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**Article**

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# Conservatism Research: Historical Development and Future Prospects\*

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## 1. Introduction and Summary

Over the last decade, there has been much empirical research on Chinese accounting conservatism. This research started with Ball, Robin and Wu (2000) that was one of the first papers to apply modern research methods to Chinese data. In this paper, I survey the early research on conservatism to provide the background and context for a discussion of my dissertation paper, Basu (1997). I describe some lessons I have learnt from the unexpected success of my dissertation, review recent Chinese research on accounting conservatism and suggest a few directions for future (Chinese) conservatism research. Finally, I describe how my current research on the origins of accounting (including Chinese accounting) is related to my search for an ultimate explanation for conservative accounting.

## 2. Early History of Conservatism

Medieval accounting applied conservatism.<sup>1</sup> Early in the fourteenth century, Walter of Henley's book on estate management titled *Husbandry* advised auditors of manorial accounts to be "faithful and prudent." We know from his surviving business records that the medieval Tuscan businessman, Francesco di Marco Datini of Prato, valued his

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<sup>1</sup> This section summarizes longer histories of accounting conservatism and conservatism research in Watts and Zimmerman (1986), Basu (1995, Appendix A), Watts (2003a, 2003b) and Lin (2004, Chapter II).

inventory at the lower-of-cost-or-market.<sup>2</sup> Penndorf (1933) cites a loss entry in 1406 “because we no longer value them as above since their price has gone down,” and loss entries in 1406 and 1408 because utensils deteriorated during the year (Littleton, 1941).

Jacques Savary the elder (1675) in an early accounting text states, “If this merchandise is starting to deteriorate, or go out of style, or is that which one judges he could find at the factory or wholesalers at 5% less, it must be reduced to this price.” Although this is the oldest known formulation of the lower-of-cost-or-market principle, Vance (1943) reports that several earlier accounting texts recommended current cost rather than historical cost valuation of inventory in specific examples where the market valuation was lower. Inventory valuation at the lower of cost or market was required by the Code of Commerce in France in 1673 (Littleton, 1941), in Prussia in 1794 (Vance, 1943), and in the German Commercial Code of 1884 (Schmalenbach, 1959, p. 17).<sup>3</sup> It had been mooted even earlier in Germany in a draft of the German Commercial Code in 1857 (Littleton, 1941). In *Newton v. Birmingham Small Arms Co Ltd* (1906), the English court held,

“Assets are often, by reason of prudence, estimated and stated to be estimated, at less than their probable real value. The purpose of the balance-sheet is primarily to shew that the financial position of the company is at least as good as there stated, not to shew that it is not or may not be better.”

An editorial in the June 4, 1881 edition of *The Accountant* discussing conservatism and the auditor’s responsibility for estimates says, “Estimates are often proper things to make use of, where they relate to subsidiary matters, and enables the balance sheet to be speedily prepared, but all estimates should be slightly to the disadvantage of the company, rather than tending the other way” (Brief, 1975).

The preceding evidence is consistent with Sterling’s (1967, p. 110) claim that conservatism is “the most ancient and probably the most pervasive principle of accounting valuation.” What we now call “conditional conservatism” was recommended as good auditing practice in the early fourteenth century and journal entries from the early fifteenth century show it was being applied by businessmen. The lower-of-cost-or-market principle (hereafter LCM) was induced from textbook examples and practice by the seventeenth century and was quickly codified into commercial law. Academic and judicial discussions of accounting conservatism date back more than a century, so modern research on conservatism follows a long history of inquiry into the causes and consequences of conservatism.

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<sup>2</sup> Almost 140,000 letters and documents from Datini’s archives covering the period 1363-1410 have survived, including numerous double-entry ledgers. They are slowly being scanned and posted online with translations to facilitate research into medieval accounting. See: <http://www.istitutodatini.it/schede/archivio/eng/arc-dat1.htm>

<sup>3</sup> As Savary was the principal author, the French Commercial Code of 1673 was also called the Code Savary.

### 3. Early Normative Research on Conservatism

Early U.S. academic discussion of conservatism was primarily normative. Gower (1920, p. 173) criticized LCM on the grounds of inconsistency in recognition of losses and profits, although Finney (1923) felt that this criticism was unfounded. Esquerre (1927, p. 258) viewed the change to LCM with alarm as “the true operation profits of the period are greatly distorted, and the efficiency of the operators is thereby challenged.” Paton (1932, pp. 421-22) lists four “Objections to the Conservative Rule,” including inconsistency in the application of inventory valuation rules and being time-intensive. Gilman (1939) critically comments,

“Conservatism has a tendency which is opposed to the ideal of matching costs with income. Ruled by the doctrine of conservatism, the accountant declines to recognize income until such recognition is clearly warranted but, on the other hand, has a tendency to be generous in recognizing costs, expenses, and losses and including them in the profit and loss statement of one period even though there may be some doubt as to the fairness of such inclusion.”

