NJBET

Northeastern Journal of Business, Economics and Technology
Volume 13 Number 1
ISSN: 2156-9444
Fall 2007

NJBET Office of the Editor

EDITORIAL NOTES

The Fall 2007 edition of the *Northeastern Journal of Business, Economics and Technology* (NJBET) is the culmination of the efforts of many individuals who volunteered their time and energy to create a quality, general-interest business and economics journal that is both useful and enjoyable to read. The name change from the *Pennsylvania Journal of Business and Economics* reflects an increasing emphasis beyond the traditional regional scope of the journal. We thank the members of the Editorial Review Board and their colleagues who agreed to review manuscripts for this edition.

All manuscripts accepted for publication in this edition underwent both a double-blind review for content and a rigorous review of grammar, formatting and style. We thank all the authors for their patience with this process; it can get lengthy at times. However, we believe it is worth the extra time and effort to help produce a quality, well-written journal. The acceptance rate for this issue is 35%. This is a continuation of our reviewers' efforts to increase standards, while still providing useful feedback to authors.

The NJBET continues to be listed in Cabell's. Dr. Leon Markowicz has coordinated the review process for this edition. Dr. Kevin Roth continues with final editing, production, and distribution of the journal.

Finally, we thank all those individuals who submitted manuscripts for possible inclusion in this edition. We encourage all our colleagues to consider the NJBET as an outlet for their work.

Table of Contents

THE IMPACT OF THE DECISION MAKER ON THE USE AND PERCEIVED VALUE OF INTERNET TECHNOLOGIES

CJ Rhoads, Kutztown University

ABSTRACT

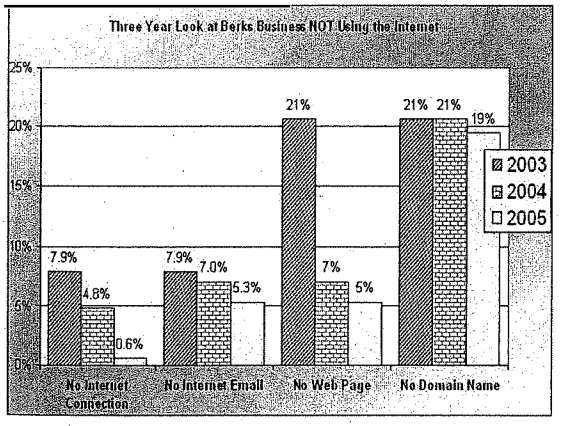
The purpose of this research is to investigate the impact of the role of the information technology (IT) decision maker within an organization on the use and perceived value of Internet technologies. A survey of 584 companies shows a significant relationship between the role of the decision maker and the use of Internet technologies.

Furthermore, companies where the Chief Information Officer makes the IT decisions are less likely to own their own domain name, but more likely to have a spam filter and Broadband or T-1 connections to the Internet. Companies where the Chief Executive Officer makes IT decisions are more likely to own their own domain name and invest in customer facing programs, but less likely to utilize a broad range of Internet technologies.

INTRODUCTION

Over a three year period, an annual survey on the use of business technology was conducted. The survey includes companies of all industries and sizes in Berks County, Pennsylvania. Figure 1 seems to show a trend of a striking change in Internet technology use among the companies in the survey. While the data gathered the first year (2003) had too many differences in question type to include in any statistical analysis, the last two years are similar enough to investigate using statistical techniques.

Figure 1. Three Year Look at Internet Use



A review of this preliminary information raises several questions: what is the relationship between the decision maker and the use of Internet technologies; what do the decision makers within a company *think* about the technology; do they believe Internet technologies are valuable? This paper will answer these questions.

This paper helps decision makers determine who should be on their team when making decisions about information technology projects. Furthermore, the relationship between *perceived* value and the use of Internet technologies is expected to be strong. If the relationship turns out to be weak, then it would raise important questions for further research.

IMPACT OF THE ROLE OF THE DECISION MAKER ON USE AND VALUE OF INFORMATION TECHNOLOGY

Despite thousands of investigations and hundreds of deliberate research projects, the argument rages on about whether or not IT has lived up to its promises regarding value creation (Bannister & Remenyi, 2000; Black & Lynch, 2001; Brown & Hagel III, 2003; Carr, 2004; Dedrick, Gurbaxani, & Kraemer, 2003; I. Foster & Grossman, 2003; Fried, 1993; Khosla & Pal, 2002; Loiacono, 2004; Mechlin & Berg, 1980; Strassmann, 2004; Tallon, Kraemer, & Gurbaxani, 2000; Thomas, 2004; Varian, 2003; Whitworth, Williams, Palvia, & Aasheim, 2005; Zhu, Kraemer, Xu, & Dedrick, 2004). For a more in-depth look at this issue, Dedrick provides the most comprehensive search of the research and comprehensively outlines the current findings.

This study focuses on three factors;

1. Who is involved in the decision making process?

2. What is the perceived value of IT?

3. Does either of these factors influence how well the Internet technologies are adopted?

Some specific questions come to mind.

- Within the decision making process, who is among the final decision makers on IT projects?
  1) The head of the whole company such as the Chief Executive Officer (CEO)?
  2) The financial head such as the Chief Financial Officer (CFO)?
  3) The head of operations such as the Chief Operations Officer (COO)? or
  4) The head of Information Technology such as the Chief Information Officer (CIO)?
- Within the decision making process, what impact does joint or group decision making have on the use of technology?
- Does it impact the use of technology if the CIO is part of the decision making process?
- Does it impact the use of technology if the CFO is part of the decision making process?
- Does the perceived value of IT by the decision maker have any impact on the use of technology within a company?

The answers to these questions will be discussed after a brief review of the literature.

LITERATURE REVIEW

Factor 1: Decision making Research

Quite a few studies on decision making include IT influences (Abdul-Gader & Kozar, 1995; Aksoy & Albayrak, 2005; Bergman & Feser, 2001; Cummings & Harris, 1999; Frank Bannister, Dan Remenyi, 2000; Fried, 1993; Harrison, Mykytyn Jr., & Riemenschneider, 1997; Henderson & Nutt, 1980; Lahdelma, Miettinen, & Salminen, 2005; Spillan, Harcar, Kucukemiroglu, Breshin, & Antunez de Mayolo, 2005).

Bergman and Feser (2001) find that cultural communication preference impacts the use of information technology within the decision making process. They identify and study 17 decision attributes related to IT use.

- Decision speed
- Information overload
- Routinization of decision making
- Forecast accuracy
- Decision time horizon
- Problem formulation
- Data quantification
- Decision effectiveness
- Alternatives generated
- Extent of analysis
- Problem identification
- Data availability
- Job complexity
- Timeliness of data
- Data accuracy
- Decision communications
- Decision participation

Bergman and Feser do not study the decision making process on the use of technology.

Benamati and Lederer (2001) include decision making styles as a factor on the level of technology knowledge transfer (which could be construed as highly correlated with reported use of technology). Benamati and Lederer find that corporations with more formalized mechanistic structures and more stable direction-oriented cultures are associated with higher levels of knowledge transfer of technology. Conversely, research organizations with more organic structures, more flexible change-oriented cultures, and more customized policies for intellectual property rights, patent ownership, and licensing are associated with higher levels of technology transfer. Another major impact is the partnership between the corporation and research organization. A trusting relationship in its university research center partner increases technology transfer (Benamati & Lederer, 2001).

Factor 2: Perceived Value of IT

Given the almost 200 different methods found in the literature on how to calculate economic or quantitative benefits related to the value of IT, it is obvious that there is difficulty across the board in trying to ascertain a level of measurement for this factor (Bannister & Remenyi, 2000). One way to resolve this issue is to simply ask a survey question regarding how much value IT has brought to the organization. There is a strong precedent for this approach.

Perhaps the strongest case for utilizing the perceived value of IT rather than a quantitative value comes from Tallon. Although one can debate the validity of utilizing subjective perception measures as a proxy for objective economic measurements, Tallon cites abundant research that shows solid support for the idea that the correlation between the perceived value and the actual value is very strong, even if the qualitative value is difficult to calculate (Tallon et al., 2000).

Other studies point to a relationship between attitude about IT and use of IT. Harrison finds that attitude toward IT had a strong influence on IT adoption (Harrison et al., 1997). Abdul-Grader also finds that attitude toward IT influences use of IT, as well as the sources of information used to decide about IT projects (Abdul-Gader & Kozar, 1995). However, in none of these cases is causality found.

Of course, this research does not purport to establish causality. Whether attitude about IT influences use of IT or the use of IT influences attitude probably cannot be determined as the two are iteratively intertwined. The relationship can be utilized, however, to determine whether the role of the decision maker influences both the attitude about the perceived value of IT, as well as the actual use of IT within an organization.

Factor 3: Use of New Technologies

The dependent factor in this study is the Use of Internet Technologies. A great deal of research has been done over the years on the influences on the speed of adoption rate of various technologies (Agarwal & Prasad, 1999; Benamati & Lederer, 2001; Bergman & Feser, 2001; Black & Lynch, 2001; Daniel & Grimshaw, 2002; Gopalakrishnan & Santoro, 2004; Harrison et al., 1997; Khosla & Pal, 2002; Levine & Rossmoore, 1994; Peart, 2002; Whitworth et al., 2005).

In general, most researchers find that support from both top decision makers and line-staff influence technology adoption. Furthermore, the amount and quality of the training, as well as the actual benefits of the information technology, are the most critical factors that impact how quickly new technologies are adopted.

While there is a great deal of research about the use of the Internet in business, and quite a bit about the mind-boggling speed with which the Internet has become a business tool, most research focuses on just one aspect of Internet use such as e-commerce, web-design, or the use of applications on the web (Aragon-Correa & Cordon-Pozo, 2005; Banerjee & Kumar, 2002; Bharati & Tarasewich, 2002; Chan-Olmstead & Ha, 2003; Chau, Cole, Massey, Montoya-Weiss, & O'Keefe, 2002; Cobb, 2003; Darley, 2003; Dutta & Roy, 2003; Englander & Moy, 2003; Larsen & Bloniarz, 2000; Maamar, Dorion, & Daigle, 2001; Simmers, 2002; Simpson, 2004).

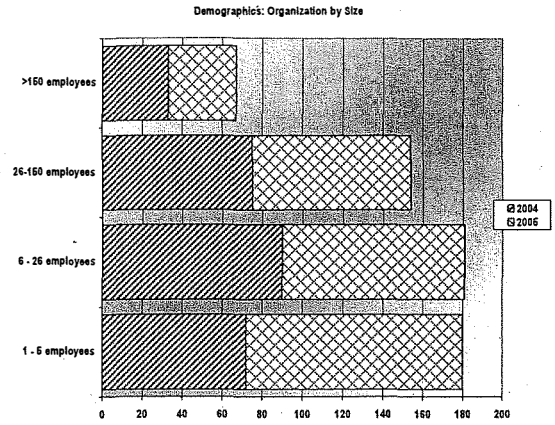
RESEARCH METHODOLOGY

Questionnaires were mailed to the technology contact and the main contact of businesses in Berks County in Southeastern Pennsylvania (with directions to have the main technology decision maker respond) over a two year period. The response rate is 10% the first year, and 7% the second year (reflecting a different and larger sample population than the first year). The questionnaires are ordinarily faxed back, although the address is included if the respondent wishes to send the response in the mail.

After some consideration, the use of a web-based survey tool was rejected because of the inherent bias it would introduce. Studies have been done that identify ways to decrease the impact that the technology bias produces on the results (Burkey & Kuechler, 2003). However, in this case, technology use is the main focus of the questionnaire. Using technology to gather the survey responses could dissuade companies less familiar with technology from answering, resulting in the absence of a good sampling from both technical and non-technical corporations.

Unusable surveys (such as blanks or multiple answers when only a single choice was allowed) were eliminated before the analysis. The remaining 584 surveys were compared to the population of businesses within the county (a typical county in Southeastern Pennsylvania) to ensure that the sample is properly stratified to include small, medium, and large businesses, as well as a wide range of industries. Figure 2 shows the organizations by number of employees and the years in which the data are gathered. The sample roughly matches the demographics of the county organizations as identified by Chamber of Commerce statistics. The second batch of questionnaires was sent to a larger list of local companies and received responses from a slightly larger proportion of tiny organizations (1-5 employees). However, this slight anomaly did not impinge upon the validity of the non-parametric statistic for comparison regarding the use of technology since the entire sample is tested as a whole rather than breaking up the data into years prior to testing.

Figure 2. Stratified Size Demographics



The independent variable, Role of Technology Decision maker within the organization, is nominal. The question is shown in **Error! Reference source not found.** Figure 3.

Figure 3. Decision maker question.

Who, within your company, makes technology decisions?
CEO/President/Owner
CFO/Controller/Finance VP
COO/Operations Manager
Individual Dept Mgrs
CIO/It Director/IT Manager*
Other:_____
*IT stands for Information Technology. May also be DP (Data Processing), EDP (Electronic Data Processing, or IS (Information Systems)

Multiple answers to this question are acceptable. Therefore, there is the potential for 720 (6!, or six factorial) different responses to the question. The response frequency were grouped into various categories for analysis.

The dependent variable, Technology Use, is an index derived from a combination of the answers to the questions in Figure 4: To determine the level or quality of use of technology, the responses to a number of questions about various technologies all relating to the Internet were used. There is a precedent for combining answers into an index. Several researchers combine different aspects of technology use into an "index" so that the comparison is applicable across different technologies, different industries, and different company sizes (Aksoy & Albayrak, 2005; Bergman & Feser, 2001; L. Foster & Flynn, 1984; Fried, 1993; Harrison et al., 1997).

Figure 4. Internet Technology Related Questions

E-mail: What percentage of your employees have a business Internet email address
1. 1-5%
2. 6-25%
3. 26-50%
4. 51-75%
5. 76-100%

Web: Do you currently have one or more domain name(s) registered in your companies' name and only used by your company?
1. Yes
2. No

Ecommerce: During the next 12 months, do you plan to implement transaction processing (e-commerce) on your web site?
1. Yes
2. No
3. Already doing

WebDevel: To whom do you turn for web site development?
1. Local developer
2. Non-local developer
3. In house developer
4. No web page

Connection: What kind of connection to the Internet do you have at your company?
1. Dialup
2. T-1 (full, fractional, frame relay)
3. DSL
4. Cable (i.e. - Comcast)
5. Wireless (Satellite)
6. None

UnfilteredSpam: If you receive unfiltered email, what percentage do you consider to be spam? (spam is unwanted bulk e-mail)
1. 1-5%
2. 6-25%
3. 26-50%
4. 51-75%
5. 76-100%

FilteredSpam: If you receive email already filtered for spam, what percentage of spam do you still get?
1. 1-5%
2. 6-25%
3. 26-50%
4. 51-75%
5. 76-100%

Based on the answers, an organization is characterized as "Savvy, Blossoming, Base, or Unversed" in their use of Internet technology. The rules utilized to characterize an organization are listed in Figure 5.

Figure 5. Rules for Use of Technology Index Score

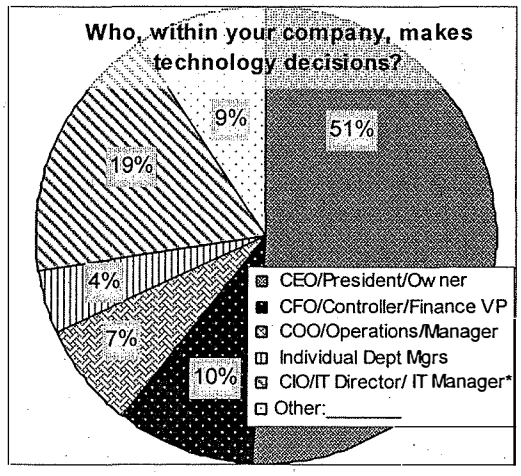
Savvy	Email >=4, Web = 1, Ecommerce<>2, WebDevel <> 4, Connection <>1 or 5, Unfilteredspam > 0 or FilteredSpam > 0
Blossoming	Email >2, Web = 1, Ecommerce =1, WebDevel <> 4, Connection <>5, Unfilteredspam > 0 or FilteredSpam > 0
Base	Email <4 and >1, Web = 1, Ecommerce =1, WebDevel <> 4, Connection <>2, Unfilteredspam > 0 or FilteredSpam > 0
Unversed	Email <=1, Web = 2, Ecommerce 2, WebDevel = 4, Connection = 1 or 5, Unfilteredspam = 0 or FilteredSpam = 0

The index is then converted to a binomial variable of a "Better Adopter" of Internet technology and a "Minimal Adopter" of Internet technology (i.e., used technology less and/or less effectively).

ANALYSIS

Who makes the IT decisions in these companies? As can be seen in Figure 6, the answer is clearly the CEO with 51% of the companies involving the CEO in IT decisions. The CIO is also involved in 19% of the companies. It should be noted that between the two years, the percentage of CIOs included in the decision making increased from 11% to 25%.

Figure 6. Decision making Categories (not mutually exclusive)



Does group decision making impact the use of Internet technologies? In order to maintain the necessary requirement of mutually exclusive comprehensive categories for the chi-square statistical test, as well as a large enough grouping size for each cell, two categories were created out of all the "combined" decision making responses: with the CIO and without the CIO. The analysis shows that the role within the organization of the IT decision maker influences the Internet adoption variable. When the CIO was part of the decision, 36 to 40% of the companies were "Better Adopters" of Internet technologies, as compared with the range of 19% to 33% for the companies where the CIO was not part of the decision. The impact is both statistically and meaningfully significant as shown in Figure 7.

Figure 7. Chi-square Analysis

Decision Maker Role in Organization	Actual Minimal Adopter	Actual Better Adopter	Expected Minimal Adopter	Expected Better Adopter	Total
CEO	224 (81%)	54 (19%)	207	71	278
CIO	55 (60%)	36 (40%)	68	23	91
CFO	25 (74%)	9 (26%)	25	9	34
COO	25 (71%)	10 (29%)	26	9	35
Department Mgr	12 (67%)	6 (33%)	13	5	18
Joint with CIO	18 (64%)	10 (36%)	21	7	28
Joint without CIO	64 (74%)	22 (26%)	64	22	86
Other	11 (79%)	3 (21%)	10	4	14
N			434	150	584
Chi square 16.29 Significant (p < .02) at df = 7					

Once significance is found using mutually exclusive groupings, it is appropriate to analyze the categories in order to see any patterns on the technology use based upon the decision maker role. The non-exclusive groupings break out slightly differently and are reported in Figure 8.. Clearly, the decision maker impacts whether or not the company falls into the Minimal Adopter category or the Better Adopter category. When the CIO is part of the decision making team, more of the companies are Better Adopters of Internet Technologies (as shown in the circled column on the chart in Figure 8). When the CFO is part of the decision making team (or the CEO made the decision alone) more of the companies fall into the Minimal Adopters of Internet Technologies (as shown in boldface in Figure 8).

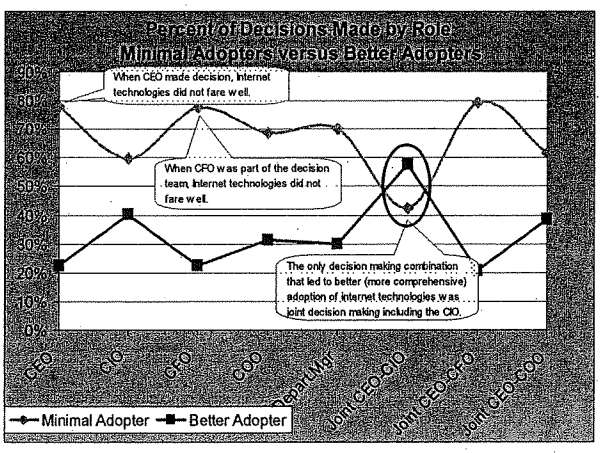
Figure 8. Decision making Categories (not mutually exclusive)

Percent Scores	CEO	CIO	CFO	COO	Depart Mgr	Joint CEO-CIO	Joint CEO-CFO	Joint CEO-COO	Percent Average
Minimal Adopter	78%	60%	78%	69%	70%	42%	79%	62%	67%
Better Adopter	22%	40%	22%	31%	30%	58%	21%	38%	33%
Raw Scores									
Minimal Adopter	262	73	52	33	21	11	23	8	60
Better Adopter	75	49	15	15	9	15	6	5	24
	337	122	67	48	30	26	29	13	672
	50%	18%	10%	7%	4%	4%	4%	2%	100%

Clearly, group decision making has an impact on the use of new technologies. It is easy to see in the graph in Figure 9 that the 26 decision making teams (the *Joint CEO-CIO* from Figure 8) that include both the CEO and the CIO have a **proportionately higher frequency of Better Adopter rating.** It is also interesting to note that, when the CIO is included in the decision making, but the CEO isn't, the frequency of Better Adopter is impacted, but not as much.

