Risk Reporting Quality:
Implications of Academic Research for Financial Reporting Policy

Stephen G. Ryan
Stern School of Business, New York University
sryan@stern.nyu.edu

Prepared for the December 19-20, 2011 ICAEW Information for Better Markets Conference

December 8, 2011

I appreciate useful comments from Gauri Bhat, Leslie Hodder, Lisa Koonce, Jim Ohlson, and Dushyant Vyas.
Abstract

In this paper, I survey empirical research in accounting and finance over the past 15 years (since
my prior survey, Ryan 1997) on the relevance of firms’ financial report information for the
evaluation of their risk.  I assume higher risk-relevance indicates enhanced risk reporting
quality. Based on these research findings and assumption, I make four primary
recommendations for how financial reporting policymakers can improve risk reporting quality.
These recommendations pertain to both summary accounting numbers (which may be recognized
bottom-line amounts or analogous amounts calculated from required disclosures) and other
financial report disclosures.

First, policymakers should require firms to: (1) report income statements based on fair value or
similarly information-rich accounting measurement attributes and (2) provide income statement
presentations or disclosures that distinguish the components of income that are primarily driven
by variation in cash flows from those that are primarily driven by variation in costs of capital.
Such income statements would provide users of financial reports with the flexibility to calculate
alternative summary accounting numbers and thereby to perform different types of risk
assessment analyses that research has shown to be useful.  This recommendation reflects a
central theme of this paper: alternative summary accounting numbers play different but
fundamental roles in risk assessment.

Second, policymakers should attempt to maximize the ties of other financial report disclosures to
summary accounting numbers.  My primary specific recommendation in this vein is to require
firms to conduct back-tests of prior significant accrual estimates and to disclose the results of
those tests, indicating any observed trends in and identified drivers of revisions to those
estimates, and describing the effects of those revisions on current and if possible future summary
accounting numbers.

Third, policymakers should encourage and to the extent feasible require firms to aggregate and
present risk disclosures in tabular or other well-structured formats that promote the usability of
the information.  Identifying and propagating the use of existing best disclosure practices and
encouraging new best practices is the most natural way to do this.

Fourth, for model-dependent risk disclosures, policymakers should encourage and if feasible
require firms to disclose the primary historical and forward-looking attributes of the models and
their implementation in practice, sensitivity of the model outputs to common variants of those
attributes, and benchmarking of the models to standard portfolios of exposures.

Keywords: Risk, financial reporting, disclosure

JEL classification: G32, M41, M48
1. Introduction

I appreciate the ICAEW Information for Better Markets Conference 2011 organizers providing me with the opportunity to write this paper on the implications of academic research on risk assessment for how financial reporting policymakers can improve risk reporting quality. Almost 15 years ago, the AAA/FASB Financial Reporting Issues Conference organizers provided me with a similar opportunity (Ryan 1997). I summarize the primary conclusions of that paper in Section 2, most of which remain relevant today. However, theoretical and empirical research on the determinants of market, credit, liquidity, and information risks have become both broader and deeper over the intervening period, rendering that paper decidedly limited in the scope of its research coverage and policy implications. Three primary developments have enabled and motivated this recent research. First, financial reports now contain much more risk-relevant information, due in significant part to the expansion of fair value accounting and disclosures that either supplement that accounting when it is required or substitute for that accounting when it is not required.1 Second, market sources now provide much more data about the pricing of risk, due to the rapid expansion of markets to trade risk, particularly credit risk. Third, the still looming financial crisis has jumpstarted and moved to central prominence a preexisting stream of research on liquidity and information risks. In addition, my own thinking about risk reporting quality has evolved considerably over this period due to my teaching, research, and other activities, particularly those related to financial reporting for financial instruments by financial institutions.

In completing the task the ICAEW has set me, I face the nontrivial difficulty of meaningfully conveying the nature and implications for risk reporting quality of a large body of highly varied research within the confines of a paper of manageable length and complexity. In an attempt to do this, I begin with definitions of risk, risk reporting quality, and the risk-relevance of financial report information, distinctions pertaining to risk disclosures and risk assessment, and some drawing of boundaries for the scope of this paper, which is more selective and idiosyncratic in its research coverage than my prior paper. As I lay out these preliminaries, I also provide some general background about risk disclosures, a sense for my overall views about risk reporting quality, and my recommendations for how financial reporting policymakers can improve it.

I define risk as random variation in firms’ future economic performance and value given currently available information. I emphasize “variation” in this definition, because I view risk as a two-sided phenomenon, and the research I survey generally does as well. I acknowledge that individuals, policymakers, and academics (particularly those trained in psychology, e.g., Koonce et al. 2005) often are primarily concerned with downside risk. Separate risk disclosures could and in my opinion should be required for upside and downside risk when outcome distributions are sufficiently asymmetric. However, downside risk cannot

---

1 In addition, in a number of recent standards—for example, FAS 166, Statement of Financial Accounting Standards No. 166, Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities, June 2009, paragraph 16-A (ASC 860-20-50)—the FASB states disclosure requirements in terms of general objectives before requiring specific disclosures. I believe this is a good idea, although it remains to be seen how great an impact it will have on firms’ disclosures.
exist without upside risk unless the benchmark outcome against which risk is assessed is the maximum of the distribution of possible outcomes.

My definition of risk encompasses Frank Knight’s (1921) distinct notions of risk and uncertainty. The Knightian notion of risk pertains to cases in which decision-makers know all possible outcomes and their probabilities of occurrence, which allows for precise quantification of the extent of random variation. The Knightian notion of uncertainty (which others refer to as ambiguity) pertains to cases in which decision-makers have incomplete knowledge of either the set of possible outcomes or their probabilities of occurrence, which generally does not allow for such precise quantification. Most of the empirical literature that I discuss does not distinguish these two notions. Obviously, it is far more feasible for firms and researchers to construct models of Knightian risk than of Knightian uncertainty. For this reason, firms’ model-based risk disclosures, such as Value at Risk, correspond more closely to Knightian risk.

I emphasize “firms” in this definition, because it is essential to distinguish firms as portfolios of exposures from their individual exposures in assessing their risk. A firm’s exposures can be risky, but the firm need not be so to the extent that economic net gains on those exposures offset (i.e., covary negatively). This is most likely to be the case for financial institutions that engage in asset-liability management and other forms of economic hedging.

I define enhanced risk reporting quality as the provision of financial report information that better convey the economic drivers (e.g., exposures with market, credit, liquidity, or information risks) and/or the statistical properties (e.g., variances and relevant covariances) of the variation in firms’ future economic performance. The empirical research that I summarize generally documents what I refer to as risk-relevance, not risk reporting quality per se. This research deems a disclosure to be risk-relevant if it has explanatory power for measures of firms’ systematic/priced risk (e.g., beta, cost of capital, or valuation multiples), total risk (e.g., share return variance), or downside risk (e.g., probability of default and loss given default). This research typically assesses risk-relevance using linear regression models with many explanatory variables, so that a variable is risk-relevant only if it has incremental explanatory power beyond the other included variables. Consistent with the inferences made in this research, I assume that higher risk-relevance implies enhanced risk reporting quality.

While necessarily informing about the future, risk-relevant financial report information could be historical to the extent that the past helps predict the future. For example, banks could provide information about how their underwriting criteria, loan and borrower attributes, loan status, and macroeconomic conditions have predicted the level and dispersion of their loan losses in the past. To the extent that the past does not predict the future, however, then these disclosures would need to be more explicitly forward-looking, such as stress tests of loan losses to potential future downturns of real estate prices or other events.

2 To illustrate, assume a firm holds only two exposures, whose economic performance is denoted A and B, so that firm’s performance is A+B. The variance of the firm’s performance equals the variance of A plus the variance of B plus two times the covariance of A and B. Perfect offsetting occurs (i.e., the variance of the firms’ performance is zero) if the covariance of A and B equals minus the average of the variances of A and B.

3 For reasons of space, I do not attempt in this essay to evaluate individual research studies based on the specification of the regression models or the statistical power of the research designs. I personally prefer studies that more fully incorporate accounting structure and economic or decision-making context into their models and designs.
This distinction between historical and forward-looking risk disclosures is one of degree rather than nature. Moreover, the two types of disclosures generally are complementary, and specific disclosures may have both historical and forward-looking aspects. For example, firms could supplement historically derived accrual estimates of future losses with disclosures of the results of back-tests of those estimates—e.g., analyses of how predictive firms’ accrual estimates in periods prior to the current balance sheet date turned out to be given subsequently available information—in order to provide a sense for how well their accrual estimates likely will predict beyond the current balance sheet date. Similarly, forward-looking disclosures can be informed by historical experience. For example, stress tests usually involve potential future events that at least are somewhat analogous to events that have occurred in the past.

I distinguish risk assessment based on summary accounting numbers (which may be recognized bottom-line amounts or analogous amounts calculated from required disclosures, such as disclosures of the fair values of financial instruments under FAS 107) from risk assessment based on other financial report disclosures (e.g., specific accrual estimates and market risk disclosures). I distinguish summary accounting numbers from other financial report information primarily because it is a convenient way to discuss the research literature. It also corresponds imperfectly to the distinction between recognized and disclosed information. Schipper (2007) discusses the differential reliability of and salience to users of financial reports of these two types of financial report information.4

Risk assessment based on summary accounting numbers may use these amounts either in isolation (e.g., earnings variance or book return on equity) or in combination with market numbers (e.g., market-to-book and price-to-earnings ratios). Summary accounting numbers and other financial report disclosures have distinct attributes that make them amenable to different sorts of risk assessment analyses. Although more limited in the range of information that they can convey, summary accounting numbers typically enable simpler and less context-dependent analyses for at least two reasons. First, summary accounting flow measures such as earnings and operating cash flows inform about historical performance without much influence from changes in their costs of capital,5 because of the predominant use of the historical cost measurement basis to measure earnings and the use of the cash basis to measure operating cash flow. Second, summary accounting numbers such as earnings and book value of equity tend to be far more comparable across firms, time, and economic contexts than are other disclosures, because of the standardizing effects of accounting rules and the normalizing effects of competition on profitability.