Normative debates over conservatism continued through the middle of the twentieth century. The introduction of corporate income taxes in the early 20<sup>th</sup> century generated a demand for unconditionally conservative accounting methods to minimize taxable income, and these new methods influenced financial reporting (eg Watts and Zimmerman, 1986; Basu, 2005).<sup>4</sup> As Ball and Shivakumar (2005) point out, the muddling together of conditional and unconditional conservatism probably caused more confusion about the desirability of conservatism. Thus, Finney (1946, p. 196), Blough (1953) and Grady (ARS 7, 1965) list conservatism as a fundamental accounting principle, but Paton and Littleton (1940) and Moonitz and Sprouse (ARS 3, 1962) do not. The chief complaint against conservatism was that current overstatement of expenses led to future overstatement of income (eg ARB 3, CAP, 1939), a criticism that applies directly to unconditional conservatism. SFAC 2 (FASB, 1980, paragraph 92) echoes these arguments stating, “conservatism tends to conflict with significant qualitative characteristics such as representational faithfulness, neutrality and comparability (including consistency).” However, Wilcox and Hassler (1941) felt that there was no conflict between conservatism and consistency. They argued,

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<sup>4</sup> Saliers (1939) notes that the creation of the depreciation allowance for income taxes in 1878 in the U.K. led to a concern over depreciation methods in the U.K. literature in the 1880s. Similar concerns in the U.S. literature strengthened after the introduction of the first effective corporate income tax in the Excise Tax Act of 1909. Boockholdt (1978) argues that the regular use of depreciation by early railroads in the State of Massachusetts was due to a law in 1846 permitting maximum earnings of 10%, with the excess recovered by the state as a tax. In addition, Hendriksen (1970, pp. 44-47) argues that the practice of expensing all R&D outlays instead of partial accrual has its roots in the Internal Revenue code.

“Consistency is sometimes thought to be in conflict with that common application of conservatism which calls for inclusion in a statement of liabilities but exclusion of doubtful assets. This apparent conflict disappears upon exploration of the field of business, recommended as the basis of a comprehension of accounting. This exploration leads to the discovery that business operates in a field of force wherein assets tend to escape and liabilities tend to adhere. Work must be done against this field of force in order to retain assets and realize profits, and in order to avoid liabilities and losses. Consistent treatment in financial statements would include both assets and liabilities having a comparable degree of probability, and recognising of the field of force shows that inclusion of all known liabilities and exclusion of doubtful assets accomplishes this. Understanding of the fundamental consistency in this application of conservatism will assist judgment in specific cases.”

Thus, the normative research on conservatism that continued into the 1960s provided some insight into the causes and consequences of conservatism, but perhaps because the definition of conservatism was too broad, was unable to provide any definitive conclusions.

#### **4. Early Empirical Research on Conservatism**

The introduction of empirical research methods into accounting quickly led to studies of the effects of alternative income-increasing and income-decreasing (unconditionally conservative) accounting methods. This research stream started with the question of whether income-increasing (aggressive) accounting methods misled investors (eg Ball, 1972), and then moved on to exploring contracting motivations for such accounting method choice (cf. Watts and Zimmerman, 1986). Christie (1990) surveys the empirical evidence from this literature, and concludes that managerial compensation, leverage, size, risk, and interest coverage and dividend constraints have significant explanatory power for the choice between more and less conservative (or income-decreasing) accounting techniques by firms.<sup>5</sup>

A related stream of research looked at differences in required accounting methods across countries and classified countries as more or less conservative (eg Gray, 1980). Subsequent research examined whether these differences in conservatism could be explained by differences in culture as proposed by Gray (1988). This research stream also focused on differences in unconditional conservatism across countries. However, by the early 1990s, both research streams discussed above appeared to be waning as accounting researchers turned to other questions.

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<sup>5</sup> Fields, Lys and Vincent (2001) provide a more recent and comprehensive review of this literature, to which I refer interested readers.

## 5. Renewed Interest in Conservatism Research as a Result of 1993 AAA Annual Meetings

For the 1993 annual meetings of the American Accounting Association in San Francisco, Baruch Lev requested veteran researchers to present detailed research proposals on: “Why is there a conservatism bias in financial reporting?”<sup>6</sup> The eight researchers (including two nonaccountants) were chosen to represent “a wide range of perspectives and research methodologies.” The session was publicized heavily and held in a large ballroom to enable attendance by a large number of researchers.<sup>7</sup> A packet of the working papers was handed out to all attendees in a bid to “foster high level research among a wide body of academics.” Thus, accounting academics were interested in better understanding conservatism in the mid-1990s.

