easton and Harris [35] compare earnings and change in earnings as explanatory variables for stock returns. They first run single regressions for the two measures and then use both in a multivariate regression analysis. Each variable is significant in the single regressions. In their multivariate specification, the coefficient for earnings is significant in all of the 19 analysed years, while the coefficient for the change in earnings is significant in 8 of the 19 years. This result

¹³ One may argue that the concept of earnings response coefficient only should be used when raw stock returns and total earnings are studied. Even if the unexpected portion of either stock returns or earnings is equal to zero, there may still be a statistical association between stock returns and earnings. As such, the stock price is earnings sensitive, and the earnings response coefficient is larger than zero.

¹⁴ ERCs can also be compared with price-earnings ratios.

suggests that both earnings levels and earnings changes play a role in stock valuation. The Easton and Harris [35] framework has been extensively applied in recent value relevance research [59-61].

Marquardt and Wiedman [56] examine the effect of earnings management on value relevance. While the cash flow component of earnings generally is regarded as the objective portion of accounting earnings, the size of the accruals is to an extent the result of subjective judgements by accountants and managers. Thus, accruals can be potentially manipulated. Marquardt and Wiedman [56] examine the value relevance of earnings for a sample of firms for which there is reasonable *ex ante* expectations as well as *ex post* evidence of earnings management. Specifically, they investigate whether opportunistic earnings management impairs the value relevance of earnings for a sample of firms issuing secondary stock. Prior research has, according to Marquardt and Wiedman [56], identified this as a situation in which managers may have both the incentives and opportunity to manage earnings. This is particularly true when the managers themselves participate in secondary equity issues by selling shares of their own stock. Marquardt and Wiedman's [56] study supports their hypotheses. For the subset of firms in which managers sell their stock through a secondary offering (the MGMT-group), discretionary accruals are significantly positive in the year of the stock offering. In addition, discretionary accruals are significantly more positive in the year of the offering for this group than for firms with managers who did not participate in a secondary offering. When regressing market price on earnings, Marquardt and Wiedman [56] find a significant decrease in the estimated coefficient on net income and a decrease in R^2 during the year of the stock offering for the MGMT-group. They interpret this as evidence of a decrease in the value relevance of net income when earnings management is present.¹⁵ In general, the conclusions of Marquardt and Wiedman [56] are supported by Christensen, Hoyt and Paterson [57], who find that the greater are manager incentives for earnings management, the less informative are earnings announcements to investors. Note that incentives are important in this kind of research; the use of subjectivity in estimating accounting figures is not necessarily negative as far as value relevance is concerned. Discretionary accruals can help managers produce a more reliable and timelier measure of firm performance. In fact, this is known as the performance measure hypothesis [62]. Ben-Hsien and Da-Hsien [63] report that income smoothing may increase the value relevance of earnings. Earnings stability can be seen as one property of high-quality earnings.¹⁶

Some studies investigate differences in the value relevance of earnings across countries.^{17,18} For instance, Ball,

Kothari and Robin [58] investigate the value relevance of earnings in seven countries and find that common-law accounting earnings exhibit significantly greater timeliness than code-law accounting earnings, but this is due entirely to greater sensitivity to economic losses (that is, income conservatism). They characterise code law as accounting systems with high political influence and common law as systems in which accounting practices are determined primarily in the private sector. Using data from manufacturing firms in 16 countries, Ali and Lee-Seok [66] investigate relations between measures of value relevance and country-specific characteristics. They find that value relevance is lower in bank-oriented financial systems, i.e., in countries in which a few banks supply a substantial portion of the capital needs of businesses as well as in countries in which private sector bodies are not involved in the process of setting accounting standards. Ali and Lee-Seok [66] also document lower value relevance in countries characterised by a Continental accounting model¹⁹ as opposed to a British-American model and in countries in which tax rules influence accounting measurement. Alternatively, value relevance appears to be higher when more is spent on external auditing services. Mingyi [68] finds that a higher use of accrual accounting as opposed to cash flow accounting negatively impacts value relevance in countries with weak shareholder protections, whereas she finds no negative association between accrual accounting and value relevance when shareholder protections are high. Brown, He and Teitel [69] document that in countries with higher levels of accrual intensity, the value relevance of earnings is positively associated with accounting conservatism. Barth, Landsman and Lang [70] present evidence that use of International Accounting Standards (IAS) is associated with higher accounting quality.

4.2. Factors Influencing Earnings Response Coefficients

There are numerous papers describing the relationship between earnings and stock returns. Still, it is impossible to give a general answer as to how sensitive stock returns are to earnings or changes in earnings. This sensitivity, the ERC, is dependent upon many factors. At the end of this section, evidence will be presented that the ERC may in fact be a function of the *level* of earnings. However, early studies that analyse the determinants of ERCs typically disregard possible non-linearity in the return-earnings association. For instance, Collins and Kothari [43] study the inter-temporal and cross-sectional determinants of ERCs. They present evidence that ERCs are a function of riskless interest rates (i.e., an inter-temporal determinant) and the level of risk, growth and/or persistence of earnings (i.e., cross-sectional determinants). Firm cost of capital increases with the interest rate and the level of risk. Not surprisingly, Collins and Kothari [43] find that the risk-free interest rate and systematic risk are negatively correlated with the ERCs. The ERCs, however, vary positively with growth prospects and earnings

¹⁵ Marquardt and Wiedman [56] also find that book values play a greater role in equity valuation when earnings management impairs the value relevance of net income.

¹⁶ Earnings quality can be evaluated along the following earnings attributes [3]: accrual quality (the degree to which earnings map closely onto cash flow), persistence, predictability, smoothness, value relevance, timeliness, and conservatism.

¹⁷ International value relevance research does not necessarily have to focus on country-specific results and comparisons across countries. Osmundsen, Asche, Misund and Mohn [64] apply international data to investigate the value relevance of accounting data for a specific industry, the oil industry.

¹⁸ Lara, Osma and Noguer [65] document that international accounting studies may be influenced by the choice of database. They conclude that differences between databases exist and lead to differences in the results of even simple empirical studies that use key accounting variables.

¹⁹ The Continental model is characterised by higher statutory control, uniformity, conservatism, and uncertainty avoidance, while the British-American model has higher professionalism, flexibility, and transparency [67].

persistence [20, 21].²⁰ This result is in accordance with their hypothesis. It should be noted, however, that growth and persistence are to a certain extent related. Collins and Kothari [43] can therefore not disregard that the proxies used for these variables may reflect the effect of both variables. Collins and Kothari [43] also demonstrate that the return-earnings relation varies with firm size. They do, however, view size as a proxy for differences in information environments. Once these differences are controlled for, they find little evidence that price changes co-vary with earnings changes across firm size. The authors also emphasise that if size is correlated with risk, growth and persistence, this variable may erroneously turn up as a significant explanatory variable for the ERCs.