For these reasons, summary accounting numbers play fundamental roles in risk assessment, an often unappreciated point that I emphasize in Ryan (1997) and again in this paper, as do other authors elsewhere.6 I describe two recent empirical literatures that

---


5 For simplicity, throughout the paper I use the term “cost of capital” to refer to any discount rate (e.g., for any financial instrument held by the firm), not just the discount rates for the firm’s debt or equity capital.

6 See, for example, Penman (2010) and Pope (2010).
individually demonstrate this point, but that collectively have conflicting implications about whether these accounting numbers should incorporate unexpected changes in costs of capital.

First, finance researchers increasingly employ summary accounting numbers rather than share returns in the assessment of firms’ systematic/priced risk. For example, Cohen et al. (2009) and Nekrasov and Shroff (2009) estimate a firm’s “cash flow beta” as the correlation of its (abnormal) book return on equity with the (abnormal) book return on equity for the market. Cohen et al. provide evidence that cash flow betas are better measures of firms’ systematic risk than are standard betas estimated using high frequency firm and market share returns. Apparently for this reason, they find that cash flow betas explain a sizeable portion of the long-standing book-to-market ratio anomaly (Fama and French 1992). Cohen et al. claim that this predictive ability results from cash flow betas being less influenced by transitory changes in the cost of equity capital and security market imperfections than are betas. They further claim that cash flow betas inherently are of greater interest to long-term investors—presumably the class of investors of most concern to financial reporting policymakers—because “[a]s the holding period increases, news about cash flows begins to dominate the second moments (covariances and variances) of returns. As a consequence, the risk in a company’s cash flows is really what matters to an investor with a buy-and-hold perspective.” That is, Cohen et al. interpret their results as showing that accounting numbers are risk-relevant because they do not reflect costs of capital and thus better correspond to the decision-making horizon of long-term investors.

Second, Hodder et al. (2006) show that banks’ fair value gains and losses on financial instruments are risk-relevant beyond reported net income, most strongly so for interest rate risk. Fair value gains and losses reflect both unexpected changes in cash flows and unexpected changes in the costs of capital for the corresponding instruments during the period. Hence, in apparent tension with the findings of Cohen et al. (2009), Hodder et al.’s findings suggest that accounting numbers that reflect changes in costs of capital are risk-relevant.

My belief is that this tension is only apparent, and that unexpected changes in cash flows and unexpected changes in costs of capital are both risk-relevant, just not in the same ways and/or for the same types of risk assessment analyses. Consistent with belief, in my opinion it is not particularly useful for financial reporting policymakers to try to identify the accounting measurement attributes that yield “the best” measurements of net income and other summary accounting numbers, a one-size-suits-all approach. Instead, they should require firms to report informationally rich income statements that: (1) use fair value or similarly information-rich accounting measurement attributes that reflect unexpected changes in both cash flows and costs of capital and (2) provide income statement presentations or disclosures that distinguish the components of income that are primarily driven by variation in cash flows from those that are primarily driven by variation in costs of capital. Such income statements would provide users of financial reports with the flexibility to calculate alternative summary accounting numbers and

---

7 From accountants’ perspective, the term “cash flow beta” is unfortunate, as its estimation involves accrual accounting numbers. A more accurate term would be “accounting beta”; in fact, this term is used in the empirical literature summarized in Ryan (1997) and Section 2. Despite this, I use the former term in conformance with the usage in the recent literature.
thereby to perform different types of risk assessment analyses. The recent push back against fair value accounting and deactivation (and perhaps demise) of the joint FASB/IASB project on financial statement presentation both work in opposition to this recommendation.

I do not mean to suggest by the above discussion that other financial report disclosures are unimportant for risk assessment. To the contrary, these disclosures are essential forward-looking complements to primarily historical accounting numbers. However, these disclosures currently are required by financial reporting policymakers and presented by firms in increasingly lengthy and poorly integrated financial reports. This makes it difficult for users of financial reports to identify the risk-relevance of the disclosures, at least prior to the occurrence of specific events that focus users’ risk assessment analyses on well-defined subsets of the disclosures. This difficulty may help explain why the empirical research surveyed in this paper collectively provides weak and inconsistent evidence that these disclosures are risk-relevant.

For this reason, I believe it is less important for policymakers to require new risk disclosures in financial reports and more important for them to impose structure on and increase the comparability of existing disclosures. I recommend that policymakers do so in three primary ways. First, they should attempt to maximize the ties of other financial report disclosures with summary accounting numbers. My primary specific recommendation in this vein is to require firms to conduct back-tests of prior significant accrual estimates and to disclose the results of those tests, indicating any observed trends in and identified drivers of revisions to those estimates, and describing the effects of those revisions on current and if possible future summary accounting numbers. Second, policymakers should encourage and to the extent feasible require firms to aggregate and present risk disclosures in tabular or other well-structured formats that promote the usability of the information. Identifying and propagating the use of existing best disclosure practices and encouraging new best practices is the most natural way to do this. Third, for model-dependent risk disclosures, policymakers should encourage and if feasible require disclosures of the primary historical and forward-looking attributes of the models and their implementation in practice, sensitivity of the model outputs to common variants of those attributes, and benchmarking of the models to standard portfolios of exposures.

I limit the scope of this paper in the following five respects. First, after a brief summary of the primary conclusions in Ryan (1997), I do not repeat the summary of risk research in accounting and finance up to the mid-1990s in that paper. I emphasize, however, that the results of that research should be understood by anyone interested in improving risk reporting quality.

---

8 I do not dispute that more and less risk-relevant financial reporting policies exist in specific economic or decision-making contexts. For example, long-standing literatures in accounting argue and provide evidence that: (1) the conservative deferral of revenue and gains is a prudent response to uncertainty about the realization of income (e.g., Penman 2011) and (2) that conservative accounting is associated with lower bankruptcy risk (e.g., Biddle et al. 2011). My point is that a policy that yields highly risk-relevant financial report information in one context may not in another. For example, Penman explains that conservatism can yield earnings growth that is “not to be paid for,” i.e., that should not increase earnings multiples.

9 I direct the reader to the October 2011 ICAEW Financial Reporting Faculty report for a broader ranging discussion of the issues related to risk reporting quality.
Second, I limit my discussion of recent research on the risk-relevance of summary accounting numbers to one paper examining implied costs of capital, two papers examining cash flow betas, and three papers examining fair value accounting. I believe the reader is better served by a solid understanding of these papers than by a casual acquaintance with a laundry list of the results of many studies.

Third, my discussion of the risk-relevance of other financial report disclosures is mostly limited to financial instruments and/or financial institutions, my area of expertise. Naturally, nonfinancial firms have meaningful risks that can and should be disclosed in financial reports. In addition, while I discuss quite a number of these studies, I do not try to be comprehensive in my research coverage, but rather focus on the papers with relatively direct implications for risk reporting quality.

Fourth, I limit my discussion to information that financial reporting policymakers naturally would require, with some degree of specificity, firms to disclose in footnotes to their financial reports. I do not discuss disclosures that, while nominally required, allow firms to substantial control over their content, such as lists of risk factors in the front end of financial reports, or that firms naturally would provided through timelier, less structured, and typically more voluntary information channels outside of financial reports. Indeed, I try my best not to wade into the swampish issue of when disclosures should be mandated versus voluntarily provided, given that firms have incentives to disclose information voluntarily when it reduces their costs of capital. I acknowledge, however, that my recommendation for financial reporting policymakers to impose structure and comparability on financial report disclosures betrays my belief that is some disclosure requirements are necessary for this to occur.

Fifth, I do not discuss cost-benefit trade-offs that are outside my comparative advantage to evaluate. I do believe the recommendations I make in this paper are not excessively costly, however.

The remainder of this paper is organized as follows. Section 2 summarizes the primary conclusions in Ryan (1997). Sections 3 and 4 address the risk-relevance of summary accounting numbers. Section 3 describes the recent literature that examines the risk-relevance of implied costs of capital and cash flow betas derived from summary accounting numbers. Section 4 describes the recent literature that examines the risk-relevance of reported or calculated (from disclosures) fair value gains and losses. Sections 5 and 6 address the risk-relevance of other financial report information. Section 5 defines the five major types of risk I consider—market, credit, information, liquidity, and estimation—and overviews existing disclosure requirements for these risks. Section 6 summarizes empirical research examining the risk-relevance of these disclosures. Section 7 contains my recommendations for how financial reporting policymakers can try to improve risk reporting quality. Section 8 concludes.

---

10 See Campbell et al. (2011) and Kravat and Muslu (2011) for evidence that firms that provide longer lists or expanded discussion of risk factors in financial reports exhibit higher risk as proxied by return variance, beta, and bid-ask spread.

11 See Beyer et al. (2010) for a recent survey of research on voluntary disclosures.
2. **Brief Summary of Ryan (1997)**

In this prior paper, I summarize theoretical and related empirical research in accounting and financing on equity risk up to about the mid-1990s. The theoretical research (e.g., Hamada 1972, Lev 1974, and Mandelker and Rhee 1984) generally assumes perfect markets. It focuses on the individual and joint effects of three broad risk components—operating risk (i.e., contribution margin variance), operating leverage (i.e., fixed operating costs, which increases contribution margin variance due to the trade-off between fixed and variable costs), and financial leverage (i.e., fixed financing costs)—on two measures of the firms’ equity risk—beta (systematic risk) and share return variance (total risk). Under simplifying assumptions, systematic and total equity risk can be mathematically represented as systematic and total operating risk, respectively, times one plus operating leverage times one plus financial leverage. Hence, the equity risk measures increase if any one of their three risk components increases holding the other two components constant.

Motivated by this theoretical research, the empirical research provides the following primary results:

- Firms’ reported earnings variance is the primary accounting predictor of both measures of firms’ equity risk (e.g., Beaver, Kettler, and Scholes 1970 and Rosenberg and McKibben 1973). This finding is somewhat surprising for systematic equity risk, because the covariance of firm earnings with market earnings (then called “accounting beta”, now called “cash flow beta”) is in theory more analogous to systematic risk than is earnings variance.12

- Market participants incorporate estimates of firms’
  - off-balance sheet financing (e.g., Bowman 1980a, Dhaliwal 1986, and Imhoff et al. 1993),
  - risk-concentrated positions such as derivatives (e.g., McAnally 1996), and
  - market value of equity (e.g., Bowman 1980b)

into their estimates of firms’ financial leverage.

