

# SMU knowledge hub

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A news update on research activity at SMU

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The Inaugural Marketing Science Institute  
Conference (Asia), 25-26 July 2005  
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## What good is it to have a Proactive Personality if you do not have Effective Situational Judgment Skills?

Professor David Chan  
*School of Economics and Social Sciences*

Researchers in psychology use the concept of *proactive personality* (PAP) to measure an individual's propensity to take actions to try improve the working environment or to create new ones. Individuals who have strong PAP are constantly looking for what they see as better ways to do things and actively championing their ideas, even in the face of strong opposition from others. Individuals differ in their propensities to exhibit such "proactive behaviors". Researchers agree that not all proactive behaviors are desirable and that misguided proactive behavior could lead to negative outcomes. However, as Prof David Chan from the SESS found out in a recent review of the published literature, research on PAP tends to document only its positive effects and neglect the negative ones. In fact, most of these studies have either explicitly stated or implicitly assumed that a high level of PAP is more desirable than a low level.

Prof Chan challenges the assumption that PAP will always lead to positive work perceptions and work outcomes. He argues that individual differences in *situational judgment effectiveness* (SJE) in fact play a critical role in this regard. SJE refers to the general ability of an individual to make a good judgment of the surrounding situation and to respond effectively to the practical situational demands. Prof Chan explains it is the interaction between SJE and PAP that determines whether a worker will have positive or negative work perceptions (perceived supervisor support, procedural justice perceptions, social integration) and work outcomes (job performance, job satisfaction, affective organizational commitment). Specifically, strong PAP leads to positive work perceptions and work outcomes only when SJE level is high but negative work perceptions and outcomes if SJE is low. His recent study using data from a sample of actual employees in Singapore ("Interactive effects of situational judgment effectiveness and proactive personality on work perceptions and work outcomes,"

forthcoming in *Journal of Applied Psychology*) provides strong support for this hypothesis.

According to Prof Chan, there is nothing inherently adaptive or positive in the conceptual definition of PAP or that of proactive behavior. "Proactive behaviors may be maladaptive if they are not pursued realistically or effectively in relation to the situational demands or constraints", he added. As an illustration, he argues that because of their inability to accurately identify, understand and effectively respond to the practical demands and constraints at the work place, high PAP individuals who are low on SJE are more likely to develop unrealistic expectations and demands about the working environment that cannot be met. As a result, they are more likely to interpret the way decisions are made (or the way things are done) at the work place as unfair processes, which in turn explains why they often score lowly in "procedural justice perception" and "perceived supervisor support". Because of their inappropriate actions and reactions, these individuals are more likely to be perceived by their co-workers and supervisor as workers who actively engage in unconstructive criticism, cynical comments, unproductive protests, unjustified complaints, tactless disagreements, or other forms of insensitive, inconsiderate and ineffective actions. Not surprisingly, they are less likely to develop good personal relationships with co-workers or feel a sense of "social integration" at work. They are also more likely to be evaluated negatively by their supervisors. Over time, with constant experiences of unmet expectations, negative work perceptions, and negative evaluations of their job and work situation in the organization, these individuals enjoy little "job satisfaction" and show little "affective organizational commitment".

Conversely, individuals who are high on SJE and PAP are more likely to act in an appropriate and productive manner as they seek to effect changes. They are more likely to do well in procedural justice perception, perceived supervisor support,

social integration and supervisory assessment of job performance. Over time, with constant experiences of fulfilled expectations, positive work perceptions, and positive evaluations of their job and work situation in the organization, these individuals are more likely to attain high levels of job satisfaction and affective organizational commitment. Meanwhile, workers who have high SJE but low PAP are less likely to engage in proactive behaviors even though they have the ability to identify the relevant situational demands.

Prof Chan concludes that understanding an individual's SJE, not just his PAP, is crucial in

prediction his or her work perceptions and work outcomes. These research findings have important conceptual and practical implications. They imply that a high level of PAP may be either "adaptive" or "maladaptive" depending on the individual's SJE level. Thus it may not be meaningful and may even be misleading to postulate a simple association between PAP and work-related performance criteria without at the same time considering the individual's SJE level. "It may not be prudent for organizations to simply select applicants based on their PAP levels," said Prof Chan.

Prof Chan, who joined SESS in July this year, is currently working on a SMU-funded research project that examines the precise affective, cognitive, motivational, and behavioral mechanisms that underlie the nature of SJE and its effects. His works on SJE have been published and cited extensively in journals, handbooks, and encyclopedias. Prof Chan has received numerous research awards and he is the first non-American to receive the prestigious Distinguished Early Career Contributions Award from the Society for Industrial and Organizational Psychology. ■



## Trust Repair

Associate Professor Don Ferrin  
*Lee Kong Chian School of Business*

Over the last few years, one has hardly been able to pick up a newspaper without reading of yet another high-profile trust violation. The leaders of companies ranging from Enron to WorldCom to Merrill Lynch to Arthur Andersen, from Bridgestone/Firestone to Parmalat in the US and even the National Kidney Foundation in Singapore, have been reported to have behaved in ways that have eroded or destroyed the trust of either their employees, shareholders, regulators and/or the general public. In some cases, they have even destroyed the company itself. What is perhaps more troubling is that these public scandals are vastly outnumbered by the small, private, perceived violations of trust that occur every day within organizations. For instance, employees often feel they do not get the recognition or rewards that they have earned, or they feel their actual or psychological contract with the organization was violated, or they act on leaders' advice only to find out that the advice was misinformed. On the other side of the equation, leaders often rely on their followers only to find that the trust was misplaced, or that their followers did not seem to have the skills or commitment that was promised or expected. Obviously, in these situations, an understanding of trust repair processes would be most beneficial. However, it is only in the last two years that scholars have begun to try to provide a more systematic understanding of how trust might be repaired after a perceived violation.

