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An Evolutionary Perspective on the *Journal of the Northeastern Association of Business, Economics and Technology*
Jonathan K. Kramer, Kevin J. Roth and John S. Walker

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Bruce Lindsley Rockwood

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The Impact of Affiliated Repair Facilities on Claims Buildup in the Automobile Insurance Industry
John D. McCollough

JNABET Office of the Editor

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EDITORIAL NOTES

The continuing goal of the *Journal of the Northeastern Association of Business, Economics and Technology* (*JNABET*) is the publication of general-interest business and economics articles that demonstrate academic rigor, while at the same time are readable and useful.

Two 2009 events demonstrate the growing stature of *JNABET*. First, *Cabell's Directory of Publishing Opportunities* has named *JNABET* a "Cabell's Commendable Journal" for the first time. Second, *JNABET* is now available through the EBSCO Host research database, which we expect will dramatically increase our readership and the citations of our authors.

JNABET currently has three co-editors-in-chief. Dr. Kevin Roth continues with production and distribution of *JNABET*, and managed the review process for an article in this edition. Dr. John Walker performed all final editing and also managed the review process for two articles. Dr. Stephen Liedtka coordinated the review process for all articles submitted since the time he became a co-editor during December 2008.

The current acceptance rate for *JNABET* is roughly 35%. We have strived to accept only high-quality research, while at the same time maintaining *JNABET* as a realistic publishing outlet for business and economics faculty throughout the Pennsylvania State System of Higher Education (PASSHE) and the northeastern United States. Key to this process is our referees, who have been challenged to help "grow" papers that have significant potential by providing authors with thorough, critical review comments. Consistent with this objective, we generally require two to three rounds of review prior to accepting articles for publication. At the same time, we are working hard to shorten the average time for each review to less than three months.

The Fall 2009 edition of the *Journal* reflects the commitment of numerous volunteers. We especially thank the officers of the Northeastern Association of Business, Economics and Technology and the many referees (listed below) who reviewed articles for this edition.

REFEREES FOR THIS EDITION

Gustavo A. Barboza
William Bealing
Chris Buss
Henry F. Check, Jr.
Michael Coyne
Robert Culp
Nandita Das
Tony Grenci
John D. Grigsby
Sheila A. Handy
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Shannon Mudd
Denise T. Ogden
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Jonathan R. Peters
Robyn Poole
Karen L. Randall
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Bruce L. Rockwood
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Elizabeth G. Rogol
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A. Blair Staley
Karen Stewart

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AN EVOLUTIONARY PERSPECTIVE ON THE *JOURNAL OF THE NORTHEASTERN ASSOCIATION OF BUSINESS, ECONOMICS AND TECHNOLOGY*

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Kevin J. Roth, Clarion University of Pennsylvania
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ABSTRACT

This paper traces the development of the *Journal of the Northeastern Association of Business, Economics and Technology* (the *Journal*) and provides suggestions for future directions. The *Journal*'s sponsoring organization (Northeastern Association of Business, Economics and Technology) has expanded its geographic reach over the last two decades and this paper examines how the *Journal* has evolved over the same period of time. We find that the *Journal* has successfully broadened its horizons beyond the Pennsylvania State System of Higher Education and improved the quality of scholarship published.

INTRODUCTION

The *Journal of the Northeastern Association of Business, Economics and Technology* (the *Journal*) was first published in 1989, and was originally titled *Pennsylvania Journal of Business and Economics* (*PJBE*). This year (2009) marks the *Journal*'s 20th anniversary. Over the same period of time, the *Journal*'s sponsoring organization, the Association of Pennsylvania University Business and Economics Faculties (APUBEF) evolved into the Northeastern Association of Business, Economics and Technology (NABET). The purpose of this paper is to examine the history of the *Journal* and trace its evolution. The most significant change in the organization that sponsors the *Journal* is how it has successfully reached out to people from outside of the Pennsylvania State System of Higher Education (PASSHE). We ask the question: Has the *Journal* broadened its horizons as well?

HISTORY OF THE *JOURNAL*

The *Journal* has published 14 times in the last 20 years for an average of one issue approximately every 1.5 years. Only once were two issues published in the same year (1997). The average number of papers per issue is 7.6. The average length of a paper (body) is 7.0 pages, 10.0 pages including tables, graphs, and appendices.

The early days of the *Journal* could best be described as parochial. The first issue of the *Journal* was published in the fall of 1989 and includes ten papers written by fourteen authors and co-authors, all of whom were employed by the PASSHE. The editor (Reza Motameni) was also an employee of the PASSHE (faculty member at Indiana University of Pennsylvania). The second and third issues (volume 2, number 1 and volume 3, number 1) codified parochialism by including a written policy that "a minimum of one author must be a member of Pennsylvania's State System of Higher Education." This policy was dropped after the third issue, but the fourth issue (volume 4, number 1) included a statement that "High priority is given to the studies that address and emphasize the problems or issues deemed significant to Pennsylvania." The next two issues (volume 5, numbers 1 & 2) state that the editors believe that "...the *Journal* would be a natural instrument for Pennsylvania topics, pedagogical developments, or conceptual papers that appear to have no other outlets." From volume 7, number 1 (volume 6 was never published) onward, no such limiting statements are made. The insular effect of these preferences is clearly evidenced by the author affiliation in the first six issues. In these issues, 81 percent of listed author affiliations are from PASSHE, whereas the proportion of PASSHE affiliations listed in the eight issues since then has fallen to 59 percent. Likewise, the proportion of lead author affiliations from PASSHE fell from 87 percent to 63 percent over the same time period.

Figures 1 and 2 show the statistically significant downward trend in the percent of PASSHE author affiliations. This is most likely the result of listing the *Journal* in *Cabell's Directory of Publishing Opportunities* (*Cabell's*), and the sponsoring organization's success in attracting people from outside of the PASSHE to attend its annual meetings.

Over the years, the *Journal* has also broadened its appeal to editors from outside of the PASSHE. For the first nine years of the *Journal*'s existence (volumes 1-5) there were no editors or co-editors from outside of the PASSHE. However, since then, 30 percent of the editors and co-editors have been from outside of the PASSHE (representing Penn

State Harrisburg, Saint Joseph's University, and Lebanon Valley College). Currently, one of the *Journal*'s co-editors is a professor at Villanova University.

The editors of the *Journal* took a significant step towards reaching out beyond the PASSHE system in 2002 (between volumes 9 & 10) when, for the first time, they listed the *Journal* in *Cabell's*. Because volume 10 was published in the spring of 2004, it is the first issue potentially affected by this listing. The apparent impact of listing in *Cabell's* was dramatic. Prior to volume 10, 78 percent of listed author affiliations are from the PASSHE, whereas from volume 10 onward, only 48 percent of affiliations are from the PASSHE. Lead authorship was similarly affected, dropping from 80 percent to 61 percent pre-versus-post listing. Since volume 10, the *Journal* has included authors from universities in New Jersey (7), New York (4), Illinois (4), Rhode Island (2), Virginia (1), North Carolina (1), and California (1). The trend lines in Figures 1 & 2 clearly indicate that the *Journal* has successfully attracted authors from outside of the PASSHE.

WHO PUBLISHES IN THE JOURNAL?

Many times at NABET/APUBEF annual meetings we have heard people anecdotally state that *JNABET/PJBE* is a good place for budding scholars to place a paper and learn about the publishing process. While that may be true, the backgrounds of those who have published in the *Journal* over the years do not fit that profile. Thirty-one percent of the people who have published in the *Journal* were full professors at the time of publication (see Table 1), and 79 percent had their terminal degrees.[1] Even during the early days of the PASSHE, publication was necessary to attain full professorship, so these authors were experienced researchers at the time they published in the *Journal*.

Sixty-seven percent of authors were either full or associate professors at the time of publication. Once again, this shows that these individuals had at least moved to the second stage of their academic careers before publishing in the *Journal*. Only about one third of those who published in the *Journal* fit the profile of a budding academic working to publish one of their first publications. Unadjusted for co-authorship, Dr. Barbara Garland (Clarion University) is the most prolific author in the *Journal*, with six co-authored papers published. However, weighted for co-authorship, she is tied with Dr. Krish Krishnan of Indiana University of Pennsylvania (IUP) who has two solo and one co-authored paper.

Table 1: Authors' Titles

Rank at Time of Publication	Percent of all Authors
Full	31%
Associate	36%
Assistant	20%
Instructor	3%
University Administrator	3%
Practitioner	3%
Ph.D. Candidate	2%
Masters Candidate	2%

QUALITY OF SCHOLARSHIP

To gauge the quality of the scholarship that went into the papers published in each volume we measure the average number of citations per paper that come from *Cabell's*-listed journals. We thus catalogue every citation (2,057) from every paper published (109) and search *Cabell's Directory of Publishing Opportunities* to determine if the cited journal is listed.[2] As Figure 3 shows, the number of citations of *Cabell's*-listed journals was extremely low in the early years. However, over time the average number of *Cabell's*-listed citations has exhibited a statistically significant upward trend. We also measure the percent of all citations that are from *Cabell's*-listed journals and find similar results (see Appendix A). We see this as evidence that the quality of the scholarship that goes into the papers has been improving over time.

TOPICS PUBLISHED IN THE JOURNAL

The *Journal* has always been open to all of the business disciplines including economics. Recently, the sponsoring organization added the word

[1] The authors' level of degree attainment and rank are not listed as part of the author biographies in the first four issues. Therefore these statistics are calculated using volumes 5-14.

[2] Using the 2009 edition of *Cabell*'s to check whether or not a journal was listed in, for example, 1989 may lead to categorizing a journal as listed or unlisted when that may or may not have been the case 20 years ago. However, if a journal is listed in *Cabell*'s in 2009 and it was published in 1989 that indicates that the journal has stood the test of time and we are willing to assume that it has done so because of a commitment to quality. Since quality is what we are trying to measure we believe this is an acceptable methodology.

"technology" to its name and to the title of the *Journal*. In order to determine if the mix of topics has changed over the last 20 years, two of the co-authors of this paper independently read each of the 109 papers in the past 14 issues, cataloging the topic according to the classification scheme shown in Exhibit 1. They then reviewed each other's classifications and came to agreement on which discipline the paper fit into best.

Over the 20 years of the *Journal*'s existence, more papers were written about pedagogy and curriculum matters (24) than any other topic (see Table 2). Marketing (19) and economics (18) papers are a close second and third. Of all of the topics, only finance (13) displays a statistically significant (upward) trend in the number of papers published (see Table 2 and Appendix B). Of the six major disciplines, accounting (10) has contributed the fewest papers and no accounting papers have been published in the most recent two issues. Despite recently adding "technology" to its name, there has yet to be a material increase in the number of technology-related papers published (Appendix B).

Table 2: Paper Topics

	Number of Papers	Percent of all Papers	Slope of Trend Line
Education	24	22.0%	0.014
Marketing	19	17.4%	-0.009
Economics	18	16.5%	-0.017
Finance	13	11.9%	.022***
Management	11	10.1%	-4E-05
Accounting	10	9.2%	-0.009
Other	6	5.5%	-0.005
Accreditation Issues	5	4.6%	0.003
Information Systems	3	2.8%	-0.001

* Significant at the 0.10 level
** Significant at the 0.05 level
*** Significant at the 0.01 level

METHODOLOGIES EMPLOYED BY THE AUTHORS

Two co-authors on this project independently classified the research method used in each paper according to the classification scheme shown in Exhibit 2. The most common methodology employed over the 14 issues is deduction (37 papers, see Table 3). Survey (32) and general empirical (31) are a close second and third. There are no statistically significant long-term trends in the types of methodologies employed, and the three aforementioned methods continue to dominate in the most recent issues (see Appendix C).

Table 3: Research Methodology

	Number of Papers	Percent of All Papers	Slope of Trend Line
Deductive	37	33.9%	-0.013
Survey	32	29.4%	-0.004
General Empirical	31	28.4%	0.014
Modeling & Simulation	6	5.5%	0.002
Behavioral	2	1.8%	0.003
Historical	1	0.9%	-0.001

CO-AUTHORSHIP

One of the goals that the *Journal*'s sponsoring organization (NABET/APUBEF) has always strived to promote is collegiality. We view co-authorship as a form of collegiality. In order to determine if the *Journal* has welcomed collegiality, we measured the percent of co-authored papers published in the *Journal*. In the first issue, eighty-two percent of the papers were written by a single author. Since then, there has been a statistically significant increase in the number of co-authored papers (see Table 4 and Figure 4). This trend has extended to the point where the most recent issue contains zero sole-authored papers. We conclude that the *Journal* has supported collegiality, a primary goal of its sponsoring organization.

Table 4: Authorship of Papers

	Sole	Co-authored	Average Authors per Paper
Volume 1, No.1	81.8%	18.2%	1.27
Volume 2, No.1	44.4%	55.6%	1.67
Volume 3, No.1	66.7%	33.3%	1.44
Volume 4, No.1	33.3%	66.7%	2.00
Volume 5, No.1	37.5%	62.5%	1.88
Volume 5, No.2	16.7%	83.3%	2.17
Volume 7, No.1	25.0%	75.0%	2.33
Volume 8, No.1	16.7%	83.3%	2.17
Volume 9, No.1	50.0%	50.0%	1.83
Volume 10, No.1	28.6%	71.4%	1.86
Volume 11, No.1	28.6%	71.4%	1.71
Volume 12, No.1	50.0%	50.0%	1.67
Volume 13, No.1	28.6%	71.4%	1.71
Volume 14, No.1	0%	100.0%	2.33

CONCLUSIONS & FUTURE DIRECTIONS

For 20 years, *JNABET/PJBE* has provided academics and practitioners from a variety of business-related disciplines an opportunity to share ideas with their colleagues. Like the organization that sponsors it, the *Journal* has successfully expanded its horizons beyond the PASSHE. It has also been shown to welcome collegiality, a central tenant of its sponsor.

We believe the most important next step in the evolutionary development of the *Journal* is in the area of distribution. Despite progress in other areas, distribution of the *Journal* has remained largely unchanged for the last 20 years. The *Journal* has only ever been distributed to members who attend the sponsoring organization's annual meeting, the authors who publish in an issue, their deans, the libraries of the PASSHE, and anyone who requests a copy. In the future, this is unlikely to be sufficient for accrediting bodies and faculty research committees who are scrutinizing the quality of peer-reviewed journal articles (PRJs). When considering the quality of PRJs, one of the factors that people examine is how widely available the journal is in which a paper is published. The current co-editors of the *Journal* have recently gotten the *Journal* listed in EBSCO so that researchers around the world now have electronic access to the papers published in the *Journal*. We believe that this is critical to the *Journal*'s future viability. Electronic distribution through the sponsoring organization's Web site could also improve both availability and access.

In addition, continuous improvement in the area of scholarly contributions has emerged as a significant assessment consideration particularly in accreditation and reaffirmation efforts. We recommend the *Journal* consider continuing efforts to improve and measure quality through emerging discipline-based approaches. Such a process might include measuring quality through a "tiering" or ranking of citations from *Journal* articles based on discipline-specific measures that continue to become available. For example, the *Strategic Management Journal* specifies a listing of journals that have a significant influence on the discipline of management (Tahai and Meyer, 1999).

We conclude that the *Journal* has significantly evolved and broadened its horizons over the last 20 years. It has done so by attracting editors and authors from inside as well as outside of the PASSHE, listing in *Cabell's*, and improving the quality of scholarship that is published in the *Journal*. If the editors continue these trends, and expand distribution, the *Journal* should continue to be a place where academics, administrators, and practitioners can share their ideas for many years to come.

REFERENCES

Fleming, R. J., Graci S. P., & Thompson J. (2000). The dawning of the age of quantitative/empirical methods in accounting research: Evidence from the leading authors of the accounting review, 1966-1985. *Accounting Historians Journal*, *27*(June), 43-72.

Tahai, A., & Meyer M. J. (1999). A revealed preference study of management journals' direct influences. *Strategic Management Journal*, *20*(March), 279-297.

Figure 1: Percent of Author Affiliations from PASSHE Institutions

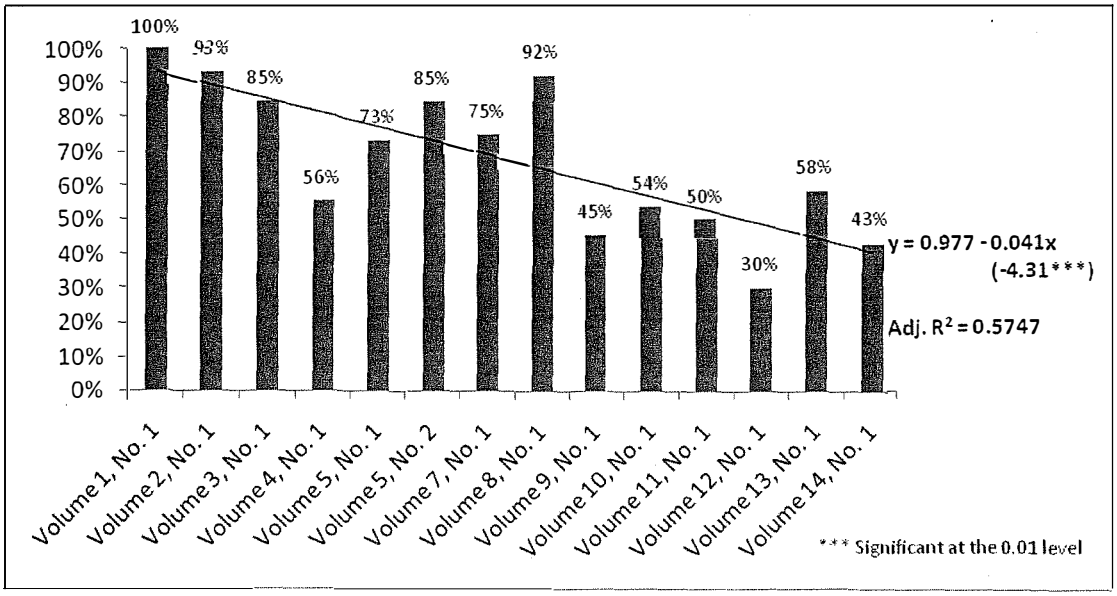


Figure 2: Percent of Lead Author Affiliations from PASSHE Institutions

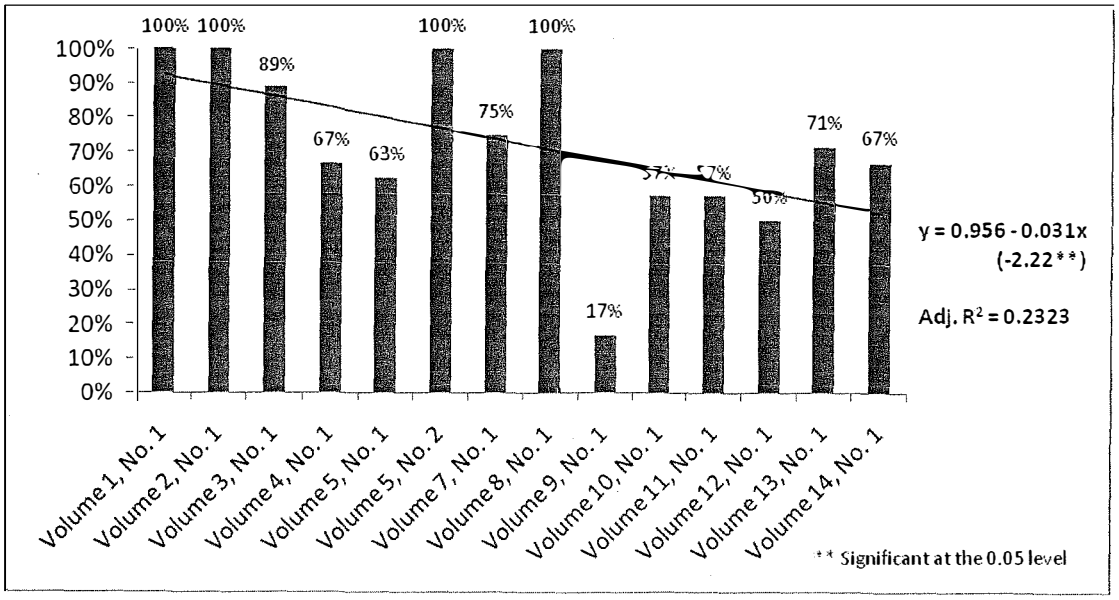


Figure 3: Average Citations per Paper from *Cabell's*-Listed Journals

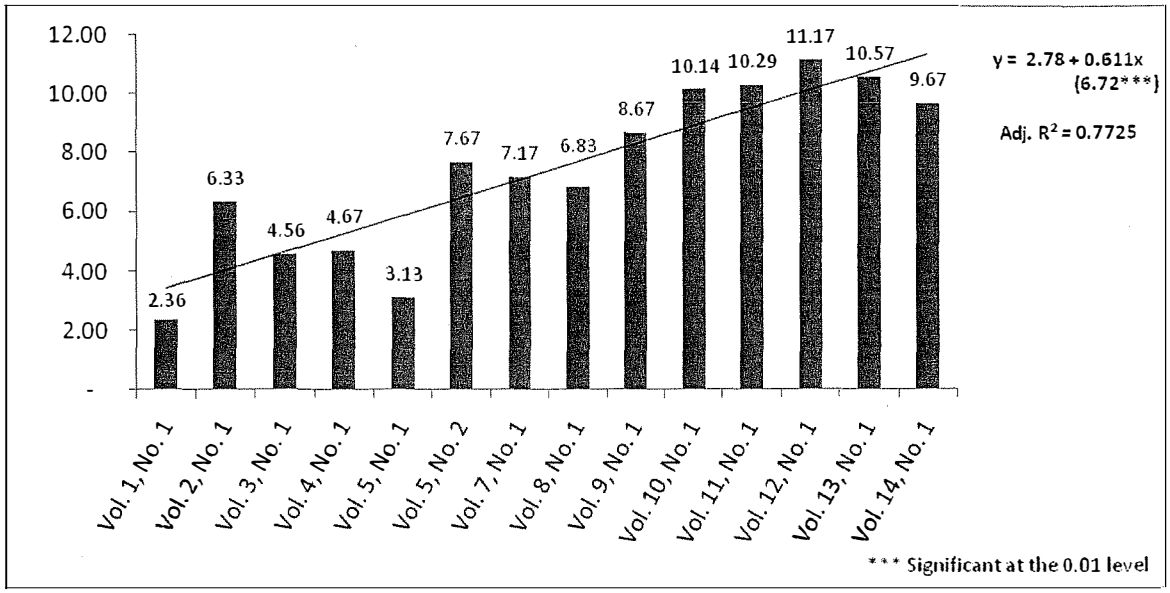


Figure 4: Authorship Trend (percent of papers co-authored)

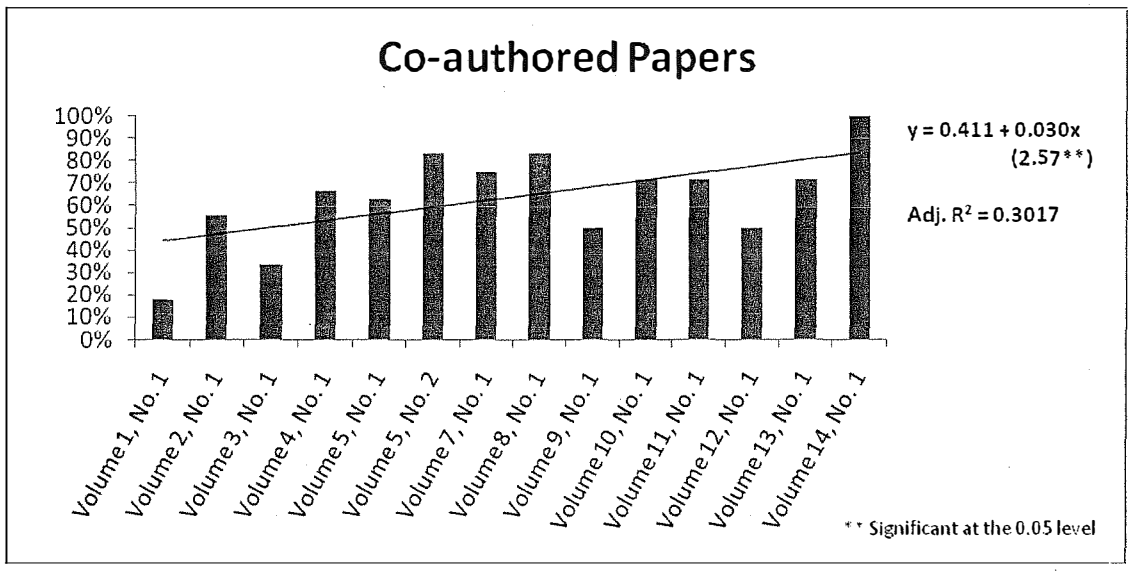


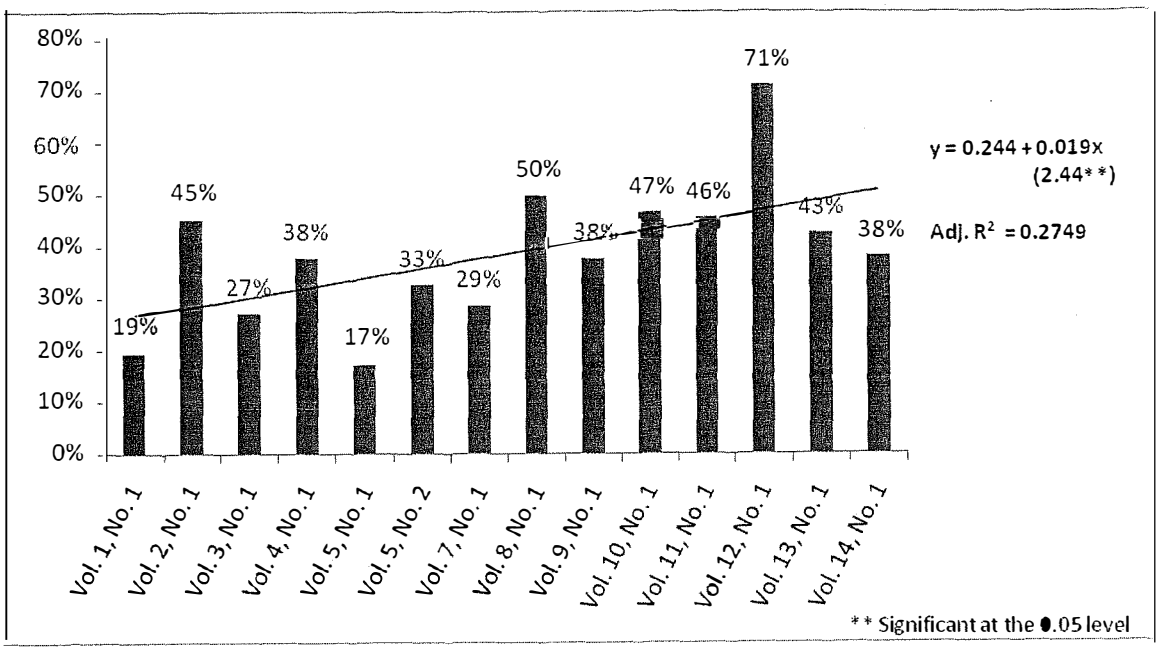
Exhibit 1: Topic Classification Scheme

Marketing (Mkt): General marketing, consumer behavior, and market research
Management (Mgm): General management including operations management and logistics and supply chain management
Finance (Fin): Including corporate finance, financial markets and institutions, investments, portfolio management, and personal financial planning.
Economics (Eco): Micro and macroeconomics as well as econometric methods
Accounting (Acc): Financial and managerial accounting as well as tax issues
Information Systems (IS)*: Broad range of papers from office automation, to evaluation methods for accounting software, to the effects of different data storage systems on decision making, etc.
Education (Edu)*: Studies on pedagogy and curriculum matters
Accreditation Issues (AI): Papers focusing on the process of accreditation
Other (Oth): Not related to one of the above
* adapted from Fleming et al. (2000, p. 46)