- Firms’ equity risk rises with each of their operating risk, operating leverage, and financial leverage, controlling for the other components (Lev 1974, Bowman 1980a,b, Mandelker and Rhee 1984, and Dhaliwal 1986). However, firms choose their financial leverage to yield an appropriate level of overall risk given their operating risk and operating leverage, so this control is necessary to observe these positive relationships. In particular, financial leverage has little relationship with equity risk without such control.

---

12 It is unclear to me whether this finding would remain if researchers used more recent data and approaches to estimate accounting beta. As discussed in Section 3, Cohen et al. (2009) find that cash flow beta has strong predictive power for standard betas, although they do not run a horse race of cash flow beta against earnings variance.
In this prior paper, I propose two primary ways that financial reporting policymakers could improve the risk-relevance of financial report information. First, policymakers could require firms to provide better information about their \textit{ex post} realizations of risk. I cite the example of disclosures required for property casualty insurers in the United States to report revisions of their loss reserves for each of the prior nine years of insurance coverage written for each fiscal year up to the current year (so-called “loss reserve triangles”). Insurance analysts examine these disclosures carefully for their risk implications and also for evidence of discretionary management of loss reserves. Policymakers could easily require similar disclosures for other types of firms’ significant accrual estimates, such as banks’ allowances for loan losses. For almost all accrual estimates, users of financial reports currently cannot distinguish revisions of the accrual estimates for preexisting exposures from the initial accrual estimates for newly assumed exposures. The proposed disclosures would convey the economic and estimation risks of accrual estimates to users of financial reports in a simple and useful fashion. My recommendation in the current paper that financial reporting policymakers should require firms to conduct and disclose the results of back-tests of their accrual estimates effectively extends this prior recommendation.

Second, policymakers could revise aspects of accounting that blur the three broad components of equity risk described above. The primary example I cited is absorption costing, which obscures operating risk by combining fixed and variable costs in the unit product costs used to estimate cost of goods sold. The FASB mitigated this issue somewhat with the issuance of FAS 151 (ASC 330-10-30),\(^\text{13}\) which constrains firms’ absorption of fixed production costs into unit product costs to reflect the range of normal capacity.\(^\text{14}\) Obviously, many other income statement line items, such as selling, general, and administrative expenses, combine fixed and variable costs. My recommendation in the current paper for financial reporting policymakers to distinguish components of income that are primarily driven by variation in cash flows from those that are primarily driven by variation in costs of capital is in a similar vein as this prior recommendation.

3. **Recent Research on the Risk-Relevance of Implied Costs of Capital and Cash Flow Betas**

The research on cash flow betas discussed in this section extends earlier research on accounting predictors of firms’ equity risk described in Section 2 to incorporate structure from formal accounting-based valuation models.\(^\text{15}\) While various models have been used for this

---

\(^{13}\) Statement of Financial Accounting Standards No. 151, \textit{Inventory Costs—an amendment of ARB No. 43, Chapter 4}, November 2004.

\(^{14}\) As a certifiable accounting dinosaur, I refer to U.S. GAAP standards that predate the Accounting Standards Codification (ASC) by their original type of standard and number designation, as with FAS 151 here. I indicate the relevant portion of the ASC the first time I refer to a standard.

\(^{15}\) On the other hand, the research on cash flow betas deemphasizes the distinctions among operating risk, operating leverage, and financial leverage made in the earlier research, although some accounting-based valuations models distinguish net operating assets (which are associated with operating risk and operating leverage) from net financial liabilities (which is associated with financial leverage). To the best of my knowledge, no extant accounting-based valuation models distinguish operating risk from operating leverage.
purpose, I limit my discussion to the simplest and most widely used model, referred to as the residual (or abnormal) income model ("RIM"). Although its initial development occurred no later than 1888, RIM had been little appreciated and rarely used until rigorously reframed in setting of uncertainty by James Ohlson in an influential series of sole and coauthored theoretical papers (e.g., Ohlson 1995 and Feltham and Ohlson 1995, 1999). As discussed below, RIM has provided the basis for two distinct risk-assessment literatures: (1) papers estimating and using implied costs of equity capital and (2) papers estimating and using cash flow betas. Both literatures focus on explaining firms’ future long-horizon share returns, which in efficient markets should on average reflect the firms’ costs of equity capital.

It is necessary for me to first explain RIM in order to convey an adequate understanding of these papers. RIM recasts the standard discounted dividends valuation model used in finance in terms of summary accounting numbers. It does so using the “clean surplus relation,” which specifies that dividends net of equity issuance and redemption in a period equal net income minus the change in book value of equity in the period. For this reason, some academics have criticized RIM as not a theoretical advance, because it derives algebraically from the assumptions of dividend discounting and the clean surplus relation. However, RIM is practically useful because it substitutes accounting numbers for dividends—the latter being zero for the foreseeable future for many firms—and thereby yields considerably more accurate valuations over the short-to-medium horizons typically used in valuation analyses (Penman and Sougiannis 1998). This usefulness is evident from the highly economically meaningful results in the risk assessment literatures described below.

The implied cost of capital ("ICOC") literature employs a simple version of RIM with a constant periodic cost of equity capital, while the cash flow beta ("CFB") literature uses a more sophisticated version of RIM with a stochastic cost of equity capital. I describe both versions below, using the following common notation. \( MVE_t \) denotes market value of equity at the end of period \( t \), \( BVE_t \) denotes book value of equity at the end of period \( t \), and \( NI_t \) denotes net income during period \( t \).

In the simple version of RIM used in the ICOC literature, \( r \) denotes the assumed intertemporally constant periodic cost of equity capital. Abnormal income in period \( t \), denoted \( NI_t^a \), is defined as net income in period \( t \) minus the product of the cost of equity capital and the book value of equity at the end of period \( t-1 \), i.e., \( NI_t^a = NI_t - r BVE_{t-1} \). Using this assumption and notation, this version of RIM is:

---

16 See Preinreich (1941), footnote 14.
17 In addition, RIM has been used to develop trading strategies based on the difference between modeled (based on accounting numbers) and observed market values of equity. The risk-assessment and trading strategy literatures appear to largely explain the same phenomena; in particular, the results of Cohen et al. (2009) and Nekrasov and Shroff (2009) strongly suggest that the estimated abnormal returns generated by the RIM-derived trading strategies can be significantly explained by RIM-derived cash flow betas.
18 RIM may also be derived from the discounted free cash flow valuation model using both the clean surplus relation and the cash conservation relation (i.e., free cash flow equals operating cash flow minus each of capital expenditures, cash dividends, and principal and interest payments to debtholders).
19 See Ohlson (1995) for the derivation of this version of RIM.
Intuitively, RIM-ICOC decomposes $MVE_t$ into two parts: $BVE_t$, which reflects the portion of $MVE_t$ that is currently recognized on the balance sheet, and discounted abnormal income, which reflects the portion of $MVE_t$ that is not yet recognized on the balance sheet (but on average will be recognized as the firm earns income in the future).

To employ RIM-ICOC to estimate firms’ ICOCs, researchers must:

- obtain or generate forecasts of firms’ future abnormal income over some horizon,
- estimate the terminal value at the end of the horizon (which involves specifying the growth path for abnormal income beyond the horizon), and
- impute the ICOC as the internal rate of return that equates the currently unrecognized portion of $MVE_t$, i.e., $MVE_t – BVE_t$, to the present value of expected future abnormal income.

To forecast future abnormal income, researchers typically use analyst earnings forecasts, although sometimes they employ statistical models of the time-series of income. Researchers employ various approaches to specify the terminal value, as described in Lee et al. (2011).

Lee et al. (2011) run a horse race in which they use alternative ICOC estimates to predict firms’ future realized share returns, which Lee et al. assume on average reflect firms’ equity costs of capital, albeit noisily. This horse race effectively summarizes the results of the now large ICOC literature. It demonstrates convincingly that ICOC estimates using any method of implementing RIM handily outperform standard finance approaches to estimating the cost of equity capital (i.e., the capital asset pricing model and two multi-factor models attributed to Fama and French). It also demonstrates that the performance of ICOC estimates varies somewhat depending on the growth assumptions used to estimate the terminal value.

These results suggest that financial report information that better enables users of financial reports to forecast future abnormal net income, including the terminal value, should enable more accurate estimation of firms’ ICOCs. While it might seem that requiring accounting approaches that smooth abnormal net income up to the horizon would do this, in fact, such approaches would tend to shove economic variance into the relatively hard to specify and growth-rate-sensitive terminal value. Instead, ICOC estimation likely would become more

---

20 Easton (2007) provides a comprehensive discussion of the conceptual and practical issues involved in ICOC estimation. In particular, he discusses the fundamental issue of the dependence of estimated ICOCs on assumed growth rates.

21 Admittedly, this is a rather low bar for success given the dismal performance of standard finance approaches to estimating the cost of equity capital to date.
accurate if the terminal value becomes smaller or more specifiable in terms of simple growth paths.

How financial reporting policymakers could enhance ICOC estimation through improved accounting or disclosure raises difficult issues worthy of future research. For example, perfect fair value accounting for all of the firm’s exposures, if it were possible, would make each element of its expected stream of future abnormal income, including the terminal value, equal to zero. While this might be desirable from a valuation perspective, it would make ICOC estimation using RIM impossible. I recommend that financial reporting policymakers consider whether it is possible to improve the forecasting of firms’ future abnormal income and thus ICOC estimation through alternative accounting measurement bases, financial statement line item classifications, and other disclosures in financial reports. I recommend they start by requiring informationally rich income statements of the sort described in the introduction.

Feltham and Ohlson (1999) and Nekrasov and Shroff (NS, 2009) derive a more sophisticated formulation of RIM that allows for stochastic costs of equity capital that are reflected in an adjustment to the numerator of a present value calculation that uses risk-free interest rates. Rubenstein (1976) shows that risk adjustment in the numerator is the conceptually more general approach. In this formulation of RIM, \( r_{t+s}^f \) denotes the (multi-period, for \( s > 1 \)) risk-free rate from the end of period \( t \) to the end of period \( t+s \). Abnormal income in period \( t \) is defined as net income in period \( t \) minus the product of the risk-free rate for period \( t \) and the book value of equity at the end of period \( t-1 \), i.e., \( NI_t^a = NI_t - r_{t-1}^f BVE_{t-1} \). \( m_{t+t+s} \) denotes the stochastic market discount factor from the end of period \( t \) to the end of period \( t+s \). The covariances of \( m_{t+t+s} \) with a firm’s \( NI_{t+s}^a \), \( 1 \leq s < \infty \), determine the firm’s systematic risk, with (more) negative covariances indicating greater systematic risk.