In a series of papers co-authored with Cecily D Cooper, Kurt T Dirks, and Peter H Kim, Professor Don Ferrin of the Lee Kong Chian School of Business has investigated a range of strategies that might be used in repairing trust after a perceived violation. In one article titled "Removing the shadow of suspicion: The effects of apology versus denial for repairing competence-versus integrity-based trust violations," *Journal of Applied Psychology* 2004 89: 104-118, Prof Ferrin and his colleagues found that there is a fundamental difference in how people perceive violations attributable to incompetence as compared to violations attributable to lack of integrity. These differences

led the authors to hypothesize, and ultimately find, that an apology is more effective than a denial for repairing a competence-based trust violation because it offers a sign not only of regret, but also of redemption. In contrast, a denial is more effective than an apology for repairing an integrity-based violation because it attempts to counter the negative information that trust was violated in the first place.

**It is not only what you know (and do), or even who you know, but also who knows and trusts you, that determines your social capital within organizations. This also means that when building trust, one should remember that we need to gain the trust not only of the specific individual, but also his or her social network**

More recently, Professor Ferrin and his three co-authors have expanded their work to consider other potential strategies such as reticence ("Silence speaks volumes: The effectiveness of reticence in relation to apology and denial for repairing integrity- and competence-based trust violations," *Academy of Management Best Papers Proceedings* 2005 CM: C1-6), multiple forms of apology ("When more blame is better than less: The implications of internal vs. external attributions for the repair of trust after a competence- vs. integrity-based trust violation," *Organizational Behavior and Human Decision Processes* forthcoming), and punishment vs. regulation to prevent future violations ("To repent or prevent? Understanding the effects of substantive responses on trust following a violation," *Annual Meeting of the Academy of Management* 2005). All of these studies found significant differences in the effectiveness of the various strategies, and also found that the effectiveness

of each strategy depended a great deal on whether it was adopted in response to a competence- or integrity-based violation.

According to Professor Ferrin, there are several conclusions that can be drawn from these studies. First, while these research findings can be very useful to those who need to repair trust, there is also a risk that the findings will be abused by people who, by definition, do not deserve to be trusted. Readers are strongly cautioned to be truthful when repairing trust. To simply pick the strategy that research indicates will be most effective in the given situation is itself unethical, and represents yet another violation that if discovered will further damage trust (as Bill Clinton discovered to the world's chagrin). Second, the research findings *can* be used to better anticipate how effective one's trust repair strategy is going to be. Taking this a step further, many violations involve incompetence *and* lack of integrity. In attempting to repair trust, it may be appropriate to emphasize one more than the other to maximize the effectiveness of the repair effort. Third, the findings provide insight not only for those who need to repair trust, but also for those whose trust may have been violated. For instance, the research indicates that people tend to react very negatively to reticence: it rarely if ever outperforms apologies and denials. But in actuality, people using reticence are only asking that judgment about the violation be withheld, and in fact there are some instances in which the use of reticence is quite appropriate (e.g., personal or private matters), or even legally required. Yet, instead of withholding judgment, people seem to be predisposed to making a negative judgment, regardless of whether that negative judgment is warranted. Fourth and perhaps most obviously, it is much easier to build trust in the first place, and maintain it, than to repair trust after a violation.

Some of Professor Ferrin's most recent work looks beyond the relationship between trustor and trustee, to consider the social network that surrounds them. In an article titled "Direct and indirect effects of third-party relationships on

interpersonal trust,” in *Journal of Applied Psychology* forthcoming (with Kurt T Dirks and Pri P Shah), Professor Ferrin and his co-authors mapped the entire network of trust, communication, and helping relationships within a company, and then analyzed the determinants of interpersonal trust. Their findings were quite surprising. Although the actions that occurred within each interpersonal relationship (such as helping each other and communicating frequently) positively influenced trust within that specific relationship, these effects were not nearly as strong as the effects of third parties. Specifically, interpersonal trust was strongest

when the two individuals were connected by a large number of third parties who could convey positive trust-related information from trustee to trustor.

“The message here is quite important: It is not only what you know (and do), or even who you know, but also who knows and trusts you, that determines your social capital within organizations. This also means that when building trust, one should remember that we need to gain the trust not only of the specific individual, but also his or her social network,” said Prof Ferrin.

Prof Ferrin is heartened that the scholarly work on trust seems to have finally reached a critical mass where it can be put into practice. For example, he noted that one consultancy firm in Toronto, *Trust Unlimited*, is explicitly drawing on academic research to develop training and intervention programs, and consult with clients in a range of industries, to help them develop stronger trust relationships within their companies and with their external customers. Professor Ferrin predicts that this will ultimately lead to synergies in which research influences practice, and practice then provides empirical insights that can inform and guide future research. ■

## Do We Know Enough About the Impact of Insider Information on Stock Price Volatility?

Professor Chunchi Wu, *Lee Kong Chian School of Business*



The relationship between return volatility and trading volume in the stock market is a subject of considerable interest in financial research. According to modern market microstructure theory, changes in price and trading volume are related to the arrival of information to the market, i.e., information arrival induces a dynamic adjustment process for prices and trading volumes. What is not so clear is how unobserved private (insider) information may affect the return dynamics of assets.