Another issue made clear in the graphical illustration is that, when the CFO was part of the decision making team, there were many more Minimal Adopters of Internet technologies. The same was true when the CEO made the decision alone.

Figure 9. Percentage of Decisions by role



See page 10 for Figure 10. A review of the correlation between the questions and the decision maker also shows some interesting points, though caution must be taken because the samples would not meet the assumption of a normal distribution. Some correlations would be expected (such as the correlation between having a Web page and using a web developer, and the relationship between utilizing ecommerce and having filtered email). However, in some cases a relationship turns up that is a bit surprising (**Error! Reference source not found.**). If the CIO is among the decision makers, the organization is **less** likely to have a domain name (r = -.20). If the CEO is among the decision makers, the organization is **more** likely to have a domain name (r = .18).

One explanation may be that CIOs are more knowledgeable about Internet technologies and, therefore, might have higher security concerns regarding maintaining a web site. Additionally, CIOs are often already enmeshed in legacy technology and, therefore, are less likely to seek Internet solutions. CEOs, on the other hand, having less technology knowledge, are probably more likely to ignore potential security issues. Alternatively, they might simply be more focused on customer-facing technologies such as the Internet and insist on utilizing that channel of customer contact and support regardless of the security risks.

Another interesting relationship is found between the CIO as the decision maker and a higher percentage of people within the organization with email. Additionally, companies with a CIO are more likely to implement SPAM-filtering software and have increased connections to the Internet. In general, CIOs focus on providing the majority of employees with useful technology. Since satisfying existing users is a difficult job in and of itself, CIOs don't tend to focus on customer-facing technologies as much.

The final question relates to the perceived value of technology by the decision maker. The question is shown in Figure 11.

Figure 11. Perception of Technology Value Question

TechVal: Has technology brought value to your company?
Much value
Some value
No value

The chi-square analysis (Figure 12**Error! Reference source not found.**) depicts an extremely strong relationship between the perceived value of technology and the Adoption of Internet technologies (as expected). Only one of the decision makers who responded "No Value" when asked about technology is rated as a Better Adopter. The majority of decision makers who did not see value in technology did not adopt Internet technologies as much. Of course, the fact that only 5% of the sample answers "No Value"

makes it difficult to determine definitively if the technology use is actually a factor, or if the excessive score is a result of the small sample size in the single cell.

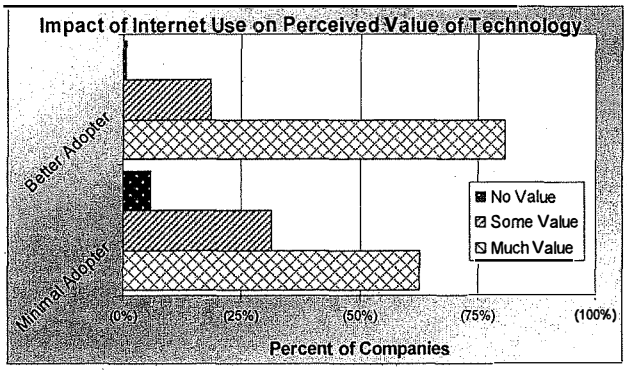
Figure 12. Chi-square analysis of Perceived Technology Value

	Much Value	Some Value	No Value	Total
Minimal Adopter	272 (63%)	136 (31%)	26 (6%)	434
Better Adopter	121 (81%)	28 (19%)	1 (1%)	150
	393 (67%)	164 (28%)	27 (5%)	584

Chi-square = 166, strongly significant (13.81 is value at p > .001)

A graph Figure 13 of the perceived value illustrates just how few companies responded "No Value" when asked about the value technology brought them.

Figure 13. Graph of Perceived Value Responses



Organizations that use Internet technology better value technology more. Causality, of course, cannot be determined as the iterative process of valuing technology, and therefore using it more or using more and, therefore, valuing more cannot be separated. However, given this strong relationship, we can say that, when the CIO is involved in the decision making, technology is both used more and valued more. It would be equally correct to say that, when technology is perceived as more valuable, there is more likely to be someone with technology knowledge (like a CIO) on the decision making team.

Further study is needed to determine the proportion of influence that the information technology decision maker's role has on the use of technologies and the perception of the value of information technologies. Another fertile avenue of study may be to determine if changing the decision making process in an organization affects the use or perceived value of information technology.

PRACTICAL IMPLICATIONS

Currently, the CEO alone makes IT investment decisions fifty percent of the time. If the CEO makes the decision, technology adoption is minimal. The CEO tends to focus on customer-related technology such as web domains but may not implement back-end infrastructure well enough to fully utilize Internet technologies.

If the CFO is involved in the technology decisions, technology adoption is also minimal. It may be that the CFO focuses too intently on costs and short-term financial returns which may hamper the technologies being implemented.

The CIO tends to focus on infrastructure and email, both back-end infrastructure items necessary for better adoption. Both are needed for optimum use of information technology. However, the CIO may be missing out on an important element picked up by the CEO – customer facing and sales-oriented technologies.

Obviously, the most important practical implication of this research is that both the CIO and the CEO should be involved in any technology decision. It might also be a good idea to minimize the role of the CFO when making strategic technology decisions.

REFERENCES

Abdul-Gader, A. H., & Kozar, K. A. (1995). The impact of computer alienation on information technology investment decisions: An exploratory. *MIS Quarterly, 19*(4), 535.

Agarwal, R., & Prasad, J. (1999). Are individual differences germane to the acceptance of new information technologies? *Decision Sciences, 30*(2), 361-391.

Aksoy, R., & Albayrak, A. S. (2005). Differences at the stage of information searching: Multiple discrimant analysis for automobile consumers. *Business Research Yearbook Global Business Perspectives, XII*(2), 620-629.

Aragon-Correa, J. A., & Cordon-Pozo, E. (2005). The influence of strategic dimensions and the environment on the introduction of internet as innovation into small and medium-sized enterprises. *Technology Analysis & Strategic Management, 17*(2), 205-218.

Banerjee, S., & Kumar, R. L. (2002). Managing electronic interchange of business documents. *Communications of the ACM, 45*(7), 96-102.

Bannister, F., & Remenyi, D. (2000). Acts of faith: Instinct, value and IT investment decisions. *Journal of Information Technology, 15*(3), 231-241.

Benamati, J., & Lederer, A. L. (2001). Coping with rapid changes in IT. *Communications of the ACM, 44*(8), 83-87.

Bergman, E. M., & Feser, E. J. (2001). Innovation system effects on technological adoption in a regional value chain. *European Planning Studies, 9*(5), 629-648.

Bharati, P., & Tarasewich, P. (2002). Global perceptions of journals publishing e-commerce research. *Communications of the ACM, 45*(5), 21-26.

Black, S. E., & Lynch, L. M. (2001). How to compete: The impact of workplace practices and information technology on productivity. *Review of Economics & Statistics, 83*(3), 434-445.

Brown, J. S., & Hagel III, J. (2003). Does IT matter? *Harvard Business Review, 81*(7), 109.

Burkey, J., & Kuechler, W. L. (2003). Web-based surveys for corporate information gathering: A bias-reducing design framework. *IEEE Transactions on Professional Communication, 46*(2), 81.

Carr, N. G. (2004). *Does IT matter? Information technology and the corrosion of competitive advantage*. Boston Massachusetts: Harvard Business School Press.

Chan-Olmstead, S. M., & Ha, L. S. (2003). Internet business models for broadcasters: How television stations perceive and integrate the internet. *Journal of Broadcasting & Electronic Media, 47*(4), 597-617.

Chau, P. Y. K., Cole, M., Massey, A. P., Montoya-Weiss, M., & O'Keefe, R. M. (2002). Cultural differences in the online behavior of consumers. *Communications of the ACM, 45*(10), 138-143.

Cobb, S. (2003). Offshore financial services and the internet: Creating confidence in the use of cyberspace? *Growth & Change, 34*(2), 244.

Cummings, M., & Harris, J. (1999). Using information technology: A model of ethical decision making. *International Journal of Management, 16*(2), 151.

Daniel, E. M., & Grimshaw, D. J. (2002). An exploratory comparison of electronic commerce adoption in large and small enterprises. *Journal of Information Technology, 17*(3), 133-147.

Darley, W. K. (2003). Public policy challenges and implications of the internet and the emerging e-commerce for sub-Saharan Africa: A business perspective. *Information Technology for Development, 10*(1), 1.

Dedrick, J., Gurbaxani, V., & Kraemer, K. L. (2003). Information technology and economic performance: A critical review of the empirical evidence. *ACM Computing Surveys, 35*(1), 1-28.

Dutta, A., & Roy, R. (2003). Anticipation internet diffusion. *Communications of the ACM, 46*(2), 66-71.

Englander, F., & Moy, R. L. (2003). Supply, demand, and the internet--economic lessons for microeconomic principles courses. *Journal of Education for Business, 78*(5), 290-294.

Foster, I., & Grossman, R. L. (2003). Data integration in a bandwidth-rich world. *Communications of the ACM, 46*(11), 50-57.

Foster, L., & Flynn, D. (1984). Management information technology: Its effects on organizational form and function. *Management Information Systems Quarterly, 8*(4), 229-236.

Fried, L. (1993). Advanced information systems technology use. *Journal of Information Systems Management, 10*(2), 7-14.

Gopalakrishnan, S., & Santoro, M. D. (2004). Distinguishing between knowledge transfer and technology transfer activities: The role of key organizational factors. *IEEE Transactions on Engineering Management, 51*(1), 57-69.

Harrison, D. A., Mykytyn, Jr., P. P., & Riemenschneider, C. K. (1997). Executive decisions about adoption of information technology in small business: Theory and empirical tests. *Information Systems Research, 8*(2), 171.

Henderson, J. C., & Nutt, P. C. (1980). The influence of decision style on decision making behavior. *Management Science, 26*(4), 371.

Khosla, V., & Pal, M. (2002). Real time enterprises: A continuous migration approach. *Information Knowledge Systems Management, 3*(1), 53.

Lahdelma, R., Miettinen, K., & Salminen, P. (2005). Reference point approach for multiple decision makers. *European Journal of Operational Research, 164*(3), 785-791.

Larsen, K. R. T., & Bloniarz, P. A. (2000). A cost and performance model for web service investment. *Communications of the ACM, 43*(2), 109-116.

Levine, H. G., & Rossmoore, D. (1994). Politics and the function of power in a case study of IT implementation. *Journal of Management Information Systems, 11*(3), 115.

Loiacono, E. T. (2004). Cyberaccess: Web accessibility and corporate America. *Communications of the ACM, 47*(12), 83-87.

Maamar, Z., Dorion, E., & Daigle, C. (2001). Toward virtual marketplaces for e-commerce support. *Communications of the ACM, 44*(12), 35-38.

Mechlin, G. F., & Berg, D. (1980). Evaluating research--ROI is not enough. *Harvard Business Review, 58*(5), 93.

Peart, R. M. (2002). A survey of the adoption of cleaner technology by South African firms. *Development Southern Africa, 19*(2), 221-237.

Simmers, C. A. (2002). Aligning internet usage with business priorities. *Communications of the ACM, 45*(1), 71-74.

Simpson, S. (2004). Explaining the commercialization of the internet. *Information, Communication & Society, 7*(1), 50-68.

Spillan, J. E., Harcar, T., Kucukemiroglu, O., Breshin, J., & de Mayolo, C.A. (2005). Who decides what to buy in Latin American families. *Business Research Yearbook Global Business Perspectives, XII*(2), 788-792.

Strassmann, P. A. (2004). Why IT will continue to matter. *Computerworld, 38*(36), 34-34.

Tallon, P. P., Kraemer, K. L., & Gurbaxani, V. (2000). Executives' perceptions of the business value of information technology: A process-oriented approach. *Journal of Management Information Systems, 16*(4), 145-173.

Thomas, R. (2004). Using metrics to achieve optimal ROI. *Healthcare Financial Management, 58*(4), 98-99.

Varian, H. (2003). Does IT matter? *Harvard Business Review, 81*(7), 112.

Whitworth, J. E., Williams, S. R., Palvia, P. C., & Aasheim, C. (2005). Measuring the impact of global information technology applications. *International Journal of Technology Management, 29*(3/4), 280-294.

Zhu, K., Kraemer, K. L., Xu, S., & Dedrick, J. (2004). Information technology payoff in e-business environments: An international perspective on value creation of e-business in the financial services industry. *Journal of Management Information Systems, 21*(1), 17-54.

CJ Rhoads, Lehigh University, is an associate professor at Kutztown University teaching Information Technology, Decision Making, Business Computer Applications, Advanced Business Computer Applications and Project Management. Her research interests include leadership, decision making, information technology, alignment and performance measures.

Funding source for this research: Berks County Chamber of Commerce and Reading Eagle Company.

Figure 10. Regression Analysis of Factors

	Email	Web	Ecommerce	WebDevel	Connection	EmailFilter	Unfilteredspam	Filteredspam	CEO/President	CFO/Controlle	COO/Operatio	Individual Dep	CIO/IT Directo	Other:_____	
Email															
Web	-0.229														
Ecommerce	-0.019	0.089													
WebDevel	-0.087	0.302	0.072												
Connection	0.089	0.119	-0.023	-0.090											
EmailFilter	-0.064	0.045	0.143	0.080	0.081										
Unfilteredspam	0.029	0.067	0.003	0.113	0.011	0.296									
Filteredspam	0.007	-0.030	-0.119	0.013	-0.006	-0.473	-0.043								
CEO/President/Owner	-0.026	0.186	0.013	0.036	0.037	0.014	0.076	0.019							
CFO/Controller/Finance	-0.072	-0.067	0.098	0.143	0.043	0.017	-0.036	-0.030	-0.105						
COO/Operations/Manage	0.013	-0.032	0.020	0.003	0.046	-0.014	0.024	-0.009	-0.185	-0.029					
Individual Dept Mgrs	-0.024	-0.099	0.047	-0.008	-0.039	-0.081	-0.027	0.038	-0.099	0.038	-0.013				
CIO/IT Director/ IT Mana	-0.150	-0.209	-0.048	-0.023	-0.024	-0.069	-0.073	-0.026	-0.579	-0.040	-0.108	-0.024			
Other:_____	0.013	-0.013	-0.079	0.007	-0.063	0.006	-0.028	-0.042	-0.354	-0.088	-0.061	-0.079	-0.120		
TechVal	-0.226	-0.219	0.082	0.140	-0.079	0.063	0.071	-0.028	0.072	-0.063	-0.005	-0.065	-0.161	0.024	

Dark Shaded cells show significance at the .01 level
Light Shaded cells show significance at the .05 level
Caution must be made in generalizing these findings as the assumptions of homodasticity and normal distribution have not been established

PERSISTENCE AND BIAS IN HEDGE FUND DATA

Nandita Das, Wilkes University
David L. Muething, Buckley Muething Capital Management Co.

ABSTRACT

The study of performance persistence in the hedge fund industry is a recent phenomenon. The direction of the bias is not clear even for traditional investments like mutual funds. We document the bias in performance data for all classifications of hedge funds in the ZCM/Hedge database. We also document the performance of complete portfolio, surviving portfolio, disappeared funds, and new funds. Hedge funds disappear from the database primarily due to poor performance. Hedge funds have a superior performance when they enter the database. Two kinds of biases act in opposite direction. The overall direction of the bias depends on the relative magnitude of these two biases.

INTRODUCTION

Bias is closely linked to the issue of performance persistence; the direction of the bias is not clear even for traditional investments like mutual funds. For hedge funds, the issue becomes more complicated, because it is possible that hedge funds disappear from the database for various reasons. There is no way to track the *disappeared* funds. There is no regulatory authority that collects data for hedge funds, nor are the hedge funds required to report their performance. Therefore, it is necessary to estimate bias to better measure performance and to get an idea of the relative performance. Hedge funds have different performance characteristics depending upon their investment strategy. To measure performance accurately, it is important to estimate bias for different categories.

LITERATURE REVIEW

Survivorship bias is the effect of considering only the performance of funds that are present in the database at a given time. Since investors are interested only in the funds that are available to them, most databases do not provide the performance of the defunct funds. Performance studies that use only *surviving* funds will result in biased measures. Much work has been done in providing estimates of survivorship bias for traditional investments. All these studies have documented an upward bias in measures of performance.

For bond funds, Blake, Elton, and Gruber (1993) find an upward survivorship bias of 27 basis points per annum. For equity funds, various researchers have come up with different estimates of survivorship bias. Grinblatt and Titman (1989) come up with several estimates of survivorship bias ranging from 10 to 30 basis points. Brown and Goetzmann (1994) estimate an upward bias of 80 basis points; Malkiel (1994) reports an upward bias of 150 basis points, whereas Carhart (1994) estimates an upward bias of 300 to 500 basis points. Elton, Gruber, and Blake (1996) estimate upward survivorship bias to range from 4 basis points to 97 basis points per annum depending upon the length of study. This apparent difference in estimates of survivorship bias for the same investment class is attributable to differences in methodology used and on the length of the study period.

For Commodity Trading Funds (CTAs), researchers have estimated an upward survivorship bias to range from 350 to 470 basis points. Schneeweis, Spurgin, and McCarthy (1996) estimate survivorship bias to be 120 basis points per annum. Fung and Hsieh (1997) estimate survivorship bias as the difference between the equal-weighted portfolio of existing CTAs and CTAs that have survived the complete study period and find the bias to be 29 basis points per month or 348 basis points per year. Diz (1999) studies the performance characteristics of *surviving* and *non-surviving* CTAs and find that survivors generated higher returns even on a risk-adjusted basis.

The estimates of survivorship bias for hedge funds range from 16 basis points to 300 basis points. Brown, Goetzmann, and Park (1997), Fung and Hsieh (1998), Brown et al. (1999), and Liang (2000) calculate survivorship bias as the performance difference in the equal-weighted portfolios of *surviving* funds and that of all funds existing in the database. Ackermann, McEnally, and Ravenscraft (1997) calculate survivorship bias as the performance difference between *surviving* funds and *disappeared* funds.

All the studies in hedge fund survivorship bias have mostly concentrated on estimating bias for the complete database, except Liang (2000). The databases used for all these studies are different. The period of study also differs, as does the procedure of calculating the survivorship bias. The commonality in all these studies is the conclusion that hedge fund survivorship study is different from other survivorship studies.

Bias in hedge fund data could be a result of funds disappearing from the database or because of funds presumably entering the database with positive performance experience. These factors that lead to bias in the performance measurement could counteract each other depending on the magnitude and direction of bias. We use the term "bias" instead of "survivorship bias" since survivorship bias in mutual funds presumably leads to an upward bias in performance measurement.

We estimate bias for each class and category of hedge funds and for the complete database, including and excluding fund-of funds. Our study is comprehensive and allows for easy comparison of the results with the results obtained by other researchers. We vary the period under study to observe the impact of the length of the study period on bias.

DATA ORGANIZATION AND METHODOLOGY

Three primary databases are popular among academic researchers and the investment industry. Providers of these databases offer different services to the industry. The Hedge Fund Research (HFR) database contains more equity-based hedge funds. ZCM/Hedge provides comprehensive coverage of global alternative investment (particularly hedge funds marketplace). TASS is the information and research subsidiary of Tremont Advisers, Inc. TASS classifies managed futures as hedge funds.

We use the ZCM/Hedge database. The ZCM/Hedge database classifies hedge funds into four general classes and eight broad categories of investment styles. The classes are "onshore" hedge fund (HF-US), "offshore" hedge fund (HF-NON), "onshore" fund-of-funds (FOF-US), and "offshore" fund-of-funds (FOF-NON).

Data Organization

The ZCM/Hedge database provides monthly returns for all the funds. We select a study period from January 1994 and December 2000. ZCM/Hedge data has 180,180 observations of monthly returns for 2,797 funds. A study period dataset from January 1994 to December 2000 is constructed from the available dataset. The dataset is further divided into two parts: from January 1997 to December 2000 and from January 1998 to December 2000.

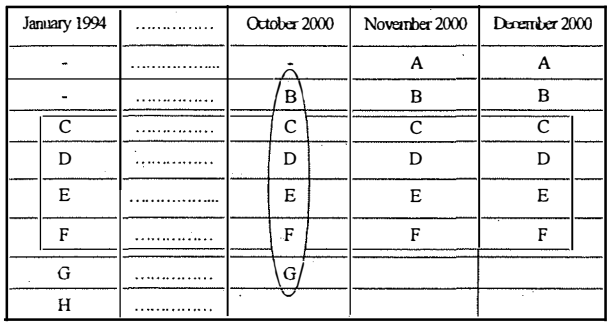
For the seven-year study period (1994 to 2000), 109,272 observations of monthly return data are available. A total of 74,657 observations of monthly return data are available for the four-year study period (1997 to 2000), and 57,691 observations of monthly return data are available for the three-year study period (1998 to 2000). These four-year and three-year datasets are used to observe the effect of the study period on bias.