Using this notation, NS express RIM as

\[
MVE_t = BVE_t + \sum_{s=1}^{\infty} \frac{E\left\{ NI_{t+s}^a \right\}}{1 + r_{t+s}^f} + \sum_{s=1}^{\infty} \text{cov}_t \left( m_{t+t+s}, NI_{t+s}^a \right). \tag{RIM-CFB}
\]

RIM-CFB expresses \( MVE_t \) as equal to \( BVE_t \) plus the present value of the future stream of abnormal income discounted at the relevant risk-free rates, plus a systematic risk adjustment.

---

22 The market discount factor \( m_{t+t+s} \) reflects investors’ state-dependent willingness to defer consumption from period \( t \) to period \( t+s \). The expectation in period \( t \) of \( m_{t+t+s} \)—which is probability-weighted across all possible future states that might occur in period \( t+s \)—equals \( 1/(1 + r_{t+s}^f) \). Intuitively, a security that pays a constant amount in each possible future state must yield the risk-free rate.

23 More negative covariances with \( m_{t+t+s} \) indicate greater systematic risk because \( m_{t+s} \) is inversely related to expected consumption in period \( t+s \). More positive covariances with consumption indicate greater systematic risk.
term that captures the covariances of $m_{t,t+s}$ with $NI_{t+s}^{a}$, $1 \leq s < \infty$. This risk adjustment term is the focus of the CFB literature.

The empirical work in this literature typically uses abnormal book return on equity above the risk-free rate rather than abnormal income in applying RIM to estimate CFBs. Defining book return on equity in period $t$ as $ROE_t = NI_t/BVE_{t-1}$, abnormal income can be re-expressed as $NI_t^{a} = BVE_{t-1}(ROE_t - r_{t-1,f})$. Using this expression to substitute for $NI_t^{a}$ in the risk-adjustment term in RIM-CFB yields the equivalent expression

$$
\sum_{s=1}^{\infty} \text{cov}(m_{t,t+s}, NI_{t+s}^{a}) = \sum_{s=1}^{\infty} \text{cov}(m_{t,t+s}, BVE_{t+s-1}(ROE_{t+s} - r_{t+s-1,f})).
$$

Equation (2) is difficult to apply in practice because it expresses systematic risk in terms of an infinite series of covariances. Similar to the derivation of the capital asset pricing model, NS assume these covariances are all equal (as well as various less important things), which simplifies the expression to the right of the equal sign of equation (2) to a single covariance of the market discount factor $m$ with abnormal ROE. Consistent with much of modern finance, NS also assume that the risk adjustment term can be expressed as a linear function of the covariances of abnormal ROE with market abnormal ROE and other risk factors. Based on these assumptions, NS estimate a firm’s CFB as the correlation of its abnormal ROE with the abnormal ROE for the market. A higher CFB implies higher systematic risk. Cohen et al. (2009) estimate CFBs using a similar approach.24

Cohen et al. (2009) and NS provide the following empirical evidence regarding the risk-relevance of estimated CFBs:

- Cohen et al. and NS both find that CFB’s have significant explanatory power over:
  - Previously anomalous long-horizon share returns on portfolios formed based on the level of the market-to-book ratio, because CFBs are higher for lower market-to-book ratios.
  - The risk adjustment (i.e., ICOC) reflected in the level of equity price.

- Cohen et al. find that CFBs predict changes in standard betas over a horizon of at least eight years. Standard betas rise (fall) over this horizon for low (high) market-to-book ratio firms. This finding is consistent with standard betas reflecting changes of cost of capital or market imperfections in the short term but ultimately being driven by accounting-related fundamentals.

24 Cohen et al.’s (2009) approach to estimating CFB is somewhat less directly motivated by RIM than is NS’s approach. Cohen et al. estimate CFB by correlating time-aggregated ROE with time-aggregated market ROE. They allow the time-aggregation horizon to vary from 1 to 15 years, under the idea that a longer horizon allows errors in the measurement of ROE to be more fully mitigated. Roughly speaking, this yields CFBs that reflect a weighted-average of the covariances in equation (2) across the time-aggregation horizon.
These findings are consistent with CFBs capturing priced risk better than standard betas and sensitivities to other previously identified risk factors, the market-to-book ratio in particular.

Overall, the results of this research indicate that CFBs are highly risk-relevant, considerably more so than one would expect from the prior research examining similar measures summarized in Ryan (1997). I recommend that financial reporting policymakers consider whether it is possible to improve the risk-relevance of CFBs. As with the ICOC literature, however, this question raises difficult issues worthy of future research. For example, perfect fair value accounting might induce CFBs to reflect changes in costs of capital rather than cash flows or related performance measures, thereby rendering CFBs more like standard betas. I again recommend policymakers start by requiring informationally rich income statements of the sort described in the introduction.

In summary, research on ICOC and CFBs summarized in this section is that this research shows that summary accounting numbers are highly risk-relevant. Hence, financial reporting policymakers should focus on enhancing the existing financial reporting system, not reinventing the wheel.

4. Recent Research on the Risk-Relevance of Fair Value Accounting

In this section, I describe the results of three recent papers—Hodder et al. (2006), Blankespoor et al. (2011), and Barth et al. (2008)—that examine the risk-relevance of calculated income or financial leverage measures based on disclosed or estimated fair values of financial instruments. I describe Hodder et al. in particular detail because it is a broad study that considers banks’ entire portfolios of financial instruments and a wide set of risk measures. Blankespoor et al. also consider banks’ entire portfolios of financial instruments but focus on credit risk only. Barth et al. examines the highly controversial issue of the incorporation of non-financial firms’ own credit risk in the measurement of fair value for their debt.

Fair values may be recognized or disclosed. As discussed in the introduction, disclosure need not be an adequate substitute for recognition, because firms do not appear to estimate and auditors, analysts, and others do not appear to evaluate fair values with as much effort if these values are disclosed rather than recognized. Moreover, firms rarely provide meaningful discussion or analysis of fair value disclosures in financial reports. Presumably, if researchers find disclosed fair values to be risk-relevant, then recognized fair values are even more so.

Hodder et al.’s (2006) and Blankespoor et al.’s (2011) restriction of their samples to banks is important, because these firms’ balance sheets primarily are comprised of financial instruments for which firms must disclose the fair and carrying values under FAS 107, as amended (ASC 825-10-50), annually prior to 2009 and quarterly thereafter. Fair value

25 I do not describe a related and far larger body of “value-relevance” research that examines the explanatory power of accounting numbers for the market value of equity or share returns.
accounting generally is most desirable when applied to firms’ entire economic balance sheets, so that any offsetting economic gains and losses on the firms’ exposures do not yield variability in the income measure, while any non-offsetting gains and losses do yield such variability. This should be the case to a reasonable approximation for banks.

In contrast, when fair value accounting is applied only to a portion of a firm’s economic balance sheet, the accounting generally will not capture any economic offsetting across the subset of the exposures that is fair valued and the subset of the exposures that is not fair valued, or within the latter subset. Accordingly, fair value accounting applied to a portion of a firm’s balance sheet could make the firm appear either more or less risky than it actually is. This is a more significant problem for non-financial firms. However, Barth et al. (2008) provide evidence that this problem is not overwhelming for the average nonfinancial firm with regard to fair value accounting for liabilities, as discussed below.

As described more precisely below, Hodder et al. (2006) examine the total and incremental risk-relevance of banks’ fair value income beyond their reported net income and other comprehensive income. They generally calculate annual unrecognized fair value gains and losses using FAS 107 disclosed fair values of financial instruments from 1996-2004. They calculate unrecognized fair value gains and losses on economic assets (liabilities) as (minus) the change over the reporting period in the excess of the fair value over the book value. Annual fair value net income equals reported net income plus reported other comprehensive income plus calculated unrecognized fair value gains and losses during the year. Hodder et al. calculate firm-specific variances of the following income measures or components across their nine-year sample period: reported net income, reported comprehensive income, calculated fair value income, reported other comprehensive income, and calculated unrecognized fair value gains and losses.

Hodder et al. (2006) report the following interesting descriptive analyses of the variances and correlations of their income measures and components.

- On average, fair value income is over five (three) times more variable than reported net income (comprehensive income), and these differences in variances are highly significant. Hence, fair value accounting for banks’ entire portfolios of financial instruments would make these firms appear considerably riskier than does their current accounting.

- On average, the correlations of reported net income, other comprehensive income, and unrecognized fair value gains and losses are all close to zero, suggesting minimal offsetting across these income components. This explains the results of the analysis described in the prior item.

27 Francis (1990), Barth et al. (1995), and Bernard et al. (1995) provide evidence that fair value accounting for a portion of firms’ economic sheets yields more variable owners’ equity and net income than does amortized cost accounting, and that this variance is only partly reflective of economic variance.

28 These disclosures are similar to those required by IFRS 7, Financial Instruments: Disclosures, August 2005 (but frequently amended), paragraphs 25-27.

29 Hodder et al. (2006) directly estimate gains and losses on non-term deposits, an important financial instrument for banks for which FAS 107 does not require disclosure of fair values.
• In contrast, on average unrecognized gains and losses on liabilities are strongly negative correlated (approximately -0.4) with both recognized (in other comprehensive income) and unrecognized fair value gains and losses on assets. This is consistent with banks actively engaging in asset-liability management, but not coming close to fully hedging.

Hodder et al. (2006) examine various market-based measures of bank risk: return variance, beta, long-term interest-rate beta, and the pricing multiple on abnormal income in a simplified version of RIM-ICOC. They correlate these risk measures with the income variance measures in two separate types of analyses. First, they evaluate the total explanatory power over their risk measures of each of reported net income variance, reported comprehensive income variance, and calculated fair value income variance, without controlling for the other two income variance measures. A measure of income variance with more explanatory power over risk is more risk-relevant. Second, Hodder et al. evaluate the incremental explanatory power over their risk measures of reported net income variance, reported other comprehensive income variance, and variance of calculated fair value gains and losses, controlling for the other two income component variance measures. An income component variance measure with significant explanatory power over risk controlling for the other measures is incrementally risk-relevant.