In a recent paper (“Daily Return Volatility, Bid-Ask Spreads and Information Flow: Analyzing the Information Content of Volume”, forthcoming in *Journal of Business*), Prof Chunchi Wu from the Lee Kong Chian School of Business (with JinLiang Li from Northeastern University in the US) tries to estimate the effects of unobserved insider information on the fundamental values of assets, using an extended version of the “Mixture of Distribution Hypothesis” (MDH).

The basic MDH model posits a joint dependence of price changes and trading volume on the underlying latent information, but the latent information that it is able to abstract contains substantial noise due to liquidity trading. The generalized model, on the other hand, is able to separate the pure private information from the noise induced by liquidity trading. As a consequence, the private (or inside) information extracted from this model has much greater precision and contains richer content.

The authors use the model to examine the relationships among stock return volatility, volume, bid-ask spreads, and daily information flows, using daily data of the Dow Jones 30 stocks for the period from January 4, 1988 to August 31, 2001. Empirical tests of the price effects of informed and liquidity trading are conducted by accounting for the dynamic features of temporal information flow and trade arrivals.

Using a Bayesian theoretic model, the authors show that information-based trading increases volatility while liquidity-motivated trading decreases it. The random buy and sell orders (noise trading) generate noise but have the benefit of reducing price volatility. The empirical evidence confirms such relationship. Indeed, once the authors sift out the effect of information flow, return volatility is found to be negatively correlated with trading volume, due largely to noise in the market. The result supports the hypothesis that liquidity trading increases market depth and dampens the volatility of stock returns. “Our study suggests that previous studies using total trading volume as a regressor in volatility regressions tend to underestimate the effect of private information on return volatility,” said Prof Wu.

In addition, the authors found that the size of bid-ask spreads is positively related to the intensity of information flow. The intensity of informed trading extracted from the generalized MDH model has greater explanatory power than any traditional

measures of informed trading in the “spread regression” model. Furthermore, there appears to be a dynamic feedback relationship between informed trading and bid-ask spreads. This phenomenon is consistent with microstructure theory that private information induces a dynamic learning (or price discovery) process, through changes in trades and adjustments in the market maker’s quotes, which eventually results in prices fully revealing the content of the private information.

The model was also used to estimate temporal information flow and informed trading volume. The informed trading volume estimated from the model has richer information content than traditional measures of informed trading such as order imbalances and trade size. Prof Wu hastened to point out that one particular advantage that the model offers is its ability to provide time-series estimates of informed volume. This allows researchers to investigate the inter-temporal relation between bid-ask spreads and informed volume, an important task which could not be accomplished by many traditional microstructure models.

“Overall, our empirical results show that the generalized MDH model is quite robust for empirical characterization of the temporal behavior of volatility and volume. The model offers a rigorous framework for uncovering the underlying information flow and predicting its effects on asset price movements,” Prof Wu said. ■



## Designing Web Page Language for Software Agents in E-Commerce: the XRML Approach

Professor Jae Kyu Lee, *School of Information Systems*

Web technology on the Internet has made e-commerce possible. To build the Web pages, HTML (Hypertext Markup Language) files are devised so that contents can be browsed in a standardized way. As the e-commerce transactions

get more complex, it has become necessary for the software agents to understand the contents in the Web pages. However, most Web pages contain texts in unstructured natural languages and tables. Since the current natural language processing

technology is not matured, it is impossible for the software agents to understand the contents. XML (eXtensible Markup Language) was designed to deal with such a problem. It identifies the data within the paired tags of data name as metadata.

For example, if a number (for instance 100) implies the price of a certain product, the number can be described as `<price> 100</price>` in the Web pages. Since the tagged representation of metadata makes the data retrievable, XML has become the industry standard to exchange messages in a way that is comprehensible to software agents and the general users. Currently XML is adopted as the basic platform of EDI (Electronic Data Interchange), EAI (Enterprise Application Integration), RosettaNet for B2B process, and Web Services.

But software agents face another challenge: they cannot understand the meaning of the XML terminologies and the relationships among them. This has led to the development of Semantic Web which provides the ontology describing the resources in the Web pages. With Semantic Web, software agents can understand the availability of resources and detect the XML contents in the Web pages.

Professor Jae Kyu Lee from the School of Information Systems believes that the next step in this endeavor is to make it possible to provide for automatic decision making by software agents. Rule processing is more challenging than data processing because it is a lot more difficult to

represent structured rules on the implicit statement. Prof Lee and other researchers have developed the XRML (eXtensible Rule Markup Language) framework for this purpose. XRML allows for the identification of rules on Web pages and the automatic transformation of these rules to structured rules. More recently, he has also tried to design the Rule Identification Markup Language (RIML) that has a structure similar to the formal rule structure. Unlike XRML, RIML is designed to identify rules not only from texts, but also from tables. "The beauty of using RIML is that the rules can be identified on the Web pages and automatically transformed to the formal rules syntax," said Prof Lee.