I had started my dissertation research on conservatism late in 1992, almost completely by accident. I had wanted to modify the earnings-return relation to study the valuation and contracting roles of earnings, and in the sixth of seven tables in an annual paper included a robustness check to document accountants’ tendency to recognize bad news more quickly than good news. The Rochester accounting faculty indicated that my conservatism test had some potential and advised me to develop the idea.

Perhaps because my focus on conditional conservatism departed from the prior empirical research on unconditional conservatism, my dissertation paper was resisted by referees. Even though my dissertation paper was the first paper presented at the 1995 *Journal of Accounting and Economics* conference, it was the only paper not printed in the conference volume. The paper underwent six rounds of review at the journal, and the near final paper was rejected for the 1997 AAA annual meetings (even the Research Forum), a few months before it was published as Basu (1997), because the referee felt the paper did not study conservatism.

## 6. Unexpected Success and Influence of Basu (1997)

Given its teething troubles, the subsequent influence of Basu (1997) is quite surprising. I was fortunate to have come up with the idea when Baruch Lev had focused researchers’ attention on conservatism.<sup>8</sup> More importantly, the Rochester faculty

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<sup>6</sup> In his letter to the researchers dated December 23, 1992, Lev defined the research issue as, “The fundamental bias in accounting measurement and disclosure practices, where possible (probable) losses have to be accrued by a charge to income, while possible gains are not accrued.”

<sup>7</sup> The session was held on Tuesday, August 10 from 10:15 to 11:45 a.m. The eight presenters were Bill Beaver, Michael Brennan (Finance), Joel Demski, Trevor Harris, Daniel Kahneman (Psychology), Bill Kinney, Shyam Sunder and Ross Watts. Their working papers are listed in the References.

<sup>8</sup> Characteristically, Baruch Lev was already moving on to greener pastures. At the 1995 *JAE* conference, my paper was presented in the same session as Amir and Lev (1996) on non-financial information, which captured the interest of both the discussant, Terry Shevlin, and the audience.

encouraged me to pursue a non-traditional idea and research design rather than nipping it in the bud. But most importantly, my dissertation committee (Ray Ball, S.P. Kothari and Ross Watts) believed in my idea strongly enough to use it to address important policy questions such as the limits of accounting harmonization (Ball, Kothari and Robin, 2000; Ball, Robin and Wu, 2000, 2003) and the continuing importance of the contracting role of accounting (Holthausen and Watts, 2001; Watts, 2003a, b). Subsequently, researchers have explored variation in conditional conservatism across numerous contexts (see Ball, Kothari and Nikolaev, 2009, for a fairly comprehensive listing) and greatly enriched our understanding of the financial reporting process.

I think the influence of the paper arises largely because of the simple way it defines and models a fundamental accounting principle. Basu (1997) defines conservatism as the accountant's practice of recognizing bad news more quickly than good news, which translates the accounting principle of "anticipate all losses but anticipate no gains" (eg Bliss, 1924, p. 110) into financial economics terminology. The resulting empirical model places earnings on the left, which in the best of all possible worlds would be the natural dependent variable that accountants study.<sup>9</sup> Using returns as a proxy for news appears to reverse the traditional return-earnings model. However, the economic focus is now on the accountant's decision rather than an average investor's trading decision, so the reversal is only one of appearance (see also Ball, Kothari and Nikolaev, 2009). The important lesson I draw for junior researchers is to find the research design that fits your research question rather than trying to force your research question into popular research designs.

One other important reason why Basu (1997) has been influential is that it defends a longstanding accounting principle on presumptive efficiency grounds rather than lamely accepting its criticisms in the conceptual framework. The old worldview was that conservatism created a downward bias in reported earnings and equity, and was something that standard-setters should weed out. The new perspective is that conservatism is widely used because it solves one or more problems — the implied issue for researchers is to figure out what these problems are and why the conceptual framework is incomplete or incorrect. Instead of presuming that academics and regulators know better than practicing accountants, the paper followed Muth (1961) in assuming that accountants have economic incentives to figure out what accounting methods are most effective in solving the problems firms face.

## 7. A Brief Review of Chinese Conservatism Research

As mentioned earlier, Ball, Robin and Wu (2000) were the first to examine accounting conservatism in China. Specifically, they wanted to examine if adoption of

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<sup>9</sup> Ray Ball has told me that he thinks the single most important contribution of my dissertation was to put earnings on the left hand side of the regression model as the variable to be analyzed.

International Accounting Standards (IAS) improved the quality of financial reporting compared to domestic Chinese accounting standards. The null hypothesis was that there would be no difference because there was comparatively low demand for transparent accounting information. Using several conditional conservatism measures from Basu (1997), they found that Chinese accounting income generally lacks conservatism, both under domestic standards and IAS, consistent with reporting incentives driving financial reporting quality.<sup>10</sup> This paper sparked a lot of interest in Chinese accounting practices by international and Chinese researchers, who typically sought to test U.S.-based hypotheses using Chinese data. I briefly survey Chinese conservatism research, before turning to new directions for conservatism research.