Easton and Zmijewski [19] present evidence that is consistent with Collins and Kothari [43]. Their cross-sectional study indicates that ERCs are positively associated with revision coefficients and negatively associated with expected rates of return. The revision coefficients measure the extent to which the information in earnings announcements results in revisions in expected earnings and is a measure of earnings persistence. Easton and Zmijewski [19] also find a weak but positive association between ERCs and firm size as well as a weak, negative association between ERCs and systematic risk. Moreover, Ahmed [22] document that ERCs can be related to competition within the firms' product markets. Biddle and Seow [72] perform cross-industry comparisons of ERCs. They claim that there are several advantages related to estimating ERCs by industry. First, industry membership naturally captures characteristic attributes for different industries. Second, within-industry estimation allows researchers to control for omitted variables that may differ considerably by industry. Biddle and Seow's [72] results confirm that ERCs differ substantially across industries. According to their study, the differences are related to industry entry barriers, product type, growth, financial leverage, and operating leverage. The ERCs seem negatively related to financial and operating leverage and positively related to industry entry barriers, product durability and growth.

Teets and Wasley [73] point out that if the hypothesis of equality for firm-specific ERCs is rejected, firm-specific estimation should be used instead of pooled estimation. This is also the case if there is correlation between firm-specific unexpected earnings variances and ERCs. In their empirical study, Teets and Wasley [73] find that the mean firm-specific ERC is 13 times larger than the corresponding coefficient estimated using a pooled cross-sectional regression. The difference is due to *both* variation in coefficients and unexpected earnings variances *and* a negative relation between firm-specific unexpected earnings variances and ERCs. Teets and Wasley [73] conclude that using a pooled estimation may lead to incorrect inferences about the magnitude of estimated coefficients and/or incorrect inferences

about differences in coefficient behaviour between groups of firms.

ERCs may also be incorrectly estimated if the functional form of the return-earnings association differs from what is assumed in the regression analyses. It has been common in the value relevance literature to assume that this relationship is linear. However, during the last couple of decades, a relatively large number of studies document that this is not necessarily the case [20, 44, 49]. These studies suggest that the ERC is actually a function of the earnings level. In other words, the return-earnings association can be non-linear. Non-linearity is often assumed to be caused by differences in earnings persistence, for instance, due to conservatism or the presence of an investor liquidation option.

As mentioned before, accounting numbers might lack timeliness due to requirements of objectivity and verifiability. This strict demand for objectivity and verifiability creates conservatism in accounting in general. Basu [44] interprets conservatism to result in earnings that reflect bad news more quickly than good news. This conservatism has consequences both for timeliness and the persistence of earnings. Basu [44] predicts and finds that negative earnings changes are less persistent than positive earnings changes. Consistent with this asymmetric persistence, he finds that ERCs are higher for positive earnings changes than for negative changes [74]. As for timeliness, bad news earnings are timelier than good news earnings, since accountants typically report the capitalised value of bad news as losses. Hayn [49] concludes that losses are less informative than earnings. She maintains that this is due to the liquidation option that investors have. Losses are not expected to perpetuate, and they are perceived by investors as temporary. Shareholders can always liquidate the firm rather than suffer from indefinite losses. Darrough and Ye [75] highlight the importance of "hidden assets" and intangibles for firms with losses. They show that companies with a high level of intangible asset intensity can sustain relatively long-term losses and remain in business for many years. In the case of losses, Joos and Plesko [76] find that investors separately value the R&D component as an asset and the non-R&D component as if it were a *transitory* loss. Dechow and Ge [46] show that earnings persistence is affected by the sign and magnitude of accruals. Consistent with Hayn's [49] finding, Dechow and Ge [49] report that the low earnings persistence of low accruals firms is primarily driven by special items.

In general, the non-linear association between stock returns and earnings is not necessarily the exclusive function of the sign of earnings. Freeman and Tse [20] support the idea of non-linearity and suggest a rather complex relationship between changes in earnings and returns. Their model rests on the assumption that the absolute value of unexpected earnings is negatively correlated with earnings persistence. Specifically, they suggest an S-shaped return-earnings relation, that is, convex for bad news and concave for good news. They obtain a substantially higher explanatory power for their non-linear model than for the traditional linear model. According to Elgers, Porter and Emily Xu [59], this non-linearity implies that a linear specification of the return-earnings relation imparts a downward bias to estimated earnings response coefficients.

²⁰ Frank [71] shows that value relevance is also a function of growth when explanatory power (R^2), rather than the response coefficients, is used as the measure of value relevance. Her conclusion is that the value relevance of accounting data is significantly higher for low-growth firms relative to high-growth firms, and she argues that the accounting data of high-growth firms seem to capture fewer value-relevant events compared to the accounting data of low-growth firms.

The non-linear relationship between returns and earnings is generally attributed to varying earnings persistence. Note that the ability of earnings (and cash flow) to forecast themselves is a popular research subject within CMBAR. Although market values or market returns are not necessarily studied in these papers, the papers can *indirectly* be regarded as being part of the value relevance literature. Since firm value is the present value of future cash flows or earnings, current cash flows and earnings should be regarded as value relevant if they are able to predict future values of cash flows and/or earnings. For example, Finger [77] “examines the value relevance of earnings by testing their ability to predict two future benefits of equity investment: earnings and cash flow from operations.” Several studies reviewed in this paper are in fact studies of the time series properties of accounting numbers, that is, studies that look at the predictive ability of cash flow and/or earnings [30, 46, 77-79].

4.3. Disaggregation of Earnings

The research presented so far generally assumes that all earnings components have identical associations with stock returns. A large amount of research shows that this is not necessarily the case. Section 4.3.1 discusses how value relevance may differ across earnings items. Section 4.3.2 investigates the value relevance of earnings relative to that of cash flow. Cash flow is a particularly interesting component of earnings. While the accrual component of earnings is a function of both accounting standards and the subjective judgement of management and accountants, cash flow is regarded as the objective component of earnings. Cash flows are also input data in many valuation models. Earnings can also be disaggregated into a normal component and an abnormal, or residual, component. The value relevance of residual earnings is analysed in section 4.3.3.