### The beauty of using RIML is that the rules can be identified on the Web pages and automatically transformed to the formal rules syntax

XRML is also capable of dealing with the issues of sharing variables and values, omitted terms, and synonyms. So far, XRML has seen a number of applications. For example, a prototype has been

developed to compare the delivery costs and the purchase prices in e-commerce. In the current e-commerce environment, customers can see the purchase prices in the electronic catalog, but not the delivery costs because each order requires its own computation based on the relevant rules described in the Web pages. The difference in delivery costs is often bigger than that in product prices in the online book purchase.

To evaluate the potential benefit of the XRML approach, Prof Lee conducted an experiment with the real world Web pages of Amazon.com, BarnesandNoble.com and Powells.com. He found that 97.7% of the core rules and 89.7% of the general rules can be detected on the Web pages. "This is good proof that XRML can benefit the extraction and maintenance of rules from e-Commerce Web pages, especially when we need to build up rule-based agents in the Semantic Web environment," said Prof Lee. ■

The output of Prof Lee's research have been published in the *Communication of ACM*, *Decision Support Systems* and others, and presented in the international conferences including the key note speech in the International Conference on Electronic Commerce 2005 held in Xian, China.



## Why Are Accountants So Conservative?

Professor Young K. Kwon, School of Accountancy

In accrual accounting, the effects of a firm's transactions and other economic events are recognized in the firm's financial statements even though the effects of the transactions and events have not yet resulted in cash flows. As such, accountants often face the difficult task of having to determine the relevant monetary amount for each transaction under a great deal of uncertainties. When high or low expenses (or losses) are assessed to be equally probable, accountants are not sure which amount should be reported in the financial statements. An important guiding principle for practicing accountants in such situations is *conservatism*, commonly expressed in the admonition to "anticipate no profits and anticipate all losses."

However, accounting conservatism has recently been under attack. For instance, in the *Statement of Financial Accounting Concepts* No. 2 (1994/95 edition), the US Financial Accounting Standard Board points out that conservatism "tends to conflict with significant qualitative characteristics such as representational faithfulness, neutrality, and comparability (including consistency)" (paragraph 92). The Board concludes that "any attempt to understate results consistently is likely to raise questions about the reliability and integrity of information about those results and will probably be self-defeating in the long run" (paragraphs 96). In 1993, a special session of the American Accounting Association's annual meeting was devoted to the economics of conservatism, and a number of eminent scholars advocated research designed to investigate the

causes and effects of conservative financial reporting.

In two recent publications: "The Demand for Accounting Conservatism for Management Control" in *Review of Accounting Studies* 6 (2001): 29-51 (with Newman, P. and Suh, Y.) and "Accounting Conservatism and Managerial Incentives" (forthcoming in *Management Science*), Professor Young K. Kwon from the School of Accountancy tried to provide a better understanding of accounting conservatism. Both articles are based on principal-agent models in which the principal (representative stockholder) motivates the agent (manager) to work hard using accounting earnings. Also, the principal's ability to penalize the agent for poor performance is assumed to be limited.

The separation of ownership and control in the models creates incentive conflicts between the principal and the agent. Such conflicts often result in three types of *agency cost* to the principal: (a) the implementation of *second-best* efforts rather than *first-best* efforts; (b) the shifting of excessive risks to the risk-averse agent; and (c) the agent's *rents*. Since the principal motivates the agent using accounting earnings, the severity of the agency costs depends on accounting characteristics such as measurement errors, biases and informational content etc. Unfortunately, the three types of agency cost interact with one another inextricably, and decreasing one type of agency cost often increases the other type(s). As a result, the task of investigating the effect of

changing an accounting characteristic on agency welfare is quite complicated and often intractable.

### It allows the principal to reduce the agent's rents by decreasing the probability of high accounting earnings being reported without decreasing the agent's incentive to work hard.

In "The Demand for Accounting Conservatism for Management Control", for tractability, Prof Kwon and his two co-authors make the simplifying assumption that the agent's effort is exogenously fixed. As a result, the agency costs of type (a) remain unchanged as accounting earnings are measured conservatively, neutrally, or aggressively. In the article, conservatively determined accounting earnings is shown to reduce the agent's rents, allowing the principal to efficiently trade off agency costs of types (b) and (c) when the agent's limited liability constraint is binding. The article provides a new rationale for conservative accounting practices. However, it offers little insight regarding the effects of accounting conservatism on agency costs of type (a) since the agent's effort is assumed to be exogenously fixed.

In the article "Accounting Conservatism and Managerial Incentives", Prof Kwon considers a risk-neutral setting so that agency costs of type

(b) do not arise. The analysis focuses on the trade-off between agency costs of types (a) and (c). In the model, the principal can induce the agent to expend greater effort by increasing the difference between the agent's rewards for favorable and unfavorable outcomes. However, such an increase is costly as it raises the agent's rents when his limited liability is binding. Therein lies another rationale for accounting conservatism: it allows the principal to reduce the agent's rents by

decreasing the probability of high accounting earnings being reported without decreasing the agent's incentive to work hard.