Hodder et al. (2006) report the following primary empirical results.

• Regardless of the risk measure, calculated fair value income variance is always risk-relevant and the variance of calculated fair value gains and losses is always incrementally risk-relevant.

• When the risk measure is return variance, reported net income variance is the most risk-relevant of the income measures, followed closely by calculated fair value income variance. The variance of calculated fair value gains and losses is highly significantly incrementally risk-relevant.

• When the risk measure is beta, none of the variance measures are particularly significant, likely due to well-known problems in measuring beta. However, the calculated fair value variance measures are the only ones that consistently are significant and have the right sign.

• When the risk measure is long-term interest-rate beta, the calculated fair value income variance measures are highly significant and essentially dominate the other measures.

• When the risk measure is the multiple on abnormal income, the calculated fair value income variance measures have the right signs and are most significant, and the reported net income variance measure has the right sign and is significant.
In summary, Hodder et al.’s findings indicate that fair value accounting yields highly risk-relevant income measures, especially regarding interest rate risk.\footnote{I believe that Hodder et al.’s (2006) findings regarding the risk-relevance of fair value gains and losses likely generalize to firms’ revisions of accrual estimates generally. For example, Petroni, Ryan, and Wahlen (2000) provide evidence that discretionary revisions of loss reserves by property-casualty insurers are positively associated with the insurers’ beta and return variance.}

Using similar methods as Hodder et al. (2006), Blankespoor et al. (2011) calculate a measure of banks’ financial leverage that incorporates the disclosed or estimated fair values of financial instruments. They examine two measures of banks’ credit risk: publicly traded bond yield spreads (over comparable maturity U.S. Treasuries) and failure as defined by presence on the FDIC’s failed bank list. It is relatively difficult to predict failure due to its infrequency; in particular, almost all bank failures occurred during the recent financial crisis. Blankespoor et al. regress each of these two credit risk measures on each of banks’ fair value and reported leverage ratios. They estimate these regressions both with and without an extensive set of controls for banks’ profitability, size, interest rate sensitivity, asset quality, and, in the yield spread regressions, bond characteristics.

Blankespoor et al. (2011) find that the fair value leverage measure exhibits far more explanatory power over banks’ credit risk than does reported leverage. For example, in the bond yield regressions without controls, the $R^2$ is 37\% using the fair value leverage measure versus 25\% using the reported measure. In the regressions with controls, the $R^2$ is 45\% for the model using fair value leverage versus 35\% for the model with reported leverage. These results indicate that fair value leverage not only dominates reported leverage in explaining banks’ yield spreads, it also dominates their extensive set of control variables. These findings illustrate the power of well-chosen summary accounting numbers for risk assessment.

Reflecting the difficulty of predicting failure discussed above, Blankespoor et al. (2011) provide somewhat weaker evidence that fair value leverage is more predictive of bank failure than is reported leverage. The most interesting aspect of their results is that the predictive power of fair value leverage rises as the bank failure horizon rises from 1 to 3 years, whereas the predictive power of reported leverage falls as this horizon lengthens. This reflects the forward-looking nature of fair value and the historical nature of the measurement attributes used to determine the recognized amounts of most of banks’ exposures.

As discussed above, the attractiveness of fair value accounting diminishes when applied to subsets of firms’ exposures. Barth et al. (2008) examine this issue in the specific setting of fair value accounting for financial liabilities, in particular, the effect of firms’ own credit risk on the fair value of their debt. Fair value accounting for debt is a particularly contentious topic within the overall contentious arena of fair value accounting, because firms whose own credit risk deteriorates (improves) generally will record gains (losses) on their debt. This would yield counterintuitive effects on their net income unless they record offsetting losses (gains) on their assets of at least equal magnitude.

In their empirical analysis, Barth et al. (2008) choose not to use reported or disclosed fair values of debt. This is attributable to two facts. First, the fair value option for debt did not exist
during their 1986-2003 sample period.\textsuperscript{31} Second, FAS 107 did not require firms to incorporate their own credit risk in the disclosed fair values of their debt prior to the effective date of FAS 157 (ASC 820-10).\textsuperscript{32} Instead Barth et al. either infer changes in the value of debt from changes in actual or modeled credit ratings or estimate the change in the value of debt using Merton’s (1974) option-pricing-based model of the value of risky debt.

Barth et al. (2008) primarily provide evidence that the value of non-financial firms’ equity is sensitive to their own credit risk and that this effect is stronger for more levered firms. Intuitively, the equity of firms is protected against downside risk to the extent that the firms’ debt absorbs that risk, and that extent is greater for firms with more debt. These findings suggest that fair value accounting for debt would convey information about firms’ own credit risk, an important risk.

Barth et al. (2008) also provide descriptive analysis that if firms recognized decreases in the fair value of their debt estimated using the Merton model, on average those firms’ net income would not change sign. This descriptive analysis is consistent with fair value gains on debt being on average more than offset by impairment write-downs on assets or other sources of negative income, and with fair value losses on debt being on average more than offset by other sources of positive income. Hence, fair value accounting for debt would not on average dominate net income for non-financial firms, obscuring their performance and risk. These results likely would change if firms were grouped based on the types of assets they hold, which affects the required accounting for assets, as well as on their financial leverage, however.

In summary, the empirical research summarized in this section shows that fair-value gains and losses are highly risk-relevant, particularly for interest rate risk, but also for systematic/priced risk, total risk, and firms’ own credit risk. Because fair value gains and losses are significantly affected by changes in costs of capital, the results of this research may appear to be in tension with those of the empirical research on CFBs summarized in Section 3. I discuss how financial reporting policymakers should view this apparent tension and provide recommendations for how they can enhance the risk-relevance of financial report information in Section 7.

5. Existing Financial Report Risk Disclosure Requirements

In this section, I overview the primary existing financial report risk disclosure requirements in U.S. GAAP and SEC rules.\textsuperscript{33} I focus on U.S. disclosure rules because almost all of the research I summarize is limited to U.S. firms. I do indicate IFRS analogues to U.S. rules, most of which are contained in IFRS 7,\textsuperscript{34} when they exist and I am aware of them; I emphasize that I am not an IFRS expert, however. With a few exceptions, I limit this overview to disclosure requirements for financial instruments as they are defined in GAAP (i.e., financial

\textsuperscript{31} Even if the fair value option had existed then, as it does now under FAS 159, relatively few firms have elected that option to date.


\textsuperscript{33} Most SEC disclosure rules are not included in the ASC.

\textsuperscript{34} IFRS 7, \textit{Financial Instruments: Disclosures}, August 2005 (frequently amended).
assets and liabilities, not the firms’ own equity) and for financial institutions. I organize this section into subsections for four primary types of economic risk—market, credit, liquidity, and information\textsuperscript{35}—as well as one for the overarching notion of estimation risk. While this is a convenient structure, I note that many disclosure requirements (e.g., notional amounts of derivatives) provide information relevant to assessing multiple types of risk.

As indicated in the introduction, I define risk as random variation in firms’ future performance and value. Types of risk pertain to specific drivers or aspects of this variation.

\textit{a. Market Risk}

Market risk is random variation in firms’ future performance and value resulting from future changes in market prices. Examples of market prices include interest rates, foreign exchange rates, equity prices, and commodity prices.

SEC FRR 48 contains the primary market risk disclosure requirements for financial instruments and derivatives.\textsuperscript{36} IFRS 7, paragraphs 40-42, requires similar disclosures. FRR 48 exhibits a number of features that reduce the comparability and interpretability of market risk disclosures and thereby compromise risk reporting quality. I describe these features in some detail, because they generalize to most other types of risk disclosures, and any attempt by financial reporting policymakers to improve risk reporting quality must make choices about these or similar features.

Reflecting policymakers’ emphasis on downside risk discussed in the introduction, FRR 48 defines risk as the possibility of loss, not gain. Possibility of loss is a one-sided notion of risk that translates into overall risk (variance) only when returns on the exposure under consideration are distributed symmetrically. Derivatives and other financial instruments that are or include options are particularly likely to exhibit asymmetric return distributions.

FRR 48 only requires annual disclosures as of the balance sheet date. Given the infrequency of these disclosures, they are unlikely to be useful for firms that speculate, since speculative positions tend to change frequently. End-of-year window dressing by firms is also a concern. IFRS 7, paragraph 42, specifically requires firms to disclose when their end-of-year exposures are not representative of their normal exposures.

FRR 48 disclosures need not be comparable across firms, exposures for a given firm, or time, for the following four reasons. First, firms may define loss in terms of reduction of value, earnings, or cash flow, and the three definitions of loss are not identical and can be inconsistent. Moreover, value and earnings depend on the accounting measurement bases used.

\textsuperscript{35} I do not discuss operational risk in this paper, despite the existence of considerable disclosure of this risk in banks’ financial reports. This risk is outside my expertise, has a quite different nature from the risks I discuss, and is not subject to any research related to the themes in this paper of which I am aware.

Second, firms may disclose their exposures to each type of market risk using any of these approaches:

- **Tabular format.** This approach reports fair values and information sufficient to estimate the expected cash flows over each of the next five years and beyond five years for derivatives and other financial instruments grouped based on common characteristics.

- **Sensitivity approach.** This approach reports the loss of value, earnings, or cash flow attributable to a specific adverse market price movement chosen by management, subject to the constraint that the movement be at least 10% of the beginning value of the market price.

- **Value-at-Risk (VaR) approach.** This approach reports the loss of value, earnings, or cash flow that occurs over a certain period with a certain probability, usually 5%.

These approaches have distinct strengths and weaknesses. The tabular format provides less processed and more disaggregated data than the other approaches, and so it allows users of financial reports more freedom to develop their own risk measures. However, this approach does not clearly convey the nature of dynamic exposures such as options or the covariances among exposures, so users typically have to make assumptions about these exposures and covariances to use these disclosures. The sensitivity and VaR approaches provide aggregate risk measures that embed management’s knowledge of individual exposures and covariances among exposures. However, these measures are difficult for users of financial reports to interpret without a full understanding of the assumptions involved in the aggregation. Moreover, the VaR approach does not indicate the direction of market price movements that causes loss, so it does not help users estimate the effects of subsequent changes in market prices. Although FRR 48 requires that firms discuss the assumptions and limitations of their chosen approaches, in practice these disclosures tend to be boilerplate.