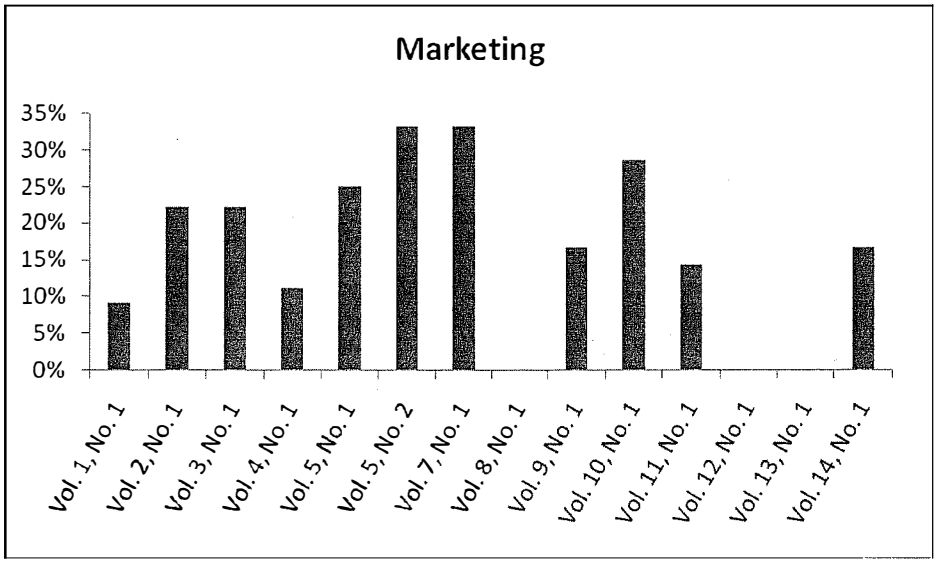
Exhibit 2: Research Method Classification Scheme

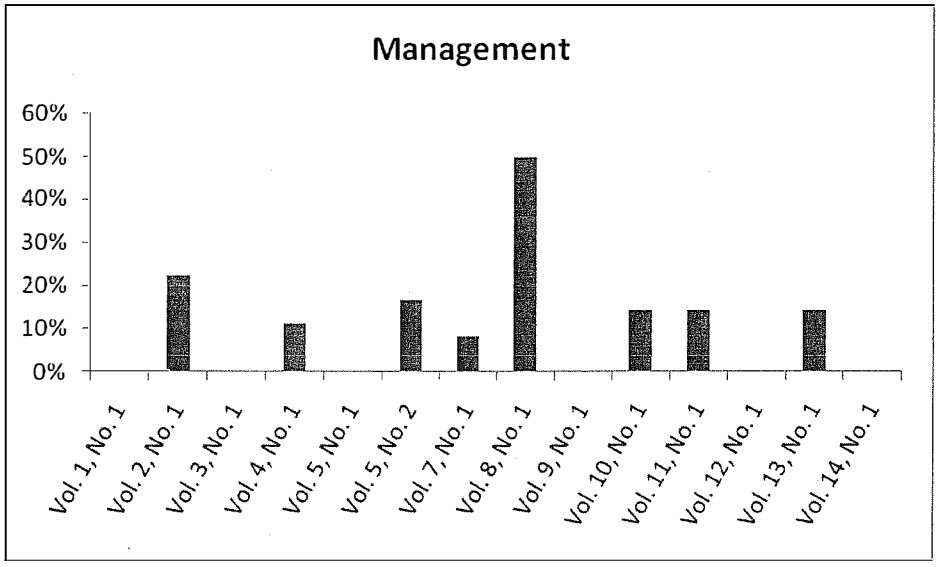
Historical (His): Papers that use archival methods to study an issue of current interest. Also included are papers that trace the development of a practice or concept using secondary sources.
Behavioral (Beh): Studies conducted to measure the reaction of students or professional subjects.
Modeling and Simulation (M&S): Studies which use modeling or simulation as the primary focus.
Survey (Sur): Studies reporting on data gathered by questionnaire about practices or attitudes.
General Empirical (Gen): A catchall that includes primarily descriptive empirical work.
Deductive (Ded): The deductive studies that do not fit in other categories, including opinion pieces. The non-empirical studies are primarily verbal/descriptive-type articles where a logical conclusion follows from a set of assumptions or premises (other than modeling studies). In addition, this category was interpreted to include inductive and legal research methods as well.
Source: adapted from Fleming et al. (2000, p. 46)

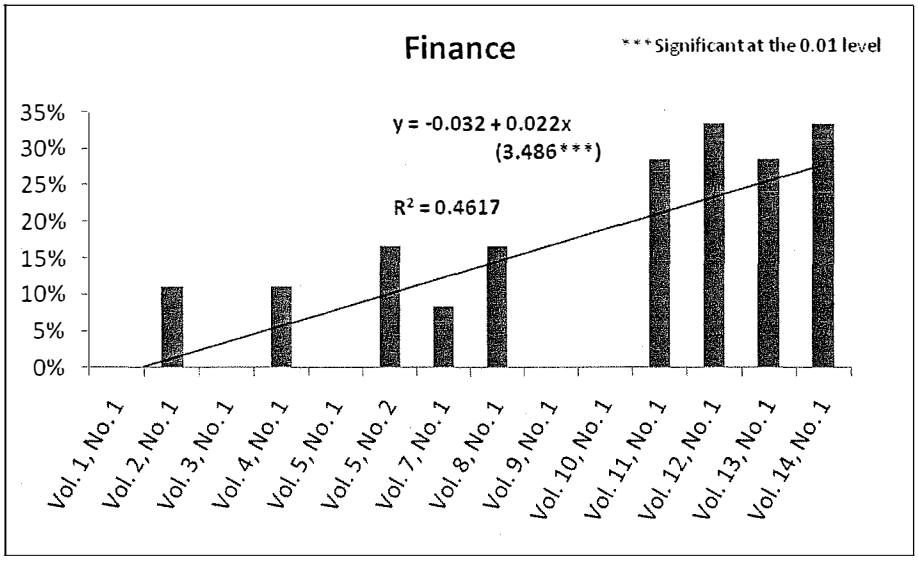
APPENDIX A
Percent of Citations from *Cabell's*-listed Journals



APPENDIX B
Quantity and Trends of the Various Academic Disciplines (as a percent of papers per issue)






Finance
***Significant at the 0.01 level
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(3.486***)
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Vol. 1, No. 1
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Vol. 3, No. 1
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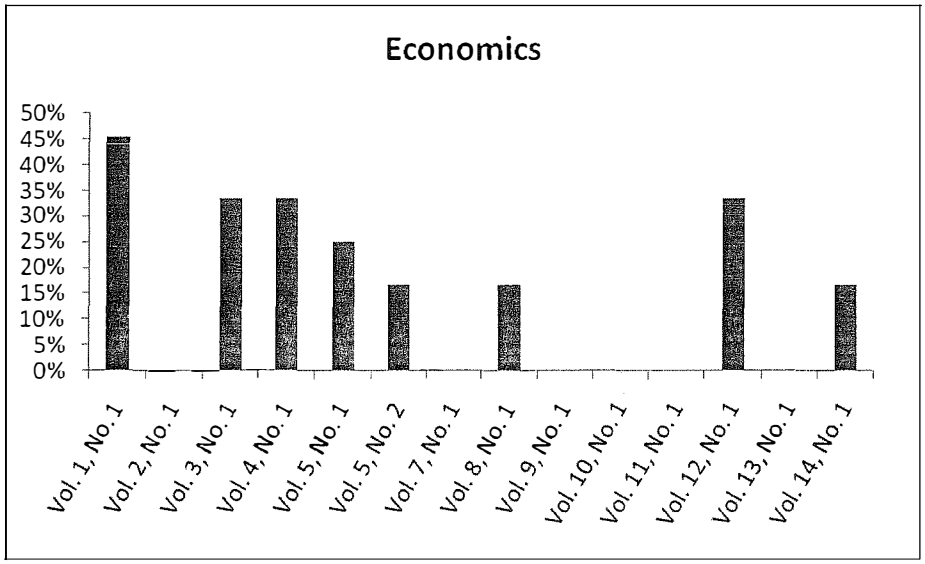
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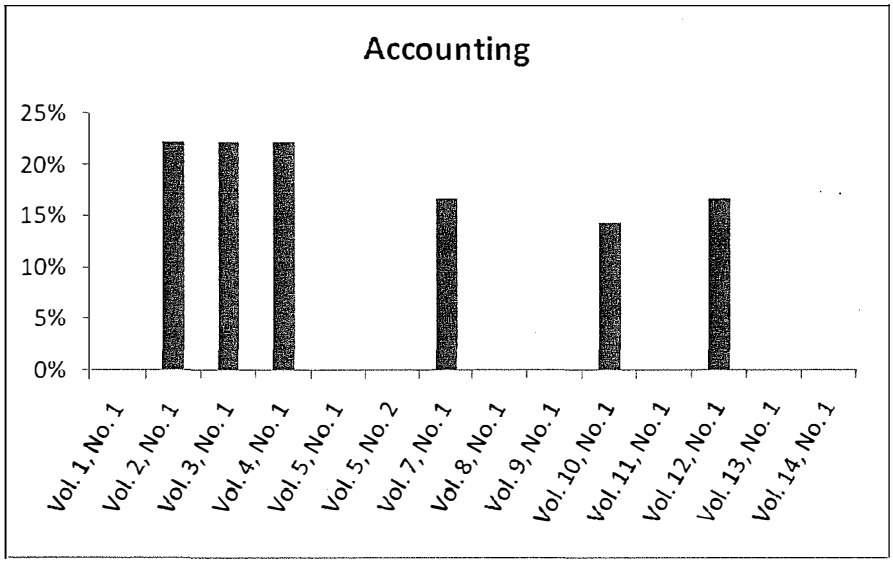
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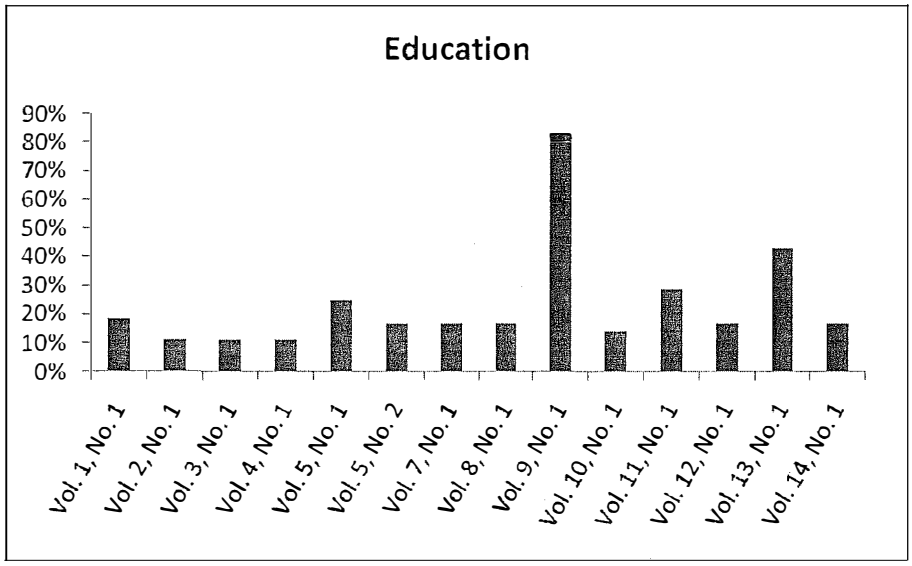
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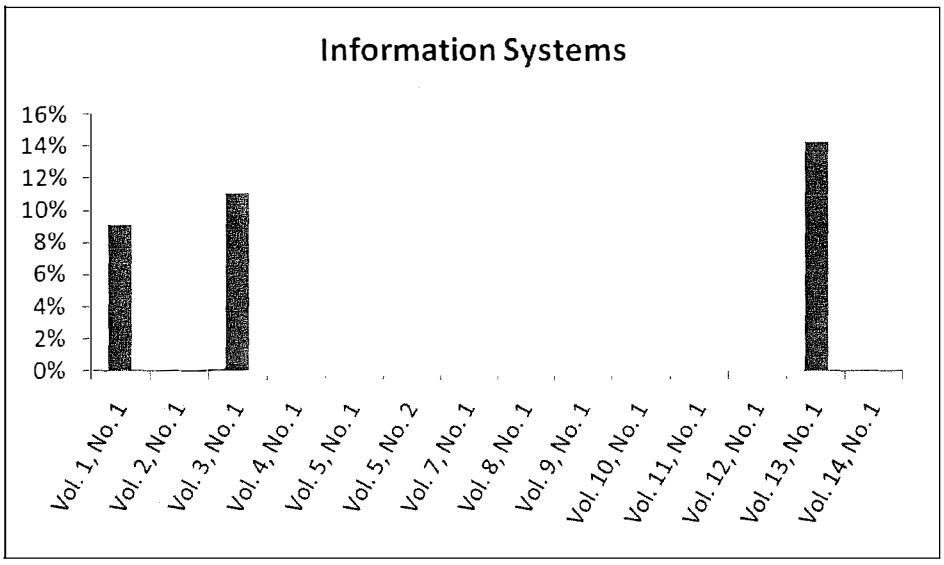
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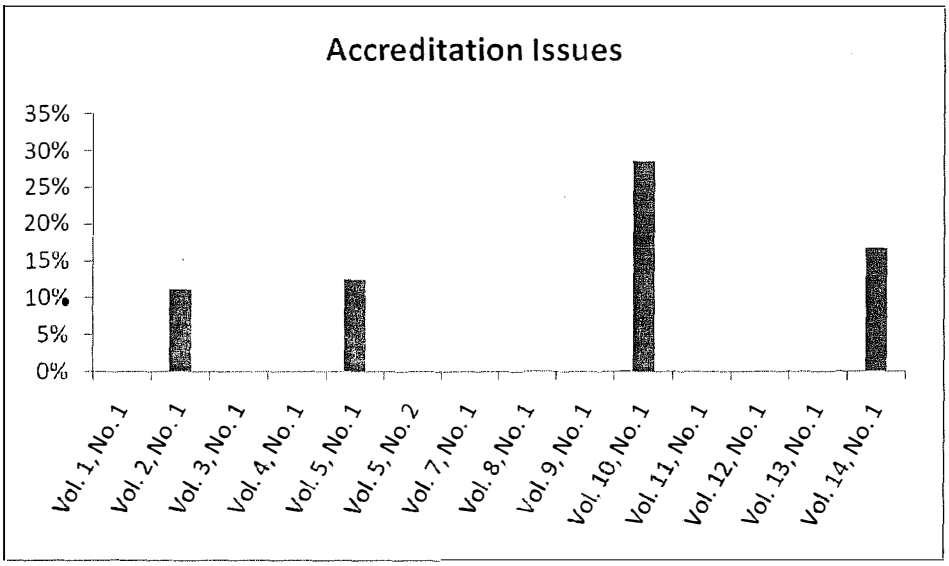
Accreditation Issues
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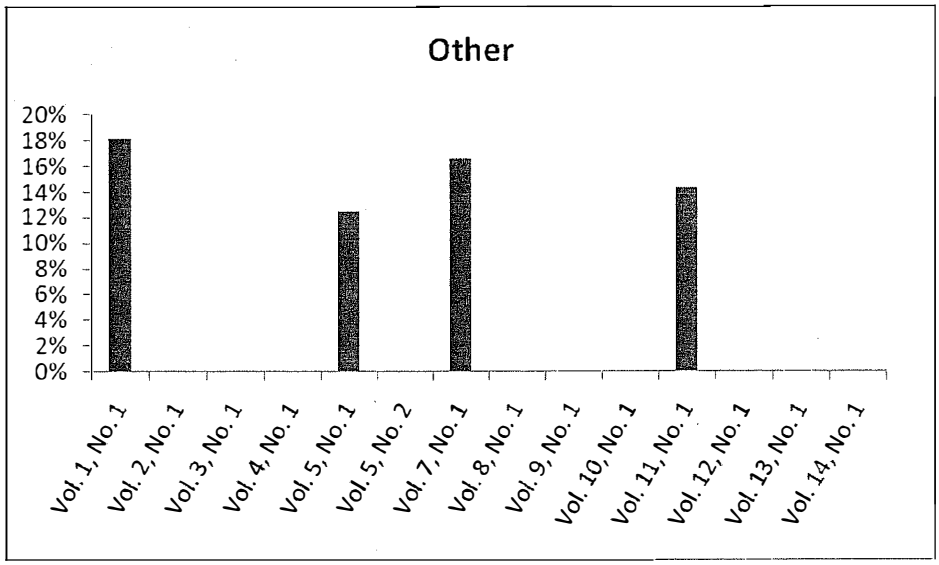
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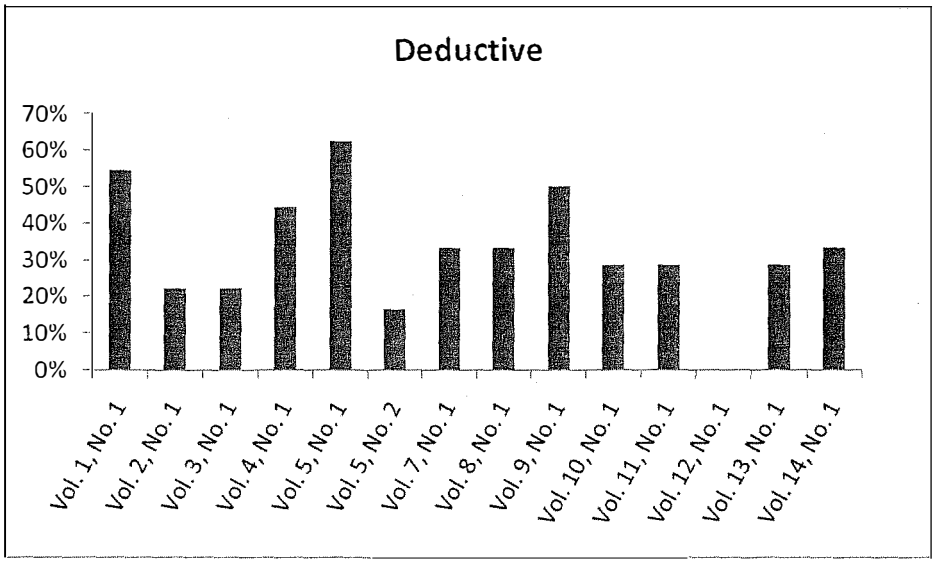
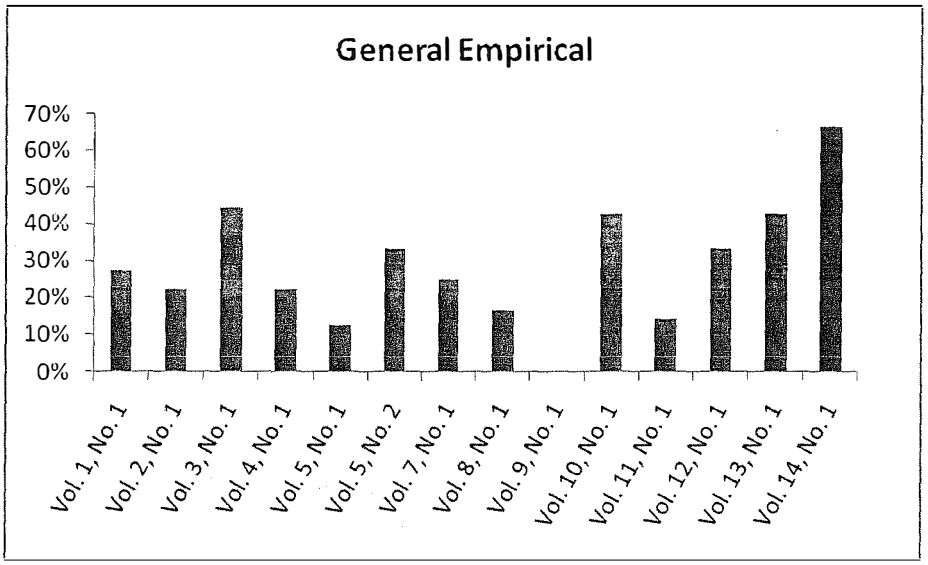
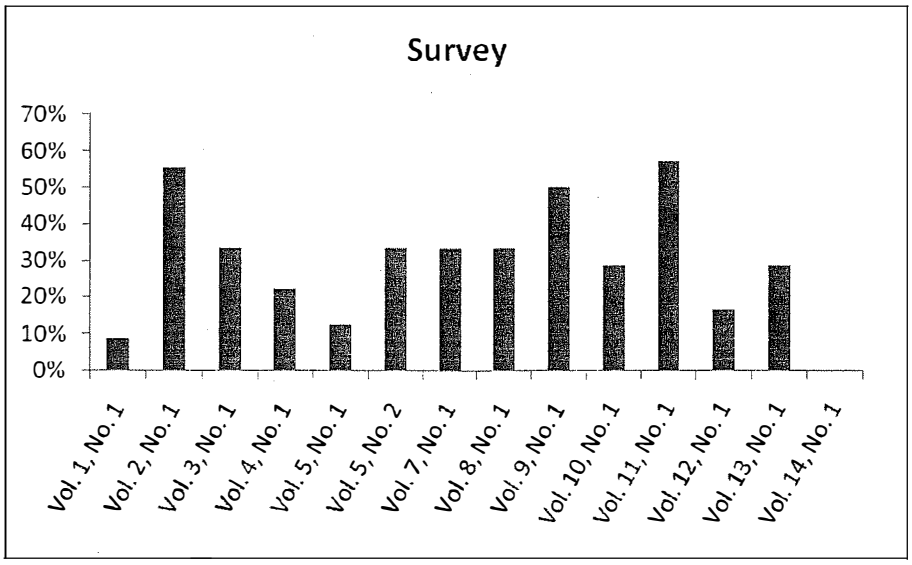
APPENDIX C
Research Methods Employed (as a percent of papers per issue)



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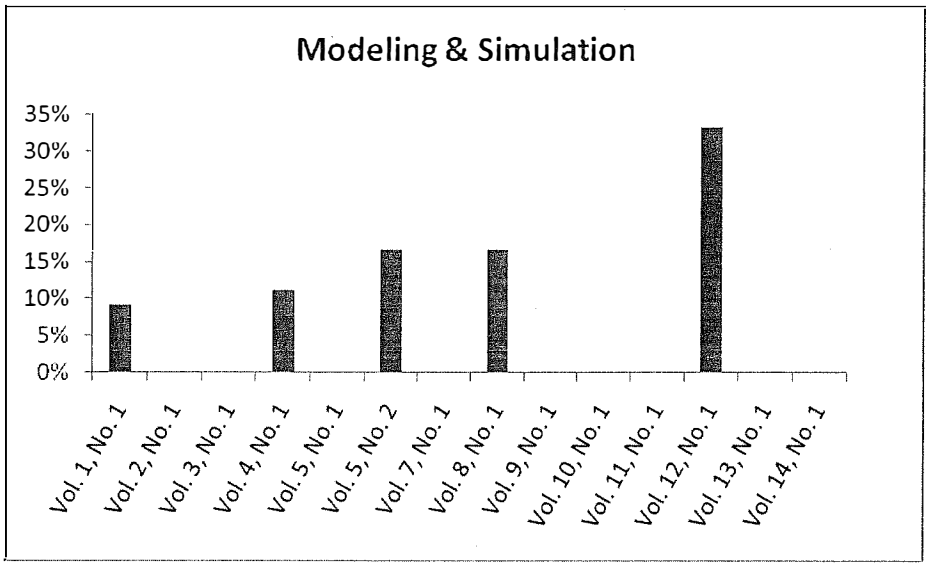
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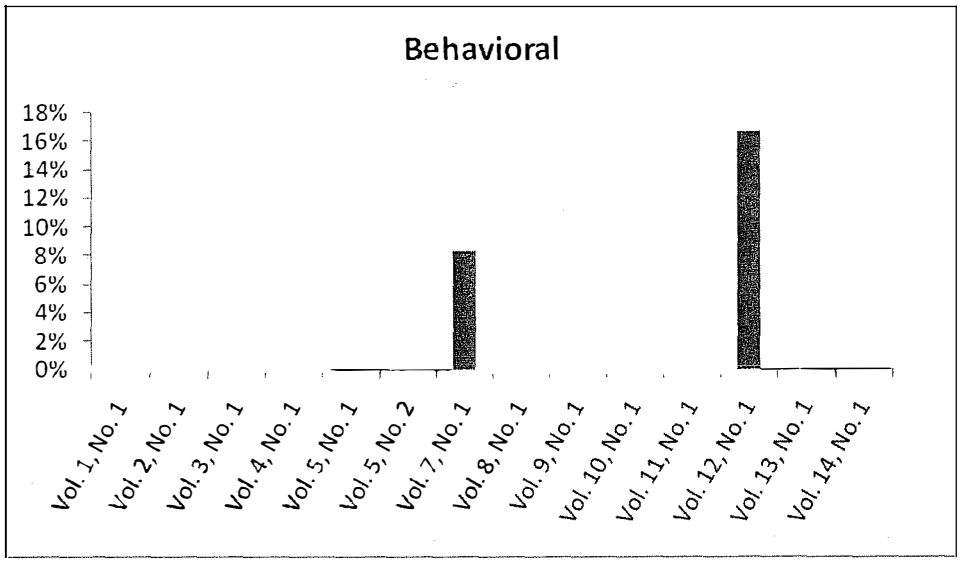

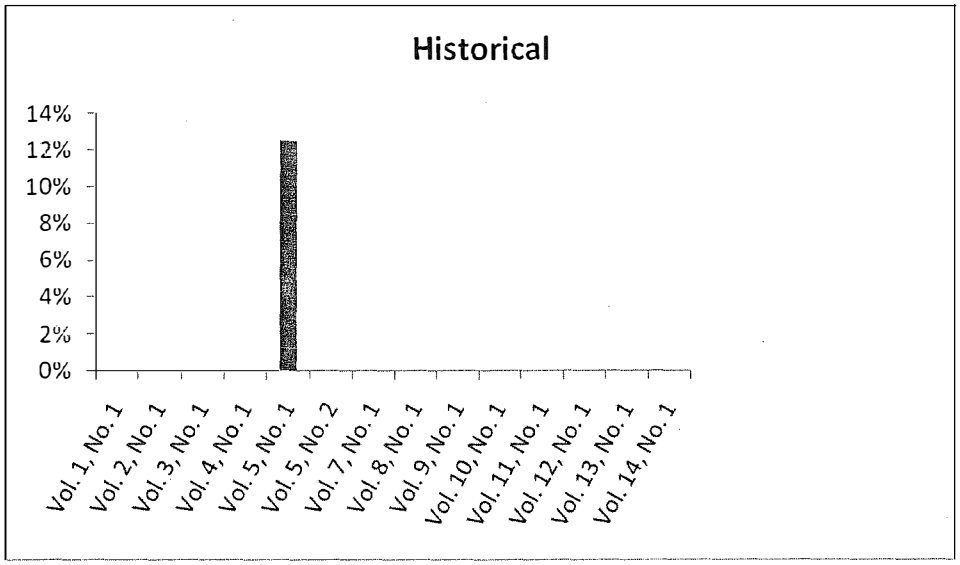

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CORPORATE DISINFORMATION AND SOCIAL RESPONSIBILITY: THE CASE OF CLIMATE CHANGE DENIAL

Bruce Lindsley Rockwood, Bloomsburg University of Pennsylvania

ABSTRACT

This paper explores the powers of corporate persons in light of the Supreme Court's First Amendment jurisprudence with respect to corporate speech to argue that some corporations violate a basic tenant of corporation law by funding misleading issue advocacy advertising, public relations campaigns, and ideologically-biased think tanks to create a false sense of scientific uncertainty in matters of important public interest. While these practices may be framed as a legitimate means of profit maximization, they result in a violation of ethics and corporate social responsibility. The cases of the multi-year campaign of tobacco companies to misrepresent the health risks of tobacco and the similar tactics of ExxonMobil and others to fund and disseminate "doubt" about the science and risks associated with global warming and climate change illustrate the problem.