The two studies add to the list of explanations for conservative accounting practices which predate regulatory intervention by centuries. However, Prof Kwon cautions that there are occasions when such conservatism may not be appropriate. For example, in a valuation exercise

where investors need to use accounting data to predict future cash flows and to set the appropriate stock prices, unbiased financial reporting may be considered more relevant than biased reporting. "To the extent that the valuation role of accounting information dominates the contracting role, conservatism might be less important," said Prof Kwon. ■



## Is Your Outsourced Data Server Telling The Truth, The Whole Truth, and Nothing But The Truth?

Associate Professor Pang Hwee Hwa, *School of Information Systems*

In "data-publishing", the owner of data delegates the job of answering users' queries to a third-party publisher. Compared with the conventional client-server model where the data owner responds directly to queries from the users, the data publishing model offers a number of advantages. For example, it speeds up user responses by reducing delays caused by congested network. The model offers a cheaper way to achieve scalability than the alternative of fortifying the owner's data center and providing more network bandwidth for every user. Furthermore, a failure at the owner's data center will no longer affect all the users as the latter are served through multiple third party publishers. This helps to reduce incidents of service disruption. The data publishing model has been applied widely in different areas including database caching, content delivery network, edge computing and P2P databases etc.

A major problem with the use of data publishing concerns the "correctness" of the query results (answers) provided to the users. Since the servers of the third-party publishers fall outside the administrative domain of the data owner, and may in fact reside on poorly secured platforms, the results generated by them cannot be taken at face value. Users will be particularly wary if they are to use these results as the basis to make critical decisions. It is important that users be given some recourse to check the "correctness" of the results they receive.

Associate Prof Pang Hwee Hwa from the School of Information Systems addresses this concern in a recent study (with A. Jain, K. Ramamritham and K.-L. Tan, "Verifying Completeness of Relational Query Results in Data Publishing", in *Proceedings of the 24th ACM SIGMOD Int. Conf. on Management of Data*, June 2005, 407-418). Working with Associate Professor Tan Kian Lee from the National University of Singapore, he tries to provide ways to check the "correctness" of the query results in relation to the following objectives:

**Authenticity** – The user can check that all the data indeed originate from the owner and that they have not been tampered with, nor have spurious entries been introduced.

**Completeness** – The user can verify that all the necessary records needed to satisfy the query are included in the answer.

**Precision** – The ratio of the query result size, over the total size of the data points and their attribute values, should be high. Ideally, it should be 100%.

**Security** – Making it not feasible computationally for the publisher to cheat by generating a false verification for an incorrect query result.

**Efficiency** – The procedure for the publisher to

generate the proof for a correct (i.e., complete and authentic) query result has polynomial complexity. Likewise the procedure for the user to verify a query result has polynomial complexity.

Among the above objectives, completeness is particularly tricky to handle. For example, how does a user detect a missing record, if he is not already aware of its existence? There is also a trade-off between completeness and precision. Theoretically, the entire certified database could be disseminated to users directly for them to perform query processing. However, this is impractical with large data bases. Besides, there are likely to be access control policies that restrict certain users to only subsets of the database.

So far, the authors have published a solution for relational select-project-join queries. The solution supports range selection on key and non-key attributes, project as well as join queries on relational databases. Moreover, the solution complies with access control policies, is computationally secure, and can be implemented efficiently. They are now extending the research to address a broader range of queries, including aggregation, OLAP (On-Line Analytical Processing) and XML queries. ■



## Do Changes in a Firm's Management Accounting and Control System Affect the Firm's Performance?

Practice Associate Professor J. J. Williams, *School of Accountancy*

A firm's accounting control system can be characterized as a portfolio of sub-systems that feature planning, control, evaluation, reward mechanisms, and decision models, among others. These sub-systems are often changed by firms over time but in ways that are not clearly understood. Within the accounting profession, advocates for such changes argue that they increase the performance of individual managers or specific

operating units within the firm. It follows that the challenge for any firm is to know which components to change so as to achieve optimal performance.

The academic literature, however, views this problem with far more complexity because of contingency variables that impact the whole portfolio of sub-systems. For example, one widely-held view of the causal linkage involved posits that

top management perceptions of the external environment impact the organization's strategic decisions, which in turn affect design decisions encompassing organizational structure and control systems. The latter then influence the individual level, including performance, and this entire linkage ultimately influences the firm's performance. However, empirical research devoted to this issue has focused on only a single sub-system at a time

rather than investigating the entire set of sub-systems simultaneously.

### **the empirical results from his research show that there is no direct relationship between changes in the set of accounting control sub-systems and the overall firm performance**

For nearly two decades, Practice Associate Professor Williams has been developing data bases from cross-cultural field studies in an effort to develop appropriate models, measures, and statistical methods capable of dealing with a set of accounting control system changes in the contingency framework described above.<sup>1</sup> Contrary to common understanding, as well as arguments contained in the professional literature, the empirical results from his research show that there is no direct relationship between changes in the set of accounting control sub-systems and the overall firm performance. This result holds even when contextual variables such

as management perceptions of environmental uncertainty (PEU) are added to the model. But theories from the information processing literature suggest that PEU should operate as a moderating variable on the accounting control sub-systems/performance relationship, meaning that high versus low conditions of PEU should combine with different accounting control sub-system changes to influence performance. Put differently, to enhance performance, firms must match particular sub-system changes with the appropriate level of PEU that they face.

In recent research (“Management Accounting Change in Singaporean SMEs: A Strategic Level Analysis” forthcoming in the *Journal of Applied Business Research*, with A. Seaman), Prof Williams found this relationship to hold for a sample of small and medium-sized Singaporean firms. This initial finding was crucial, according to Prof Williams, in asking two far more interesting and significant questions. First, do sub-system changes enhance performance in the case of both low and high levels of PEU, as implied in the contingency ‘fit’ literature? Secondly, if affirmative, are all sub-systems equally

important in each configuration? Results indicated a resounding “yes” to the first question and a categorical “no” to the second question.