The fact that firms need not and often do not choose the same approach for each type of market risk makes it difficult for users of financial reports to develop measures of firms’ aggregate market risk, since different types of market risk may be correlated. For example, interest rates are correlated with exchange rates.

Third, the period over which loss is measured in the sensitivity and VaR approaches varies across firms and across different risks for a given firm. Sensitivity and VaR estimates need not rise linearly or in any other simple fashion with the length of the measurement time period, due to portfolio changes over time and for other reasons, although under simplifying assumptions it usually is possible to make these estimates more comparable through appropriate transformations.

Fourth, the size of the market price movements in the sensitivity approach and the confidence level used in the VaR approach vary across firms. Different-size market price movements in the sensitivity approach do not raise comparability problems if exposures are linear, but they do if exposures are nonlinear. Different confidence intervals in the VaR
approach are easily adjusted for if the shapes of the lower tails of the distributions of returns on the portfolios under consideration are known (e.g., this would be the case if these returns are normally distributed), but not otherwise.

Market risk disclosures provided using the sensitivity or VaR approaches generally do not distinguish market risks before versus after any risk management activity (e.g., hedging using derivatives). Hence, these disclosures do not indicate how firms’ manage their market risks. However, FAS 161 (ASC 815-10-50) requires firms to disclose qualitative information about their risk management strategy as well as the volume of their use of derivatives (e.g., notional amounts) by type of risk, distinguishing those used for risk management purposes versus other (e.g., trading) purposes. The standard also encourages but does not require firms to make quantitative disclosures of their risk management. These disclosures give some sense for the volume of risk management activity using derivatives, but not for other forms of risk management.

Although FRR 48 is the primary source of market risk disclosures, other specific disclosure requirements related to market risk exist. Two examples of these are:

- FAS 133 (ASC 815-10-50) requires disclosures of hedge ineffectiveness, as does IFRS 7, paragraphs 22-24. These disclosures give some sense for the quality of risk management using derivatives, but not for other forms of risk management.

- FAS 140 and 166 (ASC 860-20-50) require disclosures of the sensitivity of the valuation of retained interests from securitizations accounted for as sales to changes in significant assumptions, including market prices such as interest rates, as does IFRS 7, paragraphs 42A-H. While these disclosures are limited in that these sensitivities to different parameters may interact in fashions not portrayed in the disclosures, and these limitations may hinder the aggregation necessary for firm-level analysis, these disclosures provide some sense for the degree of risk concentration in these often first-loss or otherwise highly sensitive positions.

b. Credit Risk

Firms, particularly lenders, generally view their credit risk as variation in their future performance and value resulting from uncertainty about the occurrence and timing of default by

---

40 For example, mortgage banks’ fixed-rate mortgage servicing rights are sensitive to interest rates through their direct effect on discounting and indirect effect on prepayment. Ideally, mortgage banks’ disclosed sensitivities to interest rates would reflect both effects. Instead, their disclosed sensitivity to interest rates reflects only the discounting effect and they make separate disclosures of prepayment sensitivity.
their borrowers and other counterparties, including third-party guarantors, as well as the percentage loss in the event of default. I limit my discussion to this type of credit risk.

Alternatively, firms may themselves default if they become insolvent or illiquid, and their own credit risk affects the values of their liabilities and equity. I do not discuss this type of credit risk because it results from myriad firm attributes, and many disclosures in firms’ financial reports potentially could inform about this type of credit risk. Barth et al. (2008) discussed in Section 4 examines this type of credit risk.

Existing credit risk disclosure requirements are considerably less comprehensive than are market risk disclosure requirements. They can be divided into three primary buckets. First, two standards require disclosures of known significant concentrations of credit risk in individual or groups of exposures. I emphasize “known,” because the identification of concentrations of credit risk is difficult, and reasonable people can differ about what constitutes a concentration. For example, the sharp decline in real estate prices during the financial crisis affected a wide range of banks’ exposures and devastated the overall economy, particularly in certain regions of the country. Did this exposure to real estate prices constitute a concentration for an affected bank? If so, how should a bank with exposure to real estate prices determine what exposures to include versus exclude from the concentration?

FAS 107 (ASC 825-10-50) requires the following disclosures for identified concentrations of credit risks in financial instruments: qualitative disclosures about the nature of the concentration, quantitative information about the maximum possible amount of loss, and quantitative information about collateral and master netting agreements. Although very terse, in principle IFRS 7, paragraph 34(c), requires disclosures of concentrations of any risk in financial instruments, including credit risk.

SOP 94-6 (ASC 275-10-50) requires disclosures of concentrations of any risk for which it is reasonably possible that the firm will experience a near-term (within one year), severe (higher than material) impact. Reflecting FAS 107’s more extensive disclosure requirements, SOP 94-6’s requirement explicitly applies only to concentrations of credit risk associated with non-financial instruments.

Second, FAS 5 (ASC 450-20) requires firms to accrue for loss contingencies, including credit loss contingencies, that probably have been incurred at the balance sheet date based on information available at that date, and that the firms can reasonably estimate at that date. The standard also requires disclosure for credit losses that are only reasonably possible or that cannot be reasonably estimated at the balance sheet date. IAS 37, paragraphs 85 and 86, contains similar disclosure requirements.

42 In addition, FSP SOP 94-6-1, Terms of Loan Products That May Give Rise to a Concentration of Credit Risk, November 2005 (ASC 825-10-55) indicates that nontraditional mortgage products may constitute a credit risk concentration. (This FSP is misdesignated, because it provides guidance for FAS 107, not SOP 94-6, because mortgages are financial instruments.)
44 In my rather extensive experience reading financial institutions’ financial reports, these institutions evidence little or no compliance with this disclosure requirement.
Third, SEC Industry Guide 3 requires disclosures relevant to the assessment of credit risk for banks and thrifts. Specifically, it requires those financial institutions to disclose quantitative information about:

- nonaccrual, past due, troubled debt restructured, and potential problem loans
- loan balances and allowances for loan losses by type of loan
- loan charge-offs and recoveries by type of loan
- loan concentrations

FAS 118 (ASC 310-10-50) requires lenders to provide disclosures about the amount of impaired loans (as well as the allowance and accrued interest for those loans) that in practice correspond closely to nonperforming loans disclosures required by the SEC. IFRS 7, paragraph 37, requires similar disclosures.

In addition, FSP FAS 133-1 and FIN 45-4 (ASC 815-10-50) and various other standards require disclosures of collateral, netting agreements, and credit contingent features of derivatives and similar exposures that may enhance or mitigate credit risk. Paragraphs 14, 36, and 38 of IFRS 7 contain similar requirements.

c. Liquidity and Information Risks

I describe liquidity and information risks together because they are both trading-related risks that overlap considerably but are not the same and are often confused. The overlap and confusion result in part because both types of risk tend to be higher for credit riskier exposures that are traded less frequently, particularly during credit crises, and for which asymmetric information is more likely to exist.

Illiquidity exists when trading impacts the price of the traded item or, in the limit, trading is impossible. Liquidity risk is random variation in the level of liquidity in the market for an item or of the firm’s need for liquidity, both of which may vary over time.

Information risk usually is said to exist when a party is uncertain about whether it is trading with a better-informed counterparty. Distinct kinds of information risk arise in cases

---

48 FASB Staff Position FAS 133-1 and FIN 45-4, Disclosures about Credit Derivatives and Certain Guarantees: An Amendment of FASB Statement No. 133 and FASB Interpretation No. 45; and Clarification of the Effective Date of FASB Statement No. 161, September 2008.
Relatively few disclosure requirements exist for liquidity and information risks. FAS 157 requires quantitative disclosures of balance sheet items measured at fair value classified into categories based on whether fair value is measured using Level 1, Level 2, and Level 3 inputs. Level 1 inputs are market prices for the same item in active markets, and so items measured using these inputs usually have relatively low liquidity and information risks. Level 2 inputs are other observable market information. Items measured using Level 2 inputs usually have higher liquidity risk, but possibly moderate information risk depending on the level of transparency of the market inputs. Level 3 inputs are unobservable firm-supplied inputs. Items measured using Level 3 inputs usually have relatively high liquidity and information risks, due to the absence of significant observable market inputs and unobservability of firm supplied inputs, respectively. FAS 157 requires additional disclosures (e.g., T account rollforwards) for items measured at fair value using Level 3 inputs.

Item 303 of SEC Regulation S-K requires firms to disclose known trends or demands, commitments, events or uncertainties that will result in or that are reasonably likely to result in the registrant's liquidity increasing or decreasing in any material way.

d. Estimation Risk

Estimation error is the difference between reported measurements of items and the ideal measurements given the relevant accounting standards for the items and currently available information. Estimation risk is random variation in estimation error. Such variation results from economic risk, the unobservability of transactions involving the same or similar items, imperfect modeling of the value of the item or relevant data to apply the model, and various other factors. Such variation does not include the average error, i.e., estimation bias.

In principle, while estimation risk tends to be higher for economically riskier positions, it is different from the economic risks described above. Economic risks pertain to uncertainty about outcomes that have not yet been realized and that in principle are described by distributions. Accounting measurements do not (and logically cannot) involve prediction of the one possible outcome within each distribution that will ultimately be realized. Instead, accounting measurements typically involve estimation of the central tendencies (e.g., expected values) or other points in the distributions of possible outcomes. Accounting measurements generally are revised over time as relevant new information becomes available. Such revisions typically move the accrual measurement toward the outcomes that will be ultimately realized, but they do not imply that estimation errors previously existed.

SOP 94-6 contains the primary disclosure requirements for estimation risk in U.S. GAAP. This standard requires qualitative disclosures of the use of estimates in financial

---

49 IFRS 7, paragraphs 27A-B, require similar disclosures.
reporting, the nature of any uncertainty about those estimates, and reasonably possible near-term material changes in estimates.