Through the lens of the Supreme Court's approach to corporate commercial speech (*Virginia Board of Pharmacy*) and political speech (*First National Bank of Boston v. Bellotti*) this paper examines how changes in the law have enabled corporations with deep pockets to distort the "marketplace of ideas" that is central to democratic deliberation based on the merits of policy options and objective science. This paper takes into account the critiques of the Court's speech doctrine by White and Nesteruk, and the obligations of corporate citizenship, and recommends a turn towards a more responsible, humane approach to corporate participation in public policy discourse.

INTRODUCTION: CORPORATE PERSONHOOD AND CORPORATE RIGHTS

Corporations, it is well settled in American law (Hall, 1989, p. 96), are artificial legal persons, having only those powers expressly granted to them under our Constitution and laws, or those implied powers which Chief Justice John Marshall first ruled are necessary to their very existence; *Dartmouth College v. Woodward*, 4 Wheat. 518, 636 (1819). The word "corporation" appears nowhere in the text of the Constitution or amendments. Corporate powers are set forth in state corporation codes and in corporate charters. Corporations may exist for any lawful business (RMBCA, 2003, Section 3.01). Corporate powers may include making "payments or donations...not inconsistent with law...that furthers the business and affairs of the corporation" (RMBCA, 2003, Section 3.02(15)).

Thus, when Supreme Court decisions have stated that corporations have particular constitutional rights as "legal persons" in addition to the rights of their individual creators and owners or shareholders, those rights are a result of judicial legislation. This is well illustrated in the case of *Santa Clara Co. v. Southern Pacific Railroad*, 118 U.S. 394 (1886), where Chief Justice Waite noted "The Court does not wish to hear argument...whether the provision in the Fourteenth Amendment...which forbids a State to deny to any person...the equal protection of the laws, applies to these corporations. We are all of the opinion that it does." (396)

Such holdings are often lacking in any plausible justification, as Jeffrey Nesteruk points out: "Such a bald assertion of the corporation's status as a person is striking because of what it leaves out. Why, for instance, assert the corporation's status as a person rather than as property? Certainly, the corporation's susceptibility to ownership would have allowed a contrary assertion" (Nesteruk, 1999). The consequences of granting fundamental legal rights to corporate "persons" in addition to the rights of the real flesh-and-blood persons who create, own and invest in them, or who work for them and consume their products and services, have been profound for the development of American society and the democratic process. As legal historian Lawrence Friedman has commented:

> In the late 19th century, a striking series of cases turned the due-process clause into a kind of great wall against populist onslaughts. The wall had been built, or had seemed to be built, for the protection of blacks; by irony or design, it became a stronghold for business corporations (Friedman, 1985, p. 521).

The gradual granting of Constitutional rights to corporations has unfolded in various ways over the

course of our legal and political history, although not without controversy. "Substantive due process" as a legal doctrine was used by the Court to strike down economic regulation under the doctrine of *Lochner v. New York*, 198 U.S. 45 (1905), but this use was discredited and largely abandoned during the New Deal. Critics of economic regulation in recent years have sought a revival of the doctrine. For instance, it was used to cut back on punitive damage awards in tort liability: *State Farm Mutual Automobile Insurance Company v. Campbell*, 123 S.Ct. 1513 (2003). The financial crisis that began in late 2008 may lead to a revival of judicial deference to legislation and regulation in the economic sphere (Andrews, 2008; Greider, 2008; Labaton, 2008) and less interference with state tort law absent clear proof of Congressional intent to preempt it. *Wyeth v. Levine*, S.Ct. (2009).

Corporate Criminal and Moral Responsibility

Building on this background, the intent of this section is to argue that those who wish to automatically grant corporations the full panoply of constitutional rights of natural persons fail to consider the problem of the moral status of the corporation. They also fail to recognize that the Supreme Court has been selective in the "rights" it does make available to corporate persons. Consider the example of constitutional criminal law. On the one hand, the Supreme Court ruled early in the last century that the Fifth Amendment privilege against self-incrimination did *not* apply to corporations, *Hale v. Henkel*, 201 U.S. 43 (1906), p. 74, and *U.S. v. White*, 322 U.S. 694 (1944). But corporations were held to have the attorney-client privilege for confidential communications with counsel in *Upjohn v. U.S.*, 449 U.S. 383 (1981). Legal persons with the right to sue and be sued need the same right to counsel as individuals, while the need for reasonable regulatory oversight of such artificial entities requires that they be obligated to cooperate with regulatory and criminal investigations to a degree that would violate the rights of individuals. This conditioning of the rights of corporations based in part on their artificial nature is relevant to addressing corporate speech rights.

Libertarian legal scholar John Hasnas has argued that denying corporations the right to plead the Fifth Amendment privilege, and pressuring them to waive their attorney-client privilege to avoid indictment, has resulted in the unfair treatment of corporations and professional partnerships in criminal investigations, particularly when linked to the U.S. Sentencing Commission's uniform sentencing guidelines. Hasnas further asserts that the Department of Justice's memoranda guiding its evaluation of the degree of corporate cooperation when under investigation create a conflict between corporate legal and moral duties (Hasnas, 2006).[1] Firms are encouraged to avoid cooperating with their employees' criminal defense before there has ever been a trial. Hasnas views this as creating an ethical dilemma for corporate *executives* by forcing them to choose between their employees and their shareholders, without examining the moral nature of the corporation itself. His concern for an alleged moral dilemma of individual managers fails to consider the moral relationship of the corporation itself to the state and the public. Failure to honor that relationship has resulted in substantial harm, illustrated by the recent Madoff, Stanford and other corporate frauds (Cookson, Peel & Chung, 2009).

Hasnas may be confusing the corporation with its professional managers when he argues that managers' ethical duty may be at variance with their obligation to the law. Jeffrey Nesteruk doubts the "status of the corporation [as] a moral agent" at all, noting:

> To the degree to which the corporate analogue of reason—management—no longer need to respond to the multiple personal ends of individual shareholders, it has usurped the function of desire. Whereas in a natural person desire supplies the ends or goals to be evaluated, within the corporate entity, desire's analogue—the shareholders—does not participate as a full and integral player in corporate decision-making (Nesteruk, 1988, 687, 697).

In short, Hasnas' claim that corporate moral personhood is faced with an unreasonable moral dilemma by the criminal law masks the reality of vast concentrations of wealth, power and influence in the hands of professional managers that requires reasonable tools in the hands of government to protect the public interest.

[1] The Thompson and McNulty Memoranda have been revised under the direction of Deputy Attorney General Mark Filip as a result of pressure from Congress and the American Bar Association. See: http://www.usdoj.gov/opa/pr/2008/August/08-odag-757.html Companies may still feel pressure to waive the privilege to get "cooperation credit" under the guidelines (Scholer, 2008, Alert-1-2, September, 2008).

The Challenge Posed by Corporate Speech

The argument of the balance of this paper is two-fold: First, the extension of First Amendment rights to corporations by the Courts, whether characterized as political or commercial speech, has been a mistake in legal reasoning that is grounded on the failure to understand that corporations are not moral entities. Second, the evidence of corporate abuses in the cases described herein—tobacco and climate change in particular—demonstrates that the critics of extending full First Amendment rights to corporations are correct. The conclusion is that to ensure corporations behave ethically and responsibly, and do not pose a threat to democratic institutions, the grant to corporations of the same speech rights as "persons" must be reversed.

Corporate Speech: Commercial & Political

The First Amendment was one of twelve constitutional amendments proposed during the first session of Congress, having been promised to win support of ratification of the Constitution itself. Its primary purpose has been seen to protect robust political speech by individuals, not only against prior restraint but also against subsequent punishment. Criticism of government should be protected, for as Professor Harry Kalven, Jr. has argued, "the presence or absence in the law of the concept of seditious libel defines the society...If it makes seditious libel an offense, it is not a free society" (quoted in Lewis, 1991, pp. 52-53).

The recognition of the importance of protecting unpopular speech under the First Amendment took time, and evolved out of the famous *dissent* of Justice Oliver Wendell Holmes, Jr., in *Abrams v. U.S.*, 250 U.S. 616 (1919), where Justice Holmes articulated the now widely accepted "marketplace-of-ideas" theory of free speech (Bollinger, 1986, pp. 59-62).[2]

The application of the First Amendment to corporate speech has evolved in much the same way as other judicial extensions of constitutional protections to corporations over the past century, with stops and starts as circumstances, prevailing judicial ideology, and changes in the Court's composition, dictated. Since World War II, the Court has moved from the idea that corporate commercial speech had no protection at all, to a series of decisions granting some protection to truthful commercial speech whether or not it was purely aimed at selling a product or service (Reed, 1995; Reed, 1996; Langvardt & Richards, 1997; Langvardt, 2000). The emergence of the Internet and use of blogs by corporations have added new wrinkles to these doctrines, which have generally turned on such issues as how to define what is meant by "commercial" speech, and whether and how far to permit government regulation of such speech where it is not fraudulent and misleading (Sprague, 2007). As James Boyd White notes in discussing one of the Court's seminal cases in this series of decisions, *Virginia Board of Pharmacy*:

> The crucial question for the Court, then, is the bearing, if any, of the First Amendment upon the case, on the grounds that the conduct regulated here takes the form of 'speech.'...[T]his speech is commercial in character, simply a way of doing business. While there are many proposed rationales for the First Amendment, most of them conceive of it as protecting political speech, or the discovery of socially valuable truth, or the autonomy and dignity of the speaker, not purely economic processes. Not surprisingly, when first presented with the question decades ago, the Court held that commercial speech was simply beyond the protection of the First Amendment (White, 2006, p. 78).

Expanding the scope of commercial speech rights in *Virginia Board of Pharmacy v. Virginia Citizens Consumer Council*, 425 U.S. 748 (1976), Justice Blackmun emphasized the consumer's interest in truthful information about prices rather than the corporation or business's interest in talking about its commercial activities. This makes the decision appear to be aimed at the public interest, while expanding the legal understanding of the rights to which corporations are entitled under the First Amendment.

One effect of the *Virginia Board* case was to move the Court away from focusing on the First Amendment as a source of protection of the political speech of individuals, to an implicit economic rationale for protecting speech rights by business and professionals. White notes that many professional pharmacists might have preferred existing economic regulations which precluded price advertising. The

[2] Holmes wrote in his Abrams dissent in relevant part: "But when men have realized that time has upset many fighting faiths, they may come to believe even more than they believe the very foundations of their own conduct that the ultimate good desired is better reached by free trade in ideas—that the best test of truth is the power of the thought to get itself accepted in the competition of the market, and that truth is the only ground upon which their wishes safely can be carried out" 250 U.S. 616, 630.

Court's decision in effect compels them to engage in speech whose benefits were at least debatable. White argues that given the normal deference of the Court to economic regulations adopted by the legislature, Blackmun felt compelled to base his decision on First Amendment grounds that were at best formal and ill considered, concluding "It is hard to regard Blackmun as actually meaning what he says about the First Amendment here" (White, 2006, pp. 80-83). Commercial speech may have some practical value, but it may not merit the heightened scrutiny Blackmun's decision gives it.

Two years later, in 1978, the Court took First Amendment rights for corporations one step further by granting them the same political speech rights as individuals. In *First National Bank of Boston v. Bellotti*, 435 U.S. 765 (1978), by a vote of 5 to 4, the Court held for the first time that corporate persons had the same free speech rights in the political sphere that flesh-and-blood individuals hold under the First Amendment. Building on its analysis in *Virginia Board of Pharmacy*, the Court plausibly argued that speech rights ought not to depend upon the identity of the speaker. Presciently, however, Justice William Rehnquist noted in dissent that he continued to have problems with this jurisprudence, arguing:

> Although the Court has never explicitly recognized a corporation's right of commercial speech, such a right might be considered necessarily incidental to the business of a commercial corporation...It does not necessarily follow that such a corporation would be entitled to all the rights of free expression enjoyed by natural persons. Although a newspaper corporation must necessarily have the liberty to endorse a political candidate in its editorial columns, it need have no greater right than any other corporation to contribute money to that candidate's campaign. Such a right is no more 'incidental to its very existence' than it is to any other business corporation.
>
> It cannot be so readily concluded that the right of political expression is equally necessary to carry out the functions of a corporation organized for commercial purposes...A State grants to a business corporation the blessings of potentially perpetual life and limited liability to enhance its efficiency as an economic entity. It might reasonably be concluded that those properties, so beneficial in the economic sphere, pose special dangers in the political sphere. Furthermore, it might be argued that liberties of political expression are not at all necessary to effectuate the purposes for which States permit commercial corporations to exist...Indeed, the States might reasonably fear that the corporation would use its economic power to obtain further benefits beyond those already bestowed...I would think that any particular form of organization upon which the State confers special privileges or immunities different from those of natural persons would be subject to like regulation, whether the organization is a labor union,...or a corporation (825-827).

In short, Rehnquist recognized that while the *word* "person" may be used to describe natural and corporate persons alike, there remain practical differences between the two that the law in a democracy ignores at its peril. As Nesteruk notes, the Court's majority in *Bellotti* "obscures an important difference between the speech of an individual and the speech of a corporation. Corporate speech, while ostensibly the same as the speech of natural persons—and at times even identical to it in terms of content—can never incorporate the dynamic of moral choice" (Nesteruk, 1988, p. 701). The perils of such a conflation of meaning are well illustrated by the difficulty Congress has faced in both passing and getting the Courts to uphold meaningful political campaign spending limitations (Garrison, 1989; Bevier, 2007), but here we focus on the more difficult challenge of redressing the imbalance in the discussion of important public policy issues caused by the *Bellotti* decision.

CORPORATE SPEECH ABUSES

Prior to *Bellotti* it was already apparent that some corporations were prepared to use, and abuse, their existing financial and strategic planning powers, including their powers of communication, to insulate their actions and assets from the financial consequences of the externalities their profit seeking activities imposed on society as a whole. A primary example is the fifty-year campaign of the tobacco industry to conceal the harmful effects of their product while continuing to manipulate its content for nicotine (for its addictive qualities), marketing it to minors, women and minorities and reassuring consumers generally that their health related fears were misplaced (Glantz, Slade, Bero, Hanauer and Barnes, 1996; White, 1988). The tobacco story alone demonstrates the "critical flaw" in *Bellotti* that "lies in its analysis of corporate speech rather than of the

corporate speaker" and thus ignores "the issue of corporate moral agency" (Nesteruk, 1988, p. 703).

While there are some in the law and economics movement (Viscusi, 2002) who argue that the public overestimates the risks and costs of smoking to the states, there is no question that the stories of many lives ruined by smoking cannot be accurately reduced to a number in a cost-benefit analysis spreadsheet. But for the suppression of information and the complicity of tobacco lawyers in the misuse of their attorney-client privilege (Hazard, 1998), many lives would have been saved and many of these losses avoided. Corporate free speech for tobacco companies has imposed considerable costs on our society and, with reduced U.S. smoking, is helping to further spread the plague overseas (Rabin & Sugarman, 1993 & 2001; Kluger, 1997; Glantz & Balbach, 2000; Kessler, 2001; Pertschuk, 2001; Schapiro, 2002; Slovic, 2001; Viscusi, 2002; Curriden, 2007; "An Evil Weed," *Economist*, 2007).

But the tobacco case is matched in duplicity, if not in longevity, by the similar corporate campaign to delay both governmental and corporate response to the combined problems of mitigating climate change while meeting domestic energy needs without reliance on fossil fuel. Shortly after *Bellotti* was decided, Mobil (now part of ExxonMobil) began regular issue-advertising on matters of national energy policy in an effort to counteract pressures for "soft energy" alternatives to reliance on oil and other fossil fuels during the Carter Administration. Such alternatives as solar power, wind power, geothermal, conservation, and other strategies are now being revisited in response to the climate crisis (Lovins, 1977; Kolbert, 2007). Mobil Oil advocacy advertisements in the mid-1970s had video clips formatted to look like news items which were distributed free to local television stations. (I have a set they kindly sent me at the time.)

After the *Bellotti* case was decided, some corporations, trade groups and industry spokesmen used their newly created "free speech rights" to advocate for reduced government supervision of their activities, leading to the rise of deregulation in the Reagan years and the subsequent collapse of the savings and loan Industry as a result of inadequate supervision (Rockwood, 1989). This was followed more recently by a move to privatize many basic government functions, including prisons and even the military, which resulted in the scandal over the use of Blackwater contractors in Iraq (Klein, 2007b; Singer, 2007; Scahill, 2008). Opponents of deregulation and privatization have the same First Amendment rights in principle as corporations now do under the *Bellotti* rule, but in practice corporate funding, both directly in issue-advertising and lobbying, and indirectly through the funding of think tanks and advocacy front groups, has until recently overwhelmed public debate (Brock, 2005; Kaplan, 2004; Mooney, 2005a; Rich, 2005; Rogers & Harwood, 1995).

The result has been an imbalance in the "free marketplace of ideas" that was clear in the assault on the Clinton health care proposals in 1992-1994, as documented by the work of Bill Moyers in cooperation with the Annenberg Center (Moyers, 1994).[3] If only certain viewpoints are widely expressed, how can public policy be rationally determined in a democracy? Professor White articulates this concern clearly: "[T]here is a deep opposition between advertising—the world it creates, the assumptions on which it works, the activities of mind and imagination and feeling that it stimulates—and what I call living speech: speech that rewards attention and affirms the value of the individual mind and experience" (White, 2006, p. 84).

In each of these cases the power of corporate speech ensured that *one simplistic, skeptical and self-interested viewpoint was dominant*: fully and regularly presented to the public without much criticism or analysis, whether in the print or telecommunications media, and usually without the public being aware of who was funding that viewpoint (Moyers, 1999). The rise of the Internet as a means of providing alternative views since the 1990s has created a new means of counteracting this trend, but has also led to increased polarization of views and confusion as to the reliability of information presented on Web sites whose funding provenance is often difficult to ascertain (Sunstein, 2001).

The Climate Disinformation Case

The most significant continuing example of the abuse of corporate speech rights and budgets since the tobacco case is that of disinformation in the matter of global warming (Rockwood, 2006, 2007b). There has been a long-term, widespread use of corporate funds to promote confusion and doubt in the face of the overwhelming scientific consensus on the reality and danger to society of anthropogenic

[3] Bill Moyers (1994, October 7). *Ads and Health Care*. PBS.Org. The VHS is not available on the Web site of PBS or the Annenberg Public Policy Center, but I own a copy. The PDF for a subsequent report on issue advertising by the Center is available on line at their cite: Deborah Beck, Paul Taylor, Jeffrey Stranger and Douglas Rivlin, *Issue Advocacy Advertising During the 1996 Campaign*, Annenberg Public Policy Center, University of Pennsylvania, Philadelphia, PA (1997).

global warming (McKibben, 2005; Mooney, 2005b; Gelbspan, 1995, 1998, 2001, 2004; Flannery, 2005; Pearce, 2007; Broecker and Kunzig, 2008; Speth, 2008). The scientific consensus is well documented in the peer reviewed literature (Oreskes, 2004a & b, 2006, 2007), and the work of the United Nations Intergovernmental Panel on Climate Change (IPCC). The strategy of denial has only recently received serious attention in the corporate-owned mass media (Begley, 2007). The Union of Concerned Scientists (UCS), a nongovernmental organization (NGO) actively involved in the UN IPCC process, reports (UCS, 2007) that between 1998 and 2005 ExxonMobil provided over $16 million dollars to 43 front groups to fund climate science skeptics. The summary of the report on their Web site notes that ExxonMobil's tactics:

- raised doubts about even the most indisputable scientific evidence;
- funded an array of front organizations to create the appearance of a broad platform for a tight-knit group of vocal climate change contrarians who misrepresent peer-reviewed scientific findings;
- attempted to portray its opposition to action as a positive quest for "sound science" rather than business self-interest; and
- used its access to the Bush Administration to block federal policies and shape government communications on global warming.

This campaign succeeded in confusing the public about the scientific consensus, delaying timely action during the late 1990s. It helped to persuade the Senate under a supportive administration to refuse to ratify the Kyoto Protocol negotiated by then-Vice President Gore. It continued in the new millennium, enabling President George W. Bush to reverse course after the election and un-sign that agreement. The U.S. pursued a policy of internal censorship of government funded climate science for most of his two terms of office (Revkin, 2005).

Corporate funding for climate change denial continues (Hoggan, 2009; Schendler, 2007) and is reflected in the March, 2008 conference of many familiar climate change skeptics sponsored by the Heartland Institute in New York City (Revkin, 2008). ExxonMobil continues to support the Cato Institute, which recently published another book by the well-known climate skeptic Pat Michaels.[4]

With the release of *An Inconvenient Truth* as a film and book in 2006 (Gore, 2006), and the subsequent joint award of the Nobel Peace Prize in 2007 to Al Gore and the UN Intergovernmental Panel on Climate Change (IPCC) (Byrne & Monastersky, 2007; Gore, 2007; Gibbs, 2007), more of the public has become aware that there is a scientific consensus about the climate crisis, and not a "controversy" still open to genuine scientific debate, despite the continued efforts of skeptics (Monastersky, 2006a,b). The question remaining is the response to be taken. CNN presented in the fall of 2007 a series of reports "Planet in Peril," and the National Geographic channel's winter 2007-2008 special "6 Degrees" described in compelling detail what a series of one degree increments in global average temperature might mean by the end of the century (Bowman, 2008; Lynas, 2008).

There are still those who argue that the news media should continue to "report the controversy" with respect to climate change risk, but that argument gives too much credence to the skeptics. The parallel to those who argued for doubt about the risks of tobacco in the 1960s and 1970s is strong. *Frontline* on PBS broadcast a documentary on the challenge of climate change on October 21, 2008: "Heat," http://www.pbs.org/wgbh/pages/frontline/heat/. The subtitle of the program is not "whether" there is global warming, but "Can we roll back global warming?" and the program notes that both presidential candidates in the fall of 2008 agreed there is a crisis that must be addressed in the new administration.

Yet despite these positive signs, the disinformation campaign made possible by the *Bellotti* decision continues (Samuelson, 2007; Hansen, 2007), and has done its work in making it difficult to fashion a policy consensus to match the scientific consensus for an adequate solution to the crisis in a timely manner. Scientists such as NASA's Dr. James E. Hansen, director of the Goddard Institute for Space Studies and an adjunct professor at Columbia University in Earth and Environmental Sciences, argue that we may have less than a decade to respond to the challenge before irreversible damage is done. Hansen has stated that after that it will be anything but "business as usual," because "Business as usual will produce basically another planet. How else can you describe climate change in which the Arctic becomes an open lake in the summer, and most land areas experience average

[4] Patrick J. Michaels and Robert C. Balling, Jr., *Climate of Extremes* (Washington, DC: The Cato Institute, 2009). Andrew Revkin attempts to identify points of agreement between the scientific consensus and the skeptics, at Dot.Earth: "A Starting Point for Productive Climate Discourse," January 13, 2008 in the *New York Times*.

climatic conditions not experienced before in even the most extreme years" (Pearce, 2007, p. 237). This rapidly decreasing time for us to act on the crisis is in part the result of "corporate free speech" over the past 20 years preventing business and society alike from mobilizing in a constructive fashion.

The scientific, ethical, and international consensus (Rockwood, 2006, 2007a,b; Stern, 2007; Broder, 2007) means that today no branch of the U.S. government can deny the real crisis that climate change poses, and the need for prompt and serious action by the United States in collaboration with the rest of the world (Kolbert, 2006; Speth, 2008). As the Supreme Court has ruled that the EPA may regulate CO_2 as a pollutant under the Clean Air Act, in *Massachusetts v. EPA*, No. 05-120 (April 2, 2007), 127 S. Ct. 1438 (2007) the EPA administrator in the new administration will be free to regulate greenhouse gases through rule-making, and to grant waivers to California and other states under the Clean Air Act.

Climate Mitigation & the Financial Crisis

The financial crisis of 2008 and beyond likely will lead to objections that an adequate response to the climate crisis is too expensive. If this argument is successful, then the damage already done by disinformation will be too great to undo in time to make a difference.[5] The counter-argument, that solving the climate crisis can be part of the response to the financial crisis, is reflected in the stimulus package and pending Waxman-Markey bill (Mouawad, 2009).

THE FAILURE OF SHAREHOLDER THEORY

One reason for the persistence of "junk science" in corporate issue advertising that denies the reality and significance of anthropogenic climate change is a combination of self-interest on the part of fossil fuel industry and the cover provided for such self-interest by the widely taught theory of the late Milton Friedman that the only obligation of the corporation is to make profits for shareholders, while operating "within the law" (Friedman, M., 1970; De George, 1986, pp. 92-93; Thorne, Ferrell & Ferrell, 2008, pp. 5 & 45). Milton Friedman's reputation and ideology provide "moral cover" and an excuse to do nothing (Greider, 2006; Klein, 2007a; Sachs, 2007). Heal argues that Friedman's idea of what is "within the law" is narrower than addressing what modern externalities requires (Heal, 2008, pp. 4-9). Friedman rejects stakeholder theory, or that corporations may have obligations to society similar to those of a citizen (White, 1985).