Overall, these findings suggest that firms in the private sector need to emphasize changes to particular accounting control systems conditional on top management perceptions of the external environment. For example, to the extent that the latter is seen as hostile and uncertain, changes that feature the performance/reward sub-systems should be favored while for more benign external environments, an emphasis on changes to planning and decision making sub-systems should be encouraged. However, Prof Williams cautioned that these are early results and further research needs to focus on large firms and possible cross-cultural validation in other national settings. ■

<sup>1</sup> For examples, see “Management accounting systems change and departmental performance: the influence of managerial information and task uncertainty” in *Management Accounting Research* 2002 13: 419-445 (with Seaman, A. E.) and “Predicting change in management accounting systems: national culture and industry effects” in *Accounting, Organizations and Society* 2001 26: 443-460 (with Seaman, A. E.).



## **The Beauty of Clumsy Solutions in a Complex World**

Associate Professor Marco Verweij, *School of Economics and Social Sciences*

In the 1980s, renowned anthropologist Mary Douglas posited that the seemingly endless variety of organizing and perceiving human society could all be reduced to a fourfold typology: individualism, egalitarianism, hierarchy and fatalism. She believed that while social domains were always in flux, the source of all these changes could be traced to the continuous waxing and waning, merging and splitting, and re-invention of four ways of organizing human life. Douglas noted that her fourfold typology in fact represented the least possible number of ways that would include all forms of human society which classical social and political scientists such as Weber, Marx and Durkheim had identified. It also captured the rich diversity of alternative ways of living documented in many years of ethnographic studies. Douglas’ classification of human societies was echoed in 1991 by Alan Fiske, an UCLA-based anthropologist.

### **The studies identified a number of issues that were successfully resolved by creatively combining the four contradictory ways of organizing and perceiving.**

During the following decade, a group of political scientists (e.g. Aaron Wildavsky, Richard Ellis, Christopher Hood) and anthropologists (e.g. Michael Thompson, Steve Rayner) banded together to flesh out the implications of

Douglas’ seminal ideas for political theory and public policy. They found that public debates about pressing social ills and their solutions inevitably boil down to debates between advocates of the four ways of organizing human society. They also argued that successful solutions to pressing social ills tend to consist of innovative combinations of all four, and that governance failures are typically caused by the exclusion of any of the four. It was in this context that Michael Thompson coined the term ‘clumsy solutions’ to stress the idea that effective solutions to social problems call for a creative combination of all opposing perspectives. In the 1990s, various empirical studies tested, and generally confirmed Douglas’ hypotheses. But these tests remained few and far in between, and were usually restricted to only a few specific areas such as environmental protection and urban development.

A few years ago, Associate Professor Marco Verweij took the initiative to expand the tests of Douglas’ hypotheses and to extend the analysis to other social domains and issues. Called “Clumsy Solutions for a Complex World”, the study brought together 24 political scientists, anthropologists, economists, sociologists, lawyers, engineers and geographers to test the ‘clumsy hypothesis’ for 10 widely (if not wildly) different issues. The outcome of the initiative can now be found in two sets of publications: a book edited by Prof Verweij (and Michael Thompson), “Clumsy Solutions for a Complex World: Governance, Politics and Plural Perceptions”, to be published by Palgrave Macmillan in 2006, and a article in *Public*

### **The ultimate cause of governance failure was the systematical exclusion of one of the four ways of organizing human society from the decision-making processes – and the wisdom and experience ingrained therein.**

*Administration*, “Clumsy Solutions for a Complex World”, Vol. 84, forthcoming in 2006.

The studies identified a number of issues that were successfully resolved by creatively combining the four contradictory ways of organizing and perceiving. These “clumsy solutions” included the set-up of the Internet, the new system of allocating water in certain parts of California, flood control in Eastern Hungary, and the organization of the public university in the United States. The issues that had clearly been characterized by policy failure were: international climate change-policy, safety seat belts-legislation, development policy in Nepal, the Russian transition to capitalism, anti-discrimination policy in The Netherlands, and gun-control in the United States. For all these issues, it was found that the ultimate cause of governance failure was the systematical exclusion of one of the four ways of organizing human society from the decision-making processes – and the wisdom and experience ingrained therein. ■

## Correcting the Estimation Bias in the Pricing of Bond Options and Interest Rate Derivatives



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*School of Economics and Social Sciences*



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For more than three decades continuous time models have proved to be a versatile and productive tool in finance. The models are especially useful with respect to pricing derivative securities where both closed form solutions and numerical methods are used in practical work. However such models often suffer from the problem of “estimation bias” which could result in biased estimators of the parameters of the continuous system with consequent biased effects on derivative prices.