4.3.1. Detailed Earnings Items

When analysing the relationship of accounting earnings with stock prices or stock returns, one normally looks at net earnings, changes in net earnings or unexpected net earnings. Some researchers have, however, used more detailed data to describe this relationship. Ramakrishnan and Thomas [53] separate net income into permanent, transitory and price-irrelevant components of unexpected earnings. Their results suggest that different components of earnings have different valuation implications. Several other papers also suggest that extraordinary and special items are less value relevant than other earnings items [80, 81]. In response to the lacking value relevance of some GAAP earnings items, analysts have increasingly started to focus on “street” earnings numbers [82]. Street earnings are pro-forma earnings numbers that typically exclude special items and non-cash items.²¹ Using a UK sample, Choi, Lin, Walker and Young [84] state that non-GAAP earnings disclosures often conform precisely to sustainable earnings proxies derived by analysts and other sophisticated financial statement users. In general, if earnings components do not aggregate to a fully informative bottom-line number, then information from income statement line

items can help improve the accuracy of intrinsic value estimates [85].

Ohlson and Penman [52] acknowledge that the different line items of earnings may have different valuation implications. They run regressions using various components of earnings as explanatory variables. These components include gross margin, operating expenses, depreciation expenses, tax expenses, other income or expense items, and extraordinary or unusual line items. Ohlson and Penman [52] find that the disaggregation of income data increases the explanatory power of their regressions, and comparable results are reported by Carnes [86]. They also find that although the estimated coefficients of the various line items vary in the short-run, they have approximately the same magnitudes over long-term return intervals of 10 years. They state that their empirical evidence is remarkably consistent with the idea of economic equivalence in line items. In the short-run, however, the coefficients associated with the income components that are considered difficult to measure, particularly depreciation and tax expenses, are lower than the coefficients of less problematic components.

Recent research has also disaggregated income data into foreign and domestic income and investigated the value relevance of each measure. Thomas’s [55] empirical study indicates that investors understate the persistence of foreign earnings. He finds that foreign earnings have an unreasonably low ERC compared to domestic earnings. Contrary to Thomas [55], Bodnar and Weintrop [87] document that investors place a higher weight on foreign earnings than on domestic earnings when valuing companies. They explain their result partly by the higher growth opportunities in foreign markets. Hope and Kang [88] suggest that the results of Bodnar and Weintrop [87] may be due to a misspecification of their model. When excluding what Hope and Kang [88] call “other information,” the regression specification might suffer from an omitted variables problem. Note that “other information” is defined as relevant information other than current earnings in pricing securities. The bias from excluding “other information” has a greater effect on foreign earnings than on domestic earnings, as foreign earnings are no longer incrementally value relevant when controlling for “other information.” In a variance decomposition analysis, Callen, Hope and Segal [89] document that domestic earnings contribute significantly more to unexpected stock price variability than do foreign earnings.

4.3.2. Earnings Versus Cash Flows

The majority of value relevance research focuses on the value relevance of earnings and the determinants of ERCs. However, as the ultimate return of every investment is the cash flow generated by the investment, the value relevance of cash flows is often used as a benchmark for assessing the usefulness of accounting values for stock investors. According to the FASB [see, for instance, FASB’s Objective of Financial Reporting by Business Enterprises, 90], accounting accruals cause earnings to become more highly associated with future cash flow and company value than does current cash flow. This FASB assertion is frequently studied in value relevance research.

Earnings equal cash flow plus accruals. Rayburn [54] investigates the separate value relevance of cash flow and

²¹ There is no common definition of street earnings. In fact, Cornell and Landsman [83] report that none of the pro-forma earnings measures released by companies are specifically defined.

accruals. She finds both variables to be associated with stock returns. Still, her results indicate that only cash flow and changes in working capital have significant explanatory power. The coefficients of both depreciation and changes in deferred taxes are insignificant. This result is consistent with the notion that current accruals have information content, while long-term accruals do not. Barth, Cram and Nelson [30] report that accruals items are both significantly predictive of future cash flow and significantly related to stock returns [see also 79, 91]. This conclusion holds for both long-term and short-term accruals. Dechow [92] finds that earnings are more strongly associated with stock returns than is realised cash flow. This conclusion is supported by Subramanyam and Venkatachalam [41], who state that earnings dominate operating cash flows as a summary indicator for *ex post* intrinsic equity value.²² Still, Dechow [92] also finds that the capacity of realised cash flows to measure firm performance improves relative to earnings as the measurement interval is increased, a finding consistent with Rayburn's [54] results. Another important conclusion from Dechow's [92] article is that earnings are relatively more associated with stock returns for firms experiencing substantial changes in their working capital requirements and their investment and financing activities. Under such conditions, realised cash flow is less able to reflect firm performance due to severe timing and matching problems. The return-earnings association also increases with the length of firm operating cycles. Basu [44] extends Dechow's [92] study by showing that earnings are timelier than cash flows in reflecting bad news (see section 4.2). His results are consistent with the notion that conservatism is reflected in accruals rather than in cash flow. The result also indicates that accruals do not improve the timeliness with which good news is reported in earnings relative to cash flow. Bowen, Burgstahler and Daley [93] show that the persistence of earnings relative to cash flow is a matter of which cash flow measure is used; there are several alternatives. Livnat and Zarowin [94] present evidence that the disaggregation of financing and operating cash flows into their components significantly improves their degree of association with security returns.

In general, when comparing the explanatory power of different accounting measures, it is important to distinguish between incremental and relative information content. This distinction is illustrated well in an article by Biddle, Seow and Siegel [95], who offer the following definition:

“incremental comparisons ask whether one accounting measure provides information content beyond that provided by another, and apply when one measure is viewed as given and an assessment is desired regarding the incremental contribution of the other (e.g., a supplemental disclosure). Relative comparisons ask which measure has greater information content, and apply when making mutually exclusive choices among alternatives, or when rankings by information content is desired (e.g., when comparing alternative disclosures)” [95].

²² *Ex post* intrinsic equity value is the discounted value of dividends over a three-year horizon plus the discounted market value at the end of the forecast horizon (i.e., the terminal value).

Biddle, Seow and Siegel [95] perform an empirical study in which the information content of net income, net sales and cash flow is compared. Incremental information content tests indicate that in pair-wise comparisons, each measure provides incremental information content beyond each of the others. As for relative information content, their results suggest that net income provides significantly greater relative information content than net sales and cash flow, and net sales provide significantly greater relative information content than cash flow. Their results are supported by Francis, Schipper and Vincent [60], who find that earnings dominate EBITDA and CFO in explaining stock returns.²³ Xu and Cai [97] find that sales revenue outperformed earnings and cash flow for high-tech companies in the 1990s [98, 99]. Kim, Lim and Park [100] report that an earnings change that is supported by sales is generally valued by the market as more important than an earnings change due to other means. Callen and Segal [101] perform a variance decomposition analysis to test the value relevance of cash flow and accruals. Accrual earnings news and cash flow earnings news are found to drive firm-level stock returns equally.