Friedman's vision of the purpose of the corporation, with its reliance on classical free market economics, has combined with legal decisions such as *Virginia Board of Pharmacy* and *First National Bank of Boston v. Bellotti*, to provide justification and opportunity for corporations interested in avoiding the costs of internalizing their externalities at the expense of maintaining share prices and executive compensation. Voluntarily addressing such problems as climate change risks cutting dividends and depressing quarterly earnings results.[6] Corporate issue advertising is a tax-deductible business expense, and it is easy to see why funding climate change disinformation as a policy at fossil fuel producing and consuming companies has held on for so long.

The shareholder theory of the purpose of the corporation fails to recognize two closely related realities: First, the important role corporations play in contemporary democratic society. And second, that given that role, failure of the shareholder theory to address the problem of market failures in meeting environmental concerns is a major threat to the survival of that society.[7] The demands of climate change mitigation entail expending great sums on R&D for new technologies (Kunzig, 2008), and

[5] The adverse impact of the *Bellotti* decision on public discourse has been augmented by the ability of corporations to leverage their issue advocacy advertising with lobbying and campaign contributions to direct public policy in their favor. The case of Philip A. Cooney moving from being a lobbyist for the American Petroleum Institute to the White House Council on Environmental Quality (CEQ) in the Bush Administration, where he censored climate change documents, and then left to work for ExxonMobil when this was revealed to the press, is an example. His work at the CEQ mirrored the policy agenda reflected in ExxonMobil's media campaign discounting the risk of climate change (Revkin, 2005; Friedman, 2007).

[6] There are behavioral factors that also encourage short-term thinking, such as reporting of quarterly results, the madness of crowds, and the structure of executive compensation plans. (Kindleberger and Aliber, 1978; Shiller, 2006; Mackay, 2009).

[7] These externalities include the tragedy of the commons problem (where resources held in common are over-utilized in the absence of regulation), the difficulty of assigning a market value to public goods, the need to internalize costs imposed on others, geographic spillovers, and the obligation to provide for intergenerational equity (Salzman and Thompson, 2007, 16-25).

possibly creating wholly new industries. They are simply too comprehensive and uncertain to be met unless business adopts a broader, stakeholder approach to its purposes, and works with science and government to address the problem.

Civil Society and Corporate Responsibility

Criticisms of corporate power are not new (Berle and Means, 1932) and have led to the rise of stakeholder theory and the movement for greater voluntary efforts for corporate social responsibility (Buchholz, 1989; Jennings, 2006; and Epstein, 2007). This has been paralleled by the role of public interest or nongovernmental organizations seeking to check corporate power (Heal, 2008). One example: Corporate Accountability International (formerly Infact) has worked to put public pressure on abuses such as Nestlé's marketing of powdered infant formula in Africa without access to safe drinking water, the marketing of tobacco in developing countries, and the privatization of public water. See: http://www.stopcorporateabuse.org/cms/.

One scholar argues that NGOs provide a positive incentive for corporations to improve their corporate social responsibility (CSR) ratings at such ratings agencies as KLD Research and Analytics, http://www.kld.com/ and Innovest Strategic Value Advisors, http://www.innovestgroup.com/:

> [S]uperior social and environmental performance can improve a company's financial performance in many ways, from reducing exposure to risks to improving brand value and employee morale, and the externalization of costs is viewed by the stock market as a liability...Imposing external costs on others is likely to lead to law suits, actions by nongovernmental organizations, and ultimately to regulatory intervention and changes in the legal framework (Heal, 2008, p. 41).

A thesis of this paper is that despite the movement for corporate social responsibility, the efforts of NGOs and the claim that CSR benefits the bottom line, many corporations continue to exercise their market power in ways that adversely influence the public interest.[8] The tobacco and climate change cases reflect this. When regulatory responses to an issue might cost the corporation money, they oppose them even though they are in the best long-term interest of society as a whole. And this is possible in part due to the way in which the Supreme Court has treated corporations as persons for the purposes of the First Amendment.

FINAL THOUGHTS

The history of corporate disinformation in the tobacco case, and the exposure of the similar campaign in the climate change case, might lead one to doubt that the mass media and industry will ever learn not to repeat the mistakes of the past. But relying on objective science, and adapting to the lessons of evidence in the short term, can avoid huge damage awards, expensive litigation, and enormous harm to the public image of many firms in the long term (Heal, 2008). An ounce of prevention is worth a pound of cure, and even a lot more than an ounce of climate change mitigation investment is worth avoiding or reducing the enormous potential losses. Consider the impact on business of even the relatively minor costs of recalling millions of toys with lead paint, thousands of pounds of beef from downer cattle, or thousands of cases of contaminated peanut butter.

One can also argue that a commitment to intergenerational ethics, of not imposing excessive costs on our grandchildren by avoiding more reasonable solutions now, ought to play a role in ethical corporate decision-making as well as in the public policy tools government adopts to encourage ethical and responsible individual and corporate choices.[9] Conservatives once made such an argument in calling for privatization of social security, and it certainly makes sense in the case of climate change, whose risks are far more certain and irreversible.

Despite these lessons of history and ethics, individual businesses, trade associations and lobbies continue to game the system, seeking to use funding of front groups and legitimate charities alike to pursue their self interest while remaining under the radar. As an example, it is reported that the National

[8] See: Ian B. Lee, "Is There a Cure for Corporate 'Psychopathy'?" 42 *American Business Law Journal* (2), pp. 65-90; and Jeffrey Nesteruk, "Response: Enriching Corporate Theory," *American Business Law Journal 42*(2), pp. 91-95.

[9] Government tax incentives and subsidies could be linked to default options that encouraged best climate-mitigation practices, adapting the principle of libertarian paternalism advocated by Cass Sunstein in *Laws of Fear*, and further elaborated by Sunstein and Richard Thaler in *Nudge: Improving Decisions About Health, Wealth and Happiness*. Sunstein has been appointed to head the White House Office of Information and Regulatory Affairs (OIRA) in the Obama Administration.

Healthy Mothers, Healthy Babies Coalition announced on October 4, 2007 that "women of childbearing age should eat at least 12 ounces of seafood each week, including tuna and mackerel, which can have high levels of mercury." It turns out that the recommendation, *which contradicts FDA and EPA recommendations in place since 2004*, was based on a study by the Maternal Nutrition Group, and that a member of that group had got the "National Fisheries Institute to provide $1,000 honoraria to each of the group's 14 members, with an extra $500 each to the group's four executive committee members." The Fisheries Institute also gave the coalition $60,000 "for its educational campaign."[10]

The funding source here raises doubts about the legitimacy of the recommendations made, even if it turns out that the underlying science stands up. Keeping the funding source quiet initially only makes matters worse. Similar issues arise in the kinds of disclosures to be made when publishing findings on proposed new drugs in the *Journal of the American Medical Association* or *The New England Journal of Medicine* (Monastersky, 2007). Corporate funding for, and influence upon, university research is another source of concern, particularly as public support for faculty research has declined in recent decades.

Jeffrey Nesteruk has suggested one possible solution to the problem of disinformation: reform of the *Bellotti* decision, and changing the law to "legally acknowledge the distinctive commercial character of corporate speech, but to do so in a case such as Nike as a rebuttable presumption with the burden of proof being on the corporate speaker…[T]he law is entitled to consider corporate speech as commercial speech, unless the corporation in an instant case can reveal its motivation to be substantially related to more than its economic interest…In effect, the law provides external regulation to compensate for the lack of the internal self-regulation of moral evaluation" (Nesteruk, 2007). A change in the law of corporate speech of this sort might enable society to redress the imbalance of information that currently distorts public policy—although whether it can be adopted in time to make a difference given the imminence of the climate crisis remains to be seen.

James Boyd White argues that "Law depends upon a belief in the reality of other people, in the possibility of meaningful speech in the heightened circumstances it provides, and in the kind of justice that consists of real attention, honest thought, and doubt. This belief is made express and manifest in writing that calls the reader into life. It ultimately takes the form of love, a love of other and a love of justice" (White, 2006, p. 217). White's insight is comparable to Martin Buber's distinction between treating people as subjects (I-Thou) rather than objects (I-It) in their interrelationships (Buber, 1923, 2006). It is not surprising that artificial, legal corporate persons under the framework of our legal system treat many issues in a way that has the effect of denying human values and stories in the interests of "shareholder" profit, and at the expense of human values and human life. It is up to us in the field of corporate ethics and social responsibility to call attention to this, and try to change it (Bisoux, 2008).[11]

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[10] Marian Burros, "Industry Money Fans Debate on Fish," *New York Times*, October 17, 2007. The October 4, 2007 Press Release is entitled "For Pregnant Women, Benefits of Eating Ocean Fish Outweigh Concerns from Trace Levels of Mercury," and is currently, at least, available at the Coalition's Web site: http://www.hmhb.org/oceanfishpr.html. See also: Media Matters for America, "October 12, 2007, "Wash. Post reported coalition's findings on seafood consumption without noting ties to industry," http://mediamatters.org/items/200710120003?f=h_latest.

[11] Many MBA programs are taking steps in this direction with respect to sustainable development, as are some corporations. (Fialka, 2006; Keehner, 2006; Financial Times "Sustainable Business," 2007). The AACSB supports the United Nation's Principles of Responsible Management Education (PRME), http://www.unprme.org/. See also: "Beyond Grey Pinstripes, 2007-2008: Preparing MBAs for Social and Environmental Stewardship," prepared by the Aspen Institute Center for Business Education, at: http://www.aspeninstitute.org/, CERES: Investors & Environmentalists for Sustainable Prosperity, http://www.ceres.org; and the recognition by Swiss Re of the need to address climate risk to keep officers & directors liability insurance rates low (Kunreuther & Michel-Kerjan, 2007).

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SCRANTON AIRCRAFT MANUFACTURING: TWO HANDS-ON MANAGEMENT-INTEGRATIVE SIMULATIONS FOR THE INTRODUCTORY PRINCIPLES OF MANAGEMENT COURSE

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ABSTRACT

Two related experiential simulations focusing on a variety of management topics were developed for the introductory Principles of Management course. The intent was to allow students to experience and integrate "management" concepts, rather than to rely solely upon the more common integrative "business-centered" simulations. Inherent in this position is the contention that management has its own knowledge base which also needs to be integrated. Unlike many management or organizational behavior exercises, the simulations described and discussed here maintain a profit component. This links students' managerial actions directly to performance and engages them in a competitive environment.

In these two simulations, students gain insights into and integrate such management topics as decision-making, communicating, demonstrating leadership, negotiating, change management, structuring organizations, and controlling. Additionally, this paper positions these two simulations within the context of many of the business simulations in use. Finally, potential uses for assessment of learning are discussed.

INTRODUCTION

When developing simulations for use in business schools, it is useful to evaluate the various types of simulations that have been created and used in the past. "It now seems almost an article of faith that simulations and games are good ways of teaching management" (Gunz, 1995, p. 54). Certainly, simulations in business schools have a long history (Gray, Willingham & Johnston, 1963; Ruben, 1999).

Unfortunately, a large percentage of simulations used in management courses are business-related rather than management-related. Students typically run a business of some sort. When it comes to integrating planning, organizing, directing, controlling, and decision-making, it is assumed that students just "get it." In this author's experience, it is only when students understand the integrative nature of specific management concepts that they come to have a greater appreciation of management.

The main objectives of this paper are to suggest that simulations which focus directly on integrating management concepts are strongly needed and to describe two such simulations for possible use in the classroom by others.

In reviewing the simulation literature, seven characteristics have been identified for categorizing simulations. They can be computer-based or experiential. They can be short-term (Adler, 2005) or semester-long (Keys & Wolfe, 1990), integrative (Wenzler & Chartier, 1999) or topic specific (Brumagim, 1994; Schumann, Scott & Anderson, 2006), and complex (Parks & Lindstrom, 1995) or simple (Gunz, 1995). They can be based upon hard data or soft data (Gunz, 1994), those intended for introductory courses or advanced courses, and those that are flexible (Bickford & Van Vleck, 1997) or highly-structured (Dennehy, Sims & Collins, 1998).

Along these dimensions, the two simulations presented in this paper are experiential, short-term, management (rather than business) integrative, and simple. They utilize hard data; profitability is calculated. These simulations also involve soft data, in that student managerial interactions can be observed. The simulations are designed for an introductory course in management. Finally, although the "shell" of the simulations is structured, the specific executions of the simulations are quite flexible and include unpredictable student actions and decisions. This flexibility is crucial.

Being short-term and simple, these two simulations can be easily used by the instructor and directly related to many textbook topics without consuming very much valuable class or preparation time. Unlike many management simulations, such as in-box exercises, these are profit-based. Two teams compete with each other, but unlike most computer simulations, the actions of one team do not directly affect the other team. This allows for the more direct assessment of group and individual management performance. Having an organizational structure, specific job tasks, and performance/production goals provide students with the structure needed to quickly understand and execute the two simulations. An additional benefit is that because the two simulations are classroom-based, the instructor can directly observe students' actions and interactions. Before describing these two simulations in more detail,

several simulations specifically intended for use in introductory courses will be briefly outlined.

Introductory course simulations can be quite complex. Miller (1991) describes a freshman-level experiential business simulation where large teams of often over thirty students run an actual business. Each team produces and sells an actual product or service. As would be expected, this simulation is very resource-intensive, requires a substantial time commitment on the part of students, and involves several faculty members. Miller suggests that it is a particularly important learning experience because it is taken at the beginning of the curriculum. It has the potential for framing more advanced business courses. It should be noted that it is part of an introduction to business rather than an introduction to management course.

There are several business-focused computer simulations being used at the introductory level, often in management courses. Some are advanced simulation packages. Thompson, Purdy, and Fandt (1997, p. 430) describe such an application and suggest that an integrative experience is important both at the beginning and end of the undergraduate program.

Some computer simulations are simplified versions of more advanced packages. Again they focus upon business integration rather than management integration. Two of the more popular introductory packages are the "Foundation" simulation (www.capsim.com/products/C_foundation.cfm) by Capsim and "GoVenture" (www.mediaspark.com/products/) by Media Sparks. Both have the ability to be run in simplified form for introductory courses and in a more complex form for capstone courses.

There are simulations intended to address specific topics. Using an interesting technique Schumann et al., (2006) use only part of integrated computerized business simulations to teach a single conceptual area: business ethics.

There are also topic-specific experiential simulations. For example, Cook and Olson (2006) use a simulation to teach project management in an introductory operations management course. Brumagim (1994) focuses solely upon total quality management (TQM) using a short experiential management simulation in a management course.

Many other short and relatively simple experiential simulations have also come from the organizational behavior area. They tend to be only somewhat integrative and are rarely profit-based.

This author considers cross-functional business experiences to be very powerful either in an introductory "business" course or in a capstone course. Business is certainly moving away from functional silo approaches to cross-functional teams. However, it could be argued that the business student should also be exposed to the depth of functional area knowledge with business integration being an important additional part of the curriculum. Management like other disciplines, such as accounting or finance, has its own important body of knowledge. As will be described next, an important feature of the two simulations is that they provide for a deeper understanding and integration of several management concepts.

DETAILED DISCUSSION OF THE TWO SIMULATIONS

These specific simulations are each conducted in slightly more than two 50 minute class periods. The ideal class size for each simulation is 36 students, although changes in the simulations' chain of command can be altered to accommodate different size classes. The product of both simulations is paper airplanes. Each of the two simulations is broken down into the following five phases:

1. This phase provides simulation instructions, outlines the management and production tasks, creates the company hierarchy, and provides the airplane design. Student questions are also answered. The planned time for this phase is 20 minutes.
2. This phase executes the first production run. Students become familiar with running the simulation. Additionally, one or more changes are introduced for students to react to with the intent of replicating management experiences. The planned time for this phase is 20 minutes.
3. This phase provides a debriefing of the first production run. This first debriefing is intended to get a sense of students' reactions in the middle of the simulation. During this debriefing the students not only express how they feel and discuss their performance, but identify which parts of the simulation or rules they find difficult. This discussion can result in immediate changes to the second production run (phases 4). This appears to be a somewhat unique simulation feature. The planned time for this phase is 10-20 minutes. This professor has found success in conducting debriefings across class periods, given time constraints.
4. This phase executes the second production run with several external and internal surprise changes occurring throughout the production run. The planned time for this phase is 20 minutes.

5. Finally, the last phase debriefs and provides for reflection about the simulation. One goal of this more in-depth debriefing is for the students, with the instructor's help, to link the simulation to various management concepts. The planned time for this phase is 30 minutes.

The first simulation involves a single company headed by the instructor, acting as chief executive officer (CEO). Other management and worker roles are filled by students. There are two internal production teams, thus competition is built into the experience. This simulation involves a tall and top heavy organization hierarchy. The second simulation involves two competing companies run exclusively by students. In this simulation, the professor acts as multiple customers.

Given the fast pace of these production runs, substantial time is allocated to debriefing. The importance of debriefing is widely accepted (Dennehy, et al., 1998; Keys & Wolfe, 1990). Meisel and Fearon (1999, p. 84) go so far as to suggest that one-third of the simulation time be devoted to debriefing. Because several executions of the simulations produced comparable results, one specific classroom experience will be described.

Simulation 1 (single company)—phase 1: instructing, planning, and organizing

Students were tasked with promoting individuals to various managerial positions, through a repeated process of voting and volunteering. Although this approach is seldom used in business, it provided credibility and confidence for student managers. Along these lines, research has found that group selection influences group dynamics, attitudes toward group experiences, and group outcomes (Chapman, Meuter, Toy & Wright, 2006). They suggest that self-selection of groups is most productive. Given the active involvement of the professor with students, concerns such as the free-rider problem (Brooks & Ammons, 2003) were not issues.

During simulation one, the professor acted as CEO and students filled all other positions. One chief operating officer (COO) reported to the CEO. One executive vice president (EVP) and four functional vice presidents (VPs) responsible for marketing, production, accounting, and quality assurance reported to the COO. Each functional VP had two middle managers reporting to him or her. Each of the two production middle managers (one for each production team) had two supervisors reporting to him or her. All other students were workers in one of the two production teams. This resulted in 18 student managers or supervisors.

Demand for the product was unlimited and the production time frames were announced to the class. Each manager was given a brief description of the responsibilities for his or her position. Any manager, supervisor, or worker who was underworked was instructed to find work or ask his or her boss for additional tasks.

The goal of the production teams was to make as many airplanes as possible. Quotas for the groups were arbitrarily set by the CEO and communicated to the COO. The marketing managers were tasked with showing airplane designs, taking orders, and delivering airplanes to the customer (also the instructor). The accounting managers were charged with keeping a running total of revenue and costs, in order to report profits. Accounting was kept extremely simple, capturing only production revenues and costs. Each delivered airplane generated $1,000,000 in revenue and $900,000 in cost. Quality assurance managers for each production team were given templates to measure airplane compliance. This provided a criterion to approve deliveries. There were no penalties for high inventory levels at the end of each production run. In order to keep the simulation simple, no penalty was assessed for airplanes not in conformance with quality requirements. The only negative effect of non-conformance was that fewer airplanes would be sold.

Simulation 1 (single company)—phase 2: executing the first production run

Several managers and a few production workers had difficulty fully understanding their responsibilities and tasks. The professor spent some time providing clarification as the first production run was proceeding. Many students were hesitant to make decisions. For example, the quality assurance managers requested guidance from the CEO as to how much variance to allow when comparing a finished airplane to the quality-control airplane template. These students were instructed to confer with the marketing managers or to follow the chain of command for guidance. Yet, these other managers also had difficulty in figuring out how to make this decision. Customer contact was not considered. The CEO was particularly careful to follow the chain of command. On the other hand, the COO tended to communicate directly with anyone in the company.

More than halfway through the run, the simulation was proceeding smoothly and the production teams were on track to exceed their quotas. At this point, new and significantly different airplane designs were issued through the chain of command by the CEO. This caused chaos throughout the organization and a dramatic slowdown in

production, as the organization struggled to implement the changes.

Simulation 1 (single company)—phase 3: debriefing the first production run

Students reported that a major lesson was the need for and the difficulty of achieving accurate and timely communications with the right people in a busy organization. This was particularly important when reacting to the airplane design change.

Decision-making under time pressure was another aspect of the first production run addressed by students. Several students pointed out that although the COO was very dynamic and well-respected, he often solved problems alone and did not communicate decisions to his top managers during the simulation. This affected decision-making within the chain of command. The COO acknowledged this concern. Without embarrassing the COO, benefits and limitations of his (and others') leadership styles were discussed. During the simulation, no managers had confronted the CEO about these communication issues. The students reflected upon the top-heavy nature of the organizational structure and identified situations where too many managers seemed to slow things down. This resulted in a deeper understanding when the basic concepts of organizing were later covered in the classroom.

Some students, when faced with a lack of work, sat and did nothing. Despite instruction on how to handle such situations, students were either not motivated or hesitant to take action. During the debriefing, some students suggested that it was their boss's responsibility to ensure that they had enough work to do. This experience was further discussed in subsequent class lectures on business leadership and self-motivation.

Finally, students came to appreciate the difficulty of implementing change when the airplane designs were significantly altered. Management communication seemed to break down when faced with these changes. This provided a hands-on experience in change management. Several suggestions were made to improve this situation in the future. One suggestion that seemed to be quite appropriate was to shut down the entire production line until product prototypes and new production methods could be designed. Again, time pressure was a concern.

Simulation 1 (single company)—phase 4: executing the second production run

The quotas were doubled by the CEO. Both teams rapidly adjusted without complaint and were quickly on track to meet the new production levels.

Students who continued to lack work and did nothing about it were laid off about a third of the way through the second production run. The CEO made the decisions and communicated them through the chain of command. Similar types of simulation actions are noted in Adler (2005). The affected people were not happy and demanded to know why they had been laid off. Since student managers did not want to address this issue, the CEO explained to them, in a playful way, that they appeared to be underworked. Of course, they disagreed. The four laid-off students were instructed to sit at the side of the room and watch the simulation, which they did, somewhat reluctantly.

The quality assurance inspectors and managers were initially underworked. They were able to measure the airplanes for conformance to requirements much faster than airplanes could be produced. One team of inspectors and managers, upon their own initiative, started to make airplanes. They became so involved in helping the production teams meet the quota that they fell behind in inspecting completed airplanes for quality. Finished airplane inventory increased substantially. This was discovered and corrected by the quality assurance VP. Although this was evidence of decision-making and self-motivation, it also suggested the need for better communication and forethought.

About three quarters of the way through the second production run, the CEO announced to top executives that a major customer had cancelled a very large order. One entire production team and their supervisors were laid off. They had worked very hard to meet their quota and were extremely unhappy about this turn of events. The laid-off team was also directed to stand at the side of the room and watch the simulation. Within a few minutes it was announced that several new contracts had been signed and all laid-off employees, including the first few students that had been laid off, were rehired. Despite being reinstated after only a short time, morale among the laid-off workers was extremely low. There was significant resistance to working at the previous pace. One group of three production workers and a supervisor refused to rejoin the company. They announced that they had formed their own business to compete directly with the company. Demonstrations of low morale and the refusal to rejoin the company appeared to be light-hearted.

Simulation 1 (single company)—phase 5: debriefing the second production run

The discussion of mass layoffs was a major issue for students. The concept of operating in turbulent environments was discussed.

The production workers stated that they "got into" the simulation and felt the need to compete not only against the quota, but against the other production team as well. They suggested that various changes in production processes, implemented directly by the workers, were responsible for some of the increased productivity during the beginning of production run two. These worker innovations and overall motivation were contrasted with the subsequent effects of poor morale and motivation due to the layoffs. As a result, once morale dropped it was almost impossible for supervisors and managers to control production levels. Although this led to a discussion of control issues, it was acknowledged by the instructor that the simulation could not really provide managers with the real formal or informal power often needed in the control process.

The class discussed the concept of downsizing and its causes, such as outsourcing, process reengineering, globalization, and advances in technology. Career strategies, including the need to continuously increase personal skills and provide value to the organization, were discussed. The proactive response by the quality assurance team was discussed and applauded. The possibility that there was a conflict of interest was also reviewed. Was it appropriate for these quality inspectors to evaluate their own work? They had not thought about this issue.

Professor reflections about simulation 1

Perhaps the most satisfying aspect of the simulation was that the students seemed engaged and had fun. Part of this dynamic resulted from the fact that neither of the simulations was graded. Rapport, which had been built up with the class prior to the simulation, allowed for such actions as the layoffs. Although a few students expressed displeasure at being laid off, there was no discernable bitterness either during or after the simulation. Even the students who decided to create a new company did so in a playfully confrontational manner. Another aspect that made this experience engaging for students was that their voices were heard during debriefings. Although it is surely impossible to satisfy every student, this simulation resulted in wide-spread spirited participation.

Overall, the simulation successfully provided experiences and insights for discussions of motivation, leadership, decision-making, TQM, change management, control, and the importance of the task environment. Students did find it difficult to consistently communicate up and down the chain of command. This led to some confusion when top management did not know what supervisors were doing and vice versa. It did, however, provide examples of the importance of communication and its relationship to other managerial functions. It also led to an interesting discussion of tall versus flat structures, a topic that many students find boring and of little relevance.

Simulation 2 (two companies)—phase 1: instructing, planning, and organizing

The class was separated into two competing companies. Unlike the organizational procedure from the first simulation, students selected their positions on a first-come, first-served basis. The organizational structures were significantly simplified due to the fact that there were now two student companies. Each company had a student CEO and four functional VPs. The COO and the executive VP positions were eliminated. All middle managers were eliminated except for the two marketing positions. Two production supervisors were maintained and two were eliminated. This resulted in nine student managers per company. The professor assumed the role of three different customers and had no direct role in either company. In conforming to functional responsibilities, only marketing representatives or the CEO of a company could negotiate orders with customers. The product was again paper airplanes. The companies' goal was to achieve the highest profit, given that prices were now negotiable. It was announced that the second simulation, unlike the first, did not involve layoffs.

A short presentation was given on the importance of documenting business decisions. Most principles of management texts cover various decision-making and communications models (for example, see Schermerhorn, 2007), but generally do not emphasize the more mundane aspect of maintaining a written record of important business activities and decisions. It was announced that simulation two required major decisions to be documented in memos.

Simulation 2 (two companies)—phase 2: executing the first production run

Perhaps because of the experience with simulation one, the basic rules were better understood by students in both companies. There were a few new twists. For example, playing the role of a customer,

the professor would always ask the title of anyone approaching him and only deal with appropriate people. One time, an accounting VP came to negotiate a sale and was told that the customer dealt only with marketing personnel or the company's CEO.