**It is applicable in a broad range of model specifications and it is not necessary to develop explicit higher order representations of the bias**

Of particular importance is the estimation bias in diffusion models, especially the bias arising from the estimation of parameters governing volatility and drift. When such biases occur, as they often happen with the use of the maximum likelihood estimation (MLE) and many other estimation procedures, they are transmitted directly to the pricing formulae for bonds, bond options and other derivative securities. For instance, when the true mean reversion parameter is 0.1 and 600 weekly observations (i.e. just over 10 years of data) are available to estimate a one-factor square-root diffusion model, the bias in the ML estimator of the mean reversion parameter is 391.2% in an upwards direction. This estimation bias, together with the estimation errors and nonlinearity, produces a 60.6% downward bias in the option price of a discount bond and 2.48% downward bias in the discount bond price. These biases are substantial in any practical sense. The biases would be even larger when less observations are available and do not disappear even when using long spans of data that are currently available.

To address the problem of biased estimation in continuous time models with its consequential effects on bond option prices, Associate Professor Yu Jun from the School of Economics and Social Sciences (with P Phillips) proposes to use bias reduction techniques based on a statistical tool, the jackknife method, in a recent paper published in *Review of Financial Studies* (2005). Prof Yu explains that the jackknife has several properties that make it appealing in the present application. The first advantage is its generality. Unlike other bias reduction methods, such as those based on corrections obtained by estimating higher order terms in an asymptotic expansion of the bias, the jackknife technique does not rely on the explicit

form of an asymptotic expansion. This means that it is applicable in a broad range of model specifications and it is not necessary to develop explicit higher order representations of the bias. In the pricing of bond options and derivatives, for instance, one can apply the jackknife technique directly to the quantity of interest (like the option price itself), and hence also reduce some of the bias arising from the estimation errors.

Given the complicated form of options price representations in terms of the underlying process and its parameters, this advantage is significant and makes the method very suitable for empirical implementation. In fact, it turns out that direct use of the jackknife to the options price provides significant gains relative to bias reduction in the parameters of the continuous time model. Moreover, other methods of parameter bias reduction in dynamic models, like median unbiased procedures are only applicable to parameter estimation and are not directly applicable to more complex quantities like options prices which depend on many other aspects (including distributional details) of the model.

A second advantage of the jackknife is that this approach to bias reduction can be used with many different estimation methods, including general methods like MLE. Also, as indicated above, it can be applied to many different models. This flexibility is illustrated here by implementing the jackknife in both single factor and two-factor affine term structure models both in simulations and in an empirical application.

Thirdly, the jackknife method can be applied in any asset pricing situation (e.g., stock and currency options with stochastic interest rates and interest rate derivatives) where the quantities of interest depend on the estimation of continuous time systems in which finite sample bias arises. Finally and most importantly for practical purposes, unlike many other bias correction methods such as median unbiased estimation, bias function approximation and bootstrapping, the jackknife is computationally much cheaper to implement. In fact, the method is not much more time consuming than the initial estimation itself.

“Our findings indicate that the jackknife provides a very substantial improvement in pricing bond options over existing methods,” said Prof Yu. For example, when the authors compare the distribution of estimates of the option price of a discount bond obtained by using MLE and jackknifed MLE in a one-factor square root model with 600 monthly observations, they find that the jackknife estimates are much better centered on

the true options price and do not show any appreciable increase in variance. In fact, the root mean squared error (RMSE) of the jackknifed estimates is 12.1% smaller than that of MLE while also providing a bias reduction of 11.5% for 600 observations. They further show that a carefully designed jackknife method can lead to a lower value of RMSE, so bias reduction is accomplished without compromising the gains by much larger variability.

In pricing bond options and interest rate derivatives, model specification is known to be important. Concern over specification has also led to the introduction of more flexible methods of estimation, such as the semi-parametric treatment of diffusion and the fully nonparametric approaches that allow users to be agnostic regarding functional form. At least in models where the drift is linear and parametric, the discrete time equivalent model that is satisfied by equi-spaced observations has the same general autoregressive form, so that dynamic estimation bias of the type discussed above can be expected in all conventional approaches. In consequence, it may be expected that a bias reduction procedure such as the jackknife may be useful even in situations where the continuous time model is misspecified by incorrect specification of the diffusion.

**They further show that a carefully designed jackknife method can lead to a lower value of RMSE, so bias reduction is accomplished without compromising the gains by much larger variability**

Prof Yu notes that their findings indicate that the jackknife indeed continues to deliver bias reduction in both autoregressive parameter estimation and in pricing bond options under model misspecification. In fact, the results suggest that bias reduction may be more important in practice than correct specification of the diffusion term in pricing bond options. “We believe this contribution is important as the specification analysis has become a focal point of much recent literature in finance,” said Prof Yu. In a subsequent paper (“Discussion on a selective overview of nonparametric methods in financial econometrics”, forthcoming in *Statistical Science*), the authors intend to further emphasize this line of contribution. ■

## Special Research News

### 1. Inaugural SMU EDGE Conference 11-13 July 2005

The Inaugural Enterprise Development Growth and Expansion Program [EDGE] at SMU was successfully organized at the Orchard Hotel from 11 to 13 July 2005. The conference, with the theme “Bridging the Gap: Entrepreneurship in Theory and Practice” drew an enthusiastic crowd of 98 participants from 23 countries. Keynote speakers Professor Peter S Ring (Loyola Marymount University) and Alan Carsrud (Florida International University), together with two local entrepreneurs, Richard Eu (CEO, Eu Yang Sang) and Sunny Verghese (Group Managing Director and CEO, Olam) shared their experiences with the conference participants. The conference, which received extensive coverage by The Business Times, was supported by three leading journals, *Entrepreneurship Theory and Practice*, *Journal of Enterprising Culture and Venture Capital*. The three journals will publish selected conference papers under different themes: *Entrepreneurship Theory and Practice* will publish on the theme of “Relationships, Partnerships and Entrepreneurship” while *The Journal of Enterprising Culture and Venture Capital* will do so under the themes of “Measurement Issues in Entrepreneurship Research” and “The Changing Investment Environment” respectively.