In addition, as discussed in Section 5.a, FAS 166 and various other standards now require firms to disclose the sensitivity of estimated fair values of items to important parameters. Higher estimation sensitivities likely are correlated with higher estimation risk.

e. Summary

Even the incomplete summary of the primary existing risk-relevant financial report disclosure requirements in U.S. GAAP and SEC rules in this section indicates that firms are required to provide many such disclosures in their financial reports. This is particularly true for market risk. While the volume of risk disclosures is high, these disclosures are not well integrated either within or across types of risk. Disclosure options yield inconsistency across firms and exposures. For these reasons, my belief is that users of financial reports generally do not appreciate the information in these disclosures, at least not prior to the occurrence of specific events that focus users’ risk assessment analyses on well-defined subsets of the disclosures. I emphasize, however, that immediate appreciation is not necessary for risk disclosures to be useful. One of the primary roles of financial reporting is to archive information that is not immediately informative but will be useful in evaluating information that becomes available or events that occur subsequently. Moreover, my own teaching experience suggests that these disclosures are susceptible to careful, if time consuming, financial analysis of individual financial reports.

6. Recent Research on the Risk-Relevance of Other Financial Report Disclosures

In this section, I summarize recent empirical research on the risk-relevance of other financial report disclosures. The subsections are again organized by type of risk, with a subsection on research on securitizations added at the end because the economics of these transactions and this research span the types of risk.

To keep this section of manageable length and reasonable focus, with a few exceptions I do not discuss papers in three large and well-established literatures that bear on firms’ risk assessment using financial report information. First, I exclude “value-relevance” papers in which the dependent variable is market value or returns rather than a risk measure even if the primary explanatory variables are risk disclosures, such as Venkatachalam (1996) (examining derivatives disclosures) and Lim and Tan (2007) (examining VaR disclosures). Naturally, market values and returns are sensitive to disclosures that inform about priced risk. Second, I exclude papers in which the primary explanatory variables are measures of past performance rather than risk per se, even if the dependent variable is a risk measure. For example, this excludes papers that correlate measures of banks’ risk such as bond yields or CDS spreads with their provisions or allowances for loan losses, non-performing loans, or loan charge-offs, such as Jagtiani et al. (2002). Naturally, superior past performance tends to be associated with lesser risk. Third, I exclude papers in the bankruptcy, credit ratings, loss given default, and similar
default variable prediction literatures. A number of good recent summaries of these literatures exist, such as Beaver et al. (2010) for bankruptcy prediction.

\textit{a. Market Risk}

A reasonably large number of papers empirically examine the risk-relevance of FRR 48 market risk disclosures for samples of financial institutions and/or nonfinancial firms. Most of these studies primarily examine disclosures in the sensitivity format, partly because it is the most common format, and partly because the simplicity of these disclosures render them most amenable to large-sample empirical analysis. Several papers examine VaR disclosures, which with few exceptions are made only by trading-oriented firms.

Overall, the evidence for the risk-relevance of market risk disclosures is fairly weak. It is strongest in cases of simple exposures for homogeneous sets of firms, in particular, specific commodity price risk for commodity firms exposed in the same direction to the same commodity. For example, Rajgopal (1999) (using tabular and sensitivity disclosures that pre-dated FRR 48) and Thornton and Welker (2004) (using reported sensitivity and VaR disclosures under FRR 48) both find that disclosures of energy commodity price sensitivity by oil and gas producers are commodity price risk-relevant.

By comparison with commodity price risk, interest rate risk and exchange rate risk are complex. Interest rate risk involves yield curves that can change both location and shape and that interact with firms’ exposures in each maturity or repricing interval. Most firms with exchange rate risk are exposed to multiple correlated currencies. As a consequence, firms’ modeling of these exposures is likely to be judgmental, limited, and opaque to users of financial reports. Consistent with this point, empirical evidence for the risk-relevance of disclosures of these market risks is much weaker than for commodity price risk. For example, Hodder (2002) examines interest-rate-sensitivity disclosures by banks and Sribunnak and Wong (2004) examine exchange-rate-sensitivity disclosures by nonfinancial firms. Both papers find only weak and inconsistent risk-relevance for the disclosures they examine.\textsuperscript{51}

A partial exception to these relatively weak findings is research examining trading-oriented banks’ disclosures of VaR for their trading portfolios, which usually are primarily exposed to interest rate risk. Both Jorian (2002) and Liu et al. (2004) find that these banks’ VaR disclosures explain cross-sectional differences in banks’ unsystematic risk as measured by the variances of their trading income and stock returns as well as cross-sectional differences in banks’ systematic risk as measured by their betas. In addition, Liu et al. find that these results are more significant for the largest, more technically sophisticated banks that are better able to estimate VaR, and they have strengthened over time as VaR becomes better measured by firms and understood by users of financial reports. More recently, however, Perignon and Smith (2010) find banks’ VaR does not predict the variance of trading income, a change from prior findings that they ascribe to banks’ increasing tendency to estimate VaR using historical

\textsuperscript{51} A related literature examines the value-relevance of banks’ maturity or repricing gap disclosures, e.g., Flannery and James (1984), Schrand (1997), and Ahmed et al. (2004).
simulation. Historical simulation rapidly loses predictive power when economic conditions change from the period over which historical data is sampled.

A consistent difficulty faced in these papers is developing cross-sectional samples of sufficient homogeneity and size to yield powerful statistical tests. This difficulty results in part from the varied approaches and other choices that firms are allowed to and do make in their market risk disclosures under FRR 48 described in Section 5.a. Accordingly, a frequent conclusion of this research is that the risk-relevance of these disclosures is diminished by their lack of comparability and also by the low quality of firms’ disclosures of their exposures before the use of derivatives or other risk management. This literature generally predates FAS 161, however, which has modestly improved firms’ disclosures of their exposures before derivatives.

This large-sample, cross-sectional research does not have direct implications for whether market risk disclosures are useful for assessing the risk of individual firms. I believe it is likely that these disclosures are more useful for this purpose than the research shows, but less useful than they would be if firms reported them more coherently and consistently. In this regard, psychology-motivated research indicates that users of financial reports have difficulty using firm-level disclosures and are highly influenced by the reporting format. For example, Hodder et al. (2001) and Koonce et al. (2005) argue that the limitations of market risk disclosures are exacerbated by various well-known cognitive biases regarding risk evaluation and that these biases interact with disclosure alternatives. Koonce et al. and Nelson and Rupar (2011) provide experimental evidence that fairly subtle changes in format—e.g., Nelson and Rupar examine disclosures expressed in dollars versus percentages—significantly influence individuals’ interpretation of market risk disclosures.

Empirical research also examines market risk disclosures provided under rules other than FRR 48, often disclosures about firms’ use of derivatives. For example, Wong (2000) provides inconsistent evidence (depending on the year examined) that the notional amounts of exchange-rate derivatives disclosed under FAS 119 are relevant for the assessment of exchange rate sensitivity. Ahmed et al. (2011) provide evidence that banks’ disclosures of their derivatives use became more risk-relevant after the issuance of FAS 133. This standard expanded derivatives disclosures, particularly regarding hedge ineffectiveness. They find that interest rate derivatives used for hedging are more negatively associated with bond spreads after FAS 133, consistent with the standard increasing the credence bond investors place on banks’ hedging activity.

b. Credit Risk

Aside from research employing disclosures related to banks’ loans that I do not discuss and of securitization retained interests that I discuss in Section 6.d, I am unaware of any research that uses credit risk disclosures to explain any measure of firm risk. For example, to my

---

52 Statement of Financial Accounting Standards No. 119, Disclosure about Derivative Financial Instruments and Fair Value of Financial Instruments, October 1994. This standard was superceded by FAS 133.
53 This dearth of research may reflect the difficulty of proxying for banks’ credit risk using their financial report disclosures, as discussed in Knaup and Wagnerz (2009). Banks have diverse loan portfolios and other credit risky exposures, including complex ones such as retained interests from securitizations and credit derivatives.
knowledge, no empirical study has examined the risk-relevance of concentration of credit risk disclosures. Bhat (2009) comes closest to examining this question. She finds that fair value estimates are more value-relevant for banks with more extensive credit risk disclosures.

I briefly describe two studies that suggest that disclosures of credit risk modeling are of general usefulness. First, Bhat et al. (2011a) provide evidence that banks with better historical credit risk modeling disclosures (e.g., estimation of credit loss parameters based on current loan status and credit scoring of loan applications) generally record timelier provisions for loan losses across the business cycle. They also show that banks with better forward-looking credit risk modeling disclosures (e.g., judgmental risk rating and stress testing) recorded timelier provisions for loan losses when conditions changed at the beginning of the recent financial crisis, when historical relationships changed sharply. While this paper does not examine risk-relevance per se, its findings suggest that disclosures of risk modeling are likely to be risk-relevant.

Second, Bhat et al. (2011a) and Bhat et al. (2011b) provide evidence that banks with better credit risk modeling disclosures make less procyclical and higher-quality loan originations, respectively. Specifically, Bhat et al.’s (2011a) finding that credit risk modeling improves the timeliness of provisions for loan losses, combined with Beatty and Liao’s (2011) finding that banks that make timelier provisions extended more loans during the financial crisis, suggests credit risk modeling disclosures are associated with less procyclical lending. Bhat et al. (2011b) provide evidence that banks that more fully disclosed their credit risk modeling were better able to sell mortgages during the financial crisis and had fewer nonperforming mortgages. These results indicate that credit risk modeling disclosures are associated with higher loan quality. These findings work against the claim that modeling disclosures are net costly to banks; any cost of producing these disclosures is offset by the benefits to the firm and society of higher quality loan origination.

c. Liquidity and Information Risks

Most accounting research on liquidity and information risks examines the association of proxies for those risks with measures of financial reporting quality. I do not discuss these papers, because the financial reporting quality measures used generally are accounting-based and emphasize earnings smoothness and similar constructs. These constructs tend to be highly correlated with banks’ inherent risk and can be manipulated by firms to obscure their risk. See Lang and Maffett (2011) and Ng (2011) for recent examples. Yu (2005) constitutes somewhat of an exception, however, showing that financial reporting transparency as measured by Association for Investment Management and Research disclosure rankings (which are affected by footnote disclosure quality) tend to have lower credit spreads, particularly for short-term bonds. Yu interprets these results as higher disclosure quality reducing information risk.