Since revenue depended on the price negotiated with the customers, marketing responsibilities were expanded. However, marketing personnel often did not want to make pricing decisions alone. Each company selected a group of managers to determine price bids jointly. This demonstrated the breaking of "functional silos."

Several interesting problems arose within the two companies during the first run. For example, one company had a major communication problem. The marketing manager negotiated a contract with customer one for 100 airplanes at a total price of $950,000. Actually each plane, not the entire 100, cost $900,000 to produce. Only the accounting VP had this cost information. The accounting VP's communication with the marketing manager had been misunderstood and had not been documented. The CEO of the company visited customer one, explained the error, and asked to renegotiate the contract. Since the alternative was bankruptcy for the company, customer one agreed to a renegotiation.

Both companies focused upon customer one, who purchased in large quantities, despite the more rigorous price negotiations that became quickly apparent. Something about the size of "100 plus" airplane orders seemed very attractive to both companies. It kept production running, despite lower profits per airplane. A few orders were placed with the other two customers. As suggested by the pricing problem outlined above, the two companies also had difficulty completing appropriate documentation. Part of the problem was that in their haste to "be the winner," documentation just seemed to slow them down.

Overall, the second phase ran smoothly. Quality was high, deliveries were prompt, and the sales forces maintained sufficient order backlogs. Both companies were profitable.

Simulation 2 (two companies)—phase 3: debriefing the first production run

Student decisions to approach certain customers were discussed. Members from the companies suggested that they just went to customer one without much thought. Marketing members of one company suggested that the most important factor, more important than total profits, was to keep the workforce working. They had remembered the turmoil that simulation one layoffs had caused and did not want to repeat the experience, despite the instructor's phase one assurance that no layoffs would be made. The managers' responsibility to balance a variety of stakeholders' needs was discussed. The idea of business strategy as it relates to the selection of customers was also addressed, in a general way.

Another component of the debriefing of the first run focused upon the purpose of and need for documentation.

The professor also noticed that neither CEO made any external contacts, except sometimes with customers. Both CEOs were focused primarily upon internal operations. During the debriefing it was suggested that CEOs should spend more time externally. A variety of external contacts, including major customers, community representatives, industry associations, and other interest groups were added to the simulation. The professor announced that he would act in these roles. Top management's external responsibility was discussed and related to the textbook.

Simulation 2 (two companies)—phase 4: executing the second production run

The second production run was designed to provide students with the opportunity to reinforce lessons learned from the first production run and related debriefing. Additionally, significantly increased competition was added in the form of substantially higher price sensitivity, initiated by customer one.

Despite increased price competition, teams were still attracted to customer one. Given tougher negotiations with customer one, it was not unusual for the marketing teams to get their CEOs involved in the final negotiated price. It did not appear that the companies had an explicit pricing strategy. In one case, a company was so intent on receiving an order that they priced at cost. After a few very competitive interactions with customer one, one company conducted a few transactions with customers two and three.

Simulation 2 (two companies)—phase 5: debriefing the second production run

As with simulation one, students gave high evaluations to simulation two. This, once again, was consistent with the importance of fun and engagement (Bickford & Van Vleck, 1997). Several students wanted to continue the simulation. The only major criticism was that a few students felt that the simulation was too long. Instructors using these simulations must balance these two views. This

instructor felt comfortable with the length of the simulations.

Dynamics related to the marketing teams' dealings with the customers were discussed. The professor suggested that using Porter's (1980) generic strategy model might have helped to develop a plan to guide the selection of customers. Customer one was essentially following a low-cost strategy, purchasing in large quantities, and was very price sensitive. Customer two, following a differentiation strategy, was significantly less price sensitive and purchased in relatively small batches. Customer two required extremely high quality airplanes. Customer three was pursuing a focus strategy and purchased very few airplanes at very high prices. For this customer, fast delivery time was essential. With only two companies in the simulation, the use of differing generic strategies could have been a very profitable way for the companies to segment the market. The professor also noted that neither team asked customers what their needs were.

The benefits of forming relationships with external stakeholders were again raised. Both CEOs had continued to maintain an internal focus. One CEO stated that she had thought about engaging in more external contacts, but was too busy with price negotiations. This too was related back to the textbook issues of top management roles and the need for delegation. The teams were chagrined to learn that a sizable bonus would have been given to any company whose CEO engaged external stakeholders.

Professor reflections about simulation 2

The greatest satisfaction for the professor was the students' ability to integrate managerial functions during the simulation. Student production workers also learned the managerial lessons that the simulations had provided. Debriefings were very important.

Another area of success was the dynamic that evolved in the negotiating process. It was quite interesting to hear student perspectives. Many initially felt that they were at a competitive disadvantage because they had never negotiated formally before. Negotiating with the "professor" also had a constraining effect. They were initially price-takers, accepting contracts with very small profits. By the end of simulation two, they were often price-makers.

Linking day-to-day operations to an overriding strategic plan was the basis of a fruitful discussion. It is sometimes difficult to explain many of the linkages between strategy and operations. This simulation allowed for a deeper understanding of these linkages within a managerial context using Porter's (1980) model.

One of the areas of discontent for the professor was poor documentation. No penalties for insufficient documentation were included in the simulations. The professor considered changing simulation 2 by requiring all communications to be in writing with no talking. See Greenberg and Rollag (2005) for a similar email-centered exercise. On the other hand, this would slow down the simulation to the point where other lessons would not be experienced. Another area for improvement related to interactions with external stakeholders. All of these deficiencies were learning opportunities.

CONCLUSIONS

This section is organized into three parts. The first addresses a few specific recommendations and insights for running the two simulations. The second part will briefly address broader pedagogical issues. The third will address assessment of learning issues, which has become very important to business schools.

First, when should these simulations occur during the semester? The preferred sequence would be to first cover the introductory chapter, followed by coverage of the chapter on communication. Additionally it is useful to cover the chapter on decision-making concepts, and then conduct the first simulation. Thus, the first simulation occurs fairly early in the semester. It is useful to cover the chapter dealing with the organization's task and general environment shortly after the first simulation. A discussion can refer back to the simulation's massive layoffs and further examine why they occurred. This can lead to a discussion of the ethical implications of hiring or firing people when the company is facing a turbulent environment. Ethical issues are commonly being addressed throughout many chapters of current management textbooks.

The recommended time frame to run the second simulation is about five weeks after running the first. The chapters on business strategy, leadership, and managing quality should be covered first. Although many communication lessons were learned during the first simulation, a brief review of that chapter is also useful. These are only some suggestions; many other sequences will work.

Loosely linking the two simulations together in the Principles of Management course has several benefits. The simulations are very similar in format and style. Students quickly become relaxed and lessons-learned from the first simulation apply to the second. They are both profit-based, so class participants can more directly see the implications of

their actions. Another issue is flexibility. Although structured, a significant number of on-the-spot changes were made as a result of student action or comment. This replicates changes in real management situations and increases student involvement.

Second are some pedagogical issues. Experiential simulations, in general, allow for the linkage between actions and results to be clearly observed. This was true with these simulations. In contrast to these benefits, Parks and Lindstrom (1995) suggest that business cases have the limitation that actions cannot be easily traced to results. Similar limitations may occur with computer-based simulations. Competition and the environmental factors imbedded in the computer program can blur the relationship between computer-based decisions and results. Students have been known to attempt to predict the algorithms of the program rather than focus upon business decisions (Keys & Wolfe, 1990). In defense of computer-based simulations Thompson, et al. (1997) suggest that a term-long computer simulation allows teams to develop interpersonal skills, as they work together to make decisions. However, it can be argued that these group dynamics are seldom observed by the professor and therefore can rarely be discussed or evaluated in detail during class.

This is not intended as a rejection of case studies or computer-based simulations. Cases are widely and successfully used. Computer simulations have been found to be very effective over a long period of time (Faria, 2001). Some (Parks & Lindstrom, 1995, p. 223) suggest specific actions, such as priming students to focus on generic strategies or the value chain, will overcome some of the concerns related to computer-based simulations.

The main point is that the two experience-based simulations outlined here provide students with a deepened and more integrated understanding of a wide variety of management concepts. Direct professor involvement strengthens these simulations, in that it allows the professor to use the students' responses and interactions to make explicit the learning points that would otherwise be overlooked. Over 15 concepts addressed in Introduction to Management textbooks were experienced. The professor must guide the simulations so that tacit knowledge becomes more explicit (Bickford & Van Vleck, 1997).

Another issue is the degree to which the simulations enhance active learning. Students were engaged in such higher-level learning activities as problem definition (Smith, 2003). Many traditional methods of teaching are less effective in enabling this kind of teaching (Ruben, 1999). The simulations appear to enhance students' critical thinking and application of theory. A learning environment is often created.

Finally, assessment of learning issues should be addressed, given the increased emphasis on such assessments in business schools. Assessment should take place on an individual rather than group basis. Yet, the two simulations are too fast paced to allow for individual assessment. However, post-simulation assessment would be appropriate since accreditation standards do not require a pre- and post-test design. Assessing the degree to which a level of learning has been achieved is sufficient. Students could be required to complete an in-class write-up, testing both management knowledge and the application of integrative management concepts, as illustrated in the simulations. Each paper could then be evaluated by an independent assessor using appropriate rubrics. At the author's university, business people are routinely involved in such assessment activities. Since many undergraduate business school programs have identified understanding functional concepts as a learning goal, the simulations could be very valuable. For example, the author's university has the following undergraduate learning goal: "Each student will be able to apply functional area concepts and theories appropriately." These and other function-specific simulations could supplement such other assessment tools as the nationwide "Educational Testing Service (ETS) for Business" instrument.

Approaching assessment from a different angle, these simulations could also be used for, and documented as, efforts to address past goal deficiencies. This would in essence "close the loop" between assessment and action by using the simulations to provide continuous improvement in student learning. Conducting these simulations is beneficial on many levels.

Anyone desiring more details, instructions, or discussions for running these simulations is encouraged to contact the author at brumagimal@scranton.edu.

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A BINARY CHOICE MODEL FOR PREDICTING BANK ACQUISITIONS

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ABSTRACT

Decades of deregulation and rampant merger and consolidation activity have made the subject of bank acquisitions an interesting research topic. Some banks are seeking merger candidates, some are seeking to be acquired, and some are attempting to position themselves to avoid being acquired.

We examine merger activity specifically in the community banking sector to determine the major factors driving the likelihood of acquisition. We find that *deposits/assets*, the *efficiency ratio*, and *ROA* are positively related to merger likelihood, and that *noninterest income/average assets* and *ROE* are negatively related to merger likelihood. We use a logit model to construct an index that easily quantifies the probability of acquisition.

The data set used is for acquisitions that occurred in 2004. *Ex post*, the model successfully "predicts" over 70 percent of the acquisition and non-acquisition events that occurred. Further, the model successfully predicts acquisitions that occurred in 2006 and 2007. Finally, the model is used to identify candidate banks for acquisitions that have not yet occurred. We hope this research will aid both bank management and investors in their decision-making.

INTRODUCTION

In this paper, we examine merger activity in community banks. We focus specifically on community banks, defined as banks with assets under $5 billion, because they are often ignored in banking research. Community banks potentially have different drivers for merger activity. While often thought of as targets for acquisition only, in fact community banks also seek merger candidates. Just like any bank, there are times when community banks are seeking to be acquired, and times when they are attempting to position themselves to avoid being acquired. It would be interesting not only to researchers, but to bank executives and boards of directors, to know what factors make a community bank more or less likely to be acquired.

Our goal for this paper is to better understand the primary drivers of merger activity in the community banking sector. After examining the literature on factors in banking acquisitions, we look to identify specific variables that are important in community bank acquisitions. We attempt to find predictive capacity through the analysis of those variables. To do this, we present three binary choice models—linear probability, probit and logit—which can be used to quantify the likelihood of a bank's acquisition. The models use readily available financial data as predictors, and are tested to determine their predictive capacity.

We find that a higher proportion of deposits (as a percentage of assets) favors acquisition, as does a high *return on average assets* (*ROA*) and inefficient management. We also find that lower noninterest income (as a percentage of average assets) and low *return on average equity* (*ROE*) favor acquisition.[1] Using data for acquisitions that occurred in 2004, we find that *ex post*, the models successfully "predict" over 70 percent of the acquisition and non-acquisition events that occurred. Further, the models successfully predict acquisitions that occurred in 2006 and 2007. Finally, the models are used to identify candidate banks for acquisitions that have not yet occurred. Because the mathematical nature of our preferred binary choice model, e.g., the logit model, makes interpretation of the coefficients challenging, we offer an index called the "WRC Index." This Index, which is bounded by approximately –3 and +3, indicates the likelihood of acquisition. It can be used by bank managers and boards of directors to increase or decrease their attractiveness to potential suitors, and by investors to identify potential acquisition targets.

The paper is organized as follows: In the next section we review the relevant literature. In the third

[1] In banking, *ROA*s and *ROE*s are based on *average* assets and *average* equity, respectively, for the period. When we used *ROA*s and *ROE*s, these figures were found using averages.

section we discuss our methodology, sources of data, and present our results. In the last section we draw conclusions and offer ideas for extension of our research. An example of the application of the proposed WRC Index is provided in Appendix I and summary statistics generated from our analysis are provided in Appendix II.

LITERATURE REVIEW

Mergers in General

Early merger literature focused on the characteristics of a target firm. Hasbrouck (1985) and Palepu (1986) examined merger data from the 1970s. Hasbrouck used a sample of 86 target firms, 172 size-matched firms, and 172 industry-matched firms to identify common characteristics of target firms. Statistical significance was found for *q assets* (defined as the sum of the market value of liabilities and the market value of equity divided by the replacement value of assets) and *q equity* (defined as the market value of equity divided by the difference between the replacement value of assets and the market value of liabilities).

Palepu's work tested the six frequently cited merger target characteristics: inefficient management, growth-resource imbalance, industry disturbance, firm size, asset undervaluation (represented by the market value to book value ratio), and price-earnings ratio. Using 163 acquired firms and 256 randomly selected non-acquired firms from 1971 through 1979, an acquisition model was estimated. Palepu was interested in testing previous claims that such models could predict acquisitions more accurately than financial markets did. However, he concluded that investing in predicted targets did not yield statistically significant excess returns.

Mergers in Banking

Research into banking mergers followed earlier, more generalized work. Amel and Rhoades (1989) used a multinomial logit and cross-sectional analysis to examine 1,724 mergers between 1978 and 1983. In attempting to focus on the effects of bank location on mergers (unit banking or limited branching states especially), they could not find consistent motives for acquirer banks.

Later studies of data from the 1980s did find significant merger characteristics. Hughes, Lang, Mester and Moon (1999) observe that from 1980-1994 there were 6,347 bank mergers, with 43 percent of all banks involved in a merger either as an acquirer or as an acquired. Motivation for mergers included increases in expected profit and efficiency, and decreases in insolvency risk. Indicators of attractive target banks were asset size, number of branches, deposit dispersion, and the number of states in which the target was located.

The efficiency argument was picked up by Wheelock and Wilson (2000). Banks that are poorly managed are commonly thought to be prone to failure, and, if the cost of reorganizing the bank is low, prone to acquisition as well. Noting that since 1984 the number of acquisitions of banks had been roughly four times the number of failures, Wheelock and Wilson used competing risks proportional hazard models to examine the determinants of bank failures and acquisitions within the United States. They studied the effects of capital, assets, earnings, liquidity, and miscellaneous factors such as branching on the failure or acquisition of banks. However, their studies primarily focused on the role of managerial inefficiency in the failure or acquisition of banks. There are two traditional ways of measuring efficiency: the production approach and the intermediation approach. In the production approach, bank production is measured in terms of the numbers of loans and deposit accounts serviced, and thus only includes operating costs. In the intermediation approach, output is measured in terms of dollar amounts of loans and deposits and thus includes both costs and technical expenses. Failing banks were more cost inefficient than surviving banks. However, acquired banks were less cost inefficient than surviving banks, and often the differences in cost inefficiency between acquired and surviving banks were statistically significant.

The study of mergers under distress or as a result of industry-wide consolidation also showed significance for the characteristics of inefficiency and profitability. In a study of the German banking industry, Koetter et al. (2005) studied the consolidation of the German banking industry where the number of banks decreased from 3,785 to 2,911 between 1995 and 2000. Their study investigated five possible consolidation events that included: distressed and non-distressed targets (banks being bought), distressed and non-distressed acquirers (banks buying other banks), and banks subject to regulatory intervention. Their study also predicted the probability of becoming a distressed target, a distressed acquirer, or a bank that experienced intervention but continued to function. The main financial variables utilized were capital adequacy, asset quality, management quality, earnings record, liquidity position (the CAMEL variables), size, holding company, branching status, and age. Using the competing risk proportional hazard model, they found several indicators of target attractiveness, including that decreasing cost and profit efficiency

led to higher probabilities of becoming involved in a distressed event and subsequently becoming a target. Bank consolidation in Austria was examined by Egger and Hahn (2006). The Austrian banking system had long been highly fragmented not only by region but by function, as there existed commercial banks, mortgage banks, savings banks, and cooperative banks. In a country of just eight million people, there were some 1,200 banks and 4,500 branches. Egger and Hahn discussed the expected benefits of consolidation in terms of economies of scale and economies of scope. Changes in bank regulations resulted in a wave of mergers during the 1996 to 2002 period of their study. They modeled efficiency effects by examining the cost-to-income ratio and return on employee (operating revenue per employee). Profitability effects were examined through the "net revenue ratio" (net revenue divided by equity) and return on equity.

In the U.S., there was significant bank consolidation after 1994, following passage of the Riegle-Neal Act which relaxed the restrictions on interstate acquisitions. Hannan and Pilloff (2006) identified differences between in-region and out-of-region acquisitions and between rural and urban acquisitions, and looked for a size effect. Much discussion was devoted to the distinction between a merger and an acquisition, and to "hybrid" circumstances such as merging banks which are both owned by the same bank holding company and "changes of control" where ownership changes but the bank continues to operate independently. Previous studies were cited, such as Hadlock, Houston, and Ryngaert which attributed acquisitions to seizing favorable opportunities ahead of the competition, and Moore who attributed acquisitions to the target's (low) profitability and (low) capital-asset ratios. Egger and Hahn use the competing risk proportional hazard model, a type of multinomial logit model previously used by Wheelock and Wilson, and data from *SNL Financial* for the 1996 through 2003 timeframe. They were able to show the statistically significant effects of return on assets and efficiency on the likelihood of a bank being acquired and further demonstrated that in-region acquirers where better able to identify inefficient targets. It is clear in all the banking merger studies that perceived gains in efficiency is a major driver of bank mergers.

Logit Models Applied to Mergers

The predominant use of logit models to estimate the probability of mergers has been in industries other than banking. However, some merger characteristics are universal and logit models are well-suited to predicting bank mergers. The food and hospitality industries have also found efficiency to be a factor in merger activity. Adelaja, Nayga, and Faroq (1999) focused on mergers in the food industry and created two logit models, one to represent target behavior and another to represent bidder behavior. The Kim and Arbel (1998) study focused on the hospitality industry and 161 mergers which occurred between 1980 and 1992. Nine characteristics were studied and four were found to be statistically significant, including managerial inefficiency. Their research suggested that leverage and target attractiveness were directly related, but the relationship could not be shown to be statistically significant.

Other general merger activity examined through logit models also found undervaluation (possibly due to under leveraging) as well as efficiency gains to be drivers for acquisition. Gonzalez, Vasconcellos, and Kish (1998) examined cross-border mergers using a sample of 292 mergers from the 1981-1990 timeframe. The motivation for their study was the observation that during that period of time the number of foreign acquisitions of American firms exceeded the number of American acquisitions of foreign firms, thus reversing the previous pattern. Using logit analysis they were able to demonstrate a number of characteristics which made a target attractive, such as undervaluation and managerial inefficiency. Dietrich and Sorensen (1984) used data from four industries (food and beverages, chemicals, electronics, and transportation) and a sample size of 90 consisting of 30 merged firms and 60 randomly chosen non-merged firms from the period from 1969 to 1973. By standardizing descriptive variables within industries, they were able to identify five statistically significant merger predictors including leverage and assets turnover, which was their proxy for efficiency.

The sample sizes in these studies are important. Binary choice models are often characterized as "large" sample models with exact specification of what constitutes large left unspecified. All three of the above studies utilize samples which are either smaller than ours or comparably-sized.

METHODOLOGY AND RESULTS

Binary Choice Models

Binary choice models are used to model events which have two possible outcomes, in our case the acquisition or non-acquisition of a bank. The output of the models is the probability of a bank's acquisition.

We examined three binary choice models: the linear probability model, the probit model, and the

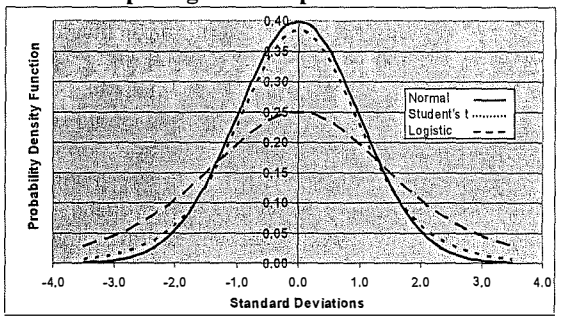
logit model. The linear probability model is estimated using the familiar ordinary least squares (OLS) method. The coefficients of the model are the change in the dependent variable per unit change in each independent variable and are thus easy to interpret. However, the linear probability model can give output values that lie outside of the meaningful zero-to-one range and therefore cannot be directly interpreted as probabilities.

The probit model is estimated using the maximum likelihood methodology. The coefficients of the model are changes in the inverse cumulative standard normal probability function of the dependent variable[2] per unit change in each independent variable and are somewhat difficult to interpret. Unlike the linear probability model, the output probabilities of the model are constrained to the zero-to-one range. The probit model is based on the standard normal distribution:

$$\phi(x) = \frac{1}{\sqrt{2\pi}} e^{-x^2/2} \qquad (1)$$

Equation (1) is the generic mathematical form for the probability density function of the standard normal distribution. If various values for x are substituted into Equation (1), $\varphi(x)$ traces out the familiar bell-shaped curve shown in Figure 1.

Figure 1
Comparing Bell-Shaped Distributions



The logit model is also estimated using the maximum likelihood methodology. The coefficients of the model are the change in the natural log of the odds ratio per unit change in each independent variable and are somewhat difficult to interpret. As with the probit model, the output probabilities of the logit model are constrained to the zero-to-one range. The logit model is based on the logistic distribution:

$$\lambda(x) = \frac{e^x}{\left(1+e^x\right)^2} \qquad (2)$$

Equation (2) is the generic mathematical form for the probability density function of the logistic distribution. If various values for x are substituted into Equation (2), $\lambda(x)$ traces out the bell-shaped curve shown in Figure 1. The Student's t distribution is included in Figure 1 as the logistic distribution is often compared to the t distribution.

Figure 1 was derived by using Equation (1), Equation (2), the corresponding equation for the Student's t distribution with seven degrees of freedom[3] and substituting values of x from –3.5 to +3.5 into each equation.

As an example of the nature of the logit model predicted values, suppose that the probability of precipitation is 80 percent. Then the odds of precipitation are 0.80/(1–0.80) = 4 to 1 and the natural logarithm of 4 is 1.39. Further, an event with a 95 percent probability of occurring has an odds ratio of 0.95/(1–0.95) = 19 to 1 and the natural logarithm of 19 is 2.944.

Thus logit models produce outputs which are roughly bounded by –3 and +3. These predicted values can be readily converted to probabilities by individual calculation, by using a spreadsheet, or most statistical software capable of maximum likelihood can convert outputs into probabilities. But the problem of interpreting the coefficients remains.

Data and Regression Results

Our models were estimated using financial data from 2004. That time was chosen so as to provide an opportunity to test the predictive capacity of the model using financial data from 2005 and 2006 and acquisitions that were known to have occurred in that timeframe. Also 2004 was a time of active merger

[2] The cumulative standard normal probability function converts z-scores into probabilities. The inverse cumulative standard normal probability function converts probabilities into z-scores. Thus, the dependent variable in a probit model is expressed in terms of z-scores.

[3] Student's t-distribution has the probability density function

$$\tau(x) = \left(\frac{1}{\sqrt{\nu\pi}}\right)\left[\frac{\Gamma\left(\frac{\nu+1}{2}\right)}{\Gamma\left(\frac{\nu}{2}\right)}\right]\left(1+\frac{x^2}{\nu}\right)^{-0.5(\nu+1)}$$

where ν is the degrees of freedom and Γ designates the Gamma function.

and acquisition activity in the banking industry and was prior to the subprime lending crisis. The data was obtained from *SNL Financial*. Its database was searched for acquisitions that occurred during the second half of 2004 and 150 acquisitions were identified. We also selected a random sample of 150 non-acquired banks from that same timeframe. The sampling process produced 16 duplicates so our sample consisted of the 150 acquired and 134 non-acquired banks.

The referenced studies in our literature review and our experience in the banking industry—specifically, our observations of merger and acquisition activity—influenced our model specification in terms of the predictor variables. Our model originally included the *core deposits/average assets ratio* and the *assets/equity ratio*. A preliminary regression indicated that these variables added little to the descriptive capacity of our model and they were dropped. The variables included in our model are: the *deposits/assets ratio*, the *noninterest income/average assets ratio*, the *efficiency ratio*, *return on average assets* (*ROA*), and *return on average equity* (*ROE*). The *efficiency ratio* is defined as:

$$\textit{Efficiency ratio} = \frac{\textit{Noninterest expenses}}{\textit{Revenue}} \qquad (3)$$

and, in banking, revenue equals net interest income plus noninterest income. A correlation matrix and a variance-covariance matrix are available for these variables as Table C and Table D in Appendix II.

Tables 1, 2, and 3 below show the results obtained for the three models. The coefficients' signs are consistent across the models and the *p*-values are remarkably good. Table 4 summarizes the coefficients from the three models.