Chen, Gul and Wu (2008) extend Ball, Robin and Wu (2000) to examine how much changes in accounting standards or reporting incentives influence the level of accounting conservatism in China. The paper finds that conservatism increases over time which the authors attribute to changing accounting standards, although it is likely that incentives and monitoring also changed.<sup>11</sup> Chen, Gul and Wu also find that privately-owned firms report more conservatively than state-owned enterprises (SOEs), consistent with incentives mattering.<sup>12</sup> Finally and most interestingly, they find an interactive effect between incentives and accounting standards, in that firms with greater demand for conservatism report more conservatively in more recent periods with more conservative accounting standards.

Sun, Liu and Wang (2005) study the debt contracting explanation for conservatism (cf. Watts and Zimmerman, 1986; Basu, 1997; Ahmed *et al.*, 2002; Watts, 2003a, b; Ball, Robin and Sadka, 2008; Zhang, 2008). Using the Basu (1997) asymmetric timeliness regression, they find that (1) firms with higher debt levels report more conservatively, (2) the worse the corporate earnings ability, the more conservative the accounting policy, and (3) the influence of debt on accounting conservatism in SOEs is significantly smaller than in non-SOEs.<sup>13</sup> Wei and Tao (2007) also study the debt contracting explanation

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<sup>10</sup> Li and Lu (2003) examine more recent 1995-2000 Chinese data and find some evidence of accounting conservatism, although Qu and Qiu (2007) find little evidence of conservatism during 1995-97. Chen, Gul and Wu (2008) find that the number of write-offs increases sharply from 1998 onwards.

<sup>11</sup> Qu and Qiu (2007) examine the impact of changing accounting standards for the allowance for doubtful accounts over 1992-2004, and find significantly increased conservatism only after the introduction of *Accounting Standards for Business Enterprises* in 2001. In contrast, Chen, Gul and Wu examine write-down standards for multiple asset classes, and find evidence of increased conservatism after the implementation of *Accountings System for Shareholding Companies* in 1999.

<sup>12</sup> This result is consistent with the finding that nonprofit institutions that have no owners report less conservatively than publicly-traded companies (Barragato and Basu, 2007), as well as that family-controlled firms report more conservatively than non-family-controlled firms (Wang, 2006).

<sup>13</sup> Jiang and Zhang (2007) argue that investors prefer fair value accounting for valuation purposes over conditional conservatism or pure historical cost, and hence, Chinese standard setters should move towards fair value reporting. This argument ignores the usefulness of conservatism for contracting with managers, shareholders and other properties (Watts and Zimmerman, 1986; Ball, 1989, Basu, 1997; Watts, 2003a, b), as well as the fact that managers can bias the many fair value estimates that are not based on quoted prices from liquid markets.



for conservatism, using the Basu (1997) measure as relabeled by Gassen, Fülbier and Sellhorn (2006) as well as measures by Beaver and Ryan (2000) and Khan and Watts (2007). They find that levered firms are more conservative when they have higher dividend-to-assets ratio, liabilities-to-assets ratio and investment risk, and that higher conservatism is associated with new loan contracts.

Recently, Chen, Chen, Lobo and Wang (2008) examine the effect of both borrower and lender ownership structures on the accounting conservatism of the borrower. Consistent with Sun, Liu and Wang (2005) they find that state-controlled borrowers report less conservatively, but they also find that borrowers from state-controlled lenders report less conservatively. I am unaware of prior research examining the impact of lender characteristics on accounting conservatism, so this study will likely contribute to the broader conservatism literature.<sup>14</sup>

Liu and Zhou (2007) examine whether Chinese clients of international Big 4 auditors report more conservatively than clients of non-Big 4 (Chinese) auditors. Basu, Hwang and Jan (2001) and others show that in the U.S., clients of Big 4 auditors report more conservatively than clients of non-Big 4 auditors, and this difference in conservatism varies with changes in auditor litigation exposure. Since auditor litigation is rare in China, the research question is effectively whether auditor reputation concerns could suffice to induce greater conservatism by Big 4 clients. Liu and Zhou (2007) find that clients of international Big 4 auditors showed significantly higher accounting conservatism than clients of non-Big 4 auditors, indicating that auditor reputation concerns may suffice to induce conservative reporting.<sup>15</sup>