In a much-cited study, Sloan [32] investigates the persistence of the cash flow and the accrual components of earnings. His results indicate that earnings performance attributable to the accrual component of earnings exhibits lower persistence than earnings performance attributable to the cash flow component of earnings. In fact, Konan Chan, Jagadeesh and Sougiannis [102] report that aggregate future earnings decrease by \$0.046 and \$0.096 in the next one and three years, respectively, for a \$1 increase in current accruals. Sloan [32] claims that this fact is not adequately appreciated by the average investor [compare 103, 104]. His study suggests that investors fail to distinguish fully between the different properties of the accrual and cash flow components of earnings.²⁴ As a result, firms with relatively high levels of accruals experience negative future abnormal stock returns. The opposite is true for firms with low accruals levels. Lev and Nissim [106] show that the so-called accrual anomaly documented by Sloan [32] still exists and that its magnitude has not decreased over time. Institutions shy away from firms with extreme accruals, because their attributes, such as small size, low profitability, and high risk, stand in stark contrast to those preferred by most institutions. Individual investors are generally unable to profit from trading on accruals information due to the high information and transaction costs associated with implementing a consistently profitable accruals strategy. When using country-level data, Pincus, Rajgopal and Venkatachalam [107] report that this anomaly is more likely to occur in countries having a common law tradition than in countries with a code law tradition. The accrual anomaly is also more likely to occur in countries that allow the extensive use of accrual accounting as well as in countries having a relatively low concentration of share ownership.

²³ In a study on multiples-based equity valuation, Liu, Nissim and Thomas [96] find that earnings multiples generally outperform operating cash flow multiples.

²⁴ In an earlier study, Wilson [105] presents evidence that for a given amount of earnings, the stock market reacts more favourably to earnings with larger cash flow components.

This section cannot be complete without quoting some important results from Hribar and Collins [108]. As has already been noted, the difference between cash flow and earnings is accruals. Accruals can be measured either as the change in balance sheet accounts or directly from the cash flow statement. Hribar and Collins [108] find that studies using a balance sheet approach are potentially contaminated by measurement errors in accruals estimates.²⁵ Accurate accruals data have been available from cash flow statements in the U.S. since 1988. Still, according to Hribar and Collins [108], some of the more recent CMBAR studies have chosen to use the indirect balance sheet approach. This choice of method may have affected the conclusions of some studies regarding the difference in value relevance between cash flow and earnings.

4.3.3. Residual Income

The works of Ohlson [11] and Feltham and Ohlson [9] triggered a vast amount of empirical research on the residual income model (see section 2). Since residual income cannot be observed either in the financial markets or in financial reports, it must be estimated by researchers. Using different estimates for residual income, several studies conclude that their measure is a value relevant number [39, 109-111].

Economic value added (EVA) is a concept closely related to residual income. EVA is Stern Steward & Co.'s trademarked variant of residual income. The basic ideas are the same as in the residual income model, but Stern Steward & Co. makes certain adjustments to accounting income and accounting equity before computing company value. Biddle, Bowen and Wallace [111]²⁶ compare the value relevance of earnings to that of residual income and EVA. Their relative information content tests reveal earnings to be more highly associated with returns than EVA and residual income. In addition, tests for incremental information content suggest that the EVA and residual income components add only marginally beyond earnings to information content. Biddle, Bowen and Wallace [111] conclude that there is little evidence to support the claim that EVA and residual income are superior measures to earnings in their association with stock returns or firm value. Note that Biddle, Bowen and Wallace [111] use current realisations, not future flows, for each performance measure. This can be one explanation for the seemingly poor value relevance of EVA and residual earnings: "equity valuation is ultimately the discounted present value of future equity cash flow (or dividends or residual income or EVA)" [111].

The conclusions of Biddle, Bowen and Wallace are in general supported by Chen and Dodd [109]. They compare the value relevance of operating income, residual income and EVA. They conclude that operating income regressions tend to show higher R^2 s than residual income regressions, which in turn have higher R^2 s than EVA regressions. Chen and Dodd [109] do, however, find that residual income measures contain significant incremental information that is not avail-

able in operating income measures. In a study using Greek data, Kyriazis and Anastassis [112] find that net and operating income appear to be more value relevant than EVA. Equivalent findings are reported by Tsuji [113] in a study using Japanese data. Bettman [114] uses an Australian sample to investigate the inclusion of technical factors in the Ohlson [11] model. She documents that the inclusion of both fundamental and technical factors within the valuation framework yields a model of greater explanatory power in comparison to models that only consider fundamental or technical measures in isolation.

5. THE VALUE RELEVANCE OF EQUITY AND OTHER STOCK MEASURES

This section reviews research on the value relevance of balance sheet measures. While much of the value relevance literature primarily focuses on flow measures, a large number of studies also show that the value relevance of stock measures. However, some of the balance sheet studies are rather specialised. Section 5.1 reviews some of the more general studies on the value relevance of balance sheet measures. Examples of the specialised research are presented in section 5.2.

5.1. General Value Relevance Research on Balance Sheet Measures

A vast amount of research papers document that book values of equity are highly associated with stock prices [52, 74, 110, 115-117]. The statistical association between stock prices and book equity is typically stronger than the association between stock returns and earnings. However, the value relevance of balance sheet measures is sensitive to the valuation principles applied to the various asset and debt components. Some empirical studies of balance sheet items compare the value relevance of historical cost estimates with that of fair value estimates. Several conclude that fair value estimates are more value relevant [118-120]. However, Khurana and Kim [119] also find that for small bank holding companies and companies with no analysts following, historical cost measures of loans and deposits are more informative than fair values. They conclude that their findings are consistent with the notion that fair value is generally less value-relevant when objective market-determined fair value measures are not available. Note that while fair value accounting may increase the value relevance of balance sheet measures, the value relevance of earnings might actually be depressed compared to historical cost estimates. This feature is attributed to a higher portion of unexpected earnings under fair value accounting, including, for instance, transitory gains and losses [40].²⁷ In a British study, Danbolt and Rees [122] conclude there is no obvious advantage to adopting fair value income accounting if fair value balance sheet values are available to the user.²⁸

Barth, Beaver and Landsman [116] study how value relevance of the balance sheet is related to financial health.

²⁵ The difference between the two methods is due to the fact that a portion of the changes in balance sheet working capital accounts relates to non-operating events, such as mergers and acquisitions, divestitures and foreign currency translations.

²⁶ Note that Biddle, Bowen and Wallace [111] provide a thorough description of the EVA model.

²⁷ Some analysts actually claim that fair value accounting is to some extent to blame for the current financial crisis [121].