Portfolio Construction

The bias can be calculated in two different ways, as in Brown et al. (1999). A *surviving* portfolio in a particular month during the study period consists of all funds that have reported return until the end of the study period. For example, for the study period that ends in December 2000, a *surviving* portfolio for each of the previous month will have only those funds that have reported return up to December 2000; the start date of these funds could vary. A *surviving* portfolio takes into consideration the new money coming in but does not consider the funds that disappear from the database during the study period. An *observed* portfolio consists of funds that are in the database for that particular month irrespective of their start and end date. A *complete* portfolio consists of funds that have reported returns for the complete study period. By definition, a *complete* portfolio consists of the same funds each month during the study period.

Figure 1 illustrates the portfolio construction process. For the month of October 2000, the *surviving* portfolio consists of B, C, D, E, and F funds; the *observed* portfolio consists of B, C, D, E, F, and G funds; and the *complete* portfolio consists of funds C, D, E, and F.

Figure 1
Portfolio Construction for the Study of Bias



We calculate equal-weighted and value-weighted portfolio returns. Bias is calculated in two ways: the difference between the return of the *surviving* portfolio and the *observed* portfolio (SP-OP), and the difference between the return of the *complete* portfolio and the *observed* portfolio (CP-OP). The return data is available for each month, so bias is calculated on a monthly basis and is reported as average monthly bias for each year of study.

PERFORMANCE CHARACTERISTICS OF DIFFERENT PORTFOLIOS

We consider both before-fee returns and after-fee returns. A before-fee return is more robust than the after-fee-return, because of the vagaries of the fee structure and the complexities of calculation. In general, hedge funds charge two types of fees: an asset management fee and an incentive fee. The asset management fee is based on amount of the assets in the fund, usually 1% or 2% per year.

The ZCM/Hedge database provides information on annual fee structure for each of the hedge funds. Subtracting 1/12th of the stated percent fee from the monthly return approximates the administrative fee.

Observed Portfolio

Table 1 provides the summary statistics (Before-fee return statistics are not reported here for the sake of brevity) for the categories, the classes of hedge funds and total hedge funds (both including and excluding fund-of-funds), for the study period of 1994 to 2000. The returns of hedge funds vary from a maximum return of 903% (*Global US* Category) to a minimum return of -99.99%. The maximum volatility of 14% of monthly returns is also for the *Global US* category. The category *Sector* has

Surviving and Complete Portfolios

outperformed all other categories on a risk-return basis, followed by the category *Event Driven* for both the study periods of 84 and 48 months.

Table 1
Summary Statistics of the Observed Portfolio
1994-2000

Category/ Class/Total	After-fee Monthly Return (%) Mean	Median	Max	Min	Mthly Std. Dev
Panel A. Category					
Event Driven	0.60	0.72	180	-58	5.47
Global International	0.68	0.59	64	-79	7.11
Global Regional Established	1.07	0.99	116	-63	7.70
Global Regional Emerging	-0.37	0.58	90	-84	9.79
Global US	-0.22	0.44	**903**	**-100**	**13.88**
Global Macro	0.22	0.36	104	-69	6.69
US Opportunistic	0.05	0.03	23	-50	5.52
Long Only/ Leveraged	0.24	1.02	83	-55	10.65
Market Neutral	0.68	0.70	219	-60	4.68
Sector	**1.25**	**1.32**	90	-78	10.25
Short Sellers	-0.20	0.28	**71**	-58	9.77
Panel B. Class					
HF-US	0.81	0.82	116	-100	7.41
HF-NON	0.31	0.62	**903**	**-100**	8.50
FOF-US	0.63	0.73	40	-46	3.30
FOF-NON	0.45	0.53	70	-49	4.09
Panel C. Total					
Excluding FOF	0.59	0.72	903	-100	7.87
Including FOF	0.58	0.70	903	-100	7.16

We studied the performance characteristics of *surviving* and *complete* portfolios. It appears that the

new funds have better performance than the old funds (existing in the database at the beginning of the study period) that disappear. The median return for the *surviving* portfolio is above the mean return 51% of the time, indicating that probably there are some very poor and very good performers in the categories, pulling the mean towards their performance.

The *surviving* portfolio has lower maximum return and higher minimum return, leading to the conclusion that probably the *surviving* portfolio has less variability in returns compared to the *observed* portfolio. This is intuitively correct if we relate dispersion in return to the risk taken by the hedge fund managers. The riskier the hedge fund, the greater the chance of its disappearance if the risk ultimately leads to poor performance. Before we confirm this conclusion, it is important to see how the *disappeared* funds perform prior to their disappearance.

The return characteristics vary between the *surviving* and *complete* portfolio. If attrition and entry rate have any impact on hedge fund returns, then it is expected that the return characteristics will vary. The rate of entry of *new* hedge funds will affect the return of the *surviving* portfolio, whereas, by definition, no *new* funds are included in the *complete* portfolio. The minimum return of the *complete* portfolio is in most cases higher than the minimum return of the *observed* portfolio.

BIAS STUDY RESULTS

The bias is calculated based on the *complete* and *observed* portfolios. The *complete* portfolio is the portfolio of hedge funds that have survived for the entire study period. By definition, the number of funds in the portfolio remains fixed for each year of study for the *complete* portfolio. The *surviving* portfolio consists of funds that have survived until the end of the study period (December 2000), irrespective of the starting date. The *observed* portfolio consists of all hedge funds that are in the database when the monthly return is calculated.

We also calculate bias as the difference between the *surviving* portfolio and the *observed* portfolio (SP-OP). The *surviving* portfolio considers *new* funds coming in, but funds that drop out before the end of the study period are not part of the portfolio. In constructing the portfolio, there is an implied assumption that funds that come in anytime during the study period will continue in the database. For example, if a fund enters the database in November 2000 it is considered a survivor even though it has an age of only one month. It is possible that the fund will survive, but it is equally possible that it will not survive if we change the end date of the study period. Calculating survivorship bias, as the difference in the *surviving* and *observed* portfolio is useful to understand performance characteristics of incoming funds.

Table 2 shows the bias calculated as the difference in portfolio returns of the *observed* and *complete* portfolios and as the difference in portfolio returns of the *observed* and *surviving* portfolios for 84-month study period. It also shows the corresponding t-statistics. The Wilcoxon Signed Rank Test is used to calculate the t-statistic. The significant t-statistics are highlighted. In general, all the classes appear to have a significant t-statistic for bias calculated as SP-OP and for total hedge funds both including and excluding fund-of funds.

Table 2: Average Monthly Bias (before-fee) 1994-2000

	EW Bias (%)			
	Panel A. Category			
	SP-OP	t-stat	CP-OP	t-stat
Event Driven	0.02	**-1.70**	-0.09	-0.86
Global International	-0.02	-0.29	-0.37	**-2.14**
Global Regional Established	0.13	**4.06**	-0.25	**-1.89**
Global Regional Emerging	0.19	**2.46**	0.04	-0.23
Global Macro	0.20	**2.80**	0.13	1.06
Long Only/ Leveraged	0.18	1.03	-0.06	0.20
Market Neutral	0.18	**5.58**	-0.09	**-1.93**
Sector	0.05	0.81	-0.44	-1.49
Short Sellers	0.09	0.74	-0.10	-0.41
	Panel B. Class			
HF-US	0.15	**5.40**	-0.22	-2.17
HF-NON	0.20	**5.52**	0.01	0.56
FOF-US	0.05	**2.81**	-0.05	-0.74
FOF-NON	0.12	**5.18**	0.00	-0.23
	Panel C. Total			
Excluding FOF	0.18	**6.31**	-0.11	-0.91
Including FOF	0.14	**5.94**	-0.11	-1.58

Highlighted values are significant at 10% level of significance.

The direction of the bias differs according to category. If bias is a negative number, then the average performance of *survived new* funds and *disappeared* funds (*new* and *old*) is greater than the average performance of funds that have survived for the complete study period. It is important to analyze the performance of *survived new* and *disappeared* funds. Hedge funds drop out of the database for two entirely opposite reasons, poor performance and probably also because of limitations in the arbitrage opportunities in the investment strategy. If funds drop out because of poor performance, this would, in general, impart an upward bias in performance measures, if there is no impact from *survived new* funds. The analysis becomes more complicated when *survived new* funds also have an effect on the bias.

Table 2 shows that seven out of nine categories show a negative bias (calculated as CP-OP) for an equal-weighted method of bias computation while six out of nine categories show a negative bias for a value-weighted method of bias computation. Poor performers drop out from the database more frequently than good performers. The bias results are different for different hedge fund categories and for different ways of calculating bias (equal-weighted versus value-weighted portfolio). The bias result of +156 to -528 basis points per year for different categories is different from the results obtained by other researchers, possibly because of the database and the methodology for bias calculation.

We calculate bias on a monthly basis and then the average bias is calculated for the study period. This gives a better estimate because the monthly calculations are a good representation of the inflow and outflow of funds from the database, and of the monthly fund return data. Fund-of-funds (FOF) have a slightly lower bias than hedge funds alone. Composite bias for all categories can be inaccurate since the bias results of different categories may cancel out. The result for the complete hedge-fund database is provided for comparison with the results obtained by other researchers.

Table 3 compares the category and class bias results (Value-weighted results are available from the authors) for different study periods of 84, 48, and 36 months. As the length of study period increases, the CP-OP bias becomes more negative. This is because the *complete* portfolio (CP) depends on the length of the study period. The number of funds in the CP portfolio decreases as the length of study period increases. Presumably, these funds have lower risk and possibly lower returns leading to a negative bias. The magnitude of the change in bias result as a factor of study period length is much smaller for SP-OP bias than that of CP-OP bias. It appears that SP-OP is a more stable measure of bias, specifically with the varying lengths of the study period. However, as mentioned earlier, this measure of bias has its limitation because of the way the *surviving* portfolio is constructed. The advantage of this measure of bias is in its robustness not its accuracy, compared to the CP-OP measure.

Table 3: Comparison of Average Monthly Bias for Different Study Periods

Category/ Class/ Total	Equal-weighted Bias for different Study Period					
	CP-OP			SP-OP		
	36	48	84	36	48	84
Panel A. Category						
Event Driven	0.00	-0.05	-0.09	0.04	0.03	0.02
Global International	-0.14	-0.44	-0.37	0.04	-0.02	-0.02
Global Regional Established	-0.05	-0.10	-0.25	0.21	0.16	0.13
Global Regional Emerging	0.35	0.19	0.04	0.40	0.27	0.19
Global Macro	0.17	0.25	0.13	0.13	0.20	0.20
Long Only/ Leveraged	0.40	0.33	-0.06	0.60	0.34	0.18
Market Neutral	0.07	0.03	-0.09	0.16	0.16	0.18
Sector	0.05	-0.10	-0.44	0.33	0.18	0.05
Short Sellers	-0.05	-0.15	-0.10	0.08	0.11	0.09
Panel B. Class						
HF-US	-0.02	-0.11	-0.22	0.19	0.16	0.15
HF-NON	0.17	0.15	0.01	0.28	0.23	0.20
FOF-US	0.04	-0.02	-0.05	0.10	0.06	0.05
FOF-NON	0.15	0.09	0.00	0.20	0.16	0.12
Panel C. Total						
Excluding FOF	0.06	0.00	-0.11	0.23	0.19	0.18
Including FOF	0.06	0.00	-0.11	0.21	0.17	0.14

PERFORMANCE CHARACTERISTICS OF DISAPPEARED AND NEW FUNDS

The performance of funds that disappeared during the study period is analyzed for 36 months before their disappearance. In hedge funds, unlike mutual funds, survivorship bias does not necessarily mean that only poor performers have dropped from the database. The performance of *new* funds that entered the database during the study period is analyzed for 36 months after they enter the database.

Cumulative Average Excess Return (CAER) Of Disappeared Funds

We analyze the performance of disappeared funds to help predict any pattern using the cumulative average excess return. For each class and category, we calculate excess return for the *disappeared* funds. We do the calculation going back 35 periods for each *disappeared* fund from the last available monthly return. We calculate average excess return for the class or category by taking the arithmetic average of excess return of all *disappeared* funds in that category for a particular month. Cumulative average excess return is calculated by linking the average excess returns. The following set of equations represents the process of calculating CAER for disappeared funds.

$$\varepsilon_{it} = R_{it} - E[R_{it}] \quad (1)$$

$$AER_t = \frac{\sum_{i=1}^{n} \varepsilon_{it}}{n} \quad (2)$$

$$CAER_{t+m} = \left\{ \prod_{j=-m}^{0} (1 + AER_{t+j}) \right\} - 1 \quad (3)$$

where:

ε_{it} is the excess return of i - th hedge fund for time t,

R_{it} is the monthly return of i - th hedge fund for time t,

$E[R_{it}]$ is the category/class return for time t,

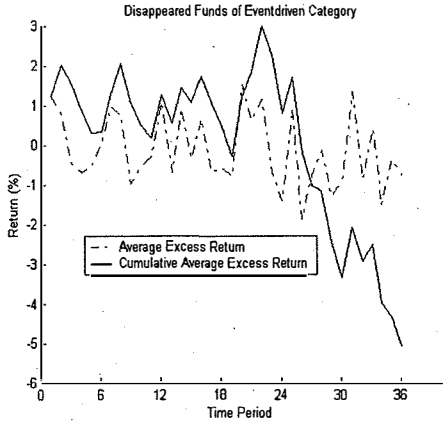
AER_t is category/class average excess return for time t,

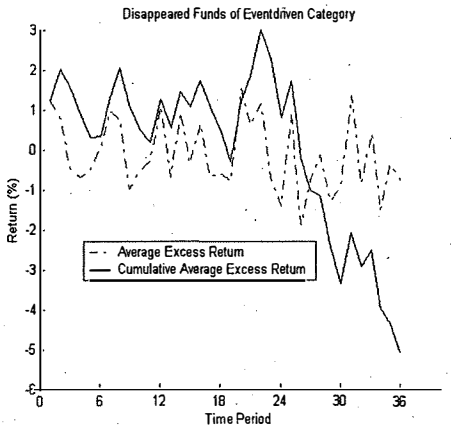
n is the number of funds in the category/class,

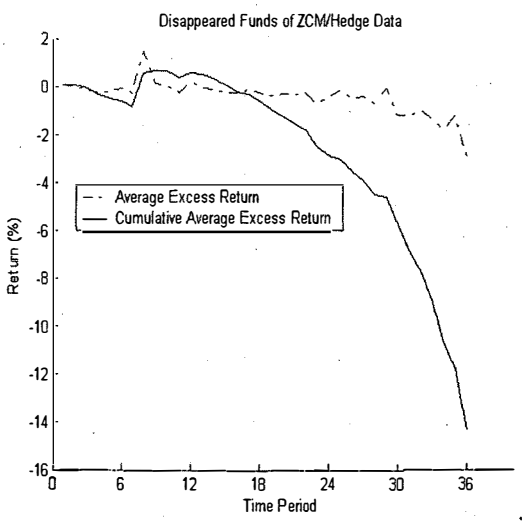
$CAER_{t+m}$ is category/class cumulative average excess return.

The results of the average and cumulative average excess return of the *disappeared* funds for representative category, class are shown in Figure 2. All nine categories show a strong pattern of a downward trend, indicating that the categories had poor performers as the portfolio of *disappeared* funds. In the analysis of class of hedge funds, all four groups show a downward trend and so do the total hedge funds, indicating that the portfolio of *disappeared* hedge funds consist of mostly poor performers.

Figure 2: Average and Cumulative Average Excess Return of *Disappeared* Funds







Individual funds drop out for various reasons. Possibly, funds disappear from the database because they perform poorly or also because they no longer wish or need to advertise in the database. Hedge funds report to the database for the sole purpose of attracting new investors. They stop reporting if the fund-manager no longer needs new investors. This could be for several reasons. There may be no arbitrage opportunity that would increase performance for the investment strategy followed by the fund-manager, or the fund manager may decide that it is better to continue with the present number of investors and obtain the necessary fund from the existing investors. Yet, it seems that the majority of the funds disappear due to poor performance.

Thus, after we ruled out the conjecture that funds disappear from the database because of lack of arbitrage opportunities, it is safe to conclude that the average return of *disappeared* funds is less than the average return of the funds that have survived for the complete study period. This does not explain why the bias results are negative. If the *disappeared* funds have low average return, the funds that contributed to the negative bias could be affected by the performance of the *survived new* funds.

Cumulative Average Excess Return (CAER) Of New Funds

We analyze the performance of the funds that entered the database after the first month of the start of the study period, namely the *new* funds, to help predict the pattern in the cumulative average excess return. For each class and category, excess return is calculated for the *new* funds. This calculation is done going forward 35 periods for each *new* fund from the start date of the fund. Equation 1 and equation 2 above represent excess return and average excess return for a category/class. Equation 4 below gives the cumulative average excess return for new funds.

$$CAER_{t+m} = \left\{ \prod_{j=0}^{m} \left(1 + AER_{t+j}\right) \right\} - 1 \quad (4)$$

The results of the average and cumulative average excess return of the *new* funds for representative category, class, and total hedge fund are shown in Figure 3 (see page 20). Eight of the nine categories show a strong pattern of an upward trend, indicating that these categories had good performers in the portfolio of *new* funds.

In the analysis of class of hedge funds, all four groups show an upward trend and so do the total hedge funds, indicating that the *new* portfolio of hedge funds consists of mostly good performers. There are two caveats for this result. First, there is an implied assumption that the start date of the fund return data in the database coincides with the date of the entry of the fund in the database. That is, there is no back filing of any fund performance data. Second, even if the assumption of no back filing is valid, there is no way of knowing the actual age of the hedge fund, that is, the actual start date of the hedge fund.

It can be concluded that hedge funds' performance is good for the first 36 months. It is very likely that funds register after a certain time lag from the date of the inception of the fund. Initially, the hedge fund managers probably manage without having the need to advertise in the database for attracting funds. When these funds reach a particular level of activity, they register in the database to attract more investors.

SUMMARY AND CONCLUSION

The performance of hedge funds is analyzed for each category and class of the ZCM/Hedge database. The performance of fund-of-funds is inferior to that of other hedge funds.

We estimate bias for different categories, class, and the complete database. The bias result of +156 to -528 basis points per year for different categories is different from the results obtained by other researchers. To understand the characteristic of *disappeared* funds, the cumulative average excess return of the portfolio of *disappeared* funds is analyzed. All the categories, class and the total hedge funds show a strong pattern of a downward

trend, indicating that they had poor performers as the portfolio of *disappeared* funds.

The average return of *disappeared* funds is less than the average return of the funds that have survived for the complete study period. If the *disappeared* funds have low average returns, the funds that contributed to the negative bias could be affected by the performance of the *survived new* funds. It can be concluded that the hedge funds perform well for the first 36 months from the date of their registration in the database. It is very likely that there is a time lag between the inception of a fund and its registration in the database. If back filing is minimal or negligible, voluntary reporting should not distort the results significantly since the bias results are not based on the total hedge fund industry, but are specific to the database under study.

Bias study is carried out for three different lengths of study period. The results show that as the length of the study period increases bias calculated as the difference in return between the *complete* and the *observed* portfolio (CP-OP) becomes more negative. The study finds SP-OP to be a more stable measure of bias, specifically with varying lengths of study period although it has its limitation because of the way the *surviving* portfolio is constructed

ACKNOWLEDGEMENTS

The authors are thankful to The Foundation for Managed Derivatives Research for providing a research grant and, to Mr. Richard E. Oberuc of LaPorte Asset Allocation System for providing the ZCM/Hedge database.

REFERENCES

Ackerman, C., McEnally, R. & Ravenscraft, D. (1999). The performance of hedge funds: Risk, return, and incentives. *The Journal of Finance*, *54*(3), 833-874.

Borsen, W. B. (1998, January). Performance persistence for managed futures. *MFA Working Paper.*

Brown, S. J. (2001). Hedge funds: Omniscient or just plain wrong. *Pacific-Basin Finance Journal, 9*(4), 301-311.

Brown, S. J. & Goetzmann, W. N. (1995). Performance persistence. *The Journal of Finance, 50*(2), 679-698.

Brown, S. J., Goetzmann, W. N. & Ibbotson, R. G. (1999). Offshore hedge funds: Survival and performance 1989-1995. *Journal of Business, 72*(1), 91-117.

Brown S. J., Goetzmann, W. N., Ibbotson, R. G. & Stephen, S. A. (1992). Survivorship bias in performance studies. *The Review of Financial Studies, 5*(5), 553-580.

Brown, S. J., Goetzmann, W. N. & Park, J. (2001). Careers and survival: Competition and risk in the hedge fund and CTA industry. *The Journal of Finance, 56*(5), 1869-1886.

Carhart, M. M. (1997). On persistence in mutual fund performance. *The Journal of Finance, 52*(1), 57-82.

Diz, F. (1999). CTA survivors and non survivors: An analysis of relative performance. *The Journal of Alternative Investment, 2*(1), 57-71.