Despite Watts' (2003b) caution that conditional conservatism often gives the appearance of "big bath" behavior, Chinese researchers have studied a reverse causation argument, the possibility that "big bath" earnings management behavior explains Chinese conservatism. Li and Li (2005), Qu and Qiu (2005) and Dai, Lu and Zhang (2007) all report that asset write-downs are concentrated in loss firms. While there is evidence of Chinese conditional conservatism when such write-downs are included in earnings, this evidence is weakened if such write-downs are excluded. However, as Watts (2003b) explains, conditional conservatism should cause write-downs by poorly performing firms, and these write-downs that anticipate future poor performance should increase the losses due to their current poor performance. Thus, it is far from obvious that these write-downs represent earnings management (ie "big baths") rather than good financial reporting. Unless international Big 4 auditors are thought to increase the

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<sup>14</sup> Peng and Li (2007) examine whether reports of American non-life insurance companies are more conservative than those of their counterparts around the world. They find that accounting reports prepared under prudent supervision are more conservative, consistent with government agencies enforcing debt-holders demand for conservative reporting.

<sup>15</sup> Li (2007) finds little evidence that managerial credibility concerns induce conservatism. Li (2007) studies the introduction of recordkeeping by exchanges of corporate disclosure violations, and finds that conservatism increases slightly (but not statistically significantly) in response to the introduction of this credibility assessment mechanism.

likelihood of earnings management, the evidence of Basu, Hwang and Jan (2001) and Liu and Zhou (2007) discussed above suggests that the Basu (1997) regression captures “good” conditional conservatism rather than “bad” big bath behavior.

## 8. Directions for Future Conservatism Research

Chinese researchers can continue to examine the numerous other hypotheses about the causes and consequences of conditional conservatism that have been tested by international researchers (see Ball, Kothari and Nikolaev, 2009, for an extensive bibliography) using Chinese data. In addition, they can exploit the unique Chinese institutional setting to examine new hypotheses about the role of conditional conservatism or constraints on its operation, which would increase the chances of publication in top international journals.

For instance, Basu (2005) argues that unconditionally conservative accounting methods arise because firms try to use these to circumvent income taxes and product regulations. Since Chinese regulations and accounting standards are still developing, it would be useful to study whether alternative accounting methods are permitted or changed (eg Staubus, 1985), and if so, how these are related to tax and regulatory concerns. Conversely, it would be useful to track the evolution of allowable contracting arrangements and observe whether conditional conservatism tracks these changes.

Chinese researchers frequently note that Chinese accounting standards before 1998 did not permit asset write-downs, and thus conditional conservatism was not possible. However, this constraint on conditional conservatism provides an interesting research opportunity to identify substitutes for conditional conservatism. Put differently, if conditional conservatism improves contracting efficiency but is not permitted, how do firms and their stakeholders improve their contracting efficiency? Is it by increased disclosure, posting deposits or other bonding devices, getting political or regulatory backing, or some other mechanism? Does the introduction of conditional conservatism reduce reliance on these alternative contracting mechanisms (are they substitutes) or increase reliance on them (are they complements)? More generally, if mandatory unconditional conservatism preempts conditional conservatism (eg R&D accounting in the U.S.), how do affected firms improve their contracting efficiency to compete with unaffected firms? Most prior analysis on conservatism has been static in nature; we still have little understanding of the dynamics of conservatism changes in response to contracting changes.

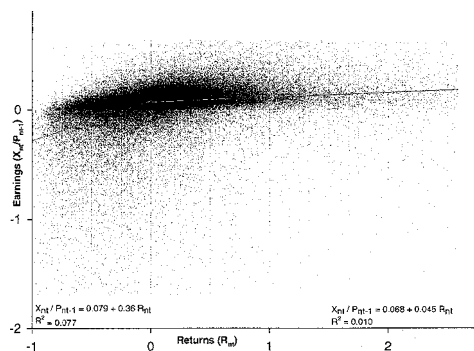
Chinese researchers can also ask more general questions regarding alternative institutional arrangements. Since the degree of state control in China is probably higher than in most other countries, non-financial and budget information likely plays a greater role in China than elsewhere. It would be useful to study how information flows between government agencies and firms, and how the expectations of both sets of parties are coordinated. How conservatively are resource budgets determined, and how has the conservatism of budgets evolved over time? Do government agencies pay any attention

to fair value estimates in their planning, or do they rely mostly on historical cost data?