²⁸ Using a sample of UK life insurers, Horton [123] finds that supplementary information regarding what she refers to as "realistic reporting" (i.e., fair value) appears to be value-relevant.

They find that the sensitivity of the equity book value to the equity market value increases as financial health decreases. The opposite is true for earnings; the incremental explanatory power of earnings is positively related to financial health. This means that as a firm's financial health deteriorates, the book value of equity becomes a relatively more important explanatory variable for stock prices than earnings. Barth, Beaver and Landsman [116] claim that the balance sheet's distinctive role is to provide information on liquidation values to facilitate loan decisions and monitor debt contracts. Liquidation values obviously become more relevant as the probability of default increases. Hence, it is not surprising that the balance sheet is more value relevant for distressed companies. The value relevance of book equity is also a function of differences relating to accounting measurement of intangible assets. One would expect that a high level of unrecognised intangible assets might lead to net income having a relatively higher explanatory power than equity book value and vice versa. Barth, Beaver and Landsman's [116] study confirms this hypothesis. Overall, Barth, Beaver and Landsman [116] conclude that their study provides support for the contention that the balance sheet and income statement fulfil different roles. In addition, their analysis shows that both equity book value and net income are priced. Barth, Beaver and Landsman [116] maintain that omitting one or the other potentially leads to model misspecification. Their conclusion is supported by Dechow, Hutton and Sloan [110], who also find that book values of equity convey additional information over earnings in explaining contemporaneous stock prices. Ayers [115] finds that firm assets and liabilities in general are value-relevant. In addition, he documents that net pension liability and other post-retirement liability amounts are significantly associated with the market value of equity. In Korea, Bae and Jeong [124] find that the value relevance of book value is significantly smaller if a firm's controlling power is heavily concentrated in an individual or a single family. Bae and Jeong [124] also report that cross-equity ownership negatively affects value relevance, while foreign equity ownership positively affects value relevance.

Ohlson and Penman [52] study the value relevance of disaggregated balance sheet data. They conclude that the disaggregation of book value into balance sheet components does not improve their model's explanatory power. Note that this result is in sharp contrast to the disaggregation of income data explained in section 4.3.1. Lev and Thiagarajan [125] identify a set of financial variables (or fundamentals) that are claimed by analysts to be useful in security valuation, and they examine these claims by estimating the incremental value relevance of these variables over earnings. Some of the variables are balance sheet items, and Lev and Thiagarajan [125] present empirical evidence that disproportionate increases in inventories and account receivables are negatively related to stock prices. Lev and Thiagarajan [125] argue that such increases can be seen as a negative signal to stock investors, since the increases suggest difficulties in selling a firm's products. Note also that the degree of conservatism in accounting in general affects the value relevance of balance sheet figures [47].

5.2. Examples of Specialised Research

A substantial portion of value relevance research is focused on earnings, cash flow and the coefficients of these flow measures. Research is often on a wide selection of firms, and it is common to pool data of different industries, company sizes, accounting standards, and so on into one large sample. As mentioned in the last section, much research on balance sheet measures is rather specialised. Some studies, for example, are from different industries. For instance, Petroni and Whalen [126] investigate property-liability insurers, Harris and Ohlson [127] study the oil and gas sector, and Barth [128] analyses banks. It is also popular to look at the value relevance of different accounting methods, including

- Purchase versus pooling accounting [129, 130].
- The equity method [131].
- Revaluation [132].
- Deferred tax liability [115, 133, 134].
- Capitalisation versus expensing of research and development costs [135, 136].
- Value relevance of asset write-downs [137, 138].
- Pension accounting [40, 139].
- LIFO inventory accounting [140].

Some of these articles are reviewed in section 7, which looks at the value relevance of different accounting standards. Note that the different methods for valuing balance sheet items also affect the income statement.

It is quite common to measure the combined value relevance of flow measures, for instance earnings, and balance sheet measures, for instance book value of equity; see specification (3). Barth, Beaver and Landsman [116] provide an excellent example of such a study. The next section demonstrates that this methodology can also be used in other settings.

6. VALUE RELEVANCE OVER TIME

During the last decades, most of the Western world has experienced a shift from industrialised economies to high-tech, service-oriented economies. The rate of change in these economies is higher than ever before. How are these changes affecting the value relevance of historical cost-based financial statements? This is a question that has been analysed by several researchers in recent years.

Collins, Maydew and Weiss [74] investigate the value relevance of earnings and book values of equity over time using the valuation framework provided by Ohlson [11]; see regression specification (3). R^2 is used as the primary metric of value relevance. The explanatory power of earnings and book values are decomposed into three elements: (1) the incremental explanatory power of earnings, (2) the incremental explanatory power of book values, and (3) the explanatory power common to both earnings and book values. Collins, Maydew and Weiss [74] conclude that while the

incremental value relevance of earnings has declined over the last 40 years, it has been replaced by an increased value relevance of book values. Overall, they conclude that the combined value relevance of earnings and book values has increased slightly in this period. This conclusion contrasts the seemingly popular view that the changes over the last decades must have made accounting measures *less* relevant. Collins, Maydew and Weiss [74] explain the shift in value relevance from earnings to book values by citing the increasing frequency and magnitude of one-time items, the increasing frequency of negative earnings, and changes in average firm size and the intensity of intangibles across time.

Francis and Schipper [15] report similar conclusions when using tests equivalent to the ones employed by Collins, Maydew and Weiss [74]. In contrast, Brown, Kin and Lys [36] find that value relevance as measured by R^2 declines significantly when controlling for scale effects (see section 3.2.2). They also present evidence that the increased R^2 reported in Collins, Maydew and Weiss [74] and Francis and Schipper [15] is largely attributable to the fact that the increase in scale effect has more than offset the decrease in explanatory power in the underlying relations. Francis and Schipper [15] do, however, perform one additional test that is fundamentally different. They use the total return that could be earned from foreknowledge of financial statement information as a measure of value relevance. Contrary to tests on explanatory power, this test controls both for scale increases and changes in the volatility of market returns over time. Francis and Schipper [15] point out that if the absolute amount of value relevant information in financial statements is constant over time, but the volatility of market returns is increasing for reasons that cannot be traced to information sources, the explanatory power tests will be biased towards the result that value relevance is decreasing over time. In fact, their study does suggest that the variability of market returns has been increasing over the sample period. Francis and Schipper [15] find that returns to perfect foresight trading strategies based on accounting earnings and book value of equity have decreased over their sample period. However, returns based on cash flow strategies have not changed significantly over time. Their overall conclusion is that their study provides mixed evidence as to whether value relevance has changed over the last decades. It should also be noted that Francis and Schipper [15] do not find support for the common belief that high-technology firms have experienced a greater decline in value relevance than low-technology firms.