Edwards, F. R. (1999). Hedge funds and the collapse of long term capital management. *Journal of Economic Perspective, 13*(2), 189-210.

Edwards, F R. & Liew J. (1999). Hedge funds versus managed futures as asset classes. *The Journal of Derivatives, 6*(4), 45-64.

Elton, E. J., Gruber, J. M. & Blake, R. C. (1996). Survivorship bias and mutual fund performance. *The Review of Financial Studies, 9*(4), 1097-1120.

Elton, E. J., Gruber, J. M. & Rentzler, J. C. (1990). The performance of publicly offered commodity funds. *The Financial Analysts Journal, 46*(4), 23-30.

Fung, W. & Hsieh, D. A. (1997). Survivorship bias and investment style in the returns of CTAs: The information content of performance track records. *Journal of Portfolio Management*, Fall, 30-41.

Fung, W. & Hsieh, D. A. (2000). Performance characteristics of hedge funds and commodity funds: Natural versus spurious biases. *Journal of Financial and Quantitative Analysis, 35* (3), 291-307.

Fung, W. & Hsieh, D. A. (2002). Hedge-fund benchmarks: Information content and biases. *Financial Analysts Journal, 58*(1), 22-34.

Grinblatt, M. & Titman, S. (1994). A study of monthly mutual fund returns and performance

evaluation techniques. *Journal of Financial and Quantitative Analysis, 29*, 419-444.

Liang, B. (2000). Hedge Funds: The living and the dead. *Journal of Financial and Quantitative Analysis, 35*, 309-326.

Malkiel, B. G. (1995). Returns from investing in equity mutual funds 1971 to 1991. *The Journal of Finance, 50*(2), 549-572.

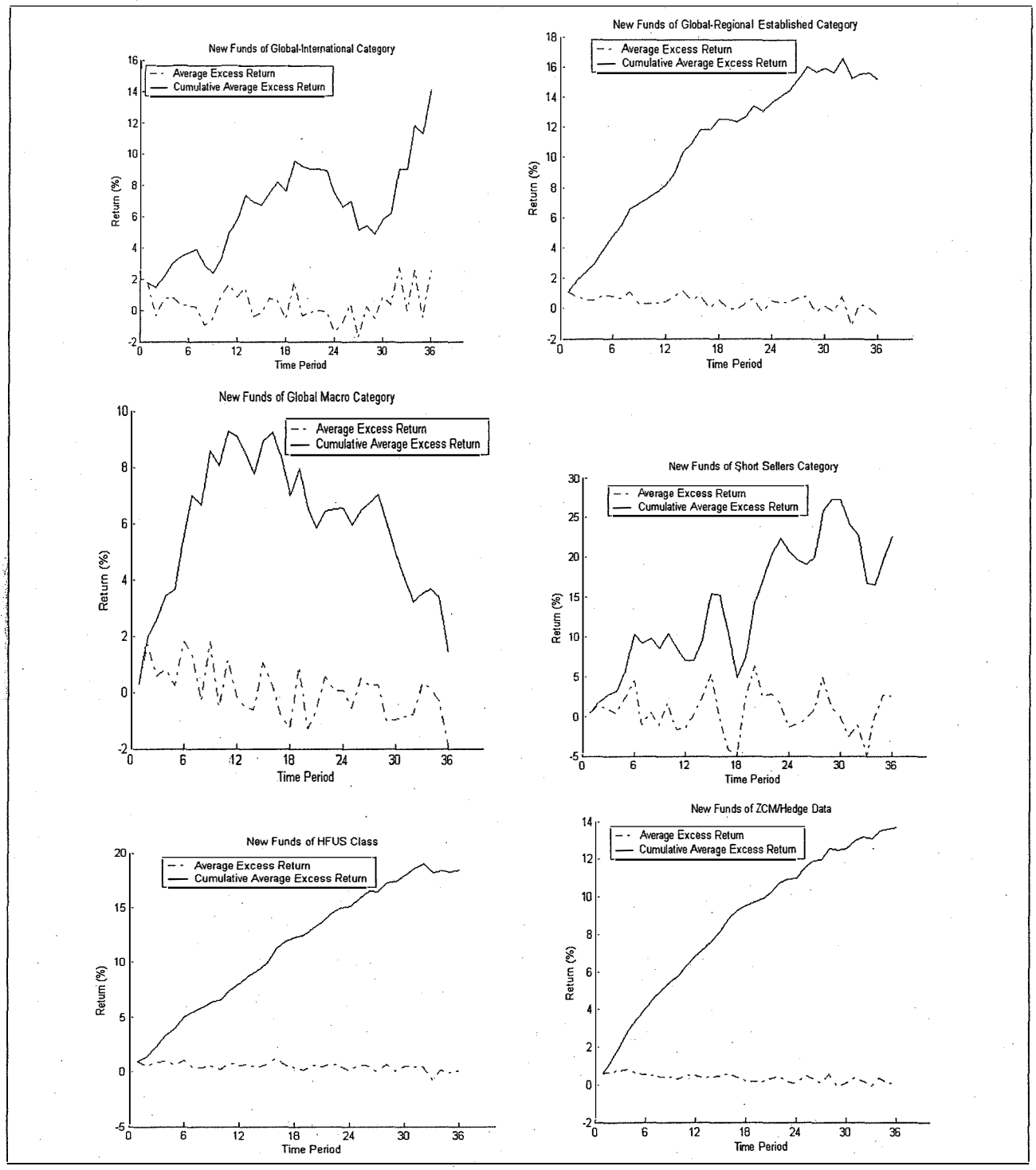
Schneeweis, T., Spurgin, R. & Potter, M. (1998). Managed futures, hedge fund, and mutual fund performance: An equity class analysis. *The Journal of Alternative Investments*. Summer, 513-533.

Nandita Das, Lehigh University, is an assistant professor of Finance at Wilkes University teaching managerial and personal finance and financial and managerial accounting.. Her research interests include Hedge funds.

David L. Muething, M.I.T., is a partner in Buckley Muething Capital Management. His research interests include hedge funds and he has taught investment-related courses throughout his career.

Funding source for this research: Foundation of Managed Derivatives Research.

Figure 3: Average and Cumulative Average Excess Return of *New* Funds



WOMEN GET LOST ON WALL STREET

Laura Marini Davis, Bloomsburg University of Pennsylvania
Victoria Geyfman, Bloomsburg University of Pennsylvania

ABSTRACT

The Equal Employment Opportunity Commission (EEOC) recently issued a special report on the status of women and minorities in the field of finance. While being an important aspect of the economy, the report finds that the industry has a much lower ratio of officials and managers to professionals and sales workers for women and minorities. Other studies report that chances of advancement are also unfavorable to these groups. The EEOC report, along with a number of successful sex discrimination suits filed against members of the industry, brings into question the treatment of women on Wall Street and in the field of finance as a whole. This paper examines the question of why women get lost on Wall Street by discussing empirical studies done on the status of women in the finance industry, by looking at the history of women in the finance industry, and by reporting on a sampling of cases brought against the industry alleging sex discrimination. The paper concludes with some thoughts about why the problems of sex discrimination persist on Wall Street.

INTRODUCTION

The financial services industry is an important aspect of the US economy, which constitutes one of the largest groups of companies in the world in terms of market capitalization and earnings. Companies such as Citigroup, JP Morgan Chase, and Bank of America are included in this category. The industry employs a large number of people and offers many well-paying jobs. According to the projections of the Bureau of Labor Statistics (BLS), employment in the financial services industry is expected to increase faster than average for the economy over the next decade (BLS, 2006). It is therefore not surprising that the industry attracts a highly qualified, talented workforce.

However, the finance industry has a poor history when it comes to attracting, managing, and retaining women. Harassment lawsuits of the 1990s, including the infamous "boom-boom room" (Antilla, 2003) and more recent cases brought against Morgan Stanley and Merrill Lynch, revealed flagrant patterns of discrimination and unfair compensation practices. The failure to advance and to promote talented women has negative consequences for workplace diversity, creativity, competitiveness, and overall profitability of firms.

This paper addresses the issue of recruitment, retention, and promotion of women in the field of finance by reviewing recent empirical evidence from demographic reports, by looking at the history of women in the finance industry, and by reporting on three important cases brought against the industry alleging sex discrimination. The paper concludes by examining factors that may contribute to gender-based employment practices that hinder career advancement of women in the industry.

EMPIRICAL STUDIES

Several demographic studies have addressed the issue of women and minorities in the financial services industry. We present the main findings of these studies below.

Periodically the Equal Employment Opportunity Commission (EEOC) issues special reports on various industries based on data from surveys, complaints they have received, and other sources. Recently, the EEOC issued a special report on the finance industry (EEOC, 2006). The finance industry is composed of credit, securities, insurance, and funds sub-sectors. The report acknowledges that the industry plays an important role in the economy by employing a large number of people at high levels of compensation. However, the evidence found in the report suggests that, throughout the finance industry, there was a much lower ratio of officials and managers to professionals and sales workers for women and minorities. In other words, women and minorities are under-represented at the top tier of their organizations.

The EEOC study performed an analysis for five occupational groups: officials and managers, professionals, technicians, sales, and clerical job

categories. The report particularly focused on the professionals category from which the officials and managers category was drawn. First, the report found that women representation in the officials and managers category varied among sub-sectors, with the highest percent of women in the credit sub-sector (48.6%) and the lowest percent of women in the securities sub-sector (33.8%). A mixed pattern emerged for various race/ethnic groups.

One of the most important findings of the study was that women are under-represented among officials and managers compared to their white male counterparts. The report calculated the odds or probability of women being in the officials and managers job category compared to such odds for white males. The report showed that the probability of being a management employee out of the total pool of professionals and sales workers is 48.4% for female employees compared to 64.7% for male employees. Except for one sector, the odds of women being managers were less than the odds of men being managers.

In a similar study of the investment banking sector, EEOC focused on demographic changes within the industry during 1995-2000 for four occupational groups: officials and managers, professionals, technicians, and sales personnel (EEOC, 2003). The study found that although overall women representation has increased over the sample period, they were still under-represented among officials and managers and the professionals category.

These results can be placed in the context of other studies that focus on access, opportunities, and career advancement for women. In its 2005 report, the Securities Industry Association found that women representation increased from 37% in 2003 to 44% in 2005 (SIA, 2005). Among 48 of group's member companies, women held 29% of senior-level positions, 57% of mid-level positions, and 88% of assistant positions. The SIA also found that women have been steadily gaining managerial ground. In 2001, 14% of managing directors were women and, by 2003, that number was 19%. However, these numbers still show lack of significant progress in the field still largely dominated by men.

A recent *Harvard Business Review* article summarized the findings of a special task force on the status of women in the private sector. Sponsored by Goldman Sachs and Lehman Brothers, the task force surveyed 2,443 "highly qualified" women with high-honors undergraduate, graduate, or professional degrees. The survey found that, despite significant progress on the access front, still far too many highly qualified women are failing to progress to senior management positions in the private sector and university tenured faculty jobs (Center for Work-Life Policy, 2005). Particularly for women with children, the study reported that 43% of women surveyed left work voluntarily at some point in their careers. Of those, 93% wanted to return but only 74% actually managed to do so, and only 40% among these women came back to work full time. This study sheds light on a workplace environment that is very demanding and competitive.

Competition for jobs in the industry is quite high, so job seekers must be flexible, mobile, able to adapt to changes, and prepared to develop their work skills. Among the most valued work skills are team working, problem solving, communication, organization, and management. The 2001 study by Catalyst, a nonprofit research and advisory organization that serves to advance women in business, reported on similarities and differences between men and women with respect to job satisfaction, perceptions, attitudes, and experiences in the financial services industry. The study surveyed more than 2,200 women and men employed at leading securities firms and reported that, in general, more than three-quarters of men and women were satisfied with their jobs in the finance industry (Catalyst, 2001). However, more women reported the existence of discriminatory practices in their workforce. Particularly, more than half of women surveyed believed that they are paid less than men for doing similar work. Sixty-five percent of women reported that they have to work harder than men to get the same rewards. More than 10% of women reported experiencing some form of sexual harassment at their workplace.

THE HISTORY OF WOMEN ON WALL STREET

Wall Street, a metonymy for the American financial industry, has long been a male enclave. Beginning in 1792 under a buttonwood tree at 64 Wall Street, 24 male brokers signed an agreement that required the signers to trade securities only among themselves, to set trading fees, and not to participate in other auctions of securities. These 24 men had founded what was to become the New York Stock Exchange (NYSE) (Ketchum, 2005).

It was not until 1943 that women were allowed to work on the trading floor, and not until

1967 that Muriel Siebert became the first woman - one among 1,365 men - to own a seat on the NYSE (Fisher, 1989). Her seat on the exchange hardly started a revolution of women following her lead; in the late 1970's, the vast majority of women working in investment firms were still secretaries. It was only in 1987 that Goldman Sachs hired its first woman partner – one among 106 men. Even after women began to be hired, often they were kept out of important meetings, lunches and social gatherings with clients, because the meetings took place in male-only clubs. Twenty years after Muriel Siebert purchased her seat, she still could not dine with business associates or entertain clients at many preferred clubs. The practices ended in 1987, not by any efforts on the part of Wall Street, but due to pressure from New York City officials who reminded the industry that city ordinances prohibited sex discrimination by clubs, if the premises were used for business purposes. Thereafter, as alleged in a suit filed against Morgan Stanley, the practice shifted to entertaining clients in venues where women were allowed, but uncomfortable or unwilling to attend, such as "topless bars" and golf outings at male-only member clubs (EEOC v. Morgan Stanley).

OVERVIEW OF THE LAW PROHIBITING SEX DISCRIMINATION IN THE WORKPLACE

In an attempt to prohibit discrimination in the workplace, in 1964 Congress passed Title VII of the Civil Rights Act and created the Equal Employment Opportunity Commission (EEOC) to implement its provisions (Civil Rights Act of 1964). Title VII protects individuals against employment discrimination on the basis of sex as well as race, color, national origin, and religion. It applies to employers with 15 or more employees, including state and local governments. Title VII also applies to employment agencies and to labor organizations, as well as to the federal government.

Title VII makes it unlawful to discriminate against any employee or applicant for employment because of his/her sex in regard to hiring, termination, promotion, compensation, job training, or any other term, condition, or privilege of employment. Title VII also prohibits employment decisions based on stereotypes and assumptions about abilities, traits, or the performance of individuals on the basis of sex. Title VII prohibits both intentional discrimination and neutral job policies that disproportionately exclude individuals on the basis of sex and that are not job related.

It was not until 1986 that the United States Supreme Court ruled in Meritor Savings Bank v. Vinson that sexual harassment was a form of sex discrimination under Title VII. To state a claim for sexual harassment under Title VII, the offensive conduct must be sufficiently pervasive so as to alter the conditions of employment and create an abusive working environment. Although a claimant's own perception of the severity of the challenged treatment must be considered, it is not dispositive of the question. To create a hostile environment, the harasser's conduct must be such that a "reasonable person" would find it abusive, and one that the victim in fact did perceive to be so (Lewis, Jr. & and Norman, 2001).

When the plaintiff seeks to hold the employer liable for the sexual harassment created by the plaintiff's supervisor or coworker, she must show that the employer knew or should have known of the harassment in question and failed to take prompt remedial action. The employee can demonstrate that the employer knew of the harassment by showing that she complained about it to higher management or by showing the pervasiveness of the harassment, which gives rise to the inference of knowledge or constructive knowledge – circumstances which existed in the Smith Barney, Merrill Lynch and Morgan Stanley cases.

In addition to Title VII, the right of employees to be free from discrimination in their compensation is protected by the Equal Pay Act of 1963. The Equal Pay Act requires that men and women be given equal pay for equal work in the same establishment. The jobs need not be identical, but they must be substantially equal (Equal Pay Act of 1963). It is job content, not job titles, that determines whether jobs are substantially equal. Specifically, employers are prohibited from paying unequal wages to men and women who perform jobs that require substantially equal skill, effort and responsibility, and that are performed under similar working conditions within the same establishment.

Women vs. Wall Street[1]

In the last decade, a number of significant (in terms of numbers of claimants and settlement dollars) have been filed against members of the finance industry. In addition to the cases discussed in

[1] Women vs. Wall Street is the subtitle of Susan Antilla's book, "The Boom Boom Room."

this article, since 1993, class action lawsuits have been filed against American Express, Lew Lieberman, US Bancorp and other firms. The concern about the treatment of women in the industry had become so great that in April 2004, the National Council of Women's Organizations (NCWO), a bipartisan network of national women's organizations, launched the Women on Wall Street Project to investigate claims of gender discrimination in the financial sector (NCWO, 2006). Some of the most notable cases against the industry are described below.

Smith Barney

The most notorious sex discrimination case filed against the finance industry was Martens v. Smith, Barney, Inc. The case was filed in 1996 as a class action in which Pamela Martens and other named plaintiffs sued Smith Barney for gender discrimination, harassment, and retaliation in violation of Title VII. Plaintiffs also challenged the compulsory arbitration policies of Smith Barney, the NYSE, and the National Association of Securities Dealers. Ms. Martens was a fifty-year-old woman who had worked at the firm for 10 years and who managed $187 million for the company. She was fired after she complained about discriminatory behavior in her suburban New York office and retained an attorney to pursue her complaints.

The case alleged that Smith Barney had systematically discriminated against women in hiring, assignments, pay and promotions, as well as through pervasive sexual harassment in some of the firm's branch offices. The plaintiffs alleged that they were denied lucrative broker jobs and instead channeled into low-paying positions as sales assistants. Those women who became brokers were denied the most lucrative accounts, received little to no mentoring, and were subjected to blatant and repeated harassment (Selmi, 2005). The harassment was recounted in the popular book *Tales from the Boom-Boom Room: Women vs. Wall Street* (Antilla, 2002). The "boom-boom room" was located in the basement of the Smith, Barney Garden City, New York office. Male brokers would "open" the room at the end of the day and mix drinks in large garbage cans located below a toilet hanging from the ceiling. At that same office, women were ordered to wear short skirts, and strippers were a frequent accompaniment for the male brokers and some of their clients (Antilla, 2002).

Importantly, the case also challenged the mandatory arbitration proceedings that had been instituted by the brokerage houses for all of their employees. Ultimately, in 1998, the case settled in a way that allowed the plaintiffs' class to avoid the company's private arbitration proceedings in favor of a more neutral arbitration forum. Most of the claims successfully settled for amounts that were not disclosed. In addition to the individual relief, the settlement required Smith Barney to spend $15 million toward various diversity initiatives, including training (Selmi, 2005).

Smith Barney's problems did not end with the settlement. In March 2005, another case seeking class action status was filed challenging compensation practices on behalf of female brokers against the company, now a division of Citigroup Inc. In Amochaev v. CitiGroup Global Markets d/b/a Smith Barney, the plaintiffs contend that they were discriminated against in account distribution, business referrals and partnership opportunities. They also claim they received less sales support than male colleagues, less desirable offices, less training, and that male colleagues retaliated against them after they had complained (Pacelle, 2005). In November 2006, an Amended Complaint was filed, adding plaintiffs from Southern California and Florida, and amplifying the allegations in the original Complaint based on evidence plaintiffs obtained through discovery. The suit is brought on behalf of a nationwide class of all female Financial Advisors employed at Smith Barney since August 30, 2003, and a California subclass of all female Financial Advisors employed at Smith Barney in California since June 25, 2003. The case is pending in the U.S. District Court in the Northern District of California.

Merrill Lynch

One year after the Smith Barney case was filed, a similar class action claim was initiated against Merrill Lynch which, at the time of the lawsuit, was the nation's largest brokerage firm. This was not the first time Merrill Lynch had been sued for sex discrimination. In 1974, the EEOC sued the firm and settled the case with a commitment by Merrill Lynch to hire more women over the next five-year period. The company never met their targets (Selmi, 2005). By the time the second suit was filed some 20 years later in 1996, only 15.8% of Merrill Lynch's brokers were women, about the same percentage that had existed in 1990, and not significantly more than had existed in the 1970s.

The culture

Scholars have promoted a view that sex discrimination is less about objectifying women as primarily sex objects, but more about men's desire to perpetuate male workplace norms (Abrams, 1998; Schultz, 1998). Discriminatory behavior preserves male control and entrenches masculine norms - a position that may be more comfortable than charting the new territory and new opportunities that would result from including female colleagues. Sadly, preserving male norms may be rational for men. Studies demonstrate that female dominated industries suffer lower wages and less prestige (Budig, 2002). Therefore, breaking down the male norms in the workplace would both threaten men's own sense of self and their wage status.

A code of silence

For decades mandatory arbitration of employment disputes existed in the finance industry. Until 1999, any broker or other employee of a Wall Street firm, as a condition of his license, had to agree to resolve a dispute in a closed-door negotiation session run by a stock exchange. However, after the Boom-Boom Room case and the Merrill Lynch lawsuit, the Securities and Exchange Commission changed the rules and said Wall Street employees with civil rights claims could not be forced to arbitrate. Before the change had taken effect, though, firms had discovered a new tactic: having employees sign private contracts that bound them to arbitrate anyway.