Linsmeier et al. (2002) show that after firms began providing market risk disclosures under FRR 48, the sensitivity of their trading volume to changes in the relevant market prices declined. This finding is consistent with market risk disclosures reducing informational differences across traders and thus information risk.
Two recent studies examine firms’ disclosures of the amounts of assets and liabilities that are measured at fair value using FAS 157’s three levels of inputs. First, Lev and Zhou (2009) argue that these levels indicate liquidity risk, Level 1 being the least risky and Level 3 the riskiest. Consistent with this argument, they find that, for economic events during the recent financial crisis that impaired market liquidity, the share price reaction is most negative for financial institutions with Level 3 items, followed by Levels 2 items and then Level 1 items. The reverse holds for events that improved market liquidity.

Second, Riedl and Serafeim (2011) argue that the three FAS 157 levels indicate information risk, with the same rank ordering as Lev and Zhou (2009). They provide evidence that firms with greater exposure to Level 3 financial assets exhibit higher betas than those designated as Level 1 or Level 2, with these differences being more pronounced for firms with poorer information environments.

d. Estimation Risk

I am unaware of any empirical research directly pertaining to the risk-relevance of estimation risk disclosures under SOP 94-6 or any other disclosure rule.

e. Securitizations

Empirical research examining the risk-relevance of securitization footnote disclosures spans the market, credit, and information risks discussed in Sections 6.a-c above. This research employs disclosures of the characteristics, volume, and retained interests in securitizations accounted for as sales under FAS 140 and 166, as well as similar disclosures in banks’ regulatory filings. For example, Chen et al. (2008) identify the amounts of retained interests by type of assets securitized (distinguishing mortgages from consumer loans from commercial loans) and the riskiness of the interests (distinguishing less risky contractual subordinated interests from more risky contractual credit-enhancing interest-only strips versus noncontractual recourse for securitizations of revolving loans). Chen et al. provide evidence that these retained interests are positively associated with banks systematic risk (beta) and total risk (return variance), with the magnitude of the associations rising with the credit risks of the securitized loans and the retained interests. Chen et al.’s results could reflect securitizing banks’ retention of credit or any other risks of the securitized loans (e.g., prepayment risk for fixed-rate mortgages).

Barth et al. (2012) focus on credit risk, and provide evidence that disclosures of retained interests are positively associated with banks’ credit risk as measured by their credit ratings and bond spreads. Barth et al. also find that banks’ sold interests are risk-relevant with respect to bond spreads (though not credit ratings), consistent with the bond market treating securitizations accounted for as sales as economic secured borrowings.

Focusing instead on information risk, Cheng et al. (2011) provide evidence that banks that securitize loans for which it is more difficult to evaluate the degree of risk transfer—as proxied by the volume of securitizations, credit riskiness of the assets securitized, and the
amount of retained interests—face greater information risk as measured by larger bid-ask spreads and analyst forecast dispersion.

Overall, the research on securitizations obtains the strongest results of all these areas of risk research summarized in this section. While this likely reflects the economic importance of securitizations to the banks that engage in these transactions, I believe it also reflects the consistent tabular formatting and other features of these disclosures that enhance their useability.

7. Recommendations to Improve Risk Reporting Quality

I first state my recommendations for accounting and income statement presentation that enhance risk reporting quality. These recommendations are motivated by the research summarized in Sections 3 and 4 (and to a lesser extent in Ryan 1997 and Section 2). I then state my recommendations for other financial statement disclosures. These recommendations are motivated by the research summarized in Section 6.

The research summarized in Sections 3 and 4 indicate that summary accounting numbers are highly risk-relevant. This research focuses on measures of income and book return on equity, possibly adjusted to remove the normal rate of return on book value or to include calculated unrecognized fair value gains and losses. Corresponding with this research, I limit my recommendations to summary measures of income. The CFB research summarized in Section 3 suggests that income is risk relevant because it is sensitive to unexpected changes in cash flows but relatively insensitive to unexpected changes in costs of capital. The fair value research summarized in Section 4 suggests that unexpected changes in cost of capital, which have significant effects on fair value gains and losses, are risk-relevant. The most sensible interpretation of these literatures collectively is that the components of income that are driven by unexpected changes in cash flows versus unexpected changes in costs of capital are both risk-relevant, just differently and in a fashion that depends upon the risk assessment analysis involved.

To preserve and enhance the risk-relevance of income, I forward the following two related recommendations. First, income should be measured using an informationally rich measurement attribute such as fair value that reflects both unexpected changes in cash flow and unexpected changes in costs of capital.54

Second, income should be decomposed in a fashion and presented on the income statement (or through informationally equivalent and prominent disclosure) to inform users of financial reports about the effects of changes in unexpected cash flows from the changes in costs of capital. This presentation would serve as a good platform for qualitative discussion by management of the events occurring during the period, distinguishing those that management

54 As discussed in Ronen and Ryan (2010), when markets are illiquid, fair value is just one sensible measurement basis among several others with similar informational richness but different approaches to dealing with illiquidity. I am not wedded to fair value as it is currently defined, but I believe whatever measurement attribute is chosen should be applied consistently across exposures.
believes are specific to the business from those that are primarily macroeconomic and, perhaps relatedly, distinguishing those that are permanent from those that transitory or cyclical.

The research summarized in Section 6 indicates that other risk disclosures in financial reports are risk-relevant but less so than one would expect given the high volume of and strong economic bases for those disclosures. The most sensible interpretation of these results is that these disclosures are less useful to investors than in practice than they should be due to their diffuse presentation in financial reports.

To enhance the risk-relevance of these disclosures, I forward the following three recommendations. First, financial reporting policymakers should attempt to maximize the ties of other financial report disclosures with summary accounting numbers. Whatever approach they take to do this, financial reports must clearly indicate and explain past revisions of significant accrual estimates, so that users of financial reports are informed about the variance of those estimates and how that variance results from the economic and estimation risks that firms face. I made this recommendation in Ryan (1997) to little or no effect, but I remain convinced it is the single most important thing that financial reporting policymakers could do.

Extending this prior recommendation, I recommend that financial reporting policymakers require firms to conduct back-tests of their significant accrual estimates and to disclose the results of those tests, indicating any observed trends in and identified drivers of revisions to those estimates. For example, a bank’s back-test at the end of 2006 of its reported allowance for loan losses at the end of 2005 would examine how well its 2005 assumptions of loan transition probabilities (e.g., from current to delinquent to default statuses) and losses given default performed over the following year. Such back-tests would reveal the trends in accrual estimates as soon as they become observable to management. In my opinion, back-tests constitute the best possible platform for management to discuss their current understanding of the risks that face their businesses.

Koonce et al. (2010) provide experimental evidence that these disclosures should be made consistently across firms, because users of financial reports need comparable firm benchmarks to effectively distinguish environmental factors from firm-specific factors. By extension, the availability of comparable firm benchmarks should also help users to distinguish economic risks from estimation risks. In the same vein, a large literature in judgment and decision-making (see, for example, Yates 1990, Chapter 4) provides evidence that disclosures used to facilitate prediction should be made frequently (in financial reporting this means quarterly), because decision-makers need regular feedback to hone their prediction models.

No doubt some will deem this recommendation too costly or proprietary to reporting firms. I disagree. If firms are not already conducting back-tests of significant accrual estimates for their own internal decision-making, then they should be, and for them the net cost of this recommendation is probably negative. For example, in my experience banks that conducted back-tests of their allowances for loan losses prior to the financial crisis were in informationally stronger positions to react to the crisis when it occurred. If a firm’s competitive advantage is dependent on it not disclosing high aggregated financial information about past decisions, then it doesn’t appear to have such an advantage.
Second, policymakers should encourage and to the extent feasible require firms to aggregate and present risk disclosures in tabular or other well-structured formats that promote the usability of the information. Identifying and propagating the use of existing best practices and encouraging new best practices is the most natural way to do this. A nice example of a best practice is JPMorgan Chase’s tabular format disclosures of its exposures to credit losses in the various portions of its highly diverse portfolio (e.g., loans, loan commitments, off-balance sheet securitizations, and credit derivatives). Another example is Countrywide Financial’s (prior to its acquisition by Bank of America) tabular format disclosures of the interest-rate sensitivity of its various on and off-balance sheet exposures, in which Countrywide aligned its economic hedged items and hedges. I believe that securities regulators, such as the U.S. Securities and Exchange Commission, are in the best position to promote such best practices. They are charged with monitoring firms’ financial reporting on a regular basis, plus they have the huge hammer of potential rejection of financial report filings with to influence firms’ reporting behavior.

Third, for model-dependent risk disclosures (e.g., market risk sensitivities or VaR), policymakers should encourage and if feasible require disclosures of the primary historical and forward-looking attributes of the models, the essential decisions made in implementing the models in practice, sensitivity of the model outputs to alternative decisions, and benchmarking of the models to standard portfolios of exposures. Absent such explanatory and comparability-enhancing disclosures, my belief is these disclosures are almost useless to users of financial reports.

8. Concluding Remarks

As explained in detail in the October 2011 ICAEW Financial Reporting Faculty report, the current widespread desire to improve firms’ risk reporting quality stems in no small part from the financial crisis. Financial institutions’ woeful performance during the crisis and investors’ inability to perceive the potential for such performance before the crisis hit led many to conclude that risk reporting must have been inadequate given many. While I do not dispute this conclusion, it obscures two related fundamental facts regarding the nature of business and the feasible goals of risk reporting. First, firms face business risks that are significantly unknowable ex ante and that evolve dynamically and behaviorally ex post. Second, while firms can and must attempt to manage these risks, risk management is inherently limited both ex ante and ex post. Liquidity risk exemplifies these facts, particularly for banks, whose business models inherently involve assuming this risk. For banks to eliminate liquidity risk entirely, if it were possible, would be for them to cease to be banks.

Given these facts, the goals of risk reporting cannot be to inform users of financial reports about events that no one can anticipate to any significant degree. Such goals must be feasible, indeed, humbler. One feasible goal is to explain what firms currently believe about the future based on current conditions and how those beliefs have changed during the reporting period as a result of changes in economic conditions and firms’ activities. A second feasible goal is to indicate the assumptions upon which firms’ current beliefs are based, how those assumptions yield those beliefs, and why those assumptions may turn out to be incorrect. A third feasible
goal is to explain how and why firms’ prior assumptions turned out to be incorrect ex post. The recommendations I forward in this paper are intended to help financial reporting policymakers advance toward these feasible yet still difficult-to-attain goals.
References