The ambiguity of results within this line of research is apparent when looking at a study by Lev and Zarowin [141]. This study suggests that the value relevance of reported earnings, cash flow and book equity has deteriorated over the past 20 years. The decrease is less pronounced for cash flow than for earnings. Lev and Zarowin [141] maintain that the deterioration in value relevance of accounting numbers is due to *change*. They document that the rate of change experienced by U.S. companies has increased during the two last decades. It is argued that the increasing rate of change distorts the fundamental accounting measurement process of periodically matching costs with revenues. Specifically, Lev and Zarowin [141] state that it is in accounting for intangibles that the present system most seriously fails to reflect enterprise value and performance. For instance, restructuring

costs and R&D expenditures are immediately expensed, while the benefits from these intangibles are recorded later. They claim that the capitalisation of intangible assets should improve the value relevance of financial information. This conclusion is supported by Aboody and Lev [136]. Jorion, Shi and Zhang [142] also find that accounting information has lost value relevance over time. They partly attribute their findings to increased earnings management (see section 4.1.). Ely and Waymire [143] find little evidence that earnings relevance is higher following (1) the empowerment of the Committee on Accounting Procedure (CAP) as the first U.S. accounting standard-setting body in 1939 and (2) subsequent reorganisations of the standard-setting process leading to the creation of the Accounting Principles Board (APB) in 1959 and the Financial Accounting Standards Board (FASB) in 1973.

Francis and Schipper's [15] claim that increased volatility of market returns might result in statistical analyses that show a decrease in value relevance when this is not in fact the case is further investigated by Dontoh, Radakrishnan and Ronen [117]. Dontoh, Radakrishnan and Ronen [117] basically confirm Francis and Schipper's [15] claim, showing that when non-information-based trading activities increase, R^2 from a regression of stock prices on accounting information declines. This is explained by the injection of noise into stock prices due to non-information-based trading. Dontoh, Radakrishnan and Ronen [117] document that reported decreases in the association between stock prices and accounting information may be due, at least partly, to increased non-information-based trading activities. Interestingly, they find that this effect is particularly strong for highly intangible-intensive firms. According to Dontoh, Radakrishnan and Ronen [117], this result suggests that a possible decrease in R^2 for such firms is to a large extent attributable to non-information-based trading rather than to the inadequacy of accounting information.

In Australia, Brimble and Hodgson [144] conclude that the value relevance of core accounting earnings has not significantly declined over time; comparable results are also reported for Denmark [145]. Their empirical study controls for transitory items using non-linear regressions and adjusts for possible stock market inefficiencies [39].²⁹ They state that the nature of the relationship between earnings and stock prices has changed such that a linear model does not fully abstract the association, and so researchers must utilise non-linear models and adjust for potential market inefficiencies in their research design. Brimble and Hodgson [144] also find that book values do not have as high of an association with stock prices as do earnings. In fact, the relation between book values and stock prices is lower than in comparable studies that use U.S. data. Hellström [147] investigates the value relevance of accounting information in a transition economy. Her analyses are conducted on a sample from the Czech Republic from 1994-2001. She states that the objective of the study is to investigate the validity of the value relevance methodology by finding an accounting setting in which the results of value relevance tests might be predicted unambiguously; she argues that a transition economy such as the Czech Republic provides such an institutional and ac-

²⁹ Balkrishna, Coulton and Taylor [146] report that incidence of loss in Australia is particularly frequent.

counting setting. She finds that value relevance is lower in a transitional economy than in a well-developed market economy using Sweden as a benchmark, but value relevance increases over time as a result of transition progress. Hellström [147] concludes that as the results of the study confirm the predicted results, they thus provide evidence supporting the validity of the value relevance methodology.

This paper focuses mainly on what can be termed direct value relevance research, i.e., how accounting variables are associated with stock prices and stock returns. However, CMBAR studies have also devoted considerable attention on the ability of accounting measures to forecast future firm performance, as measured by future earnings or cash flow (see section 4.2). Since today's stock price is the present value of future cash flow or earnings, this line of research can be understood indirectly as value relevance research. Kim and Kross [148] use the methodology of Collins, Maydew and Weiss [74] to study how the ability of earnings to predict future cash flow has developed over time. They find that the relationship between current earnings and future operating cash flow has increased over time. Still, the same sample reports a decreasing contemporaneous association between stock prices and earnings. One possible explanation for this seemingly paradoxical finding is that the authors analyse cash flow only one year ahead, while stock prices undoubtedly are a function of all future company cash flows. Note also that their finding is consistent with market inefficiency explanations. Nevertheless, Kim and Kross [148] conclude that they are unable to reconcile the increasing ability of current earnings to predict future cash flow with the decreasing ability of current earnings and cash flow to explain prices.

7. THE VALUE RELEVANCE OF ALTERNATIVE ACCOUNTING METHODS

Different accounting standards in general have different informational value for stock investors. One possible accounting standard may produce significantly more timely accounting measures than another competing standard. Information on varying value relevance between accounting standards (or more generally, accounting methods) is useful to accounting standard setters across the globe, although timeliness is only one of several objectives of accounting. Section 5.2 showed some examples of value relevance research on different accounting standards. This section gives a more thorough overview on the subject. Section 7.1 presents some typical studies within this field of research. This section in particular emphasises the value relevance effects of altering accounting regimes. Section 7.2 discusses the accounting treatment of intangibles. Specifically, the question of whether capitalisation or expensing renders intangible assets more value relevant has been heavily investigated in recent years. Section 7.3 investigates the value relevance effects of increased disclosure, while section 7.4 focuses primarily on a paper by Holthausen and Watts [149]. Holthausen and Watts [149] initiate a serious academic discussion, as they criticise the value relevance research for having made only a limited contribution to actual accounting standards.

7.1. Some New Accounting Standards' Influence on Value Relevance

Ayers [115] performs a very typical study within value relevance research. His study is a comparison of the Statement of Financial Accounting Standards (SFAS) No. 109 Accounting for Income Taxes and Accounting Principles Board (APB) Opinion No. 11 Accounting for Income Taxes. He investigates whether the net deferred tax liabilities under SFAS No. 109 produces additional value relevant information over the disclosure required by APB No. 11. His evidence suggests that the former provides value relevant information above and beyond the latter. The changes induced by SFAS No. 109 include the separate recognition of deferred tax assets, the creation of valuation allowances for deferred tax assets, and the adjustment of deferred tax accounts for enacted tax rate changes. Ayers [115] finds that all three changes are associated with firm value. Another typical study on the value relevance differences of various accounting methods is performed by Hope [150]. He investigates the effects of introducing deferred tax accounting in Norway. He concludes that this change in the accounting legislation significantly increased the value relevance of earnings.