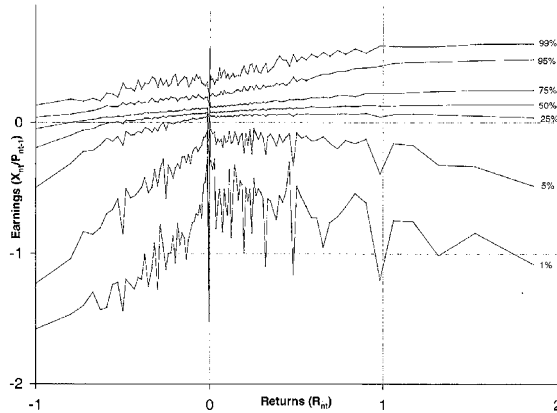
There is a lot of room to improve the methodologies used in conservatism research. Basu (1997) uses a very simple (almost naïve) approach and it is quite obvious looking at the data that the earnings-return relation is *not* piecewise linear. Figure 1 reproduces Figure 2 from Easton (1999), which plots earnings and returns and overlays estimates of the Basu (1997) regression for a Compustat dataset. The estimated line is quite far from the observations near the bottom left-hand corner and a quadratic or other nonlinear model for negative returns would likely fit the data better (Basu, 2005). Similarly, Easton's Figure 4, reproduced here as Figure 2, shows that earnings is very left-skewed as predicted by conditional conservatism, ie, that the 95<sup>th</sup> and 99<sup>th</sup> percentiles are much closer to the median earnings (50<sup>th</sup> percentile) than the 5<sup>th</sup> and 1<sup>st</sup> percentiles respectively. However, earnings skewness is not constant, and increases with the magnitude of bad news, which is also consistent with conditional conservatism. In other words, median regressions will generate different estimates than OLS (mean) regressions because of this conditional skewness (Basu, 2005). Since we know accountants and auditors face asymmetric loss functions, due for instance to their litigation exposure, OLS regressions could mislead us regarding how accountants respond to different kinds of news (cf. Basu and Markov, 2004). Easton's figure suggests that the slopes for the 95<sup>th</sup> percentile are much steeper than those for the 5<sup>th</sup> percentile, but they are both approximately piecewise linear. Quantile or expectile regressions would likely provide a better description of accountants' behavior than the traditional OLS regressions (Koenker and Bassett, 1978; Newey and Powell, 1987). Beaver and Ryan (2005) and Basu (2005) discuss these and other ideas for improving empirical conservatism models, but there have been few substantive improvements in conservatism models since.

### Figure 1. Scatter-Plot of Earnings and Returns

(Reproduced Figure 2 from Easton (1999))



The estimates of the simple regression relation between earnings and returns for the sample of firms with negative returns and for the sample of firms with positive returns are plotted and the coefficient estimates are included in the expression of the regression equation. Returns (R<sub>it</sub>) are price change plus dividends over the fiscal year divided by beginning-of-year price; earnings (X<sub>u</sub>/P<sub>m,t</sub>) are reported earnings per share for the fiscal period divided by beginning-of-period price per share.

**Figure 2. Distribution of Earnings for Each Percentile of Returns***(Reproduced Figure 4 from Easton (1999))*


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Returns (on the x-axis) are divided into percentiles and for each of these returns percentiles, the 1st, 5th, 25th, 50th, 75th, 95th, and 99th percentiles of earnings (y-axis) are plotted.

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Finally, more work needs to be done to clear up misconceptions that have crept into published conservatism research. Theoretical models of conservatism frequently abstract away from practice in misleading ways and create misunderstandings. As an example, Givoly, Hayn and Natarajan (2007) analyze an “aggregation effect” on the asymmetric timeliness coefficient, assuming unilaterally (p. 69), “The notion underlying the DT measure is that conservatism is captured by the differential incremental effect of individual events on current earnings as a function of the nature of the event (good or bad).” However, accountants do not apply conditional conservatism event by event; rather write-downs are typically based on a comparison of fair values and book values at the end of the reporting period. The relevant information that could change the impairment decision from the previous period is the *entire* change in fair value in the current period. I am unaware of any accounting or auditing standard or interpretation that conditions the write-down on whether the price fell steadily (“uniformly”) or sharply (“extreme”) or in any other manner during the period. By choosing a theoretical definition of conservatism that is not based on practice, the authors scientifically generate a theoretical result and data simulations that have no operational content (cf. Hayek, 1942; Gordon, 1955). Ball, Kothari and Nikolaev (2009) explain why the Basu (1997) regression is a model of accounting decisions and not a reverse regression model of investor decisions as sometimes misunderstood, but there are other fallacies that need to be identified and corrected.

## 9. Towards a More Fundamental Understanding of Conservatism

In my recent research, I seek to identify the ultimate determinants of conditional conservatism. Accounting researchers have identified several penultimate determinants of conditional conservatism such as contracting, tax, regulation and litigation (eg Watts and Zimmerman, 1986; Ball, 1989, 2001; Basu, 1997; Watts, 2003a, b). However, we do not understand well why, for instance, litigation is asymmetric. Furthermore, conservatism was used before there was publicly-traded debt, limited-liability equity, income taxes, class-action litigation, accounting standard-setting, and many other modern institutions that we use to explain cross-sectional or cross-country variation in conservatism (cf. Vance, 1943). By focusing so intensely on today's highly visible institutions, we risk missing the fundamental demand for conservatism.