The author of the Boom-Boom Room believes that the settlement of cases, rather than a public airing of the facts in a courtroom, perpetuates the problem (Antilla, 2004). While the cases against Merrill Lynch, Smith Barney and Morgan Stanley settled for huge amounts, perhaps the firms came out winners. The businesses were able to keep confidential the actual documents regarding their hiring, promotion and treatment of women employees. Ingrained cultural misconduct changes only when customers, colleagues, and the public get wind of the nasty facts and companies are embarrassed. Those who can afford to keep their problems quiet may never have to change. Perhaps Wall Street will make changes only when its culture and compensation and promotion practices are exposed in open court.

Women's choice

Some recent articles have suggested that the lack of advancement of women in the industry is due to their own choice. The desire for a better balance between professional and family life, the interruption of their career path to raise children or care for aging parents, rather than overt discrimination, has been theorized to be the cause of the glass ceiling (Nyberg, 2006). However, while it is likely that all employees, men and women alike, would want more time at home, this explanation belies the facts of the suits brought against the industry. The discrimination complained of in the Smith Barney, Merrill Lynch, or the Morgan Stanley cases was not tied to child or family care issues, but issues related to compensation, promotions and flagrant sexual harassment.

CONCLUSION

More than anything, Wall Street represents financial and economic power. The financial services industry is the one of the largest industry categories in the world in terms of earnings. To Americans, Wall Street can sometimes represent elitism, power politics, and cutthroat capitalism, but it also stirs feelings of pride about the market economy. Nonetheless, this industry that is the symbol of an economic system developed through free trade and innovation has failed to be a free market to women.

This paper examines the evidence found in demographic and perception studies, as well as cases alleging sex discrimination in the finance industry, that show that women continue to suffer a disparity in wages, promotion and working conditions compared to their male colleagues. It is likely that many factors combine to cause the disparity. Contributing factors include a long history of male dominance, secret settlement agreements, and choices that the female employees may make in terms of career advancement and work-life balance. However, as we try to identify the factors that lead to sex discrimination on Wall Street, the finance industry must be honest about the role that intentional discrimination may play in the problem and make a commitment to equal opportunity. The legal system cannot unilaterally create the changes that are needed. Senior leaders in the industry should embrace diversity, establish and communicate strategies to develop an inclusive culture, make women's pay statistics and the record of promotion public, and hold managers accountable for creating an inclusive culture. Only when senior executives and industry

leaders promote diversity and allocate sufficient resources to this goal will entire organizations understand that diversity is smart business.

REFERENCES

Abrams, K. (1998). The new jurisprudence of sexual harassment. *Cornell Law Review, 83*, 1169.

Anderson, J. (2005, July 22). After she sued Merrill, it's back to the job. *New York Times*, p. C2.

Antilla, S. (2002). *Tales from the boom-boom room: Women vs. Wall Street.* Princeton, N.J.: Bloomberg, L.P.

Antilla, S. (July 22, 2004). Money talks, then women don't. *Chicago Daily Law Bulletin*, p. 6.

Budig, M. (2002). Male advantage and the gender composition of jobs: Who rides the glass escalator? *Social Problems. 49*(2), 258-77.

Bureau of Labor Statistics. (2006). *Occupational Outlook Handbook* [Electronic version] http://www.bls.gov/oco/.

Catalyst. (2001). *Women in financial services: The word on the street.*

Center for Work-Life Policy. (2005). *The hidden brain drain task force: Women and minorities as unrealized assets.*

Civil Rights Act of 1964, 42 U.S.C. §§ 2000e-2000e-17 (2005).

EEOC v. Morgan Stanley, No. 01 CV 8424 (RMB) (S.D.N.Y. filed Sept. 10, 2001).

Equal Employment Opportunity Commission. (2006).

Investment Banking Report [Electronic version] *http://www.eeoc.gov/stats/reports/investmentbanking/index.html*

Equal Employment Opportunity Commission. (2006). *Diversity in the Finance Industry* [Electronic version] http://www.eeoc.gov/stats/reports/finance/finance.pdf

Equal Employment Opportunity Commission. (2004, July 12). EEOC and Morgan Stanley announce settlement of sex discrimination lawsuit. Retrieved October 1, 2006, from http://www.eeoc.gov/press/7-12-04.html

Equal Pay Act of 1963, 29 of the U.S.C, § 206(d) (2007).

Fisher, A. (1989). *Wall Street women.* New York: Alfred A. Knopf.

Gender Lawsuits Against Smith Barney. (2005). Retrieved May 30, 2007, from http://www.genderlawsuitagainstsmithbarney.com/Ketchum, R.

The Fifth Annual A. A. Sommer, Jr. Lecture on Corporate, Securities & Financial Law. *Fordham Journal of Corporate & Financial Law, 10*, 203.

Lewis, Jr., H., & Norman, E. (2001). *Employment Discrimination Law and Practices*. Paul: West Group.

The National Council of Women's Organizations (NCWO), Retrieved September 30, 2006, from (NCWO) Corporate Accountability Project website http://www.augustadiscriminates.org/

Nyberg S. (2006, June). What women want. *CFO Magazine*. Retrieved August 16, 2007, from http://cfo.com/article.cfm/6970016?f=home_featured.

Pacelle, M. (2005, April 1). *Wall Street Journal*, p. C3.

Schultz, V. (1998). Reconceptualizing sexual harassment. *Yale Law Journal, 107*, 1683.

Securities Industry Association. (2005). *2005 Report on diversity strategy, development, and demographics* [Electronic version] http://www.sia.com/hrdiversity/pdf/2005fullDiversityReport.pdf

Selmi, M. (2005). Sex discrimination in the nineties, seventies style: Case studies in the preservation of workplace norms. *Employee Rights and Employment Policy Journal, 9*, 1-49.

The Buzz: Morgan Stanley is hit with suit claiming gender discrimination. (2006, June 24). *Wall Street Journal,* p. B3.

Laura Davis, Southern Illinois University, is an associate professor of legal studies at Bloomsburg University. Her research interests include employment discrimination and constitutional law.

Victoria Geyfman, Temple University, is an assistant professor of finance at Bloomsburg University. Her research interests include financial services industry and bank regulation.

THE SENSITIVITY OF PENNSYLVANIA UNEMPLOYMENT TO CHANGES IN CRUDE OIL PRICES

James R. Dunn, Edinboro University of Pennsylvania
Michael J. Hannan, Edinboro University of Pennsylvania

ABSTRACT

Recent increases in the price of crude oil on world markets are indicative of a series of energy "shocks" that have impacted the U.S. and Pennsylvania economies over the past 35 years. This paper uses a vector autoregressive (VAR) model to explore the impact of these shocks on the Pennsylvania economy apart from the impacts on the U.S. economy at large. The results show a significant impact of oil price changes on Pennsylvania unemployment rates at lags different from those found on other macroeconomic variables at the national level.

INTRODUCTION

The impact of changing crude oil prices has been widely cited as a causal factor in determining overall U.S. economic activity and outcomes, including inflation and unemployment. However, very little attention has been given to regional and state impacts. This focus on national impacts is probably partly due to a lack of relevant and sufficiently dense, time-series data, which measures economic activity at the state level. The present study, by contrast, will examine the effect of changes in real oil prices on both the national and Pennsylvania economies using a Vector Autoregressive (VAR) model. This approach will allow us to measure the timing and significance of changes in oil prices on both national and local variables.

Oil price changes may be expected to impact state-level economic activity differently than the national economy for a number of reasons. These include the diversity of industrial structures across the states, differences in regional energy resource production and usage, and the extent of the linkage of states to their own local economies relative to their linkage with the national economy. For example, Bhattacharya (2003) used the VAR methodology to analyze the impact of oil price changes, changes in defense spending, and other variables on 10 regional economies in the U.S. The results showed that oil rich states had positive employment impacts from oil price increases, while the Detroit, MSA, a non-oil rich region, was negatively impacted by oil price increases due to the local economy's dependence on durable goods manufacturing. National output was not significantly impacted by oil price changes, the effect likely muted by offsetting state-level effects, though the timing of the impacts differed somewhat across regions. Research by Hooker (1996a, 1996b) and Davis et al. (1997) also showed that oil price shocks had stronger economic impacts at the regional level than at the national level. Clearly, oil-producing states may be expected to positively benefit from oil price increases, while energy importing states may be more adversely affected economically. These findings show that state-level impacts will differ between states and from the nation in both timing and magnitude based on factors such as the relative importance of manufacturing in the state economy and whether the state produces or imports oil.

Since most analyses of such impacts are performed at the national level, it is important for state policymakers, business leaders, and consumers to be aware that the results from such studies may not accurately reflect either the timing or magnitude of oil price impacts on the state economy. Also, differences in timing or magnitude may result in national stabilization policy responses to be insufficient to meet needs at the local level (Bhattacharya, 2003). Thus, the present study analyzes the impact of oil price changes on the Pennsylvania economy in particular. The results will allow policymakers to assess how such changes in energy prices can be expected to impact state unemployment and industrial activity, with potential consequences for social insurance funding and tax revenue generation. Business leaders and consumers will find the results important for understanding the local (regional) magnitude and timing of such energy price shocks for their own economic decision-making.

Before we develop our model, it is instructive to briefly examine the historical pattern of oil prices during the period of analysis. Figure 1 (page 37) presents real crude oil prices (2000 dollars) from January 1970 through March 2005 along with the Pennsylvania unemployment rate beginning in 1976. The first major oil price increase occurred in January

1974, followed by the largest rise in real prices beginning in May of 1979 and peaking in April of 1980. Both these increases corresponded closely with the economic recessions of those periods, with the national business cycle peaking in November 1973 and reaching its cyclical trough in March 1975. The subsequent "double-dip" recessions occurred from January to July 1980 and from July 1981 to November 1982. In this latter case, the rise in oil prices preceded the onset of the recessions.

Beginning in 1986 real oil prices fell dramatically and remained relatively stable until 1997. The exception was the increase in prices from August 1990 to February 1991 due to the first Gulf War. This rise in oil prices was coincident with the timing of the recession of that period (July 1990 through March 1991). Following a decline in prices between 1997 and 1998, real prices again increased from December 1998 to November 2000, before falling once again. As in the late 1970s, the increase in real oil prices preceded the recent economic recession that occurred from March through November 2001. Most recently, real oil prices have been rising since January of 2002.

This brief review of real oil prices and business cycle patterns suggests some correlation, though the timing of the relationship is indefinite and likely related to other economic variables. It also is apparent that there is a relationship between oil price changes and Pennsylvania unemployment, with the relationship existing with a time lag. While the relationship between these variable may be direct in part, the model to be developed here will allow for the measurement of indirect effects of oil price changes on national economic variables, with consequent implications for Pennsylvania unemployment.

Oil Prices and the Economy

Characteristic of much of the literature in this area is the lack of specification of the causation that gives rise to the variation in economic activity when crude oil prices change. The authors have identified two basic approaches or models that have been implicitly used by various researchers working in this area – the aggregate demand – aggregate supply (AD-AS) approach and the efficiency wage framework. The AD-AS approach has two variants. In the first variant, an increase in the price of crude oil shifts the aggregate supply function to the left causing a reaction in both output and employment, as well as the price level. This is presented in Figure 2 (page 37). It is assumed that no compensating change takes place in aggregate demand and that the AD curve is not vertical. Consequently, there is a measurable response of output and employment to aggregate supply shocks such as changes in crude oil prices. The respective response of prices and output to oil price shocks will depend on the properties of the aggregate supply and demand function that are in place at the time of the shock. All that is required for output and employment effects is that the AD curve is not vertical.

Most of the literature dealing with macroeconomic responses to oil price changes either explicitly or implicitly assume this model. Jimenez-Rodriguez and Sanchez (2005) use this framework and a multivariate VAR analysis to explore the effects of oil price changes on macroeconomic activity for a cross section of major industrialized countries. Oil price increases are found to have a negative impact on real economic activity in all nations included, except Japan. Blanchard and Quah (1989) find that supply shocks, and in particular crude oil price increases, induce higher levels of unemployment with the effect cumulating over a five year period. Similar results – that supply shocks in the form of crude oil price increases induce lower rates of real macroeconomic activity and/or higher unemployment rates – are reported by numerous researchers. See for example Hamilton (1983), Pindyck and Rotemburg (1983), and Shapiro and Watson (1988). An offshoot of this approach has been suggested by Mankiw in which variations in the real price of oil cause a reallocation of labor between sectors with different levels of energy intensive operations. This reallocation raises both frictional and structural unemployment (Mankiw, 1997).

The second variant of the AD-AS approach reflects issues raised originally by Bernanake, Gertler, and Watson (1997). In this version, oil price changes alter production costs which give rise to output and price effects as shown in Figure 3 (page 38). These latter effects then trigger a reaction on the part of Federal Reserve policy-makers, which take steps to offset the effects of the shock. This results in a change in interest rates which consequently alters aggregate demand that, in turn, creates output, employment, and price effects (Bernanke, Gertler, & Watson, 1997). The impact of the monetary policy action depends on the policy emphasis -- stabilizing prices or output -- of the Federal Reserve System.

In Figure 3, the original equilibrium output level of O_1 is defined by the intersection of AD_1 and AS_1. This equilibrium is disrupted by a significant increase in the price of crude oil that results in a shift

of aggregate supply to the left (AS_2). If the Fed's policy is to offset the price effect of the oil price shock, the Fed will act to reduce aggregate demand by increasing interest rates, causing the aggregate demand function to shift to the left (AD_3), reducing output to O_3 but maintaining a stable price level. If the Fed's policy is to offset the output effects, then it will act to shift the AD curve to the right (AD_2) by lowering interest rates. In this case aggregate output remains constant, but the price level rises. The upshot is that in analyzing the economy's reaction to oil price shocks, the role of Federal Reserve policy and interest rates cannot be ignored. References to this issue, in addition to Bernanke, Gertler, and Watson cited above include: Brown and Yucel (1999), Hamilton and Herrera (2004), Federal Reserve Bank of Cleveland (2005), Clarida, Gali, and Gertler (2000), and Hamilton (2000).

The two variants of the AD-AS approach are summarized in Figure 4 (page 38). The first variant, the traditional textbook approach, is shown on the left where changes in production cost directly affect output and prices, with a consequent impact on real incomes and employment. This logical flow was reflected in Figure 2. The right side of the diagram illustrates the second variant. In this case, the change in production cost again puts pressure on output and prices. However, in this case the central bank would intervene with monetary policy, directly influencing aggregate demand, which in turn would determine the impact of the combined oil price change and monetary policy on employment.

A derivative of the debate regarding the role that monetary policy may or may not play has been extensively discussed in the literature regarding the asymmetry of the effect of oil price changes on the macroeconomy (Jimenez-Rodriguez & Sanchez, 2005; Clements & Krolzig, 2002; and Mory, 1993). In general it has been found that oil price increases affect economic activity by increasing unemployment rates and prices, while oil price declines have not been found to have an equal, or, in some cases any, opposite effect. This has been attributed by some to the effect of using monetary policy to respond to oil price increases but taking no action subsequent to oil price decreases.

An alternative to the AD-AS approach has been suggested by Carruth, Hooker, and Oswald (1998). They have termed this approach the "efficiency wage framework," with its causal relationships summarized in Figure 5 (page 39). The efficiency wage framework assumes that an externally imposed increase in the price of crude oil increases the production costs of firms. Those firms in competitive industries experience a decrease in economic profits, causing profits to become negative. Under the restrictions imposed by this framework, real wages must decrease in order to restore zero economic profit equilibrium. This requires that unemployment rates rise because "only that will induce workers to accept the lower levels of pay necessitated by the fact that the owners of oil are taking a larger share of the economy's income" (Carruth, Hooker, & Oswald, 1998, pp. 622-623). In their accompanying empirical analysis the authors find that oil price changes Granger-cause changes in unemployment rates. In addition, using a cointegration forecasting model, the authors report an ability to successfully forecast changes in unemployment rates using oil prices and short-term interest rates as explanatory variables.

DATA AND METHODOLOGY

The selection of the data to be used in any empirical study depends on two factors: First, that called for by the underlying theoretical framework and second, the availability of relevant datasets. For this study, these two considerations indicate the use of the variables listed in Table 1 (page 41). The model employed data from January 1976 to March of 2005 to coincide with the earliest available data for Pennsylvania unemployment rates. Descriptive statistics for these variables are provided in Table 2 (page 41).

Based on the theoretical models discussed above, our model will attempt to measure the dynamic relationships between the Pennsylvania unemployment rate (PAUNE), real oil price (ROILPRICE), U.S. unemployment rate (USUNE), and federal funds rate (FEDFUNDS). It was expected that the ROILPRICE would have a direct macroeconomic impact on both the USUNE and PAUNE variables. This finding is anticipated through both the AD-AS model framework as well as that proposed by Carruth, Hooker, and Oswald (1998). A difference in magnitude and timing of the effect of an oil price change on the nation versus the state may be expected. Pennsylvania has a greater concentration of manufacturing in the economy as well as greater import dependence on oil compared to the nation as a whole. This implies that the magnitude of the impact of oil price shocks may be greater on the Pennsylvania economy relative to the national economy. In terms of timing, Crone (2000) found that, while the Pennsylvania economy generally contracts and expands with the national economy, the onset and length of such changes differ from the

nation and other states. He found that between 1970 and 2000, three of the four recessions in Pennsylvania began earlier than the nation's and were longer in terms of months of decline. Thus, oil price shocks, like other macroeconomic shocks, may also differ in the timing of their impact on the state economy versus the nation.

The FEDFUNDS variable was included to account for the suggestion by Bernanke, Gertler, and Watson (1997) that the Federal Reserve also may respond to changes in oil prices by adjusting interest rates based on Fed goals. (We should note that the 3-month Treasury Bill rate was also considered as an alternative interest rate variable. However, the federal funds rate was believed to better reflect interest rates as a Fed policy variable; additionally, the correlation coefficient between the two rates was 0.975.) Our present model will, therefore, contain these four variables. As will be discussed in the results, an alternate version of the model was also estimated using the Index of Industrial Production (INDPRO) as a substitute for USUNE to determine the consistency of the results to an alternate model form.

The VAR methodology is employed to allow for the measurement of dynamic relationships between each of the model's endogenous variables. The VAR approach models all of the endogenous variables as a function of lags on themselves and all other endogenous variables, in addition to any separately specified exogenous variables. This approach has been widely used in the regional literature and the reader is referred to Cromwell and Hannan (1993) for a more detailed presentation of the methodology and issues inherent in its application.

Our purpose in using the VAR approach is the calculation of impulse response functions following the work by Sims (1981). An impulse response function measures the effect on all endogenous model variables from a one-time shock (or unit increase) in one of the variables at time period 0; all other variables are assumed fixed at that point. Since the shock is stimulated through the error term of a given VAR equation, the impulse response shows the effect on current and future values of all endogenous variables from a one standard deviation shock to the error of a given variable. Since the shock is modeled as a one-time event, one would theoretically expect the magnitude of the impulse response to approach zero across time; this also will be the case statistically if the model variables are stationary. The VAR approach is ideal for this analysis since our goal is to measure the timing and significance of changes in real oil prices on Pennsylvania unemployment and other variables, as is forthcoming from the impulse responses from the VAR model.

While the VAR methodology is widely used for regional and non-regional analyses (see e.g., Clark, 1998; Freeman, 2001; Bhattacharya, 2003), it is not without limitations. For instance, Cooley and Leroy (1985) and Bernanke (1986) discuss that VAR models may not be useful for policy evaluation without the imposition of some model restrictions. As discussed by Sarte (1997), the ordering of variables in a VAR model system is critical and would constitute the imposition of prior identifying restrictions on the model structure. While the focus of the present study is not policy evaluation, statistical procedures are performed and a theoretically supportable variable ordering structure is imposed on the model to permit practical interpretation of the impulse responses.