Several countries have adopted the International Accounting Standards (IAS) (denoted International Financial Reporting Standards from April 2001) over the last couple of decades. Barth, Landsman and Lang [70] examine whether the application of IAS is associated with higher accounting quality. They conclude that firms applying IAS exhibit less earnings smoothing, less managing of earnings towards a target, a more timely recognition of losses, and a higher association of accounting amounts with share prices and returns. Regarding value relevance, they document a significantly larger R^2 for IAS firms when running regressions of price on net income and equity book value. Their analyses are based on comparisons of accounting quality metrics for a broad sample of firms in 21 countries that adopted IAS between 1994 and 2003. From 2005 and onwards, European law has required that all companies listed on an European stock exchange prepare their consolidated financial statements based on International Financial Reporting Standards (IFRS). The value relevance effect of introducing IFRS in European countries is a popular research topic. For instance, Floros [151] finds that the introduction of IAS has a negative but insignificant effect on the volatility of the Greek stock market. Using a German sample, Hung and Subramanyam [152] find that book value and earnings are no more value relevant under IAS than under the German GAAP. However, Jermakowicz, Prather-Kinsey and Wulf [153] report increased value relevance of earnings after the adoption of the IFRS for the German DAX-30 companies, that is, the thirty German companies listed on the Deutsche Börse with the largest market capitalisation and turnover. In Finland, Niskanen, Kinnunen and Kasanen [154] report that the reconciliation of Finnish GAAP to IAS earnings does not provide significant value relevance.

7.2. Capitalisation or Expensing: The Case of Intangible Assets

The treatment of intangible assets is heavily debated among accountants. Several papers have looked at the value

relevance of alternative accounting methods. Lev and Sougiannis [135] analyse research and development costs. U.S. GAAP mandates full expensing of R&D in financial statements. Lev and Sougiannis [135] compute firm-specific R&D capital for a large number of public companies and adjust reported earnings and equity book values to reflect the capitalisation of R&D. They find that these adjustments are strongly associated with stock prices and returns and conclude that this suggests that R&D capitalisation yields value relevant information to investors. They also find that R&D capital is associated with subsequent stock returns and claim that R&D capital does not seem to be fully reflected in contemporaneous stock prices. According to Lev and Sougiannis [135], this result indicates either a systematic under-pricing of R&D-intensive firms or that the excess returns compensate for an extra market risk factor associated with R&D. The absence of a relation between R&D expenditures and its subsequent benefits was a major reason for the FASB's decision to require the full expensing of R&D outlays.³⁰ Lev and Sougiannis [135] maintain that this argument be questioned.

The conclusions of Lev and Sougiannis are [135] supported in general by Aboody and Lev [136]. They specifically look at the capitalisation of software development costs.³¹ Similarly to Lev and Sougiannis [135], Aboody and Lev [136] find that capitalised development costs are positively associated with stock returns. As for balance sheet measures, they find that the cumulative capitalised software costs are associated with stock prices. Aboody and Lev [136] conclude that capitalisation is value-relevant for investors. This conclusion is also supported by their finding that software capitalisation is associated with subsequent reported earnings. However, Callen and Morel [155] find weaker results than those reported by Lev and Sougiannis [135] and Aboody and Lev [136]. When running firm-specific rather than pooled regressions, they find that no more than 25% of companies exhibit significant associations between market values and R&D. Monahan [61] demonstrates that the conservative treatment of R&D affects the return-earnings relation only for firms that experience high growth in R&D during the return interval of interest.

Cazavan-Jeny and Jeanjean [156] also test the value relevance effect of different treatments of R&D expenditures. Their study is performed on a French sample, as the authors argue that the French context provides an interesting field for R&D value relevance studies, because both accounting treatments of R&D costs (i.e., expensing and capitalisation) are allowed in that country. They document that the firms choosing to capitalise R&D are smaller, more highly leveraged, less profitable and have fewer growth opportunities. In contrast to Aboody and Lev [136] and Lev and Sougiannis [135], Cazavan-Jeny and Jeanjean [156] find that capitalised R&D is negatively associated with stock prices and returns. In other words, investors react negatively to the capitalisation of R&D expenses.

7.3. The Influence of Disclosure

The effect of increased disclosure is investigated by Hope, Kang, Thomas and Vasvari [157]. SFAS No. 131 introduced rather extensive changes in the disclosure of information related to geographic business segments and, therefore, foreign earnings. Hope, Kang, Thomas and Vasvari [157] find strong support for the hypothesis that increased disclosure is positively related to the foreign earnings response coefficient. Their analysis shows that the foreign earnings response coefficient increases with (1) the introduction of SFAS No. 131, (2) an increase in the number of geographic segments disclosed, and (3) the inclusion of performance measures in geographic segments. In the previously-discussed article by Thomas [55], it is suggested that poor disclosure may have been one of the reasons why investors discounted the value of foreign earnings for U.S. multinationals. The results of Hope, Kang, Thomas and Vasvari [157] to a large extent support this view. Ettredge, Soo Young, Smith and Zarowin [158] also investigate the adoption of the SFAS No. 131 segment disclosure rules by firms and analyse possible changes in the stock market's ability to predict firm earnings. They find that single-segment firms that began disclosing multiple segments experienced an increase in their forward earnings response coefficient, i.e., the association between current-year returns and next-year earnings. Analogous to Hope, Kang, Thomas and Vasvari [157], Ettredge, Soo Young, Smith and Zarowin [158] conclude that SFAS No. 131 enhances available market information. Consistent with this assertion, Hossain [159] reports that the value relevance of quarterly foreign sales data increases after firms adopt SFAS 131. Barth, Beaver and Landsman [118] study the value relevance of the fair value disclosures of banks under SFAS No. 107 (see section 5.1). Their analysis suggests that disclosed fair value estimates under SFAS No. 107 provide significant explanatory power for bank stock prices beyond that provided by book values. Specifically, they document that differences between fair values and book values of securities, loans and long-term debt are value-relevant. However, fair values of deposits and off-balance sheet items do not seem significantly value-relevant.

Disclosure does not have to be mandatory in order to have value relevance effects. Lajili and Zeghal [160] examine the value relevance of the voluntary disclosure of labour costs. They find that the relationship between equity market values and labour cost disclosures is positive and significant. Lajili and Zeghal [160] suggest that investors view labour costs as a proxy for human capital investments and incorporate this information into their firm valuation processes. They conclude that this result might encourage further human capital disclosure in the future. In principle, the value relevance of several voluntary disclosures can be investigated. For instance, Chee Yeow and Mui-Siang [161] report that the disclosure of quantitative value-at-risk (VaR) is related to stock return. Lapointe-Antunes, Cormier, Magnan and Gay-Angers [162] claim that Switzerland's financial reporting system provides managers with extensive discretion in corporate disclosure, and there are important variations in the level of information provided in Swiss annual reports. Lapointe-Antunes, Cormier, Magnan and Gay-Angers [162] investigate how this flexibility affects earnings

³⁰ Value relevance was not the only reason that the expensing of R&D became required. These standards were also set in order to enhance the reliability and objectivity of estimates required for R&D capitalisation.