<http://www.research.smu.edu.sg/faculty/edge>.

### 2. The Inaugural Marketing Science Institute Conference (Asia) 25-26 July 2005

On 25 and 26 July 2005, the Lee Kong Chian School of Business organized and co-sponsored the first Marketing Science Institute (MSI)<sup>2</sup> Conference in Asia. Entitled “State of the Art Marketing: Recent Advances in Marketing Concepts and Practice from Academic and Industry World Leaders”, the prestigious conference featured seven leading marketing academics and five well known industry leaders from around the world. Minister of State at the Ministry of Education, Chan Soo Sen, gave the opening address at the conference. The MSI and the Australian Graduate School of Management (AGSM) were the other two co-sponsors.

The academic speakers were among the leading marketing thinkers in the world today including George Day (Wharton), Mike Hanssens-(UCLA and MSI), Kevin Keller (Dartmouth), David Reibstein (Wharton), John Roberts (GSM), Raj Srivastava (Emory) and Earl Taylor (MSI). The industry speakers were Erwin Elechicon (Procter

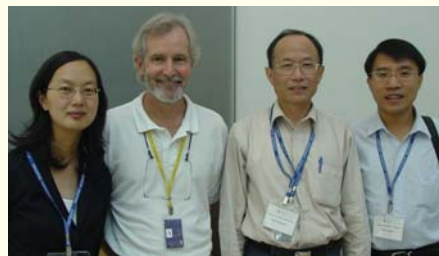
& Gamble), Alastair Gordon (ACNielsen), Ho Kwon Ping (Banyan Tree Holdings), Minsok Pak (McKinsey) and Frank Wong (DBS Bank).

The themes covered in the conference include “Developing Customer Oriented Organizations”, “Building and Exploiting Strong Brands”, “Leveraging Customer Satisfaction”, “Global Marketing in a Cross-Cultural World”, “Managing by Marketing Metrics and Marketing Management: A Strategic Perspective”. Participants who were made up of an exclusive group of senior marketing executives and CEOs heard the latest research findings from the academics as well as the practical perspectives on the same issues from the industry speakers.

### 3. The Second Singapore Econometric Study Group (SESG) Meeting 8-9 July 2005

The School of Economics and Social Sciences (SESS), SMU, hosted the Second Singapore Econometric Study Group (SESG) on 8 and 9 July 2005. The one-and-half day meeting, chaired by SESS Professors Roberto Mariano, Yiu-Kuen Tse and Associate Professor Jun Yu, took place at SMU’s new city campus. A total of 28 participants from 10 other countries<sup>3</sup> attended the meeting. The highlight of the meeting was the keynote address delivered by Professor Peter Phillips, Sterling Professor of Economics and Professor of Statistics at Yale University. The title of the keynote address was “Trends and Economic Transition”. In all, 17 papers were presented. They covered a wide range of topics, including empirical finance, macro-econometrics, panel and simultaneous-equation models, theoretical econometrics and financial volatility models.

<http://www.sess.smu.edu.sg/SESG/index.htm>.



### 4. Finance Summer Research Camp 26-27 July 2005

On 26 and 27 July 2005, SMU held the inaugural summer research camp in finance. The goal of

the two-day event was to provide junior finance faculty in Singapore an opportunity to present their research to and to benefit from discussion with well known senior faculty in the profession. A total of 12 papers were presented and discussed. It was clear from the feedback that both paper presenters and discussants benefited a great deal from the exchange of ideas that the forum provided. Indeed, attendance at the conference exceeded the organizer’s initial expectations and included several faculty members from the NUS. The organizers plan to expand the conference next year by including more participants from other universities in the region.

<http://www.business.smu.edu.sg/PrjgFinSummerCamp/index.htm>

### 5. “The Economic Prospects of Singapore” by SESS

A new book published by SESS, “The Economic Prospects of Singapore”, was launched on 2 August 2005 at the Li Ka-Shing Library. Edited by Associate Professor Winston T.H. Koh and Professor Roberto S. Mariano, with a Foreword by Professor Howard Hunter, President of SMU, the book was written to celebrate Singapore’s 40 years of independence. The book describes the policies that have led to Singapore’s economic success and discusses the strategies that Singapore must embark upon to meet the future challenges. Several broad themes are explored in the book, ranging from the employment trends and the outlook of the economy, to the challenges of promoting entrepreneurship and stimulating innovativeness.



<sup>2</sup> MSI is a Cambridge-based organization that connects business people and academic researchers who are committed to advancing the theory and practice of marketing in order to achieve higher levels of business performance. Founded in 1961, MSI brings together executives from approximately 65 sponsoring corporations with leading researchers from over 100 universities worldwide.

<sup>3</sup> Australia, Canada, China, England, Hong Kong, Netherlands, New Zealand, Sweden, Taiwan, and USA.

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Working papers referenced in the newsletter can be accessed in their entirety through the electronic version of SMU Knowledge Hub at [www.research.smu.edu.sg/or](http://www.research.smu.edu.sg/or)