Since not all endogenous variables included in the model system will be completely independent, one would expect that some correlation between the errors in the different system equations may exist. In such cases, the errors may have common components that cannot be distinguished among the different equations. To alleviate this problem, the errors are orthogonalized using Cholesky decomposition. However, depending on the degree of correlation among the errors, different orderings of the endogenous variables in the model may result in non-unique impulse responses. Thus, the ordering of the variables in the VAR model may be important. The variables assumed to be most exogenous should be positioned first in the system and those assumed most endogenous positioned last (e.g., see Bhattacharya, 2003). In the present study, the variables were ordered with ROILPRICE first in the system (assumed to be most contemporaneously exogenous) followed by FEDFUNDS, USUNE, and PAUNE. Alternative orderings of the variables were also tested with the result that the impulse responses were not significantly impacted by the different orderings. Mathematically, we have the following model structure:

$$ROP_t = \beta_0 + \sum_{i=1}^{5} \beta_i^{ROP} ROP_{t-i} + \sum_{i=1}^{5} \beta_i^{FF} FF_{t-i} + \sum_{i=1}^{5} \beta_i^{UU} UU_{t-i} + \sum_{i=1}^{5} \beta_i^{PU} PU_{t-i} + u_t^{ROP} \quad (1)$$

$$FF_t = \varphi_0 + \sum_{i=1}^{5} \varphi_i^{ROP} ROP_{t-i} + \sum_{i=1}^{5} \varphi_i^{FF} FF_{t-i} + \sum_{i=1}^{5} \varphi_i^{UU} UU_{t-i} + \sum_{i=1}^{5} \varphi_i^{PU} PU_{t-i} + u_t^{FF} \quad (2)$$

$$UU_t = \delta_0 + \sum_{i=1}^{5} \delta_i^{ROP} ROP_{t-i} + \sum_{i=1}^{5} \delta_i^{FF} FF_{t-i} + \sum_{i=1}^{5} \delta_i^{UU} UU_{t-i} + \sum_{i=1}^{5} \delta_i^{PU} PU_{t-i} + u_t^{UU} \quad (3)$$

$$PU_t = \theta_0 + \sum_{i=1}^{5} \theta_i^{ROP} ROP_{t-i} + \sum_{i=1}^{5} \theta_i^{FF} FF_{t-i} + \sum_{i=1}^{5} \theta_i^{UU} UU_{t-i} + \sum_{i=1}^{5} \theta_i^{PU} PU_{t-i} + u_t^{PU} \quad (4)$$

For brevity, ROP represents ROILPRICE, FF represents FEDFUNDS, UU represents USUNE, and PU represents PAUNE. Each of these variables has been defined above. β, φ, δ, θ are the parameters to be estimated. The u_t values represent innovations associated with each dependent variable; they are assumed to be white noise processes with zero means, homoscedastic, and individually serially uncorrelated. As discussed above, a Cholesky decomposition is performed to orthogonalize these u_t values to make them contemporaneously uncorrelated with each other.

It is necessary that all variables included in the VAR model are stationary to ensure precise calculation of the impulse responses (Cromwell and Hannan, 1993). Therefore, Augmented Dickey-Fuller tests for a unit root were performed on all of the variables to determine the appropriate level of differencing required to achieve stationarity (Dickey & Fuller, 1979). These results are reported in Table 3 (page 41), showing all variables to be I(1) (i.e., stationary in first differences).

The model order is also an important concern in the development of a VAR model. Since the endogenous variable of focus in this study is the Pennsylvania unemployment rate (PAUNE), the Likelihood Ratio (LR) test was performed in a univariate sense on this variable (see Hannan, 1970; Anderson, 1971). The results for this test indicated an appropriate lag length of 5 months for this variable. While the LR test is commonly employed for this purpose, the present application is multivariate in nature. Thus, causality tests also were performed between PAUNE and ROILPRICE to confirm the direction of causality and to identify at what lag a Granger-causal relationship was forthcoming (see Granger, 1969). It was found that causality was unidirectional in the expected direction (i.e., ROILPRICE Granger-causes PAUNE) beginning at lag 5. Additional causality tests were performed between other endogenous variables showing in some cases that models of even higher order were indicated. For purposes of model parsimony, it was determined that the VAR model would be specified with 5 lags of the endogenous variables in each equation. It should be noted that models of higher order were also estimated and it was found that the impulse response results were quite stable over the different model lag structures.[1]

In cases where all endogenous variables in a VAR model are I(1), as in the present model, it also is necessary to test if the series are cointegrated. Following Engle and Granger (1987), if two series are I(1) and cointegrated, then a VAR model with the endogenous variables defined in differences may be misspecified. In such cases, a Vector Error Correction (VEC) model specification must be estimated to explicitly accommodate the cointegrating relationships in the model. Given the model order determined above, Johansen's (1991, 1995) VAR-based test for cointegration was performed. Five different versions of the cointegration test were implemented and all cases showed no evidence of cointegration in the model at .05 significance level. These findings are shown in Table 4 (page 42) and allow us to estimate the proposed VAR model in first differences.

RESULTS

The central focus of this paper is the response of economic variables, particularly Pennsylvania unemployment rates, to changes in crude oil prices. To answer these questions, impulse response functions are presented for relevant cases. Note that we will consider the impulse responses to be statistically significant if their 95% confidence bands do not include zero. Our findings indicate that a one standard deviation increase in crude oil prices results in a significant increase in Pennsylvania unemployment rates in months 6 and 9 after the oil price increase (see Figure 6a)(Figure 6a-6d page 40). The direction is correct theoretically and demonstrates that oil price increases will have a negative impact on Pennsylvania firms, eventually resulting in a rise in the state unemployment rate 2 to 3 quarters following the initial oil price increase. (Note that while the real oil price was used for this analysis, following work e.g., by Bhattacharya (2003), an alternate version of the VAR model was also estimated and tested using nominal oil prices with little change in the results.) The response of the U.S. unemployment rate to an oil price increase showed a similar pattern, although the relationship was more muted and only significant in the 9th month after the oil price increase; again the direction of the impulse response was consistent with expectations. This result is shown in Figure 6b.

To confirm this finding, a second VAR model was estimated using INDPRO in place of USUNE.[2] These results are presented in Figure 6c and show that a shock to the oil price had no significant effect on industrial production even up to 18 months following the shock. The results at the national level

were consistent with those obtained by Bhattachara (2003) and perhaps can be explained by the positive employment reaction to oil price increases in oil rich states offsetting the negative reaction in other states, thus "washing out" the effects at the national level. It is also possible that monetary responses by the Fed to the oil price increases have offset observable macroeconomic impacts in the aggregate (national level). Also, given that Pennsylvania unemployment (PAUNE) is sensitive to changes in national unemployment (USUNE), such a muting effect may also occur to some degree at the state level. However, it should be noted that no significant direct effect was found between changes in the Fed Funds rate and PAUNE.

Last, a shock to oil prices showed a significant positive impact on the Fed Funds rate with a lag of one month (see Figure 6d). Since this variable represents a policy response variable by the Fed, this finding suggests that the Fed may respond to such oil price increases rather quickly by increasing the Fed Funds rate. This is consistent with the notion that an oil price increase may be viewed by the Fed as potentially inflationary, leading the Fed to increase the Fed Funds rate (i.e., slow the growth rate in the money supply) in order to reduce inflationary pressures.

Related to this latter finding, the model also tested the reaction of monetary policy to changes in economic conditions, as measured in this model by USUNE. In this case a one standard deviation shock to the U.S. unemployment rate led to a negative response by the Fed Funds Rates 2, 4, and 6 months following the innovation (see Figure 6e). Thus, the model finds that the Fed responds over a period of time to negative macroeconomic conditions by reducing the Fed Funds Rate in an attempt to stimulate macroeconomic activity. The negative and significant response of the Fed Funds rate to an increase in unemployment and its positive and significant response to an increase in oil prices are expected if the Federal Reserve's reaction to macroeconomic events driven by oil price changes is as described by Bernanke, Gertler & Watson (1997).

Last, how did the Pennsylvania unemployment rate respond to shocks to the other variables in the model? As shown in Figure 6f, a shock to the U.S. unemployment rate had a positive and significant impact on the Pennsylvania rate with a lag of 1 month and for months 3 through 10. This finding was expected given the fact that changes in national economic conditions will affect state conditions with some lag (see e.g., Crone (2000)). Our result shows that the effect of a rise in the U.S. unemployment rate will translate to upward pressure on the state unemployment for nearly one year following the initial rise in the national rate. Lastly, a shock to the Fed Funds rate did not show any statistically significant impact on the Pennsylvania unemployment rate, even 18 months into the future.

CONCLUSIONS

Our analysis has shown that increases in crude oil prices will increase the Pennsylvania unemployment rate 6 to 9 months following the price change. It also was found that Pennsylvania unemployment responds strongly to changes in national macroeconomic conditions (i.e., USUNE), though national monetary policy had no measurable state-level effect. The response of the national macroeconomy to these same changes in oil prices is much smaller, with national industrial production not responding at all and the national unemployment rate having a small response after 9 months. Last, evidence was found that monetary policy actions affecting the Fed Funds rate are used to mitigate the effects of oil price increases.

What do these results imply for Pennsylvania policymakers and community leaders? The study finds that although national (aggregate) results show a small impact from changes in oil prices after 9 months, the results for Pennsylvania show a significant rise in local unemployment as early as 6 months following an oil price increase. The anticipation of this impact should allow policymakers to plan appropriate responses to expected impacts on demands for social insurance programs and on sales and income tax revenues. Business leaders may also note that, while oil price shocks will only increase national unemployment rates after 9 months, local economic conditions (as measured by PAUNE) are sensitive to changes in national economic activity (as measured by USUNE) with little lag and in a sustainable manner. Thus, once an oil price shock stimulates an increase in national unemployment, regional economic activity will also be negatively impacted for several quarters as a result of a decrease in national demand for locally-produced goods and services. Last, it was noted that some of the national-level, and to some extent regional-level, impact from an oil price shock may be muted by an appropriate Fed response.

REFERENCES

Anderson, T.W. (1971). *The statistical analysis of time series*. New York: John Wiley & Son.

Bernanke, B.S. (1986). Alternative explanations of the money-income correlation. *Carnegie-Rochester Conference Series on Public Policy, 25*, Autumn 1986, 49-99.

Bernanke, B.S., Gertler, M., & Watson, M. (1997). Systematic monetary policy and the effects of oil price shocks. *Brookings Papers on Economic Activity, 1*, 91-142.

Bhattacharya, R. (2003). Sources of variation in regional economies. *The Annals of Regional Science, 37*(2), 291-302.

Blanchard, O., & Quay, D. (1989). The dynamic effects of aggregate demand and supply disturbances. *American Economic Review,* 79(4), 655-673.

Brown, S.P.A., & Yucel, M.K. (1999). Oil prices and U.S. aggregate economic activity: A question of neutrality. *Federal Reserve Bank of Dallas Economic and Financial Review,* Second Quarter, 16-23.

Carruth, A., Hooker, M., & Oswald, A. (1998). Unemployment equilibria and input prices: Theory and evidence from the United States. *Review of Economics and Statistics, 80*(4), 621-628.

Clarida, R., Gali, J., & Gertler, M. (2000). Monetary policy rules and macroeconomic stability: Evidence and some theory. *Quarterly Journal of Economics, 115*(1), 147-180.

Clark, T.E. (1998). Employment fluctuations in U.S. regions and industries: The role of national, region-specific, and industry-specific shocks. *Journal of Labor Economics, 16*(1), 202-29.

Clements, M., & Krolzig, H. (2002). Can oil shocks explain asymmetries in the U.S. business cycle? *Empirical Economics, 27*(2), 185-205.

Cooley, T.F. and LeRoy, S.F. (1985). Atheoretical macroeconomics: A critique. *Journal of Monetary Economics, 16*(3), 283-308.

Cromwell, J.B., & Hannan, M.J. (1993). The utility of impulse response functions in regional analysis: Some critical issues. *International Regional Science Review, 15*(2), 199-222.

Crone, T.M. (2000). A new look at economic indexes for the states in the third district. *Business Review* (Federal Reserve Bank of Philadelphia), November/December, 3-14.

Davis, S.J., Loungani, P., & Mahidhara, R. (1997). Regional labor fluctuations: oil shocks, military spending, and other driving forces. Board of Governors of the Federal Reserve System, International Finance Discussion Paper 578.

Dickey, D.A., & Fuller, W.A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association, 74*(366), 427-431.

Federal Reserve Bank of Cleveland. (2005). Oil prices and the macroeconomy. *Economic Trends, April.* Retrieved May 20, 2005, from www.clevelandfed.org/research/ET2005/0405.

Freeman, D.G. (2001). Sources of fluctuations in regional growth. *The Annals of Regional Science, 35*(2), 249-66.

Engle, R.F., & Granger, C.W.J. (1987). Co-integration and error correction: Representation, estimation, and testing. *Econometrica, 55*(2), 251-276.

Granger, C.W.J. (1969). Investigating causal relations by econometric models and cross-spectral methods. *Econometrica, 37*(3), 424-438.

Hamilton, J.D. (1983). Oil and the macroeconomy since World War II. *Journal of Political Economy, 91*(2), 1232-1266.

Hamilton, J.D. (2000). This is what happened to the oil price-macroeconomy relationship. *Journal of Monetary Economics, 38*(2), 215-220.

Hamilton, J.D., & Herrerra, A.M. (2004). Oil shocks and aggregate macroeconomic behavior: The role of monetary policy, a reply. *The Journal of Money, Credit, and Banking, 36*(2), 265-286.

Hannan E.J. (1970). *Multiple time series*. New York: John Wiley & Sons.

Hooker, M.A. (1996a). What happened to the oil price-macroeconomy relationship? *Journal of Monetary Economics, 38*(2), 195-213.

Hooker, M.A. (1996b). This is what happened to the oil price-macroeconomy relationship: Reply. *Journal of Monetary Economics, 38*(2), 221-222.

Jimenez-Rodriguez, R., & Sanchez, M. (2005). Oil price shocks and real GDP growth: empirical

evidence for some OECD countries. *Applied Economics, 37*(2), 201-228.

Johansen, S. (1991). Estimation and hypothesis testing of cointegration vectors in gaussian vector autoregressive models. *Econometrica, 59*(6), 1551-1580.

Johansen, S. (1995). *Likelihood-based inference in cointegrated vector autoregressive models.* Oxford, UK: Oxford University Press.

MacKinnon, J.G. (1991). Critical values for cointegration tests. In R.F. Engle & C.W.J. Granger (Eds.) *Long-run Economic Relationships: Readings in Cointegration* (pp. 267-276). Oxford, UK: Oxford University Press.

Mankiw, G. (1997). *Macroeconomics.* New York, Worth Publishing.

Mory, J.F. (1993). Oil prices and economic activity: Is the relationship symmetric? *Energy Journal, 14*(4), 151-162.

Osterwald-Lenum, M. (1992). A note with quantiles of the asymptotic distribution of the maximum likelihood cointegration rank test statistics. *Oxford Bulletin of Economics and Statistics, 54*(3), 461–472.

Pindyck, R., & Rotemburg, J.J. (1983). Dynamic factor demands and the effects of energy price shocks. *American Economic Review, 73*(5), 1066-1079.

Shapiro, M.D., & Watson, M. (1988). Sources of business cycle fluctuations. In S. Fischer (Ed.), *Macroeconomics* Annual (111-148). Cambridge, MA: MIT Press.

Sarte, P-D.G. (1997). On the identification of structural vector autoregressions. *Economic Quarterly*, Federal Reserve Bank of Richmond, *83*(3), 45-67.

Sims, C.A. (1981). Macroeconomics and reality. *Econometrica,* 48(1), 1-48.

[1] Detailed results for the LR and Granger-causality tests are available from the authors.
[2] Results for variable stationarity and cointegration also showed that the model could be estimated with the Index of Industrial Production in first differences with 5 lags of each endogenous variable.

James R. Dunn, SUNY-Binghamton, is an associate professor at Edinboro University. His research interests include monetary economics, corporate and public finance.

Michael Hannan, West Virginia University, is a professor at Edinboro University. His research interests include economic forecasting and regional analysis.