Table 1
Linear Probability Model

	Deposits/Assets	*Non-interest income*	*Efficiency ratio*	*ROA*	*ROE*
Coefficient	0.830	–0.179	0.007	0.273	–0.016
Standard Error	0.284	0.034	0.002	0.079	0.006
t-Statistic	2.927	–5.307	3.063	3.462	–2.802
p-Value	0.0037	0.0000	0.0024	0.0006	0.0054

Table 2
Probit Model

	Deposits/Assets	*Non-interest income*	*Efficiency ratio*	*ROA*	*ROE*
Coefficient	2.292	–0.753	0.021	0.748	–0.039
Standard Error	0.847	0.156	0.007	0.244	0.017
z-Statistic	2.704	–4.837	2.839	3.070	–2.297
p-Value	0.0068	0.0000	0.0045	0.0021	0.0216

Table 3
Logit Model

	Deposits/Assets	*Non-interest income*	*Efficiency ratio*	*ROA*	*ROE*
Coefficient	4.070	–1.360	0.049	1.478	–0.079
Standard Error	1.605	0.285	0.015	0.431	0.029
z-Statistic	2.535	–4.776	3.368	3.425	–2.684
p-Value	0.0112	0.0000	0.0008	0.0006	0.0073

Table 4
Summary of Model Coefficients

	Deposits/Assets	*Non-interest income*	*Efficiency ratio*	*ROA*	*ROE*
Linear Probability	0.830	–0.179	0.007	0.273	–0.016
Probit	2.292	–0.753	0.021	0.748	–0.039
Logit	4.070	–1.360	0.049	1.478	–0.079

The regression coefficient signs are consistent with our *a priori* expectations, except for the *ROE* coefficient.[4] A positive sign on the *deposits/assets ratio* indicates that a higher proportion of deposits favors acquisition. The positive sign on the efficiency

[4] Although it is beyond the scope of this paper, the relative magnitudes of the coefficients are mathematically consistent as well. The logit coefficients should be approximately four times larger than the linear probability model coefficients and the logit coefficients should be approximately 1.8 times larger than the probit coefficients. See Gujarati and Porter, 2009, pp. 571-573 for an accessible treatment of this point.

variable indicates that inefficiency favors acquisition. The positive sign on the *ROA* variable indicates that a high *ROA* favors acquisition and the negative sign on the *ROE* coefficient indicates that a low *ROE* favors acquisition.

The negative sign on the *noninterest income* variable (which is actually noninterest income as a proportion of average assets) indicates lower noninterest income favors acquisition. Based on our research and discussion with bankers, we believe that a positive or negative sign could be explained. The majority of most banks' revenue comes from net interest income, which is sensitive to changes in interest rates. Specifically, when the yield curve becomes flatter, banks' spreads and margins come under pressure. Therefore, banks look to noninterest income—both fee income and other noninterest income—to not only contribute to revenue, but also to serve as a hedge. Noninterest income, such as financial planning services and safe deposit box fees, tends to be less interest-rate sensitive. Looking at it from this angle, a bank with a healthy portfolio of noninterest income might be considered an attractive target. Thus, one would expect a positive sign for noninterest income in our models.

On the other hand, anecdotally we learned from a bank CEO, who was directly involved in M&A activity after his bank was acquired, that banks sometimes shy away from acquiring other banks that have a lot of noninterest income. The reasoning is that many of the noninterest income businesses, such as travel agencies, insurance companies, and others, contribute not just revenue, but sometime a disproportionate amount of overhead. An acquiring bank often has made different decisions about what noninterest income businesses are optimal and complementary to its core business of net interest income. That leaves them in the position where they take ownership of costly noninterest income businesses that need to be trimmed or eliminated after an acquisition. This can be costly and/or detrimental to morale, post acquisition. From this perspective, a negative sign on the noninterest income variable would seem logical.

The fact that greater inefficiency but a higher *ROA* both point to a higher likelihood of acquisition might seem inconsistent. That is because, all else equal, as inefficiency rises, a bank's *ROA* falls. However, while there are common factors determining both a bank's efficiency ratio and its *ROA*, there are other factors that are not connected to both performance measures. For example, *ROA* reflects a bank's tax burden and level of provisioning for bad debt, while these do not affect the efficiency ratio. Moreover, a bank's revenue and expenses affect the efficiency ratio as a ratio, while they affect the *ROA* as a difference. Thus, because of these definitional and mathematical differences, the two statistics do not always correlate.

Since *ROA* and *ROE* generally vary directly, one might expect their signs to agree. *Return on assets* and *return on equity* are related through the equity multiplier, assets divided by equity:

$$ROE = ROA \cdot \frac{Assets}{Equity} \qquad (4)$$

Thus, the regression coefficient signs are indicating that acquisition is favored in low equity multiplier circumstances, where equity is a high proportion of assets, i.e., an under-levered bank. Our model identifies attractive targets as those which are inefficient and under-levered, two circumstances that would likely be remediable by an acquirer within a reasonable timeframe.

Since the traditional goodness of fit measure, the coefficient of determination R^2, does not apply to binary choice models, it is customary to use the proportion of correct predictions in the original data set as a measure of goodness of fit. Each of our models successfully predicted more than 70 percent of the acquisitions and non-acquisitions in the 2004 data set:

- Linear Probability: 73.94%
- Probit: 73.94%
- Logit: 75.00%

Of course, the models don't give a prediction per se; rather, they give the likelihood for an acquisition event. We categorized all output that corresponded to odds greater than 50/50 as a prediction for acquisition and anything less than 50/50 odds as a prediction against acquisition.

Choice of a Model

As explained above, the linear probability model is flawed and should not be used in practice. Specifically, the linearity of the model assumes that changes in explanatory variables have the same effect on the probability of acquisition regardless of the preexisting probability. For banks with high acquisition probabilities, further probability-increasing changes in the explanatory variables should have ever-diminishing impacts on the probability of acquisition. That non-linearity is what the probit and logit models capture. The discussion regarding the linear probability model has been included in this paper to ease the reader's and the

user's transition from familiar regression concepts into those that might be less familiar.

The choice between probit and logit is usually one of convenience, because the two models are essentially equivalent. (See Gujarati & Porter, 2009, p. 571; Hill, Griffiths, & Lim, 2008, p. 426; Kmenta, 2000, p. 555; Maddala, 1999, p. 23 for further discussion.) In this application, logit is clearly superior to probit as three of the five logit coefficients have smaller *p*-values, the logit proportion of correct *ex-post* predictions is larger, and logit has the larger likelihood ratio statistic.[5] (See Appendix II, Table F and Table G for the complete regression results.) Thus, we have chosen to use the logit model for our predictions of acquisition probabilities.[6]

The WRC Index

Because the dependent variable in a logit model is difficult to interpret, as are the model coefficients, we propose the "WRC Index" to indicate the likelihood of a bank being an acquisition target. The WRC Index is bounded by approximately –3 and approximately +3, where –3 is very unlikely, zero is neutral, and +3 is very likely. The coefficients of the logit model are now changes in the WRC Index. An investor who speculates on bank stocks might use the WRC Index to identify banks that are likely candidates for acquisition. Similarly, a bank wishing to be acquired to increase shareholder wealth can concentrate its efforts on the characteristics that will have the most impact on its attractiveness. Appendix I provides a further description of the WRC Index as well as an example of its application.

Using 2005 financial data and our logit model, we identified and listed in Table 5 the banks that were the six most likely acquisition candidates. Note that some of these WRC Index values are relatively small. Remember, however, that the WRC Index is roughly bounded by –3 and +3 so it is never very far from 0. Also, the WRC Index was calculated using model coefficients that were highly statistically significant and financial characteristics that are known with certainty.

Table 5
Predicted Merger Candidates from 2005 Data

Name	WRC Index	Probability
Towne Bancorp, Inc.	1.41	80%
Golden State Business Bank	0.51	62%
Diablo Valley Bank	0.40	60%
Summit Bank	0.27	57%
Clover Leaf Financial Corp.	0.27	57%
Globe Bancorp, Inc.	0.24	56%

A search through the banking industry news section of the *SNL Financial* database produced the following three announcements:

Thrift – Mergers and Acquisitions

> **Clover Leaf** deal gives First Federal opportunity to deploy excess capital
>
> March 15, 2006 5:49 PM ET
> By Diana Finkel
> As a way to deploy excess capital from its 2004 initial public offering, First Federal Financial Services Inc. (MHC) sought an acquisition and found a willing, suitable and convenient merger candidate just around the corner in a fellow Edwardsville, Ill.-based thrift, Clover Leaf Financial Corp., according to a Form S-4 filed March 14.

Bank & Thrift – Mergers and Acquisitions

> Deal Profile: New Orleans investor group enters into letter of intent to acquire **Globe Bancorp**
> February 14, 2007 4:48 PM ET
> By Thomas Orgren
> Globe Bancorp Inc. said Feb. 14 that it entered into a letter of intent in which a New Orleans investor group will acquire the company and unit Globe Homestead Savings Bank for a cash price to be determined.

[5] The likelihood ratio (LR) statistic replaces R^2 as the goodness of fit measure in the maximum likelihood platform. The LR statistic is χ^2 distributed with degrees of freedom equal to the number of explanatory variables. It is methodologically superior to the proportion of correct *ex-post* predictions because its statistical significance can be tested.

[6] The discussion above captures our thinking at the time the original version of this paper was written. However, some probing questions by a reviewer led us to revisit this issue. We verified the superior fit of the logit model over the probit model and found additional appeal in the existence of a closed-form equation for the logistic distribution which the normal distribution does not possess. Thus, we were able to convert the model's output into probabilities and calculate the marginal effects of the logit model algebraically, whereas the probit model would have required using Excel or a standard normal table.

Bank – Mergers and Acquisitions

> **Diablo Valley Bank** shareholders approve sale to Heritage Commerce
> June 14, 2007 4:41 PM ET
> By Mike Layfield
> Shareholders of Danville, Calif.-based Diablo Valley Bank ($254.6 million) approved the company's acquisition by San Jose, Calif.-based Heritage Commerce Corp. ($1.07 billion), the companies said June 14. The transaction has received all necessary regulatory approvals and is expected to close by the end of June.

Thus, as of this writing in May 2008, three of the six predicted acquisitions have been announced.

Using 2006 financial data and our logit model, we identified the acquisition candidates in Table 6. As of this writing in May 2008, none of these acquisitions has occurred.

Table 6
Predicted Merger Candidates from 2006 Data

Name	WRC Index	Probability
Pacific West Bank	2.69	94%
Noble Community Bank	0.97	72%
Pacific Valley Bank	0.62	65%
Pan Pacific Bank	0.31	58%
California Business Bank	0.29	57%

IMPLICATIONS FOR MANAGEMENT

Our work identifies five readily available, financial variables which influence the probability of acquisition: the *deposits/assets* ratio, the *noninterest income/average assets* ratio, the *efficiency* ratio, *ROA* and *ROE*. In addition, we've identified a logistic regression equation which relates those variables to the probability of acquisition, and a simple metric, the WRC Index. The logit model and the WRC Index can be used by practitioners to quantify the appeal of a potential merger target or conversely the appeal of a target to a potential acquirer.

Further, the logit model and the WRC Index can be used to alter a bank's probability of acquisition. An extensive, numeric example of this process is provided in Appendix I.

Thus, our work can aid practitioners in three ways: (1) a bank seeking acquisition candidates can calculate a target bank's WRC Index to quantify that particular bank's appeal as a candidate, (2) a candidate bank can calculate its own WRC Index to determine its appeal to potential acquirers, and (3) a candidate bank can use the WRC Index concept to alter its appeal to potential acquirers, i.e., increase or decrease its probability of acquisition.

CONCLUSIONS AND IDEAS FOR FUTURE RESEARCH

We have discussed three methods of modeling binary choice events: the linear probability model, the probit model, and the logit model. The linear probability model is unsuitable for this application because it imposes on the dependent variable constant per-unit effects of changes in the independent variables. For banks with high probabilities of acquisition further probability-increasing changes in the independent variables should result in diminishing impacts on the dependent variable.

Probit and logit are both non-linear models with the desired diminishing-effects characteristics. In general, the choice between probit and logit is one of convenience or familiarity. In this application, the logit model fits the data better than the probit.

Using readily available financial data and logistic regression, we have developed a model useful in predicting bank acquisitions. The model was developed using data from acquisitions that occurred in 2004. The 2004 and subsequent timeframe was chosen as it was a time of active merger and acquisition activity in the banking industry and was prior to the subprime lending crisis.

The model was then used to identify potential acquisition candidates post-2004. Of the six candidate banks identified by the model from 2005 financial data, three were actually acquired by other banks prior to May 2008.

It is clear from the number of acquisition candidates that our model is predicting compared to the total number of acquisitions that are occurring that we are identifying only one type of acquisition, that of the inefficient, under-levered target. Further work is needed to expand the scope of our predictive capability. Multinomial logit and cross-sectional analysis, as used by Amel and Rhoades (1989), can extend our predictive capability.

Also, it would be desirable to determine how the impact of our explanatory variables is changing over time, and how the impact of our explanatory variables is affected by the interest rate environment, regulatory changes, and general macroeconomic conditions.

Our analysis can be extended to the other side of the market, to the acquiring bank. Potentially a multivariate logit model could be used to match acquisition partners.

The non-linear nature of logistic regression causes its use by bank consultants and bank executives to be problematic. We propose an alternate metric called the WRC Index which is directly related to a bank's probability of acquisition. The WRC Index is bounded by approximately –3 and approximately +3, where –3 is very unlikely, zero is neutral, and +3 is very likely. Bankers can think in terms of their current and target WRC Indexes, and its implicit probability of acquisition, and make financial decisions accordingly.

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APPENDIX I
Using the WRC Index

We suspect that a banking consultant or a bank executive would find an explanation of logistic regression and marginal effects to be quite technical. Even an individual who is familiar with regression analysis might struggle to comprehend how the non-linearity of logistic regression affects its application.

There are two distinct areas of difficulty: (1) the output of the logit model is the natural logarithm of the odds ratio and needs to be mathematically converted into a probability. Thus, if P_i is the predicted probability of bank i's acquisition, the logit model would yield $\hat{y}_i$:

$$\hat{y}_i = \ln\left(\frac{P_i}{1-P_i}\right) \qquad \text{(A.1)}$$

Then we solve for P_i by:

$$\exp(\hat{y}_i) = \exp\left[\ln\left(\frac{P_i}{1-P_i}\right)\right]$$

$$\exp(\hat{y}_i) = \frac{P_i}{1-P_i}$$

$$P_i = \exp(\hat{y}_i)(1-P_i)$$

$$P_i = \exp(\hat{y}_i) - P_i \exp(\hat{y}_i)$$

$$P_i + P_i \exp(\hat{y}_i) = \exp(\hat{y}_i)$$

$$P_i\,[1+\exp(\hat{y}_i)] = \exp(\hat{y}_i)$$

$$P_i = \frac{\exp(\hat{y}_i)}{1+\exp(\hat{y}_i)}. \qquad \text{(A.2)}$$

(2) The logit model coefficients are not slopes or per-unit-changes. This occurs because a logit model is not linear in the parameters (the coefficients). Logit model coefficients need to be converted into slopes or per-unit-changes and are then referred to as marginal effects (ME). This requires:

$$ME_{ij} = \beta_j P_i \left(1-P_i\right) \qquad \text{(A.3)}$$

where j indexes the regression coefficient and i indexes the particular bank.

We seek to facilitate the use of logistic regression to this application through the use of the WRC Index and a pair of tables.

To address issue (1), we denote the WRC Index as equal to the predicted output of the logistic model for a particular bank, i.e., the WRC Index is the value of the dependent variable. Hence, the WRC Index ranges continuously from about –3 to about +3, where –3 is very unlikely, zero is neutral, and +3 is very likely. We use Table A to convert the WRC Index into a probability of acquisition. Naturally the tabular approach involves some loss of precision but the loss is insignificant in practice. The shaded cells are used in the example which follows. The conversion in Table A is merely a repeated application of Equation (A.2). If the loss of precision noted above is undesirable, Equation (A.2) can be used instead.

Table A
Conversion of WRC Index
to Probability of Acquisition

WRC Index	Probability of Acquisition	WRC Index	Probability of Acquisition
–3.0	5%	0.0	50%
–2.7	6%	0.1	52%
–2.4	8%	0.2	55%
–2.1	11%	0.3	57%
–1.8	14%	0.4	60%
–1.6	17%	0.5	62%
–1.4	20%	0.6	65%
–1.2	23%	0.7	67%
–1.0	27%	0.8	69%
–0.9	29%	0.9	71%
–0.8	31%	1.0	73%
–0.7	33%	1.2	77%
–0.6	35%	1.4	80%
–0.5	38%	1.6	83%
–0.4	40%	1.8	86%
–0.3	43%	2.1	89%
–0.2	45%	2.4	92%
–0.1	48%	2.7	94%
0.0	50%	3.0	95%

Issue (2) from above is relevant when a bank wishes to alter its probability of acquisition. Using the WRC Index approach, a bank executive could readily determine how changing the bank's relevant financial characteristics would affect the probability of acquisition.

Here's an example of how the WRC Index might be utilized in practice. All numbers in the example have been rounded to two decimal places. As the actual calculations were done in Excel, some rounding

discrepancies occur. When adequate precision is observed, the calculations are mathematically correct.

Using the coefficients from the logit model and the financial inputs from Diablo Valley Bank, Diablo's WRC Index can be calculated as:

$$WRC = -5.70 + 4.07 \cdot \frac{Deposits}{Assets} - 1.36 \cdot \frac{Noninterest\ income}{Average\ assets} + 0.05 \cdot Efficiency + 1.48 \cdot ROA - 0.08 \cdot ROE.$$

$$WRC = -5.70 + 4.07(0.86) - 1.36(1.16) + 0.05(64.21) + 1.48(1.44) - 0.08(13.88)$$

$$WRC = -5.70 + 3.50 - 1.58 + 3.16 + 2.13 - 1.10 = 0.40$$

From Table A, a WRC Index of 0.40 translates into a probability of acquisition of 60 percent.

Suppose Diablo Valley Bank wishes to reduce its probability of acquisition to 35 percent. Again from Table A, that would require lowering the WRC Index from 0.40 to –0.60, a change of –1.00. In incremental form the logistic model is:

$$\Delta WRC = 4.07 \cdot \Delta\left(\frac{Deposits}{Assets}\right) - 1.36 \cdot \Delta\left(\frac{Noninterest\ income}{Average\ assets}\right) + 0.05 \cdot \Delta Efficiency + 1.48 \cdot \Delta ROA - 0.08 \cdot \Delta ROE.$$

The desired change in acquisition probability could be accomplished by decreasing *deposits/assets* from 86 percent to 80 percent, increasing *noninterest income/average assets* from 1.16 percent to 1.40 percent, lowering the *efficiency ratio* from 64.21 percent to 60.21 percent, and increasing *ROE* from 13.88 percent to 16.88 percent.

$$\Delta WRC = 4.07(0.80 - 0.86) - 1.36(1.40 - 1.16) + 0.05(60.21 - 64.21) + 1.48(1.44 - 1.44) - 0.08(16.88 - 13.88)$$

$$\Delta WRC = -0.24 - 0.33 - 0.20 - 0.00 - 0.24 = -1.00$$

Using these inputs, the new WRC Index is:

$$WRC = -5.70 + 4.07(0.80) - 1.36(1.40) + 0.05(60.21) + 1.48(1.44) - 0.08(16.88).$$

$$WRC = -5.70 + 3.26 - 1.90 + 2.96 + 2.13 - 1.34 = -0.60$$

Note that this is just one combination of changes in financial characteristics which would yield the desired change in probability of acquisition. Further, the *ROA* was not changed in this example suggesting that the change in *ROE* was accomplished by changing leverage.

The appeal of the WRC Index is its simplicity. Bankers can think in terms of their WRC Index and its implicit probability of acquisition without being concerned with logarithms or marginal effects.

All of this has been accomplished without resorting to a discussion of marginal effects. The correctness of the above process can be verified using the marginal effects approach. When converted to marginal effects form, the incremental equation now gives changes in the probability of acquisition.

First, the logit model must be converted to the marginal effects form by dropping the intercept and using Equation (A.3). Each coefficient is multiplied by the appropriate factor from Table B.

Table B
Factors to Convert Coefficients to Slopes

WRC Index	Factor to Convert Coefficients to Slopes	WRC Index	Factor to Convert Coefficients to Slopes
–3.0	0.05	0.0	0.25
–2.7	0.06	0.1	0.25
–2.4	0.08	0.2	0.25
–2.1	0.10	0.3	0.24
–1.8	0.12	0.4	0.24
–1.6	0.14	0.5	0.24
–1.4	0.16	0.6	0.23
–1.2	0.18	0.7	0.22
–1.0	0.20	0.8	0.21
–0.9	0.21	0.9	0.21
–0.8	0.21	1.0	0.20
–0.7	0.22	1.2	0.18
–0.6	0.23	1.4	0.16
–0.5	0.24	1.6	0.14
–0.4	0.24	1.8	0.12
–0.3	0.24	2.1	0.10
–0.2	0.25	2.4	0.08
–0.1	0.25	2.7	0.06
0.0	0.25	3.0	0.05

It should be noted that Table B merely converts the WRC Index into a probability using Equation (A.2) and then calculates $P_i(1-P_i)$. Hence for a WRC Index of 0.00 (neutral), the conversion factor is 0.50(1–0.50) = 0.25.

Now the calculation above can be verified by calculating the marginal effect of each of the variables. As mentioned above, drop the intercept and multiply each coefficient by the appropriate factor from Table B. Since Diablo Valley Bank had a WRC Index of 0.40 that factor is 0.24. In marginal effects form, the incremental equation is:

$$\Delta Prob = (0.24)(4.07)\cdot\Delta\left(\frac{Deposits}{Assets}\right) - (0.24)(1.36)\cdot\Delta\left(\frac{Noninterest\ income}{Average\ assets}\right) + (0.24)(0.05)\cdot\Delta Efficiency + (0.24)(1.48)\cdot\Delta ROA - (0.24)(0.08)\cdot\Delta ROE.$$

$$\Delta Prob = 0.98\cdot\Delta\left(\frac{Deposits}{Assets}\right) - 0.33\cdot\Delta\left(\frac{Noninterest\ income}{Average\ assets}\right) + 0.01\cdot\Delta Efficiency + 0.35\cdot\Delta ROA - 0.02\cdot\Delta ROE$$

$$\Delta Prob = 0.98\,(0.80-0.86) - 0.33\,(1.40-1.16) + 0.01\,(60.21-64.21) + 0.35\,(1.44-1.44) - 0.02\,(16.88-13.88)$$

$$\Delta Prob = -0.06-0.08-0.05-0.00-0.06 = -0.25 = -25\%$$

Note that this is the reduction in probability desired by Diablo Valley Bank in the example.

APPENDIX II
Summary Statistics and Regression Outputs

Table C
Correlation Matrix

	Deposits Assets	*Noninterest income*	*Efficiency ratio*	*ROA*	*ROE*
Deposits Assets	1.00				
Noninterest income	–0.12	1.00			
Efficiency ratio	0.22	–0.02	1.00		
ROA	–0.04	0.20	–0.84	1.00	
ROE	–0.04	0.22	–0.69	0.84	1.00

Table D
Variance-Covariance Matrix

	Deposits Assets	*Noninterest income*	*Efficiency ratio*	*ROA*	*ROE*
Deposits Assets	0.01				
Noninterest income	–0.01	0.76			
Efficiency ratio	0.53	–0.36	546.73		
ROA	0.00	0.15	–16.89	0.75	
ROE	–0.03	1.62	–138.84	6.18	73.10

Table E
Linear Probability Model

Dependent Variable: ACQUIRED
Method: Least Squares
Date: 10/14/07 Time: 14:09
Sample: 1 284
Included observations: 284

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CONSTANT	-0.533281	0.244686	-2.179456	0.0301
DEPOSITS/AA	0.830348	0.283666	2.927199	0.0037
NONINTEREST INC	-0.178583	0.033647	-5.307480	0.0000
EFFICIENCY	0.007229	0.002360	3.063218	0.0024
ROA	0.272612	0.078740	3.462182	0.0006
ROE	-0.016071	0.005735	-2.802092	0.0054

R-squared	0.203366	Mean dependent var	0.528169
Adjusted R-squared	0.189038	S.D. dependent var	0.500087
S.E. of regression	0.450345	Akaike info criterion	1.263297
Sum squared resid	56.38146	Schwarz criterion	1.340388
Log likelihood	-173.3881	F-statistic	14.19369
Durbin-Watson stat	0.348537	Prob(F-statistic)	0.000000

Table F
Probit Model

Dependent Variable: ACQUIRED
Method: ML - Binary Probit (Quadratic hill climbing)
Date: 10/14/07 Time: 14:11
Sample: 1 284
Included observations: 284
Convergence achieved after 4 iterations
Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
CONSTANT	-2.738695	0.736695	-3.717541	0.0002
DEPOSITS/AA	2.291532	0.847231	2.704732	0.0068
NONINTEREST INC	-0.753249	0.155713	-4.837408	0.0000
EFFICIENCY	0.020521	0.007227	2.839578	0.0045
ROA	0.748465	0.243822	3.069717	0.0021
ROE	-0.038680	0.016836	-2.297542	0.0216

Mean dependent var	0.528169	S.D. dependent var	0.500087
S.E. of regression	0.437931	Akaike info criterion	1.188083
Sum squared resid	53.31576	Schwarz criterion	1.265174
Log likelihood	-162.7078	Hannan-Quinn criter.	1.218990
Restr. log likelihood	-196.4029	Avg. log likelihood	-0.572915
LR statistic (5 df)	67.39013	McFadden R-squared	0.171561
Probability(LR stat)	3.57E-13		
Obs with Dep=0	134	Total obs	284
Obs with Dep=1	150		

Table G
Logit Model

Dependent Variable: ACQUIRED
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 10/14/07 Time: 14:12
Sample: 1 284
Included observations: 284
Convergence achieved after 5 iterations
Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
CONSTANT	-5.703837	1.437018	-3.969217	0.0001
DEPOSITS/AA	4.070335	1.605388	2.535422	0.0112
NONINTEREST INC	-1.360476	0.284867	-4.775825	0.0000
EFFICIENCY	0.049217	0.014613	3.368102	0.0008
ROA	1.477618	0.431423	3.424987	0.0006
ROE	-0.079150	0.029494	-2.683618	0.0073

Mean dependent var	0.528169	S.D. dependent var	0.500087
S.E. of regression	0.428487	Akaike info criterion	1.166434
Sum squared resid	51.04104	Schwarz criterion	1.243525
Log likelihood	-159.6336	Hannan-Quinn criter.	1.197341
Restr. log likelihood	-196.4029	Avg. log likelihood	-0.562090
LR statistic (5 df)	73.53857	McFadden R-squared	0.187214
Probability(LR stat)	1.88E-14		
Obs with Dep=0	134	Total obs	284
Obs with Dep=1	150		

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DECISION RULES AND EXTENSIONS FOR IMPROVING BUSINESS PROCESS REENGINEERING PRACTICE

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ABSTRACT

This paper introduces a new approach to improve the effectiveness of business process reengineering (BPR) practice. Operating environments in business can be classified into three main categories using the V.A.T. classification scheme. Decision rules and conceptual extensions are developed for reengineering each of these categories. The decision rules proposed are designed to fit the characteristics of the underlying operating environment and to help maximize the value generated from BPR programs. Guidelines are provided to assure effective implementation of the proposed BPR rules and extensions.

INTRODUCTION

Empirical evidence shows that while some business process reengineering (BPR) programs succeed, many fail in practice and do not achieve their intended results (Hall, Rosenthal & Wade, 1993). BPR programs aim not just at marginal improvements, but also at realizing drastic improvement in current processes. This translates into increased competitiveness and positive transformation of business performance. The importance of this study is underscored by the fact that typical BPR projects involve large investments and intensive efforts over a long period of time. They also result in long-range business implications.