De Ste. Croix (1956, p. 38) points to fragmentary evidence that conservatism is millennia old, saying "Columella, who wrote about A.D. 60, tries to make a conservative estimate of the profits to be made from vine-growing..." He observes that the lack of a general understanding of the distinction between capital and income makes the attempt appear incomplete and inaccurate to modern readers. However, since accounting is at least 10,000 years old (eg Mattessich, 2000; Basu and Waymire, 2006), it seems likely that a fundamental principle like conservatism is very old indeed.

**Figure 3. From Tokens to Receipts in Sumeria (c. 8000 – 3300 B.C.)**

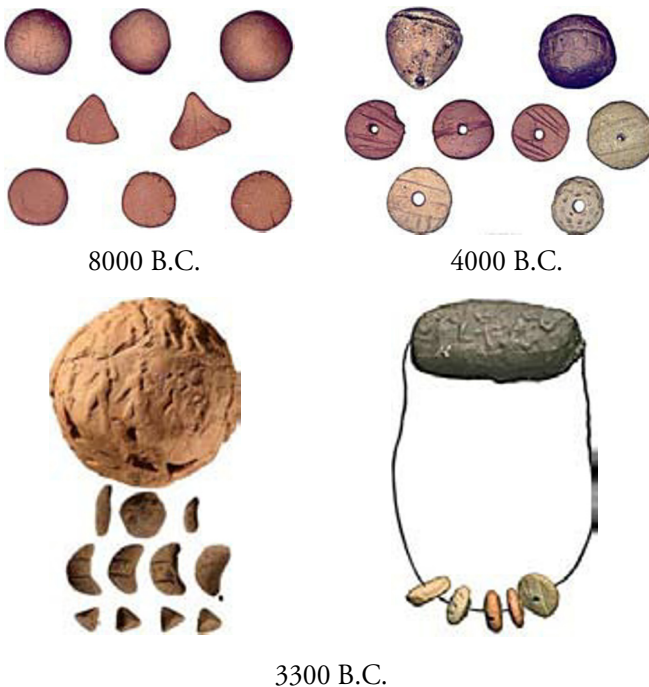


Figure 3 illustrates the pre-historical evolution of accounting in Mesopotamia, as reconstructed by archaeologists (Schmandt-Besserat, 1992; Nissen, Damerow and Englund, 1993). At the top left are some of the oldest recordkeeping tokens, found in the same location and time as the start of agriculture — ancient Mesopotamia (about 10,000 years ago). The baked-clay tokens represent various agricultural commodities (eg, wheat and barley) on a one-to-one basis. These tokens likely signify “tribute” paid to a community leader or “Big Man” in exchange for protection from invaders and/or supernatural beings. The tetrahedral tokens in the middle represent units of work, consistent with the inter-temporal trading of fieldwork for storable food that became useful when agriculture started.

By the fourth millennium BCE, the food surplus created by agriculture supported a large economy of specialized craftsmen. At the top right of Figure 3 are new tokens with different colors, shapes and markings that represented the many manufactured goods of differing grades.

At the bottom left of Figure 3 is a group of tokens baked into a *bulla*, likely to represent a contract or promise of multiple goods. The records had now become “hard” (Ijiri, 1975) in that transacting parties would find it difficult to disagree over what had been done and was left to do, since the *bullae* could be broken open in front of witnesses at the time of settlement.

Within a few hundred years, the recordkeeping technology improved even further. The tokens were impressed on the exterior before being placed inside and baked so that all could see what the obligation was before it was broken open at settlement. Personal seals of the transacting parties and witnesses were also impressed on the *bulla* exterior before baking. These *bullae* were found in temples, and this contracting technology is equivalent to signed and witnessed property records in modern economies. Note that this artifact has been dated to almost 5,000 years after the first tokens were seen, which suggests that the improvements in the recordkeeping technology took thousands of years to evolve.

Figure 4 shows the evolution from these transaction records to writing in Mesopotamia. First, the baked external representations made the internal tokens redundant, which led to a flattening of the *bullae* into tablets (extreme left). Second, line drawings of outlines were substituted for the impression enabling a 2-dimensional representation (second from left). Third, a numeral system was invented that enabled large numbers of a single commodity to be represented much more concisely (third from left). Finally, the signs were simplified into an alphabet that enabled representation of services, emotions and abstract concepts. Last but not least, the scribe would personally sign the back of the record, similar to a notary today (extreme right). Based on these and similar records from around the world, archaeologists believe that writing and numbers were invented by accountants to improve recordkeeping.