Figure 1: Real Crude Oil Prices & Pennsylvania Unemployment Rate

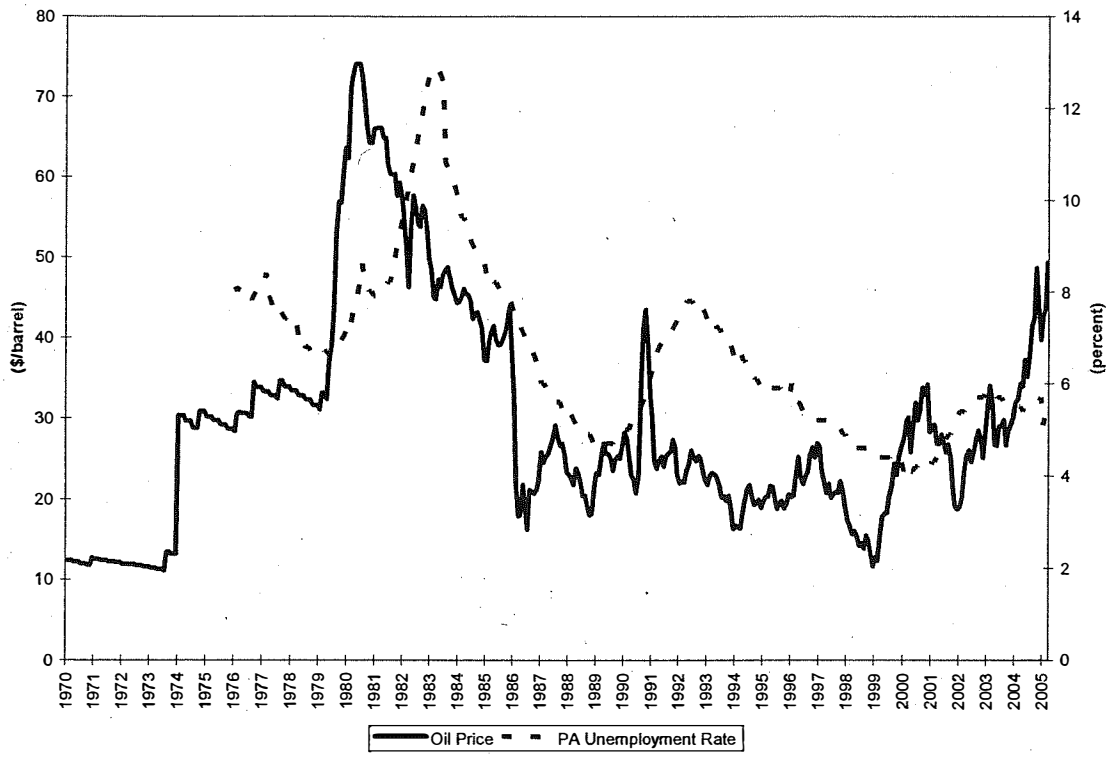


Figure 2: AD-AS Analysis of an Oil Price Increase

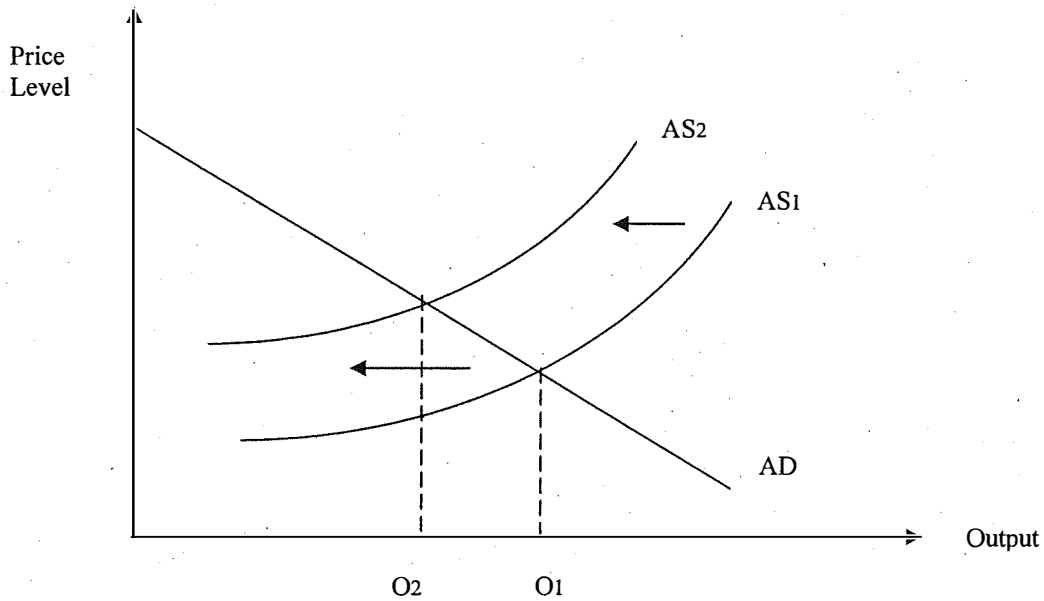


Figure 3: AD-AS Analysis with a Monetary Policy Response

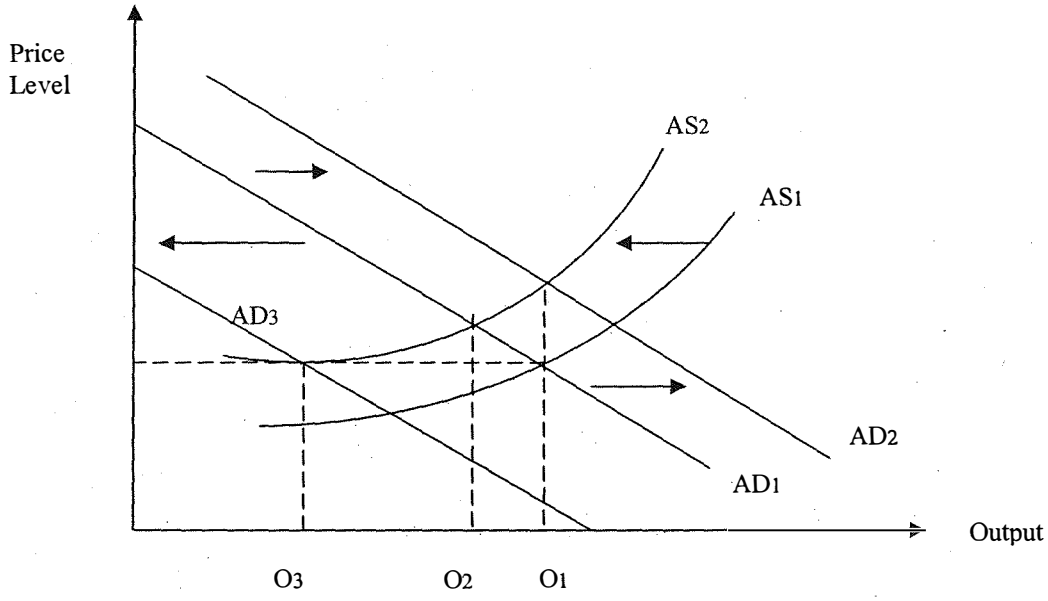


Figure 4: The AD-AS Approach

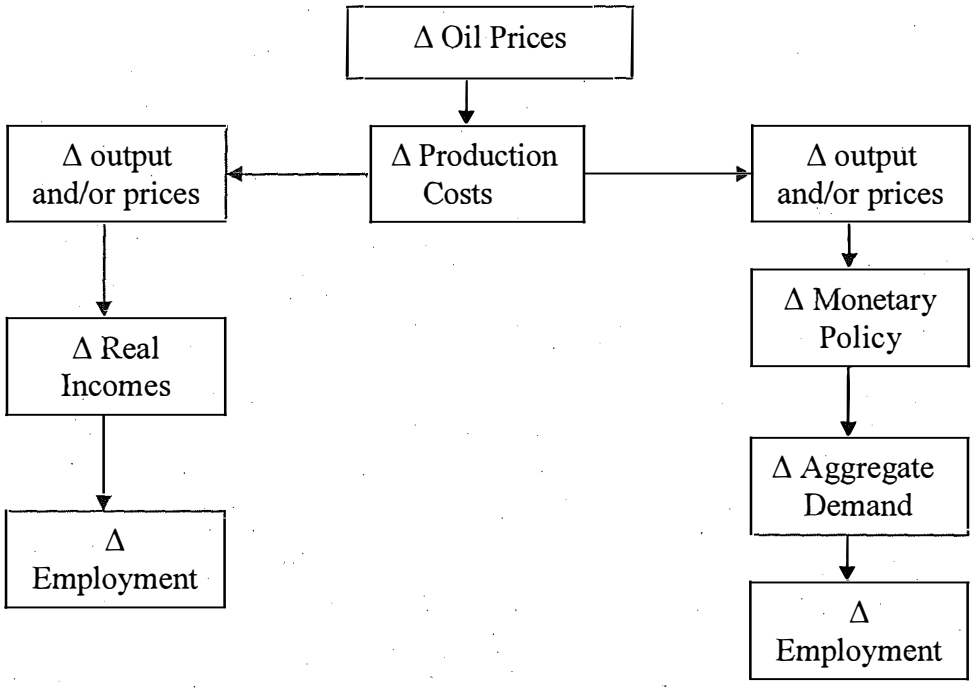


Figure 5: Efficiency Wage Framework

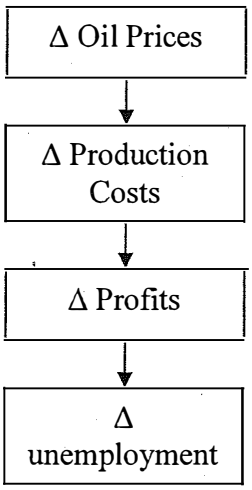


Figure 6: Impulse Response Function Results

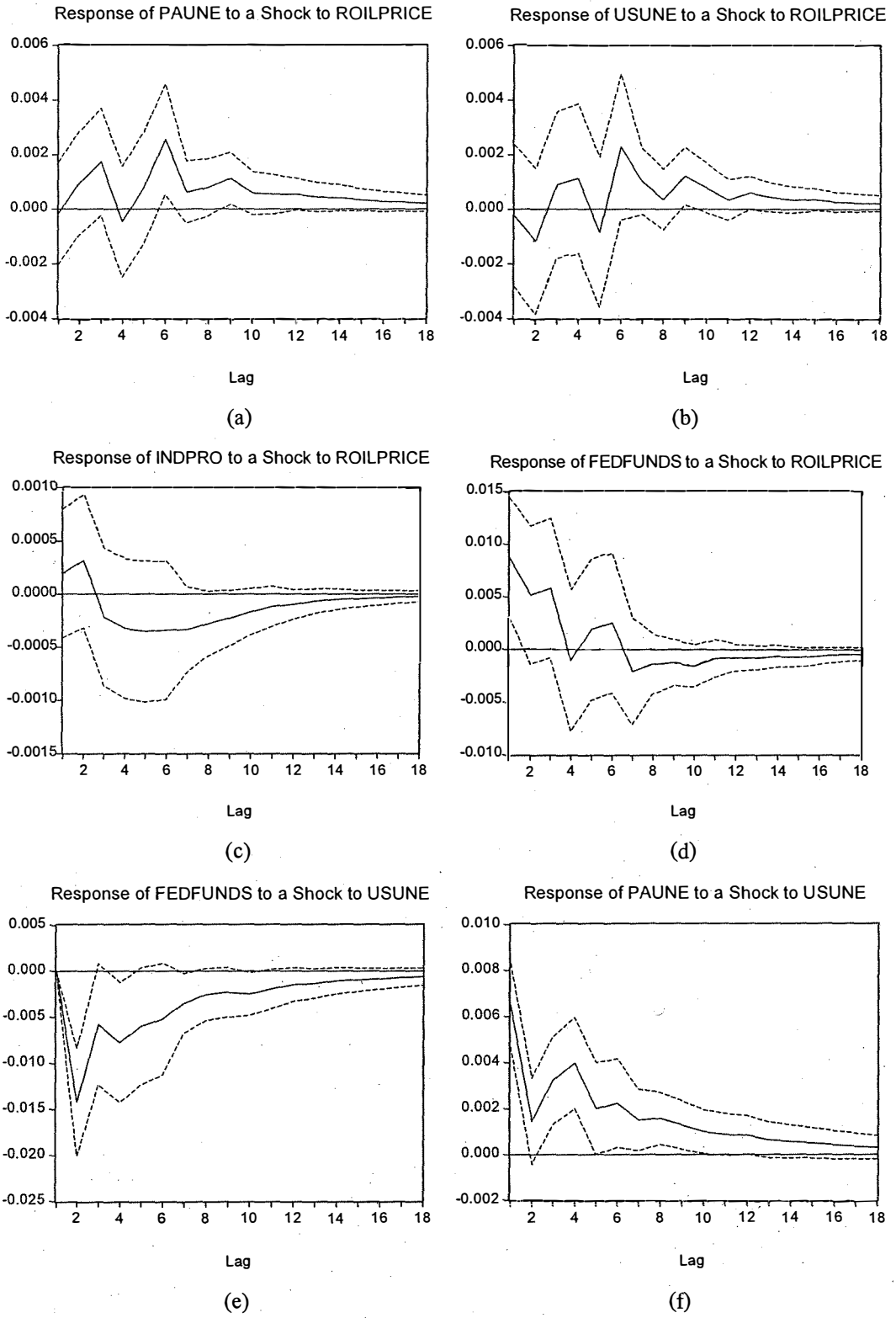


Table 1
Model Variables

Variable Name	Variable Abbreviation	Units	Data Source
Pennsylvania Unemployment Rate	PAUNE	Percent, Seasonally Adjusted	U.S. Department of Labor, Bureau of Labor Statistics:
Real Price of Crude Oil	ROILPRICE	Dollars, Real 2000	The ratio of the spot price of West Texas intermediate oil to the GDP deflator. Board of Governors, Federal Reserve System
GDP Implicit Price Deflator	GDPDEF	Index, 2000=100	U.S. Department of Commerce, Bureau of Economic Analysis
Federal Funds Rate	FEDFUNDS	Percent	Board of Governors, Federal Reserve System
U.S. Unemployment Rate	USUNE	Percent, Seasonally Adjusted	U.S. Department of Labor, Bureau of Labor Statistics
Index of Industrial Production	INDPRO	Index, 1997=100	Board of Governors, Federal Reserve System

Note: the data are available from the authors upon request.

Table 2
Data Descriptive Statistics

Statistic	PAUNE	USUNE	ROILPRICE	FEDFUNDS	INDPRO
Mean	6.64	6.30	31.77	6.69	82.36
Median	6.20	6.00	26.99	5.92	76.90
Standard Deviation	1.88	1.40	13.59	3.67	19.77
Minimum	4.00	3.80	11.64	0.98	53.51
Maximum	12.90	10.80	74.04	19.10	118.53
Observations	351	351	351	351	351

Variable units and sources are defined in Table 1.

Table 3
Augmented Dickey-Fuller Tests for a Unit Root

Variable:	Required Differencing:	Test Coeffcient	Dickey-Fuller t Statistic:	Additional Equation Variables
FEDFUNDS	First Difference	-0.5170	-11.2387	LD1
INDPRO	First Difference	-0.4544	-8.1785	LD2, C
PAUNE	First Difference	-0.3611	-4.9656	LD3
ROILPRICE	First Difference	-0.8520	-14.6357	LD1
USUNE	First Difference	-0.4746	-6.1637	LD4

Notes: The variables were transformed to natural logarithms for testing and model estimation. All Dickey-Fuller t-statistics are significant at the .01 level, using MacKinnon critical t values (MacKinnon, 1991). Additional Equation Variable definitions are as follows: C = constant term, LD = lagged dependent variable followed by the number of lags (e.g., LD2 = 2 lags of the dependent variable).

Table 4
Cointegration Test Results

Eigenvalue	Likelihood Ratio	5% Critical Value	1% Critical Value	Hypothesized Number of Cointegrating Equations
Test 1: Series have no deterministic trends and the cointegrating equations do not have intercepts.				
0.054326	**26.47166**	**39.89**	**45.58**	**None**
0.013593	7.200989	24.31	29.75	At most 1
0.006880	2.479132	12.53	16.31	At most 2
0.000282	0.097465	3.84	6.51	At most 3
Test 2: Series have no deterministic trends and the cointegrating equations have intercepts.				
0.057762	**35.05587**	**53.12**	**60.16**	**None**
0.024020	14.52937	34.91	41.07	At most 1
0.011809	6.141331	19.96	24.60	At most 2
0.005904	2.043070	9.24	12.97	At most 3
Test 3: Series have linear trends but the cointegrating equations have only intercepts.				
0.055443	**33.69770**	**47.21**	**54.46**	**None**
0.023666	14.01927	29.68	35.65	At most 1
0.011106	5.756491	15.41	20.04	At most 2
0.005502	1.903510	3.76	6.65	At most 3
Test 4: Both the series and the cointegrating equations have linear trends.				
0.056975	**41.06862**	**62.99**	**70.05**	**None**
0.025136	20.83023	42.44	48.45	At most 1
0.023607	12.04745	25.32	30.45	At most 2
0.010970	3.805479	12.25	16.26	At most 3
Test 5: Series have quadratic trends and the cointegrating equations have linear trends.				
0.055802	**39.19006**	**54.64**	**61.24**	**None**
0.024761	19.38045	34.55	40.49	At most 1
0.022913	10.73054	18.17	23.46	At most 2
0.007893	2.733747	3.74	6.40	At most 3

Critical values are those reported by Osterwald-Lenum (1992). The conclusion for each test is shown in bold.

A PENNSYLVANIA COLLEGE'S APPROACH TO ADDRESS THE COMPUTER LITERACY OF BUSINESS STUDENTS

W. R. Eddins, York College of Pennsylvania

ABSTRACT

Assessment of computer literacy of incoming students should be an important precursor to college entry. Unfortunately, this is not done on a recurring basis by most colleges at this time. However, this situation is changing. In the interim, this paper presents a customized solution to literacy testing based upon the use of a Computer-based Training (CBT) tool for assessment and training and institutional initiatives such as creating and revising course content.

INTRODUCTION

Universities and businesses require some level of computer literacy for incoming students and for new hires. There are several questions raised by this statement, such as what is the definition of computer literacy and what level of literacy is required, how does one establish computer literacy, and what does one do if a student does not meet a requirement for computer literacy. These questions are particularly vexing since many k-12 school districts provide computer training in a variety of software. Probably more troubling is the fact that no formal outcomes assessment of computer education is done at the k-12 or college levels of education in the United States.

The evidence is emerging that incoming students are not, as a whole, computer literate. For instance, Case, MacKinnon, and Dyer (2004) assessed the degree of computer knowledge attained by incoming college students at a medium-sized regional university in the southeast United States. They concluded that, despite the increasing number of students who have had at least one high-school course, there is a wide variation in computer literacy. They concluded that the introductory level computing course at their university cannot be removed from the curriculum. An interesting phenomenon related to the study of computer literacy is that often times, students, and for that matter faculty and administrators, overestimate the computer competency of incoming students. Baugh (2004) reports a directive at Robert Morris University, a private school in Pittsburgh, that incoming students be evaluated for computer literacy because faculty and administrators thought that incoming students did not need an introductory course in computing. Baugh reports that 44% of incoming students were not literate with spreadsheet software and that 68% were not literate with database software. Finally, Eddins (2003) reports a study of the computer performance skills of incoming students using a Computer-based Training (CBT) tool to simulate application software. This study was conducted at York College of Pennsylvania (YCP), a medium size school in south central Pennsylvania, and found that students in an introductory computer literacy course performed significantly higher (about 80% of tasks were completed correctly) than students who did not take an introductory computer literacy score (about 60% of tasks were completed correctly). This study specifically addresses computer application literacy in the use of word processing software.

One might expect that the traditional testing agencies would provide an assessment of computer literacy for colleges and universities since so much is expended in computer training in k-12 and colleges. In the spring of 2005, when this article was originally written, neither the Scholastic Aptitude Test (SAT), the American College Testing (ACT), nor the Educational Testing Service (ETS) reported a computer literacy scale of computer proficiency of incoming students or graduates from colleges. However, there are developments on several fronts that are changing this state of affairs.

On the first front, since March of 2006, ETS offers the ICT Literacy Assessment (Kostino, 2007). The ICT Literacy Assessment is a comprehensive test of Information and Communication Technology proficiency. The test uses scenario-based tasks to measure both technical and cognitive skills. Technical skills include using basic office productivity tools such as word processing, spreadsheet, database, and presentation software. Cognitive skills include the ability to use computing resources to:

- Define information representation methods.
- Identify and access information.

- Manage and apply existing information organization schemes.
- Integrate information from multiple electronic sources.
- Evaluate the relevance or accuracy of electronic information.
- Create new information from existing electronic information.
- Communicate information in a specific context.

The second front is developing in the commercial sector and suggests that the private sector is seeing a potential for profit. The International Computer Driving License (ICDL) is an assessment of computer literacy, suited for employers to evaluate the skills of newly graduated students (Csapo, 2002). The ICDL has a certification program that is very comprehensive (icdlus.com 2005). It covers seven areas of computer literacy: basic concepts, computer use and file management, word processing, spreadsheets, databases, presentations, and information and communication. It can be completed within two years. However, it is reported that computer and information literate individuals have completed the ICDL in an hour and a half.

On a third front, certification organizations are beginning to recognize the need to specify computer training and outcomes assessment on the part of colleges and universities. The Association to Advance Collegiate Schools of Business (AACSB) recently revised its statement of curricular content for schools of business to require learning experiences in areas such as communications abilities, ethics and reasoning abilities, analytic skills, ability to use information technology, understanding of multicultural and diversity issues, and reflective thinking skills (AACSB, 2004).

The AACSB (AACSB, 2004) further emphasizes that college faculty should describe information technology in several contexts by:

- Discussing models of educational delivery that use technology.
- Explaining that global and technological advances in business require innovation.
- Considering the totality of the students' education including technology-based experiences.
- Evaluating faculty by their experience in technology and information systems as used by modern businesses.

On a fourth front, the Association of Computing Machinery (ACM), Association of Information Systems (AIS), and Association of Information Technology Professionals (AITP) provide model curricula that can be used by colleges to develop an Information Systems (IS) undergraduate curriculum (Gorgone, Davis, Valachich, Topi, Feinstein, & Longenecker, Jr., 2002). While the curriculum directive, also known as the IS 2002 Undergraduate Curriculum, is geared primarily to IS programs, it includes a description of a prerequisite course for entry into an undergraduate level IS program of study that could/should be adopted by business programs in colleges and universities. The course, IS 2002.P0 – Personal Productivity with IS Technology, has as its focus a requirement that incoming students have problem solving skills exhibited by the ability to apply information technologies to problem situations involving individuals or teams. The scope statement for the prerequisite course lists application software that should be mastered by incoming students including spreadsheets, databases, presentation graphics, and web authoring software. The IS 2002 Undergraduate Curriculum concedes that the introductory computer course may be remedial in nature and authorizes the college or university to employ non-traditional delivery techniques such as self-directed learning, computer-based training (CBT), or a traditional, lecture based course.

Given that definitions and levels of computer and information literacy will be standardized within a few years, the question was asked: what does "computer literacy" mean and what will schools or departments of business do in the interim to guarantee that incoming students can benefit from courses that have computer literacy as a basic prerequisite? This paper reports on the experience gained from the Information Technology (IT) competency program at York College of Pennsylvania (YCP) which was designed to answer these questions and implement a solution.

DISCUSSION

Previous to the IT competency initiative, the Business Department had a three pronged approach to computer and information literacy training. In addition, one course in the college core supplemented the department's initiative. First, all incoming students in the Business Department were required to take IFS105-Personal Productivity Computing. As a testament to the popularity of the course, 30% to 40% of the students in this course typically were not business majors. This course is roughly analogous to IS 2002.P0 – Personal Productivity with IS Technology (Gorgone et al., 2002). The emphasis of

the course is on the knowledge of computing concepts and the attainment of performance skills using applications software such as word processing, spreadsheets, operating systems, databases, and presentation programs. The catalog description in force at the original time of this study for IFS105 follows (York College of Pennsylvania, 2001).

> "Presents the fundamentals of computers and computer terminology. Stresses the importance of computers as essential components of the business world and society in general. Extensive lab segment focuses on the computer as a personal productivity tool using word processing, spreadsheets, presentation managers, and databases."

Second, all business majors were required to take IFS305-Management Information Systems (MIS). This was a traditional MIS style of course in that it served as an introduction to the application of computing to managerial problem-solving and decision-making. The traditional MIS course focuses on the support that computing provides to management in problem solving and decision-making by means of writing papers or doing case studies, and not on the hands-on use of computer application software. Following is the catalog description of IFS305 (York College of Pennsylvania, 2001).

> "A comprehensive discussion of the role of computer based information systems in modern organizations. Integrates managerial and computer knowledge towards identifying and solving information problems. Computer literacy is extended to MIS literacy. This is a writing intensive course."

Third, the faculty of other Business Department courses required that students use application software in their courses as they felt the software appropriate to their discipline.

Finally, the college core has a course which supplements the department's approach to computer and information literacy training. All YCP students are required to take IFL101-Information Literacy which is taught by library faculty. The catalog description follows (York College of Pennsylvania, 2001).

> "The goal of this course is to assist students in developing skills which will enable them to function as information literate individuals capable of locating, evaluating, and using information. Students in this course will learn how to conduct research using the library and the World Wide Web resources. They will develop skills in written and visual presentation of information and in various forms of electronic communication."

Given the departmental approach to computer and information literacy and IFL101, students in the YCP Business Department received an array of computer and information instruction; but, can one assume that students who successfully complete the program of study were "computer literate?" Csapo (2002) defines the term as the ability to type and use application software and to be able to discuss concepts such as hardware, systems, software, and ethical use of computing. It appeared that IFS105 and IFS305 support the achievement of computer literacy given by Csapo's definition.

Next, the question was asked: were the students receiving instruction that supports the assumption of being both computer and information literate? While this paper does not directly treat the definition of the term "information literacy," a definition is given because this term is often confused with "computer literacy." Jenson (2004) defines "information literacy" as the ability to recognize that information is lacking in a specific situation and being able to find, evaluate, and apply information effectively using computer-based tools such as the Internet and office productivity software. It appeared that IFL101 adequately supports the delivery of information literacy content and that the combination of IFS105 and IFS305 supported the delivery of computer literacy content to students in the Business Department at YCP.