This paper introduces a set of conceptual decision rules and provides extensions and guidelines that are designed to make BPR programs more successful. Specifically, the contribution of this paper is two-fold. First, a set of decision rules are developed to identify the most appropriate BPR targets to be pursued for each category of operating environments, as encountered in practice. (These proposed rules advance the earlier BPR approaches discussed in the literature.) Second, conceptual extensions and guidelines are provided to advance the effectiveness of BPR implementation practices.

This study is organized into five parts. The first part introduces the problem of interest and the contribution (discussed above), describes the empirical features of the operating environments, and the plan of the study. The second part contains a review of prior research that is pertinent to our topic. In the third part, we develop a set of decision rules to follow, and identify the process improvement outcomes to achieve for each category of operating environment, including the necessary assumptions. The proposed rules make use of geometric logic and are based on both the actual characteristics of the underlying operating environment and the desired outcome. These rules are discussed and verified graphically for each type of operating environment. The fourth part focuses on the implementation of these rules in actual organizations. Here, conceptual extensions and general guidelines that help assure effective implementation of BPR in practice are addressed. The fifth part provides a summary and conclusion, along with suggestions for future research.

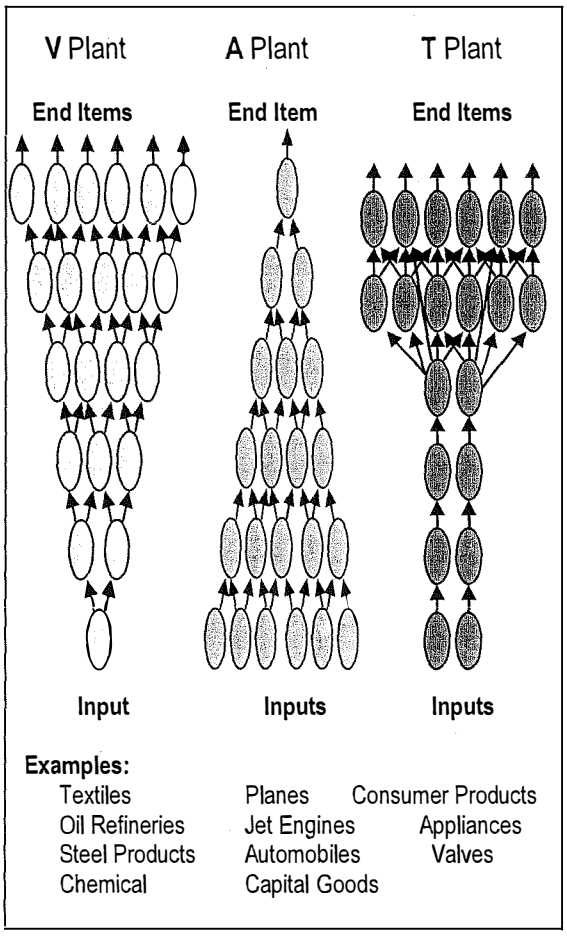
Operating environments found in practice to fit in one of three categories, denoted as V.A.T., are depicted in Figure 1 (Chase & Aquilano, 1995). Each of these three letters represents a distinctive operating structure:

- In the "V" plant category, operations start with using one raw material as input, and then branches to several stages that end with many final products or outputs. Examples in this category include production of cotton textiles, oil refineries, steel and chemical products.
- In the "A" plant category, operations follow an opposite path, i.e., start by using many raw materials as inputs, complete several production stages and end with one final product as output. Examples of this category are production of planes, automobiles and capital goods.
- In the "T" plant category, the production process starts by parallel tasks and components, and branches to multiple products as end items. Examples of products that belong to this category include appliances and valves.

This empirically-based categorization of V.A.T. operating environments (illustrated in Figure 1) will

be used as a foundation for identifying BPR targets and rules to achieve the desired outcome.

Figure 1. The V.A.T. Classification



PRIOR RESEARCH IMPORTANT TO THIS TOPIC

BPR is a topic of great importance and relevance for achieving transformational strides in business performance in both manufacturing and service firms, and for both profit maximizing and nonprofit organizations. Several definitions are used in theory and in practice for BPR (Hammer & Champy, 1993; Peppard, 1996; Saad, 2006; Siha & Saad, 2008). In this paper BPR, is defined as the "rethinking and radical redesign of business processes to achieve drastic improvement in performance measures in terms of cost, quality, responsiveness, throughput, service, value-added, and/or speed." This is a modified version of the definition provided by Hammer & Champy (1993).

Many authors have addressed the relationship between BPR and total quality management (Ackoff, 1993; Gonzalez-Benito, Martinez-Lorenta & Dale, 1999; Saad & Siha, 2000). The consensus in the literature exploring this relationship is that total quality management (TQM) focuses mainly on *marginal* and *continuous* improvement, while BPR focuses on achieving *drastic* and *transformational* improvement for a problem faced or a specific project. Because an improvement that results from a BPR project is drastic and "leap-frog" in type, it is considered a *discontinuous function*. Yet, various authors have different opinions as to whether BPR can or cannot reinforce TQM implementation.

The theory of constraints (TOC) was introduced in the early 1990s (Goldratt & Cox, 1992). Some might be curious as to how this research relates to, or differs from TOC. It should be noted that both TOC and the BPR rules proposed in this paper aim at improving efficiency and maximizing profit, yet their means and scope are different. TOC's focus is on maximizing the utilization of bottlenecks for a given set of resources, i.e., TOC assumes that both the resources available and the production technology used are fixed. Yet, the decision rules proposed in this paper focus on objective identification of BPR targets which results in reconfiguration of tasks and reduction in the needed resources. For more details on TOC, the reader is referred to Goldratt & Cox (1992) and Leporé & Cohen (1999). We apply different rules that make use of "EISA," which stands for elimination, integration, simplification and automation of tasks, as well as resources. The scope of improvement in our approach is much broader, as it includes both the technology employed as well as the resources used.

Zairi (1995) addressed the integration of benchmarking and BPR and considered this coupling to be international best practice. Peppard (1999) emphasized the importance of alignment of this integration with the firm's strategic objectives. As a realization of the recommendation provided in this later paper, Saad (2001) developed an analytic hierarchy process model for performance evaluation and improvement of solid waste management systems. This model ties in the strategic objectives expressed in terms of criteria and sub-criteria to alternative policies used to fulfill the predetermined strategic objectives.

Motwani, Kumar, Jiang & Youssef (1998) developed a theoretical framework for BPR that consists of six phases. These phases start with defining BPR first and end with an evaluation phase that involves three steps: compare the success of the reengineering efforts against the performance objectives established, modify as necessary, and

monitor the progress. These authors emphasized the need for BPR research that would help managers identify those areas where improvement should be made and resources should be better allocated. This paper seeks to fulfill that need.

Many authors have focused mainly on the implementation aspects of BPR projects (Hall, Rosenthal & Wade, 1993; Zairi & Sinclair, 1995; Attaran & Wood, 1999; Attaran, 2000). Others have focused on a specific BPR project application at a particular organization as a case study. The cases include both for profit and nonprofit organizations, as well as both service and manufacturing firms. For instance, BPR applications in the service sector include banking, police and other services (Shin & Jemella, 2002; Greasley, 2004). Several BPR cases have been conducted and reported at manufacturing companies (Zinser, Baumgartner & Walliser, 1998; Lapré & Van Wassenhove, 2002; Hauser & Paper, 2007).

Some authors have focused on the relationship between information technology and BPR and have provided examples of different success factors as well as barriers to successful implementation of BPR in this context (Ahadi, 2004; Attaran, 2004).

Others used simulation as a tool for conducting BPR. For example, Xirogiannis & Glykas (2004) proposed using the fuzzy causal characteristics of fuzzy cognitive maps to simulate the operational efficiency of complex processes to be able to quantify the impact of performance driven reengineering activities. Hauser & Paper (2007) have used simulation to identify potential cost savings from process manipulation at a Toyota plant in Kentucky. They showed that simulation offers managers a cost effective means to explore BPR alternatives without actually modifying manufacturing plant layouts.

Goel & Chen (2008) studied the risks involved in BPR when a large company acquires small, fast-growing companies to promote its own growth. They wrote a case study looking at a specific BPR project implemented at General Electric's energy wind division to integrate business operations across its globally dispersed acquisitions.

Siha & Saad (2008) surveyed and analyzed the empirical results reported in the literature of four process improvement (PI) approaches: BPR, benchmarking, process mapping, and six sigma. Based on the analysis of these empirical findings, they developed a conceptual framework for PI. This framework serves a dual purpose. It is a diagnostic mechanism for specifying the areas that require improvement in an organization. It can also be used to guide decision makers to the appropriate solution needed to recover from actual problems faced in practice. This framework consists of three phases: specify, analyze and monitor—denoted as (SAM). They have discussed in detail the contents and implementation guidelines for each of these phases.

PROPOSED DECISION RULES

In this section, we propose decision rules that will help identify objective BPR targets for each of the three V.A.T. categories. We start with basic assumptions. The rationale for the starting assumptions is that they represent a special case of operating environment with simple characteristics and features. They serve two main purposes. The first is to illustrate how geometric logic and rules can be used. Second, they provide a pedagogical start to introduce further extensions and generalizations. Some of the starting assumptions are then relaxed to represent the more general case of actual operating environments so we can generalize the implementation of the proposed rules. Here, the decision rules proposed are designed to fit the general characteristics and features of each of the three main categories of operating environments illustrated in Figure 1.

The starting assumptions are:

1. Each task is represented by a circle in Figure 1 and is assumed to have the same cost or relative complexity.
2. Each branch is a link of two tasks and incurs the same cost. A branch is indicated by an arrow in Figure 1. It represents transportation and transaction costs.
3. Based on the first two assumptions, we now use geometric logic to reengineer, i.e., drastically improve, each of the underlying operating structures.
4. The outcome achieved can be measured in different value dimensions and forms. These may include reduction in costs, increase in profits, and increase in customer's value.
5. Further process improvement can be achieved using a modified version of the original eliminate, simplify, integrate, and automate (ESIA) framework (Greasley, 2004; Peppard & Rowland, 1995). The modification we make and plan to use here is EISA, instead of ESIA. This is because the integration of two or more tasks would typically result in a more significant improvement than a simplification of just one task. Thus, it is more logical to execute first the possible integration of tasks before simplification of one.

Dual planning modes will be used along with the above assumptions. One is *forward planning*, i.e., start from the present status quo and seek to improve it moving forward to the future. This shows how, over time, improvements are made. For example, if the actual cost of a product is now $7.00 per unit, how can one reduce this cost moving forward?

The second uses an opposite path and is denoted as *backward planning.* This means to start from a distant point in the future, establish a goal to be achieved at that future point, and then move backward to the present, evaluate the current situation, and identify accordingly the gap between what is desired to be achieved at this specific point in the future and the actual present status, and then take the necessary steps to close this gap.

Typically, a desired goal to be achieved at a distant specific point in the future will be much more ambitious than just seeking to achieve any improvement of the present. Furthermore, it should be noted that *backward planning* starts from a blank page, i.e., a purely fresh start. That is why *backward planning*, in general seeks primarily to realize a drastic improvement and an ideal achievement at a distant point in the future, unlike *forward planning* which emphasizes continuous and gradual improvement that is typically marginal in nature.

It should be noted, however, that while each of these two planning modes has a different emphasis, they both can and should reinforce each other in achieving actual improvement in business practice. Therefore, these two planning modes will be used for developing decision rules proposed in this paper, as follows:

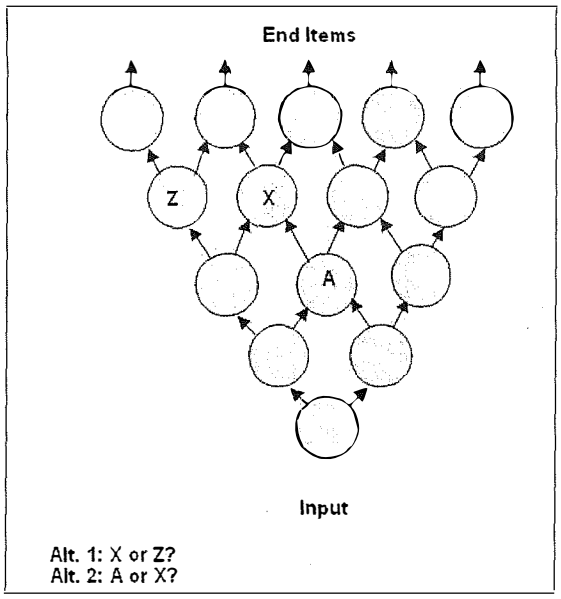
1. Starting from the set of existing processes, which task—if eliminated, integrated with another task, simplified, and/or automated—will result in the best outcome, i.e., will generate the most possible savings or added value? A *forward planning* approach is used here to carry out these initial investigative steps.
2. Using a *backward planning* path, i.e., starting from a prespecified desired outcome, what is an ideal process design that would help achieve this desired outcome? A most desired outcome is typically one that represents a drastic achievement to be realized at a specific point in the future. An example of such an outcome includes maximizing business performance, in terms of increased market share, return on investment, service levels, and/or stakeholders' value.

As indicated earlier, since the integration of two or more tasks would typically result in a more drastic improvement than just a simplification of one task, we modify the ESIA approach introduced earlier (Peppard & Rowland, 1995, p.181) to be EISA, i.e., the integration of one or more tasks would be explored first, before simplification of one task. This EISA framework is now used to answer the two questions above for each of the V.A.T. operating environments.

For a V plant or facility, illustrated in Figure 2, there are two alternatives to consider (denoted as Alt. 1 and Alt. 2). For Alt. 1, is it better to consider eliminating, integrating with another task, simplifying, or automating task **X** or task **Z**?

Clearly it is better to focus the reengineering effort on task **X** first. A main reason is that task **X** is positioned in the core of the total process structure and is not positioned on the peripheral as with **Z**. Furthermore, it should be noted that task **X** is linked with more tasks, so its improvement will result in a higher value added impact than **Z**. This can be accomplished by **X** being eliminated—if possible—integrated with others, simplified, or automated.

Figure 2. The V Plant



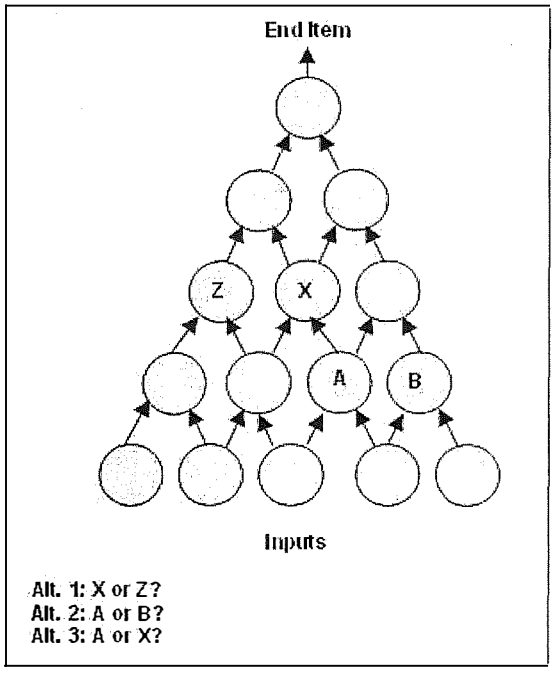
Using geometric logic, elimination of **X** will result in saving not only one task, i.e., the area of one circle, but more importantly it will result in reducing the number of linking arrows, each of which includes transaction and transportation costs. Since each arrow incurs the same cost—as stated in assumption 2 earlier—the more arrows one can eliminate, the better the net outcome achieved.

Next consider Alt. 2 in Figure 2. Is it better to use EISA for task **A** or for task **X**? Clearly it is better

to focus on task **A** first since it is earlier in the order of execution than **X**, i.e., it has a much more drastic impact on the overall V structure. This means that it has a more intensive domino effect on the whole operating system.

Now consider an A plant as illustrated in Figure 3. Here, which task is most appropriate to be eliminated first, integrated, or improved using any of the EISA steps? Start with Alt. 1. Compare **Z** versus **X**. Clearly, it is better to conduct EISA on task **X** first. This would have a higher total impact on the operating system since **X** is positioned in the core of the total operating structure, while **Z** is on the periphery.

Figure 3. The A Plant



Similar logic can be used for Alt. 2 in Figure 3, where task **A** is a better move than task **B**. Again, **A** is in the core while **B** is on the periphery.

Next consider Alt. 3. Here, eliminating task **A** is preferred to eliminating task **X**, because task **A** is executed earlier than **X**, i.e., has a more intensive "domino-effect" on the overall structure's performance than that of **X**.

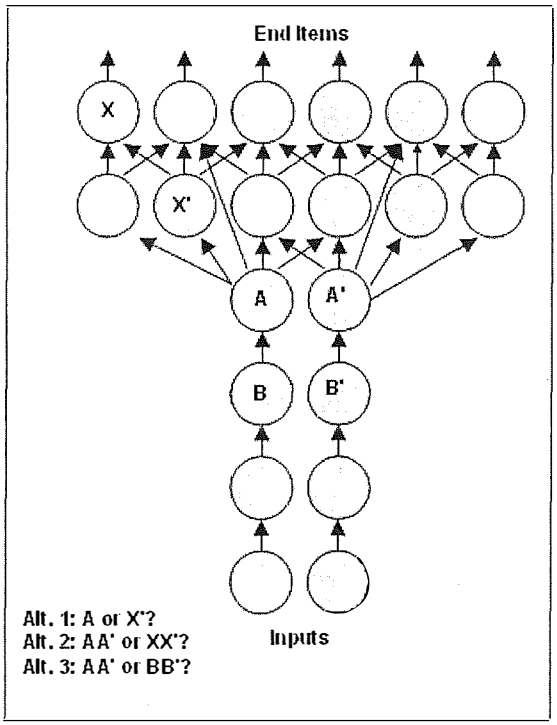
Therefore, based on the above analysis, the rule proposed is to:

> *Improve first the internal and early processes and branches, as much as possible.*

Now, consider Figure 4, a T-shape operating environment. Here in Alt. 1 compare **A** versus **X'**. It is best to focus on applying EISA on task **A** first compared with task **X'**. This is because task **A** is earlier in the order of execution than task **X'**, and hence, has a greater impact on the performance of the whole system, as explained earlier.

For Alt. 2, compare tasks **AA'** versus **XX'**. It is better to examine EISA possibilities on **AA'** first, since **AA'** are both parallel tasks and earlier in the order of execution than **XX'**. Additionally, **X** and **X'** are not parallel. Use similar logic in Alt. 3. Compare **AA'** versus **BB'.** It is much better to apply EISA on **BB'**, if possible, since they are both earlier than **AA'**, and thus have better overall impact on the system's performance. The same argument applies when focusing on branch improvement. For instance, in order to shorten or eliminate a branch, one must consider first the one which is the earliest in execution and is positioned more in the core of the overall structure.

Figure 4. The T Plant



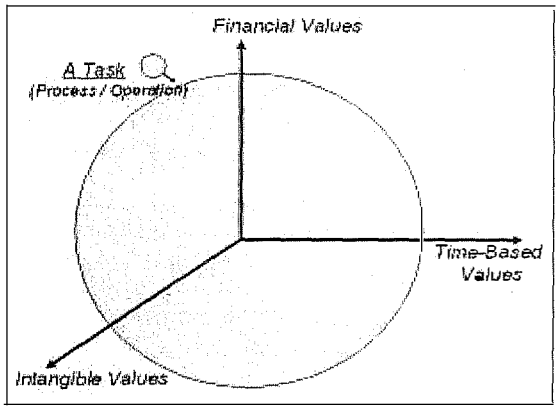
Therefore, the main rules to follow using the EISA approach on each of the V.A.T. categories are:

1. Focus on the *early* nodes in the order of execution.

2. Account for the impact of *node dependency* as much as possible.
3. Improve first the *internal* and the *early* processes and branches as much as possible.

Now, let us relax assumption 1 and consider the general case where the different tasks each have different costs, revenues and/or different marginal value. Here, the above rules still apply; however, one cannot use the geometric logic, as saving tasks with the same area does not imply that these tasks have the same total costs and/or the same net effect. Still, EISA steps should be considered on the nodes that are earliest in execution first; but one has to calculate the net effect of each move. The assessment of the net effect of each of the EISA steps should include both financial as well as non-financial impacts. These latter ones may include intangible values as the impact of an increase of labor morale and/or the betterment of the work environment is tough to quantify. At least three main dimensions of assessment of the impact of each move should be considered, namely, financial values, time-based values, and intangible values, as illustrated in Figure 5.

Figure 5. Outcome Dimensions



It should be noted that the financial values generated can and should be evaluated quantitatively in monetary terms. Yet, often the time-based advantages and the intangible values are qualitative in nature; because it might not be feasible to assess these in dollar terms, they can be assessed using a rank order, such as high, medium, or low, or by using a wider scale (e.g., from 1, 2, …, 10). The difficulty of not being able to assess accurately the intangible values should not be used as an excuse to neglect and not consider them at all. These very hard to quantify factors have real impact that can be significant and thus must be accounted for in some fashion. A general principle to be used here is that being half blind is much better than being completely blind. In other words, a rough approximation is better than no approximation.

Additionally, the effect resulting from applying the EISA steps and the decision rules explained earlier should be assessed for each stakeholder, whether producers, customers, or partners, along the supply chain. This results in achieving a win-win outcome for all the supply chain partners, and not just one firm at the expense of other partners in the chain.

CONCEPTUAL EXTENSIONS AND IMPLEMENTATION GUIDELINES

To help maximize the value generated from BPR implementation, the following conceptual and practical guidelines are proposed:

Conceptual Guidelines

1. All the decision rules and concepts proposed in the above section should be applied both at the firm level and across the supply chain. Such generalization of the scope of implementation of the rules proposed to include all supply chain partners whenever it is feasible to do so is highly significant. This would help to maximize the total supply chain profits, not only one's firm profit at the expense of other partners in the chain. This means that one should avoid local optimization by focusing only on his/her firm level, neglecting others' interest in the chain. This focus in many cases is shortsighted, as one should seek global optimization to achieve a win-win outcome for all the supply chain partners. Such a win-win approach is the right thing to do for achieving sustainable competence.
2. Since the performance of any supply chain is determined by the weakest link in the chain, it is particularly important to assess the impact of the BPR rules on this weakest link. For instance, if the level of quality desired for a producer is much higher than the suppliers quality for the components and subcomponents supplied, this would certainly limit the capability of the producer to achieve a higher quality.
3. For task elimination, integration with others, simplification, or automation, one should use the decision rules and concepts introduced earlier for each V.A.T. category.
4. In addition to using the decision rules proposed on manufacturing tasks, management should pursue minimization of cycle time from order-to-shipment for each item and subcomponent

produced. This can be effectively carried out through task splitting, parallel and/or concurrent processing, whenever any of these approaches can be used, i.e., is feasible to execute.

5. Consider and assess the expected outcome for the different parties and stakeholders at each stage of the BPR projects, i.e., at both the planning and the execution stages. Different priority may be used for the different stakeholders; for instance, give the highest priority to the end customer's value.
6. Define the process scope and contents efficiently and effectively. This requires serious consideration of:
   a. The BPR project budget, its time frame and how to maximize the value added per dollar spent from this budget. This implies that the best re-engineering project to undertake will vary for different budget levels and planning horizons.
   b. Make use of *Pareto logic* in identifying the project scope. This means focusing only on the few significant projects that result in the highest value added and neglecting the remaining many insignificant, yet feasible ones.
7. As conflicting interests may exist among the different stakeholders, different priorities and weighting schemes should be evaluated, and the one that would generate the most long-lasting outcome for all the supply chain partners should be selected and actually implemented. This will yield a larger overall benefit and impact for each partner, therefore achieving a win-win outcome for all.
8. Use appropriate modeling tools, as deemed relevant and feasible, e.g., Visio, flow charting, Oracle9i, Developer Suite, Workflow Modeler. These allow examining different alternative configurations of tasks and assessing the impact of each on the overall system's performance.

Practical Guidelines

1. Account for the intangible outcomes by using an appropriate scale, or scoring scheme, and do not neglect these types of outcome under the excuse of the difficulty associated with measuring them. Considering these factors' contribution with less-than-accurate evaluation is much better than overlooking them completely. While it might be difficult to assess them accurately, accounting for their impact is essential, as the intangible results may prove very significant in the long run.
2. Avoid the *silo* organizational practice and mode of operation. This would involve substituting independently-based divisions and organizational units with well-integrated, organic structure and self-directed teams. The classical *silo* structure results in isolation, territorial emphasis, redundancies, rigidity and sub-optimization. This must be replaced by:
   a. An integrated product team (IPT) organization that features synergetic team orientation, parallel processing, flexibility, and optimization. Such teams result in seamless operations and a drastic reduction in the number of design changes and costs associated with them.
   b. Emphasize schemes of coordination, co-operation and collaboration, *intra-firm*, i.e., across each firm's units and functional areas, and *inter-firm*, i.e., among all the different firms in the supply chain. For instance, *intra-firm* would mean using one team for design, manufacturing, quality, and technical support, and not four units working independently for these functional areas. Several collaborative arrangements among producers and their suppliers can help achieve much higher performance, and increase significantly the total supply chain surplus, realizing a win-win outcome for all parties. Such increase in total supply chain surplus cannot be achieved if every firm focuses only on its own profit, i.e., sub-optimization.
3. Assure top management support and involvement during all implementation phases of a BPR project. This is essential for the project's success.
4. Additionally, as emphasized by others in the literature, it is important to align each BPR project with both the corporate vision and strategy (e.g., see Greasley, 2004; Lapré & Wassenhove, 2002; and Peppard & Rowland, 1995). Empirical evidence shows that such an alignment is a main driver of the success of BPR implementations in both service and manufacturing environments. This is true regardless of the scope of such implementation, and regardless of the size of the organization in which a BPR project is conducted.

SUMMARY AND CONCLUSION

This paper has introduced a set of decision rules and conceptual extensions that should improve the implementation of BPR projects. The rules proposed are designed in a way that fits the characteristics of

the underlying operating environments, while simultaneously fulfilling the most desired goals and outcomes.

Appropriate BPR rules and targets have been identified for three categories of operating environments, and their pertinent logic has been explained, along with illustrative examples. Conceptual and practical guidelines for implementation have been discussed. These should increase the chances of success of actual BPR projects and help solve the current problem of high failure rates of BPR projects in practice.

A logical next step for managers and practitioners in the field is to make use of these proposed rules and guidelines in their BPR projects. This applies to both manufacturing and service organizations. Since the scope of implementation of these rules may vary from one company to another, it is always advisable to start with a pilot project. First, gain enough insight and feedback to assure success before generalizing the scope of implementation to include the whole organization and/or several of its units. It is also noted that the different units in the same organization may refine the implementation mode as dictated by the nature, the specific characteristics and details of their pertinent decision-making environment.