**Figure 4. From Receipts to Accounts & Writing in Sumeria (c. 3300 – 3100 B.C.)**

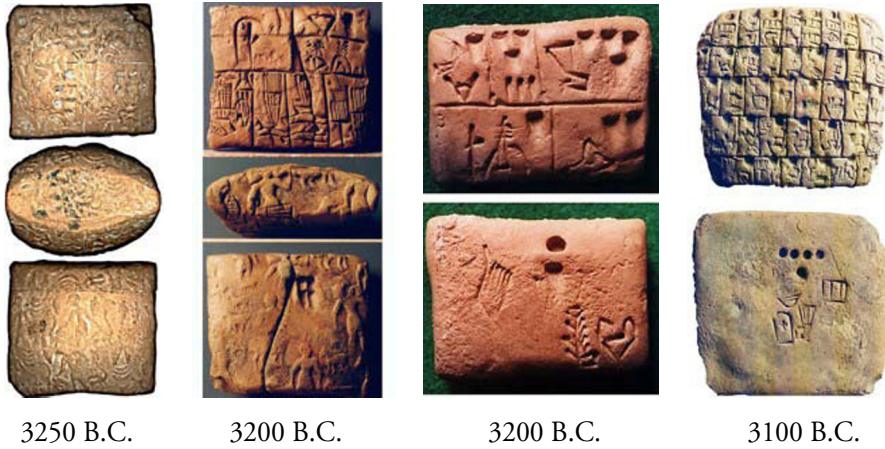


Figure 5 shows recent archaeological findings from China. At the extreme left is a turtle shell with ancient Chinese characters that was found in the Shang capital of Yīnxū (now Anyang in Hénán province). These “oracle bones” (Jiaguwen) were used in traditional Chinese medicines until Wáng Yiróng discovered in 1899 that the marks were ancient Chinese script. In the middle are turtle shells recently found in human graves at Jiǎhú in Hénán province that have been dated back to 6200-6600 BCE (Li, Harbottle, Zhang and Wang, 2003). These turtle shells were found with black and white pebbles, shown in the foreground of the picture, that Basu and Waymire (2006) speculate might have been similar to the early Mesopotamian tokens, with the turtle shells functioning as *bullae*. These turtle shells also have symbols carved on them that might be precursors of the Shang dynasty script, some of which are shown at the far right of Figure 5. Numerous pottery shards with symbols found in neighboring provinces might link these Jiahu symbols to the Shang dynasty written inscriptions, but this research is still in its infancy.<sup>16</sup> Deciphering the prehistory of Chinese accounting is likely to be an endeavor with high payoffs.

Dickhaut, Basu, McCabe and Waymire (2009a, b) argue that if accounting has evolved from such ancient origins, then it is likely that its major features reflect the inner workings of the human brain. Just as recordkeeping expanded the brain’s memory capacity (Basu and Waymire, 2006; Basu, Dickhaut, Hecht, Towry and Waymire, 2009), similarly, Dickhaut *et al.* (2009a) reason that the accounting system improves the brain’s ability to identify and consummate profitable transactions. Dickhaut *et al.* (2009b) review neuroscientific studies that show brain activation patterns consistent with basic financial accounting principles.

<sup>16</sup> See eg [http://en.wikipedia.org/wiki/Neolithic\\_signs\\_in\\_China](http://en.wikipedia.org/wiki/Neolithic_signs_in_China)

**Figure 5. Recent Chinese Pre-Historical Finds**Anyang, Henan,  
1600 – 1027 B.C.

Jiahu, Henan, 6600 – 6200 B.C.

Consistent with Markowitz (1952) and Kahneman and Tversky (1979), neuroscientific studies show that the human brain processes gains and losses differently. Specifically, when confronted with identical decisions but with different outcomes, experimental participants experiencing gains showed greater activity in the rational part of their brain (neocortex) whereas loss participants showed greater activity in their emotional circuits (amygdala). Loss participants were also more likely to remember experimental details three months later, showing that the brain processes and stores loss information more strongly than gain information. This differential behavior likely derives from the survival benefit it would provide in ancestral environments (Ijiri and Nakano, 1989; Nagar, 2008). Thus, the ultimate reason that the accounting system is conditionally conservative is likely that the human brain itself operates conservatively (Dickhaut *et al.*, 2009b). Mapping the information processing of the accounting system to that of the human brain promises to greatly increase our fundamental understanding of accounting, and could lead to a much better conceptual framework for accounting.

## 10. Concluding Comments

I have described the medieval development of the conservatism principle and the beginnings of modern conservatism research, both in the West and in China. I suggest that conservatism research can be developed further, and similar to Chen and Schipper (2008), that “one possibly fruitful avenue is to explore how best to adjust research designs and research questions to fit China’s specific institutional and economic features.”

In the second portion of this paper, I describe my recent research with Greg Waymire, John Dickhaut and others in which we seek to develop a more fundamental



understanding of accounting. This part of the paper begins with a brief survey of pre-historical accounting in Mesopotamia and China, and then discusses the promise of neuroaccounting research with an example of its insights into the ultimate origins of conservatism.

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