³¹ Note that software capitalisation is, according to SFAS No. 86, an exception to the full expensing rule of R&D. Software capitalisation pertains to the development component of R&D. SFAS No. 86 offers flexibility by allowing those who wish to expense this component to do so.

smoothing and the value relevance of earnings. They report that the use of discretionary accruals to smooth earnings is negatively related to voluntary disclosures by Swiss firms. They also find that investors put a significantly lower valuation weight on discretionary accruals reported by high-disclosing firms relative to low-disclosing firms, and they interpret this as evidence that investors are in a better position to detect discretionary accruals when a firm voluntarily discloses more information in its annual report. In Denmark, Banghøj and Plenborg [163] find that more voluntary disclosure does not improve the association between current returns and future earnings. These results contrast the study of Lapointe-Antunes, Cormier, Magnan and Gay-Angers [162], as Banghøj and Plenborg [163] suggest that investors might not be capable of incorporating voluntary information into their estimates of firm value.

Hassel, Nilsson and Nyquist [164] find that in the quarterly financial statements of Swedish listed companies, both the book value of equity and net income provide value-relevant information to investors. However, their main contribution is to prove that environmental performance (as measured by an index developed for Swedish institutional investors) has an incremental explanatory power. Hassel, Nilsson and Nyquist [164] state that the environmental performance variable is used as a proxy for other value-relevant information in valuation models. Nevertheless, the negative relationship between environmental performance and the market value of equity indicates that firms rated highly in terms of environmental performance are not, *ceteris paribus*, highly valued by investors. Hassel, Nilsson and Nyquist [164] suggest that the findings are due to the fact that high environmental performance is generally costly and thus has a negative impact on expected earnings and market values.

7.4. Contribution to Standard Setting

Holthausen and Watts [149] claim that the existing value relevance literature's general contribution to standard setting seems modest. Even though the literature is large, they claim that it does not seek to develop a descriptive theory of accounting and standard setting. They also state that even if the value relevance literature's tests effectively inform us about the role of accounting in providing inputs for equity valuation, those tests still ignore the other roles of accounting and other forces that determine accounting standards and practice. In response to Holthausen and Watts [149], Barth, Beaver and Landsman [6] maintain that value relevance research assesses how well accounting figures reflect information used by equity investors and provides insight into questions of interest to standard setters. They argue that since a primary focus of financial statements is equity investment, the relation between equity prices and returns is of great interest. Barth, Beaver and Landsman [6] conclude that other uses of financial statement information, such as contracting, do not diminish the importance of value relevance research.

Ball, Robin and Sadka [165] use international data to study whether financial reporting is shaped by equity markets or by debt markets. An analysis of 78,949 annual earnings observations from 22 countries supports the hypothesis that important properties of financial reporting originate in the reporting demands of debt markets rather than in equity markets. They claim that these results are inconsistent with

the basic premise of what they refer to as the value relevance school of accounting thought, according to which financial reporting exists primarily to inform equity markets. In contrast, the results are consistent with the hypothesis that the debt market exerts a substantial impact on accounting practices. The debt markets create a demand for financial reporting that scores highly on traditional metrics (i.e., explanatory power and ERCs). The findings are attributed to high demands for timeliness and conservatism in the debt market.

8. CONCLUDING REMARKS

One of the major goals of financial reporting is to assist stock investors in estimating company value. Value relevance research studies whether this goal is met by investigating statistical associations between market values of stocks and accounting information. This review has provided a comprehensive study of the empirical value relevance literature. Thus, it is now time to ask: is accounting information relevant for equity investors? The answer to this question is undoubtedly "yes." The accounting summary measures of value and value creation, that is, book value of equity and earnings, respectively, are generally associated with the economic measures of value and value creation, i.e., the market value of stocks and stock returns, respectively. In particular, book values appear to be highly associated with market values. Some argue that earnings, even if they are significantly related to stock returns, have a disappointingly low ability to explain variance in accounting earnings. Nevertheless, a large number of studies argue that the value relevance of earnings is systematically under-estimated when traditional regression specifications are employed. For instance, the misspecification of statistical models may lead to the "true" value relevance of earnings not being fully captured. Several studies propose that the return-earnings association is non-linear and that this non-linearity must be incorporated in regression specifications. Furthermore, there is much evidence suggesting that the valuation impact of various earnings components varies across these components. Disaggregation of bottom-line earnings often leads to substantial increases in value relevance.

Value relevance research has also devoted much attention to the development of value relevance over time. It is often argued that since today more firms heavily rely on intangible assets that generally cannot be recognised under existing accounting regimes, accounting information has become less relevant during the last decades. The decline in value relevance may also be reinforced by an ever-increasing pace of change in business in general, especially if accounting information is lagged. In the U.S., value relevance studies provide support for these views. There is rather undisputed evidence that the value relevance of earnings has decreased over the last decades. Some studies find that this decrease has been replaced to a certain extent by the increased relevance of book equity. Note that non-U.S. studies generally do not document decreases in the value relevance of either earnings or book equity.

A large body of value relevance literature focuses on the value relevance effects of varying accounting standards or more general accounting methods. A particularly up-and-coming subject within this research tradition is the investigation of differences in value relevance between fair value

accounting and historical cost accounting. Several studies suggest that the value relevance of the balance sheet improves when fair values are implemented. However, some studies also show that the value relevance of earnings actually go down if historical cost is abandoned. The value relevance literature has been able to illustrate to a small degree that from a value relevance perspective, the discussion of fair value versus historical cost may force standard setters to choose between the value relevance of *either* the balance sheet *or* the income statement. I expect this issue to be particularly important in future value relevance research. Value relevance research has also devoted much attention to the treatment of intangibles, which is an issue closely related to the fair value discussion. Most value relevance research suggests that increased capitalisation of intangibles will render financial reports more relevant to stock investors. However, this literature tends to ignore that other uses of financial reports, for instance, by creditors or the government, demand a large degree of objectivity and measurability for accounting numbers. I anticipate that future value relevance research will have to take into account the other roles of financial reporting when assessing the general usefulness of accounting information. Such an approach will increase the usefulness of this research from a standard setting perspective.

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