An important issue suggested for future research is to explore using the decision rules and BPR targets identified in this paper in collaboration with other supply chain partners or potential partners for achieving the best supply chain configuration for all parties involved. Furthermore, different coordination, cooperation, and collaboration schemes should be explored *inter-firm* to make full use of the decision rules and conceptual extensions suggested in this paper. Such coordination, cooperation and collaboration across supply chain partners would allow establishing not only optimal supply chain design, but also achieving best alignment and contractual arrangements among the different enterprises in the chain.

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THE IMPACT OF AFFILIATED REPAIR FACILITIES ON CLAIMS BUILDUP IN THE AUTOMOBILE INSURANCE INDUSTRY

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ABSTRACT

Claims buildup continues to be a major cost for the automobile insurance industry. This paper extends prior research on claims buildup by looking at how repair facilities (i.e, auto body shops) estimate repair costs when a third party insurer is paying for the repair and the repair facility has a special allegiance with that insurer.

Data is provided by 60 estimates solicited from repair facilities for which the repair facilities were told that the estimate was either to be paid "out of pocket" by the customer, to be reimbursed by a third party with which they were unaffiliated, or to be reimbursed by a third party with which they were affiliated. The empirical results suggest that affiliated repair facilities make estimates that are significantly lower than estimates by unaffiliated repair facilities, and not significantly different from estimates given to customers who pay out of pocket. These results suggest that service provider networks substantially mitigate claims buildup for insurance companies.

INTRODUCTION

In 2006 the average American consumer was expected to pay $867.00 in automobile insurance premiums per car.[1] With 1.9 vehicles per household (U.S. Department of Transportation, Office of Highway Transportaion, 2003), the average American household will spend close to $1,647.00 per year in automobile insurance which represents close to 4.5 percent of the median household's after tax income.[2] This makes automobile insurance one of the largest expenditure items in a typical family's budget.

Unfortunately, a significant portion of these premium costs represents claims fraud and claims buildup. For instance, in a 2002 national survey entitled "Fraud and Buildup in Auto Injury Claims: 2004 Edition," the Insurance Research Council finds that fraud and claims buildup added anywhere from $4.3 billion to $5.8 billion in auto injury settlements in 2002. This represented roughly 11 percent to 15 percent of all dollars paid out on private passenger injury claims. The Insurance Information Institute reports the annual cost of no-fault auto insurance fraud in the State of New York increased by 30 percent from 2000 to 2001. The Institute further reports that by 2003 the total estimated cost of no-fault auto insurance fraud to New York insurers was close to $432 million dollars.

Despite the large payout on fraud and claims buildup, it has been found that very few claims suspected of fraud or buildup are actually ever denied payment.[3] The most compelling explanation for this is that claims fraud and especially claims buildup are easy to perpetrate on the part of the claimant but costly to prove on the part of the insurer.

The purpose of this paper is to investigate the usefulness of service provider networks in reducing claims buildup for collision and comprehensive claims. It will be shown in this paper that when a service provider (i.e, auto body repair facility) does not have an allegiance to the insurance company paying for the repairs, then the initial estimates for repair costs will be inflated.[4] On the other hand, if a repair facility is submitting an estimate to an affiliated third party for reimbursement then those estimates will not be statistically different from estimates prepared for customers who will pay "out of pocket" for the repair. Investigation of this issue is important because 39 percent of premium dollars earned went to pay for damages to cars and/or other tangible property (Insurance Information Institute).

[1] Projection made by the Insurance Information Institute based on average automobile insurance expenditure data from the National Association of Insurance Commissioners.

[2] Source: U.S. Bureau of the Census, "Alternative Income Estimates in the United States: 2003" table A-6 "Median After-Tax Households Income by Selected Characteristics and Tax Model: 2002."

[3] Weisberg and Derrig (1991) find in a review of bodily injury claims paid in the state of Massachusetts in 1989 that only 2.6 percent of suspicious claims would be considered deniable or referable to law enforcement authorities.

[4] The purpose of this paper is to determine the pervasiveness of claims buildup by examining the initial estimates of the claims. These initial estimates could very well differ from the final negotiated or settled price paid out by the insurance firms.

Following this introduction there is a brief review of previous studies regarding claims fraud and claims buildup within the automobile insurance industry, as well as a general background discussion on how networks operate and how they are believed to control claims buildup. The paper then presents the study's design and sample size. After that, the empirical results are displayed and discussed. The paper ends with a conclusion and discussion section.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Evidence of Claims Buildup

There is an avenue of literature on automobile insurance that deals with the theory and practice of claims auditing and evidence of fraud and claims buildup. Many of the studies that attempt to quantify the amount of fraud and claims buildup within the industry rely on experienced claims adjusters reviewing previously closed claims, such as studies by the Insurance Research Council (1996, 2004), Weisberg & Derrig (1991), and Carroll & Abrahamse (2001). These studies have found that approximately 40 percent of all claims have been subject to either fraud or claims buildup, with the estimated costs ranging anywhere from $4.3 billion to $6.3 billion (Insurance Research Council, 1996, 2004). Despite this evidence, however, an overwhelming proportion of claims do not get refuted (Tennyson & Salsas-Forn 2002, Loughran, 2005).

Although there is strong evidence as to the costly nature of claims fraud and claims buildup with respect to bodily injury and personal injury protection, research dealing with claims fraud or claims buildup in the area of collision and comprehensive has been very limited. One such study from 2001, cited by Goch (2002) from the California Bureau of Automotive Repairs, found that of 507 inspected vehicles, 43 percent of them had problems with fraudulent billing for parts and labor which were never supplied. The average cost of the fraudulent repairs amounted to $586 per vehicle.

In another study, Tracy & Fox (1989) find that estimates can run anywhere from 30.6 percent to 43.9 percent higher when a repair facility is under the impression that the estimate is to be submitted to an insurance firm for reimbursement as opposed to the car owner paying out of pocket for the repairs. Tracy & Fox acknowledge that their data represented estimated costs and that settled cost, after some negotiations with claims adjusters, might possibly be lower than the initial estimates. However, they argue that the difference would not alleviate the entire difference in estimates to be paid out of pocket and estimates which are to be submitted to insurance firms for reimbursement.

One possible explanation for the claims buildup is that since the insured are only responsible for paying their deductible, then once the deductible has been reached, the insured driver has little motivation to seek the best price. Instead, he or she will be more concerned with "convenience, reputation for quality service, and speediness of repair than cost," Tracy & Fox (1989, p. 602). The argument that the insured will not seek the best price has been defined as a moral hazard with respect to search cost by Dionne (1981). Dionne (1981, p. 431) proposes that search activity for the best price will decrease by the insured "because the insurer cannot observe ex-ante the search activity of the insured, implying an increase in the average loss of events." It is assumed that when a service provider knows there is little incentive for the insured to comparison shop, the service provider will then charge a higher price.

The Use of Affliated Repair Facilities

Because of the costs involved with claims fraud and claims buildup, various techniques are put into place by insurance firms which are designed to minimize these costs (Crocker & Tennyson 2002, Loughran 2005). Establishing a network of repair facilities is one such technique that is believed to be effective at controlling costs associated with claims buildup. Bourgeon, Picard, & Pouyet (2008) argue that initially repair facilities, although far more numerous than automobile insurance companies and far smaller in scale, have more market power than insurance companies due to convenience, location and reputation. Insurance companies are considered to be in a more competitive industry and have relatively little market power. However, when an insurance company creates a network of repair facilities, due to its size, it is able to extract and transfer some market power away from the repair facilities.

To convey how networks can control for claims buildup, it is instructive to give some background information on the development of networks and how they operate. Networks started in the mid 1980s and were immediately met with resistance from the auto body repair industry. In spite of the resistance, which continues today, approximately 5,000 repair facilities nationwide participated in networks by the mid 1990s. By 2008, nearly 20,000 repair facilities nationwide, or close to 40 percent of the industry, were participating in networks, with 13,000 of those participating with the largest automobile insurer's network. Approximately 5,000 shops participate in

the second largest insurer's network (Bourgeon, Picard, & Pouyet 2008).[5]

Networks developed primarily due to the fragmented nature of the auto body repair industry, which consisted of over 50,000 independent repair facilities. Insurers had to deal with grossly different pricing on labor and parts as well as job performance. This meant that prior to the development of networks there were no industry standards, which made it difficult for an insurance company to judge what the correct reimbursement rates should be. Each individual claim was subject to negotiation. This, of course, is costly, both in time and money. In addition, consumers often spent a great deal of time searching for reputable mechanics.

Insurance companies developed their networks by asking local claim representatives to scout out potential candidates for membership. Typically, to qualify for network membership the owner of a repair facility has to demonstrate that "its facility can handle the repair of any vehicle the insurance company sends its way. The repair facility will also have to show that it has a solid reputation for quality repairs. If the body shop has complaints filed against it, then the insurer is not likely to add it to the preferred list" (Insurer.Com). More importantly, for a repair facility to qualify for membership in the network, that facility must agree to a predetermined rate on labor and parts as well as agreeing to certain repair practices. Because of their size, insurance companies have a certain degree of monopsonist power and this enables them to negotiate deep discounts on labor and parts (Ma & McGuire, 2002). Repair facilities are willing to accept these terms in exchange for a greater quantity of work.

The largest insurer in the state of Pennsylvania has developed an extensive list of repair facilities within its network.[6] Its claims process works as follows: when submitting a claim, the claimant is advised of the option to have the estimate prepared by one of the repair facilities within the network. If a claimant chooses to have the estimate prepared by one of the network repair facilities, then the insurer will, for the most part, honor that claim. The claimant can then choose to have that same repair facility do the repair work. On the other hand, if the estimate was written by a repair facility that is "out-of-network," then the estimate has to be submitted to a claims adjuster for approval. There is no guarantee that the insurer will honor the full price of the claim. The insurer might choose to negotiate for a cheaper price. However, once the claim has been honored, the claimant can choose to have the actual work done by any repair facility (in-network or out-of-network) of his or her choosing.

The other nine largest automobile insurers in Pennsylvania have the same claims process as the largest insurer. However, none of these insurers has nearly as extensive a list of repair facilities as the largest insurer; therefore, those insurers are much more likely to rely on estimates prepared by repair facilities with whom they are not affiliated.

Insurance companies cannot dictate whether a claimant uses a network repair facility or not. Such a practice is referred to as "steering," which is considered a restraint of trade and business interference in most states. Pennsylvania has an anti-steering law on the books that limits insurers' ability to recommend or direct consumers to any one specific repair facility. Regardless of such laws, critics of the network system agree that steering is a widespread problem (Insurer.Com).

Insurers benefit by establishing networks in a number of ways. First, with an agreed upon rate and standard repair practice, the cost and time of handling a claim is greatly reduced. For instance, there is no longer a need for an appraiser to inspect every repair. Sullivan (1995) reports that reduced haggling between the owners of repair facilities and appraisers saves between one to three days in handling claims.[7] In addition, and most relevant to this study, researchers argue that networks allow insurers to better monitor claims buildup, with estimated savings of $250 per claim (Sullivan, 1995).[8]

Because of the standard reimbursement rate and standard repair practices, repair facilities that are a part of an insurer's network have very little flexibility when pricing out estimates for the insurer. Despite these restrictions, the repair facility benefits by receiving numerous referrals. So, the repair facility will give up the freedom to price whatever the market will bear and accept what the insurance firm offers in exchange for a greater quantity of work.

The potential for claims buildup still exists within networks. This might be even more so than before due to the discounts that repair facilities have conceded to insurance companies over the years. Nonetheless, networks are believed to be able to control for buildup in two important ways. First, the standardization of labor costs, time and job performance, makes it is easier for the insurance companies to monitor and control for claims buildup. Those repair facilities that can keep their costs down

[5] Auto body shops are not prohibited from participating in a network with more than one insurer.

[6] This insurer has at least 45 repair facilities within a 10 mile radius of the author's zip code.

[7] This is not insignificant, particularly when a claimant needs to be assigned a rental car.

[8] This represents $353.00 in 2009 dollars.

or can keep their repair/replace ratio low will be sent more referrals in the future. On the other hand, repair facilities that cannot keep their costs down, perhaps due to claims buildup, run the risk of being removed from the network. Also, insurance companies still need to routinely inspect network shops. As stated above, the higher the degree of trust that has been built over the years between a network shop and the insurance company, the fewer the number of inspections that are required (Goch, 2002).

The second way in which networks can control for claims buildup is through what Ma & McGuire (2002) refer to as the "network effect," or owner's fear of insurance companies steering referrals to other shops. The larger the share of a repair facility's business that comes from network referrals, the more likely it is that the owner will comply with the desires of the insurance company.

Although anecdotal evidence suggests the possibility exists for an insurer's network of repair facilities to control costs as well as claims buildup, this potential has never been empirically tested. This research, therefore, examines the following formal hypothesis:

H_1: Repair facilities, on average, will prepare lower estimates for an insurer with whom they are affiliated as opposed to an insurer with whom they are unaffiliated.

Not only can an insurer's network of repair facilities potentially control for claims buildup, but it might also ensure competitive pricing. If this is correct, then estimates prepared by repair facilities for an affiliated third party will not be significantly different from the estimates prepared for customers who are paying for the repairs "out of pocket," which prior research argues are highly-competitive (e.g., Tracy & Fox, 1989). This leads to hypothesis 2:

H_2: No statistically significant difference exists between estimates prepared by repair facilities for an affiliated third party and estimates prepared for customers who are paying for repairs "out of pocket."

TEST DESIGN

An experiment was designed to shed light on the role of affiliated repair facilities in mitigating claims buildup in the automobile insurance industry. More specifically, the purpose of the test is to find out if a difference exists in the initial estimates provided by repair facilities (i.e., auto body shops) when the repair facility knows the estimate is to be submitted for reimbursement to a third party with whom the repair facility is not affiliated with versus if the estimate is to be reimbursed by a third party with which the repair facility is affiliated with or if the repair is to be paid directly out of pocket by the consumer.

Although similar in scope and design to the Tracy & Fox (1989) study, there is an important and significant difference between this study and the latter study. The Tracy & Fox study uses two subgroups. One subgroup consists of repair facilities which were told that the estimated costs would be paid for out of pocket by the owner. The second subgroup consists of repair facilities that were told the estimates would be submitted to an insurance firm for reimbursement. This current study uses three subgroups. Two of the subgroups are characteristically the same as in the Tracy & Fox study, but the third subgroup consists of repair facilities that were told the estimates would be submitted to an insurance firm for reimbursement with whom the repair facilities were affiliated as a part of the insurance firm's overall network of repair facilities.

This study also has a stricter selection process for its repair facilities. The Tracy & Fox study randomly selects repair facilities from the yellow pages. With this selection process, it is possible that some "fly by night" operators could have been included in the sample. Therefore, it is possible that not all repair facilities in the Tracy & Fox study provided the same level of service. To help address this issue, the selection process for this study selects repair facilities from the network of the largest automobile insurer in Pennsylvania. These repair facilities had to meet a certain standard in terms of reputation, quality, and fairness in order to be a member of the network. This reduced the possibility of including a "fly-by-night" repair facility and helped control for the quality of the repair facility within the sample.

Again, the three subgroups used in this test consisted of only repair facilities that belonged to a network of providers for the largest auto insurer in Pennsylvania (called insurance firm X). All repair facilities, regardless of which subgroup they belonged to, were asked, on-site, to submit an estimate of repair cost for a car that was in a "fender-bender" accident. All repair facilities were estimating repairs for the same car with the same problem, regardless of which group they belonged to. No mention was made to the repair facilities that the individual soliciting the estimate was comparison shopping for a better price. In addition, to remove any possibility of gender, racial, or other types of demographic bias, all estimates were solicited by the same individual. Thus, even though one would expect

repair estimates to vary slightly among repair facilities, one would not expect to see a significant difference in the mean estimate between the subgroups unless the subgroups differ in the extent to which they engage in claims buildup. There was no indication that any of the shops specialized in any specific type of auto body work, such as a foreign body repair specialist. Therefore, all of the repair facilities are assumed to be equally competitive with one another.

The first group of repair facilities (subgroup A) was told to provide estimates for the repair and that the repair was to be paid out of pocket by the owner. Although this estimate may not reflect marginal cost pricing as derived from a purely competitive industry, it should reflect the market price as derived by a monopolistically competitive industry (Bourgen, Picard, & Pouyet 2008). The second group of repair facilities (subgroup B) was also asked to provide estimates. This group was told that the repair estimate was going to be submitted to insurance firm X, the insurance firm with whom the repair facility was affiliated as part of the insurance firm's network of repair facilities (much like a network of doctors for an HMO). The third group of repair facilities (subgroup C) was also asked to provide an estimate. This group was told that their estimate was to be submitted to a different insurance firm (insurance firm Y).[9] None of the repair facilities within the third group was a part of insurance firm Y's network of repair facilities; therefore, it is assumed that none of the repair facilities in the third group (subgroup C) owed a special allegiance to insurance firm Y.

The car used to solicit the repair estimates was a two year old Honda Civic LX. The required work was the replacement of the rear bumper cover. It was specified that the repair shop had to use an OEM (original equipment manufacturer) bumper. The new bumper cover had to be painted to match the rest of the car's exterior and then replaced. Generally speaking, this repair results in nearly half a day of labor for a typical repair facility. The replacement cost for a new bumper cover is $240.18. The remainder of the estimated cost represents labor for painting and installing the bumper cover as well as some miscellaneous supply charges.

TEST RESULTS

A total of 20 estimates were solicited from each of the three subgroups for a combined total of 60 estimates. Solicitation of the estimates started with the most convenient repair facility in terms of location according to a list of network repair facilities provided by insurance firm X's website. Repair facilities were then alternatively assigned to one of the three groups. Therefore, solicitation of the estimates was a random event. The mean estimates for group A (out of pocket), group B (insurance firm X), and group C (insurance firm Y) was $670.80, $681.12, and $783.87, respectively. The results are shown in Table 1.

Table 1: Data Results for the Three Subgroups

Subgroups	A (Out of Pocket)	B (Insurance Firm X)	C (Insurance Firm Y)
Number of Observations	20	20	20
Mean ($)	670.80	681.12	783.87
Standard Deviation ($)	66.49	64.82	186.69

The ANOVA test was used to see if a difference existed between the mean estimates of the three different groups. The ANOVA test results show that a difference between the means of at least one of the three subgroups does exist, and it is significant at the 0.6 percent level.

It is apparent from the data results in Table 1 that the standard deviation is much larger for group C (insurance firm Y) than for group A (out of pocket) or B (insurance firm X). Therefore, a Levene test was run in conjunction with the ANOVA test to find out if the variances between the groups were unequal. The Levene test results show that the group variances are unequal and significant at the 0.003 level. Indeed, three of the sample estimates from group C (insurance firm Y) were over $1,000—values of $1,329.07, $1,126.00, and $1,036.43 in descending order. These estimates were far outside the norm for all three groups which suggests that these specific repair facilities were really trying to take advantage of the system. A boxplot of the data is portrayed in Figure 1. The boxplot shows that there are only three extreme outliers and that they reside with group C (insurance firm Y).

Because the Levene test reveals unequal variances among the three groups, a Tamhane test was run to see exactly how many of the means from the three groups were different. The results of the Tamhane test are provided in Table 2.

Results from the Tamhane test shows that there is not a statistically significant difference between the mean estimates provided by group A (out of pocket) or group B (insurance firm X). The difference in means was a mere $10.32 with the mean of group B

[9] Insurance firm Y has its own network but is drastically smaller than the network of insurance firm X.

(insurance firm X) being just 1.5 percent higher than the mean of group A (out of pocket). The level of significance between group A (out of pocket) and group B (insurance firm X) is 0.946. This suggests that the network of repair facilities put into place by insurance firm X does a very good job of controlling costs. In other words, there is no statistical difference in price if the owner of the vehicle tells the repair facility that he/she is paying out of pocket or submitting the claim to insurance firm X (the insurance firm with whom the repair facility is affiliated with as part of a network of repair facilities). Hypothesis 2, therefore, is supported.

Figure 1: Boxplot of Data for the Three Test Groups

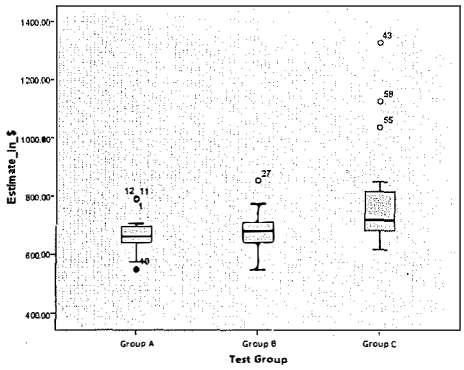

Table 2: Results from the Tamhane Test

Subgroup Difference	Mean Difference ($)	Significance Level
A minus B	–10.32	0.946
A minus C	–113.07	0.045
B minus C	–102.75	0.075

However, the Tamhane test reveals a different story when comparing the mean of group C (insurance firm Y) to the means of group A (out of pocket) or group B (insurance firm X). The test results show that the mean of group C (insurance firm Y) is statistically different from both group A (out of pocket) and group B (insurance firm X). Consistent with the findings of Tracy & Fox (1989), group C's (insurance firm Y) mean is $113.07 higher than the mean in group A (out of pocket), nearly a 16.9 percent difference. This difference in means is significant at the 0.050 level. In addition, consistent with hypothesis 1, group C's (insurance firm Y) mean was $102.75 higher, or nearly 15.1 percent greater than that of group B (insurance firm X). The difference in means between these two groups is statistically significant at the 0.075 level.

In summary, the results from the Tamhane test demonstrate that a network of repair facilities is effective at controlling for claims buildup. Furthermore, there is no statistical evidence that estimates provided for affiliated insurance firms are any less competitive than estimates provided for customers who pay out of pocket.

To account for the outliers, the ANOVA test was repeated, but this time the sample size was trimmed by 10%, with the largest estimates being dropped from each group. The ANOVA test shows, once again, that a difference between means does exist, and it is significant at the 0.3 percent level. Table 3 displays the means for each group along with the standard deviation after trimming the sample.

Table 3: Trimmed Sample Results for the Three Subgroups

Subgroups	A (Out of Pocket)	B (Insurance Firm X)	C (Insurance Firm Y)
Number of Observations	18	18	18
Mean ($)	657.17	666.33	734.57
Standard Deviation ($)	53.01	45.57	96.98

The Levene test was repeated for the trimmed sample, and it was found, once again, that the variances were unequal at the 0.082 level of significance. The Tamhane test was repeated once again, to see exactly which of the means from the three groups were different. The results are displayed in Table 4

Table 4: Results from the Tamhane Test after Accounting for the Trimmed Means

Factor Variable	Mean Difference ($)	Significance Level
A minus B	–9.16	0.932
A minus C	–77.40	0.023
B minus C	–68.29	0.044

The results from the Tamhane test still show that there is not a statistical difference between the means of group B (insurance firm X) and that of group A (out of pocket). Furthermore, the results still show the means to be statistically different between group B (insurance firm X) and group C (insurance firm Y) at the 0.044 level of significance.

IMPLICATIONS AND CONCLUSION

Results presented in this paper confirm the prevalence of claims buildup noted by Tracy & Fox

(1989) when repair facilities are unaffiliated with third party insurers. However, this paper also demonstrates that when an insurer can establish an affiliated network of repair facilities, then claims buildup can be controlled. Indeed, results presented in this paper show that there is no statistically significant difference in estimates when a repair facility is under the impression that the customer will be paying for the repairs out of pocket or if the claim is to be submitted to a third party with whom the repair facility is affiliated.

The results presented in this paper show that the average initial estimate for a specific small repair job is at least 15 percent higher when the repair facility knows that the claim is to be paid by a third party with whom the repair facility does not have any special allegiance. According to the Insurance Information Institute's 2004 estimate, nearly 22 percent of total premium dollars collected were paid out in both property damage liability and collision claims. If we extrapolate the information found in the Insurance Information Institute's report, then it is possible that claims buildup for collision and comprehensive claims is costing the automobile insurance industry an additional 3.3 percent for every dollar of premium earned. This amount would be in addition to the findings by the Insurance Research Council and others who have found claims fraud and claims buildup in the area of bodily injury and personal injury protection to be both costly and widespread.

Although it is difficult to determine what percentage of claims is not paid in full, previous studies have shown that less than 3 percent of audited claims are rejected or refuted (Weisberg & Derrig 1991, Tennyson & Salas-Forn 2002). Furthermore, underpaying claims do have costs to the insurance firm in terms of additional administrative work and possible litigation costs with respect to attorneys' fees from aggrieved claimants (Crocker & Tennyson, 2002). It is possible that experienced repair facilities know of these additional costs to the insurance firms and, therefore, choose to inflate the initial estimate knowing that the insurance firm will elect not to "haggle" over a 15 percent differential. Therefore, it is unlikely that the insurance firms are able to prevent the systemic abuse of inflated claims unless the insurance firm is able to put into place an extensive and, most likely, costly network of repair facilities. Furthermore, the insurers must then have their claimants submit estimates that were prepared by a repair facility from within the established networks.

While networks can be costly to establish and maintain, it may be that the significant benefits observed in this study outweigh the costs. If maintaining a network of providers is a prerequisite for sound business practices within the industry, then this raises the barriers to entry for the industry and thus limits competition.

Finally, it is important to note certain limitations associated with this study, which can serve as the basis for future research. First, the difference in estimates could have resulted from the fact there might be differences (real or perceived) in costs to repair facilities when dealing with insurance firm Y rather than insurance firm X. Insurance firm Y may have a reputation for being slow to reimburse repair facilities or being extra tough at negotiating repair costs. This would drive up the cost of dealing with insurance firm Y which would warrant higher estimates. It would be worthwhile in future studies to control for any perceived difference in costs among reimbursing third parties. One way to control for this might be to conceal the identities of the unaffiliated reimbursing third party.[10]

In addition, only one type of repair was examined and it is not certain if the same results would hold if a different type of repair was examined. In this study, the repair estimate is for a rather small job. Even so, the mean price to repair this type of damage was at least 15 percent higher when a repair facility was submitting the estimate to an unaffiliated insurance firm rather than an affiliated insurance firm or directly to a customer paying out of pocket. For a much larger job, the difference in price might be greater than 15 percent, because it would be much more difficult for insurance adjusters to second guess the estimate provided by the repair facilities on larger and more complicated repairs. Rather, it is argued that for larger and more complicated repairs, it would be easier to hide inflated costs within the estimate.[11] For larger and more complicated repairs, it is possible that repair facilities would be just as likely to want to cheat an affiliated insurer as opposed to an unaffiliated insurer. This suggests another interesting avenue of future research, which would be to see if the difference between estimates submitted to affiliated insurers and to unaffiliated insurers changes as the repair or complexity of repair increases.

[10] This is more difficult than it sounds because one of the first questions asked by all repair facilities is who the insurance company is.

[11] This was suggested in the Fox and Tracy (1989) article as well.

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