When it was proposed that students in the Business Department will obtain the necessary levels of computer and information literacy knowledge by taking IFL100 and IFS350, many faculty in the Business Department agreed that IFS105 was no longer necessary to be taught at YCP. Since the research indicated that all incoming students are not uniformly literate in computing skills and given the experience of faculty in the classroom who taught IFS105, the Business Department instituted an ad hoc committee, called the Information Technology Competency (IT Comp) Committee, to review the potential courses of action to ensure that students are both computer and information literate and to make recommendations to the Business Department as appropriate. The next section describes the recommendations of the IT Comp Committee.

IT Comp Committee recommendations

The recommendations of the IT Comp Committee are briefly summarized. First, having examined the content of the courses involved and the advice of some faculty who teach those courses, the committee recommended that IFS105 could be dropped from the curriculum with several stipulations. The stipulations include a recommendation that the Business Department get a handle on the magnitude of the problem. That is, the committee recommended some form of ongoing testing of incoming freshmen and sophomores to determine the level of the proficiency with computer software applications. Had the ICT Literacy Assessment or the ICDL been available at the time, they would have been reviewed as tools. But, on reflection, both tools assess more capabilities and knowledge than was required. Since IFS105 does not provide training in information literacy or associated cognitive skills, the ICT and ICDL are probably too comprehensive.

The IT Comp Committee also stipulated that technology be employed to provide the ongoing testing and that the technology closely simulate technology used in the business community. In other words, the committee ruled out paper based testing in favor of Computer-based Testing (CBT); and the committee recommended that Microsoft application software be the targeted knowledge for testing since it is so prevalent in the business community.

Second, the IT Comp Committee recommended that IFS305 be revised to focus more time on hands-on computer software application knowledge. Up to then, IFS305 was totally focused on papers, case-studies, and other forms of written exercises to educate and evaluate students. At that time, the pedagogy of IFS305 required faculty led lectures and discussion for instruction purposes and three tests (with a significant writing component), four papers or case-studies, and participation for evaluation purposes. The IS faculty revised IFS305 to refocus the course on software applications, including lab-based instruction and business case studies, while maintaining the writing intensive requirement. Currently, the pedagogy of IFS305 requires faculty led discussions and labs (two or three) and in-depth business cases studies that actively use computer application software for instruction and for evaluation. There are three software application projects, three tests, and a participation component for evaluation. Both projects and tests have significant writing components.

Third, the IT Comp Committee recommended that a new "course" be proposed to automate ongoing testing. Although the IFS100-Information Technology (IT) Competency Exam is listed in the college catalog, it is not a bona fide course. The catalog description of IFS100 follows (York College of Pennsylvania, 2001).

> "IFS100 is a surrogate for a computer competency exam. Students are required to pass all components of the competency exam within the first 30 credits; otherwise, they are required to take IFS105 within their first 30 credits. The exam covers fundamental concepts of Microsoft Windows and the Microsoft applications of Word, Excel, and PowerPoint. The exam will be given four times during a semester. Students are encouraged to practice for this exam and materials and instructions will be provided via the normal textbook buying procedures. Mandatory pass/fail grading."

Following the recommendation of the IT Comp Committee, IFS100 uses a CBT to automate the testing process and to simulate the experience of actually using application software. The next section describes the CBT tool that the Business Department now employs.

Automating remedial instruction

Within the last few years, CBT has become affordable, internet based, and realistic. Traditionally, CBT provides multi-media functionality to the learner that includes text, sound, video, and animation. CBT also may simulate the behavior of application software, provide testing for subjects who perform specific operations using a simulated interface, give feedback on subjects' mistakes, and provide instruction to students on how to perform required operations (Janicki & Steinberg, 2003).

There are many examples of CBT on the market that satisfy the features discussed above. In addition, many of the traditional book publishers provide CBT. The Business Department at YCP examined CBT from traditional publishers such as Thompson Course Technology, McGraw-Hill, and Prentice-Hall. The CBT that was chosen by YCP is provided by Thompson Course Technology (Course Tech). However, all of the publishers reviewed have very competent CBT which should be examined with objectives appropriate to the institution in mind.

Course Tech's CBT is named SAM XP/TOM. SAM XP is an acronym for Skills Assessment Manager for Windows XP. Also, SAM simulates the four software applications that were directed by the Business Department for testing: Word, Excel, PowerPoint, and Windows. It is a client-server application that has two primary components. The server is operated by the publisher and has an administrative interface that functions over the internet by means of a standard internet browser. Because the server is operated by the publisher, costs to the college for administration are kept down.

The second component is the client. The client software simulates Microsoft Office and is the interface that the learner uses while taking either practice tests or graded tests. It can be installed in a college's labs, or students can install it on their own machines, either at home or in their dorms. It requires Windows XP and about 550 megabytes of hard disk space. Given the massive hard disks available these days, the disk space requirement is minimal. Finally, SAM XP simulates the software being learned, so that the labs or the students' computers do not require the installation of Microsoft Office. See http://samcentral.course.com/ for additional information.

Course Tech's TOM is a CBT that instructs the learner in using Microsoft Office. It is an acronym for Training Online Manager. It runs over the Internet and comes on a CD. Since TOM simulates MS Office, it does not require the installation of MS Office on the computers in a college lab or on students' computers. However, it requires either an internet link or a diskette drive should instructors or students wish to track their progress while learning. TOM provides true multimedia instruction. Students can read about operations or concepts that they need to learn, view and hear narration from a movie clip of the operation being performed, or practice the operation themselves before they take any tests. The next section briefly describes SAM's administrator interface.

SAM XP's administrator interface

The SAM XP administrator interface is comprehensive and provides features for managing people and designing and administering tests. See Figure 1 (page 50). The first form in the administrative interface is for managing sections. Sections are analogous to specific classes or courses. Section forms allow the administrator to manage course details, students, and instructors and to give students permission to auto-enroll into a section.

Administrators must have access to several types of reports. The Reports menu gives the administrator or instructor access to a variety of useful reports. Examples of SAM reports include task frequency analyses, individual student performance, and exam results by student, exam, or section. One also can obtain TOM training progress reports. Figure 2 (page 50) depicts the SAM Frequency Analysis Performance report. Using this report, the instructor can assess which tasks or activities that students understand and which tasks that may need further instruction. For instance, Figure 2 shows that most students can use Excel to insert a cell; however, students may need additional instruction in merging or splitting cells. The next section describes changes made to Business Department courses.

Revising IFS105 and other business courses

In addition to "automating" the remedial instruction in IFS100, the IT Comp Committee made several changes to IFS105 that recognize that it is a remedial course and that it should be automated using CBT as well. The changes took effect in Fall 2004 and Spring 2005.

Finally, non-computing courses were examined within the Business Department by the IT Comp Committee to determine whether faculty felt that computer literacy was necessary. One non-computing course was identified as requiring computer literacy, QBA260-Business Statistics I. This is a standard course in teaching the process of using quantitative techniques for preparing, analyzing, and interpreting business data. The faculty of QBA260 regularly employed spreadsheet and statistical software as illustrative of the process of hypothesis testing. As a result, catalog descriptions of the course were updated to publish the use of spreadsheet software and to state that computer literacy is a prerequisite for entry into the course. Computer literacy for the course prerequisite is now defined as passing IFS100 with a 70 or better for each application or passing IFS105. The next section answers the basic questions regarding the level of computer literacy of incoming freshmen.

Experience with computer literacy

SAM XP/TOM has been used at YCP for about three years. As seen in Table 1 (page 51),

initially student passing frequency for IFS100 was a little over half of incoming students.

The faculty were very satisfied that 40% of the incoming students were able to pass the exam on the first attempt. Overall, 52% of students are able to pass the exam by the second exam. On the other hand, this suggests that almost half of the incoming students will need additional training and/or remediation.

The IT Comp Committee felt that IFS100 and SAM XP/TOM have been very successful at the college. However, what is not apparent from Table 1 is which software application(s) incoming students might be most deficient in. Based upon their experience in the classroom and research, the IT Comp Committee felt that students would have more difficulty with Excel than any other software application. This is a very important question because it impacts the new hands-on component of IFS305.

In order to test the hypothesis that incoming students are most deficient in Excel, data were collected from the ongoing testing of IFS100 during for Fall 2005 semester. During that fall, 588 tests were taken by students in IFS100, a total of 451 (76.7%) students passed IFS100, and 137 (23.3%) students failed IFS100. The reader should note that the overall passing rate jumped from 52.0% to 76.7% from Fall 2004 and Spring 2005 to Fall 2005. The increase in passing rate probably is due to the extraordinary effort by administrators and faculty to communicate to incoming students to the Business Department the importance of passing this test; and that a student can insure passing by taking multiple practice tests and by taking advantage of TOM, the training part of SAM, before the student attempts to take the actual exam. To determine which exam is the most difficult, the reader can examine Table 2 (page 51).

Table 2 shows that Excel probably is the most difficult exam as 69 students failed. Surprisingly, students did not do well in PowerPoint. However, one cannot be sure, without a test of significance based upon the pass/fail frequency of IFS100. The first hypothesis examined is that there is a significant difference in the independence of the pass/fail frequency of IFS100. Figure 3 (page 51) shows a Chi-Square analysis of the pass/fail frequency of IFS100 during the Fall of 2005. There is a significant difference in the pass/fail frequency of IFS100 by type of exam. Next, Figure 4 (page 52) shows the average grade of each application for students in IFS100. The reader will note that the average for Excel is 65.8 which is the lowest average. Surprisingly, the average for PowerPoint also was low, 72.9.

However, neither Table 2, Figure 3, nor Figure 4 supports any conclusions regarding the significance of the differences between tests. The next question addressed by this analysis is whether there is a difference in the grade for an exam. Specifically, it is asked whether there is a significant difference in average grades of students based upon software application. To determine whether the differences in the application averages are significant, a Bonferroni test was applied. Figure 5 (page 52) presents the Bonferroni adjustment for multiple comparisons among the four exams. The conclusions from Figure 5 are that the Excel average grade is significantly different from the average grades for both Word and Windows and that one cannot assume that there is a significant difference between the Excel average grade the PowerPoint average grade. This was totally unexpected by the IT Comp Committee.

CONCLUSION

This study provides an example of the use of a CBT to test incoming students for computer literacy or, more specifically, application software literacy. Microsoft application software was chosen as the target knowledge area by the Business Department because of its prevalence in the business community. While the study does not provide a randomized design, it does indicate the level of computer literacy of incoming students and gives some indication of the knowledge which students may lack. As a result of the information from IFS100, students in IFS305 receive instruction and hands-on labs in the use of Excel and PowerPoint within the context of business case studies.

Finally, computer-based training provides a cost effective solution to the computer literacy problem. The approach presented in this paper gives students the opportunity to take CBT practice exams, training, and final assessment for only a few dollars (around $25). Students who do not pass the test the first time can train themselves using the CBT and take the final test one more time. Students who do not pass or do not take the test are required to take an instructor-led course. Since the course is considered remedial, business students get no credit for the instructor-lead course.

Since schools of business can anticipate that a major proportion of incoming students will not be computer literate, it would be favorable if testing services such as SAT or ACT tested for computer literacy alone. It is noted that there are instruments that do test for both computer and information literacy and associated cognitive skills; however, a customized approach was taken to test for specific computer skills. It would be more favorable that high-schools test for computer literacy and provide additional training and remediation. Until this occurs, educational institutions can expect to have a significant proportion of incoming students who are not computer literate.

REFERENCES

AACSB International. (2004, April). Eligibility procedures and accreditation standards for business accreditation. aacsb.edu. Retrieved Wednesday, April 06, 2005 from http://www.aacsb.edu/accreditation/accounting/AccountingStandards-APRIL-19-04.pdf.

Baugh, J. M. (2004). Assessment of spreadsheet and database skills in the undergraduate student. Proceedings of ISECON 2003. Retrieved Monday, April 11, 2005 from http://isedj.org/isecon/2003/2111/ISECON.2003.Baugh.pdf.

Case, T., MacKinnon, R., & Dyer, J. (2004). Computer literacy and the introductory student: An analysis of perceived and actual knowledge of computers and computer applications. Proceedings of the 7th Annual Conference of the Southern Association for Information Systems. Retrieved Monday, April 11, 2005 from http://sais.aisnet.org/sais2004/ SAIS2004-TOC.pdf.

Csapo, N. (2002). Certification of computer literacy. *T H E Journal, 30*(1), 46, 48, 50-51.

Eddins, W.R. (2003). Are in-coming PA freshmen computer literate? Assessing computer literacy with a computer-based tool. Presented at the *Association of Pennsylvania University Business and Economics Faculty Conference 2003*.

ETS. (2007, April). Overview – ETS ICT Literacy Assessment. Retrieved from http://www.ets.org/portal/site/ets/menuitem.1488512ecfd5b8849a77b13bc3921509/?vgnextoid=fde9af5e44df4010VgnVCM10000022f95190RCRD&vgnextchannel=cd7314ee98459010VgnVCM10000022f95190RCRD on April 5, 2007.

Gorgone, J. T., Davis G. B., Valachich, J. S., Topi, H., Feinstein, D. L., & Longenecker, Jr., H. E. (2002). Model curriculum and guidelines for undergraduate degree programs in information systems. Retrieved Monday, April 11, 2005 from http://www.aisnet.org/Curriculum/IS2002-12-31.pdf.

icdlus.com. (2005). ICDLUS – Computer skills for life. icdlus.com brouchure. Retrieved on Wednesday, April 06, 2005 from http://www2.icdlus.com/icdlus-lms-webclient/pdfs/ICDL Academic Brochure.pdf.

Janicki, T., & Steinberg, G. (2003). Evaluation of a computer-supported learning system. *Decision Sciences Journal of Innovative Education, 1*(2), 203-223.

Jenson, J. D. (2004). It's the information age, so where's the information? *College Teaching, 52*(3), 107-112.

Kostino, K. (2007, January). Telephone conversation with a representative of ETS confirming March 2006 as the initial offering of the ICT Literacy Assessment.

York College of Pennsylvania. (2001). College Catalog 2001-2003. Published by York College of Pennsylvania.

York College of Pennsylvania. (2004). College Catalog 2005-2007. Published by York College of Pennsylvania.

W. R. Eddins, University of Maryland at Baltimore County, if a professor at York College of Pennsylvania. His research interests include software development, database management systems, and instructional technologies.

APPENDIX

Figure 1
SAM XP's Administrator's Interface

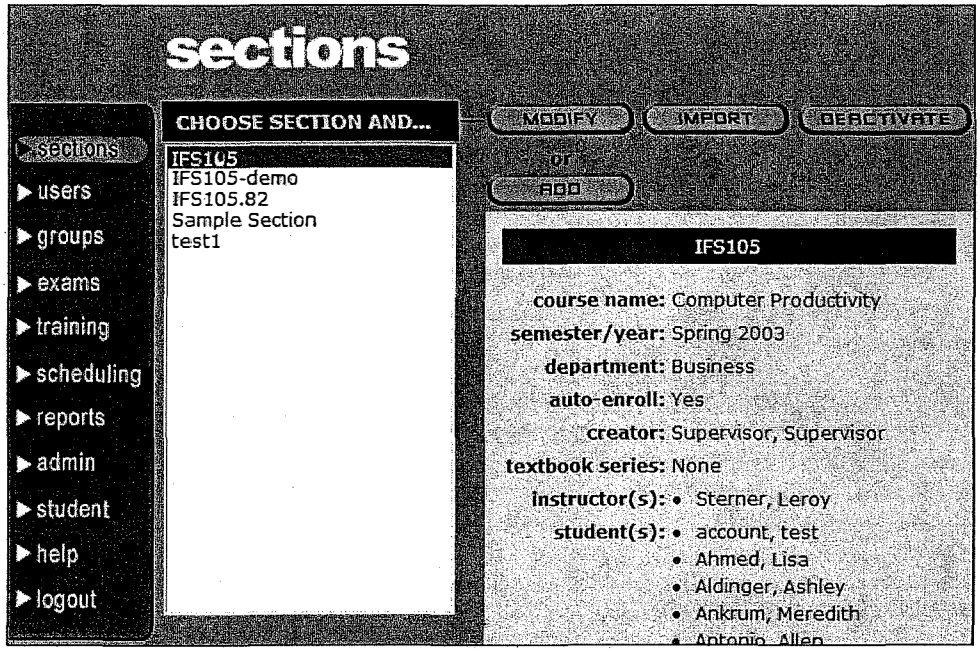


Figure 2
SAM XP's Frequency Analysis Report

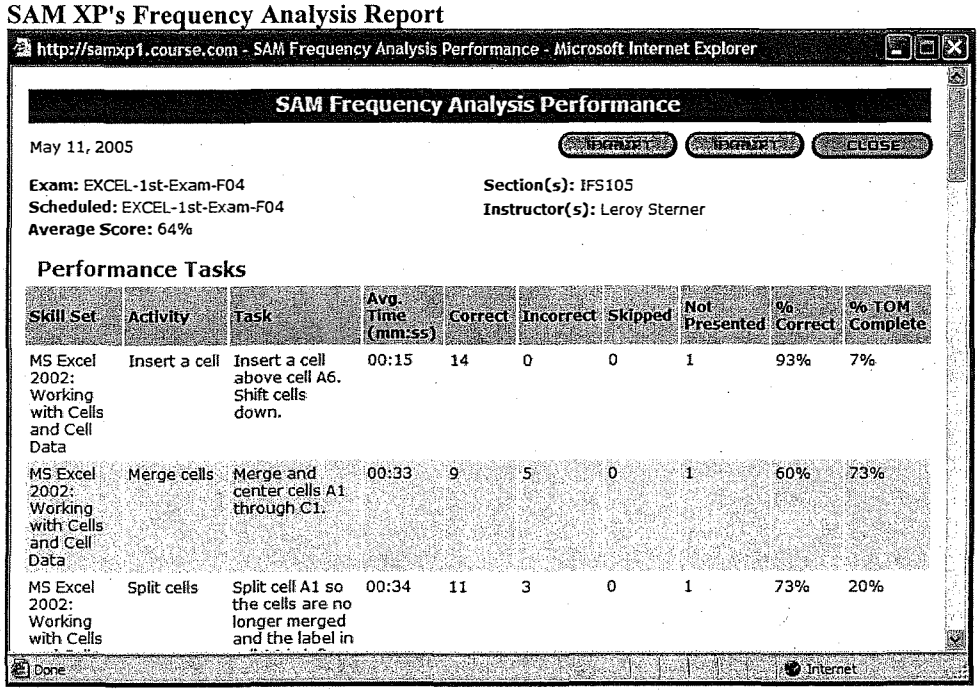


Table 1
IFS100 Summary for Fall 2004 and Spring 2005

	1st Time	2nd Time	Total	Percent
Passed	50	15	65	52.0%
Failed	47	13	60	48.0%
Total	97	28	125	
Passed %	40.0%	12.0%		

Table 2
IFS100 Summary for Fall 2005

Software Application	Pass	Fail	Total
Excel	83	69	152
PowerPoint	103	43	146
Windows	138	4	142
Word	127	21	148
			588

Figure 3
Chi-Square Test of Pass/Fail of IFS100

Pass/Fail

	Observed N	Expected N	Residual
Fail	137	294.0	-157.0
Pass	451	294.0	157.0
Total	588		

Test Statistics

	Pass/Fail
Chi-Square[a]	167.680
df	1
Asymp. Sig.	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 294.0.

Figure 4
Descriptive Statistics and ANOVA

Descriptives

Grade

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Excel	152	65.8553	23.08045	1.87207	62.1564	69.5541
PowerPoint	146	72.9863	19.66828	1.62776	69.7691	76.2035
Windows	142	91.6056	15.75925	1.32249	88.9912	94.2201
Word	148	81.7568	15.80993	1.29957	79.1885	84.3250
Total	588	77.8469	21.15660	.87248	76.1334	79.5605

ANOVA

Grade

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	54450.277	3	18150.092	50.888	.000
Within Groups	208291.9	584	356.664		
Total	262742.2	587			

Figure 5
Bonferroni Comparisons of Grade By IFS100 Pass/Fail

Multiple Comparisons

Dependent Variable: Grade

Bonferroni

(I) Test	(J) Test	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Excel	PowerPoint	-7.13104*	2.18847	.007	-12.9245	-1.3376
	Windows	-25.75037*	2.20413	.000	-31.5853	-19.9154
	Word	-15.90149*	2.18091	.000	-21.6750	-10.1280
PowerPoint	Excel	7.13104*	2.18847	.007	1.3376	12.9245
	Windows	-18.61933*	2.22590	.000	-24.5119	-12.7268
	Word	-8.77046*	2.20291	.000	-14.6022	-2.9388
Windows	Excel	25.75037*	2.20413	.000	19.9154	31.5853
	PowerPoint	18.61933*	2.22590	.000	12.7268	24.5119
	Word	9.84888*	2.21847	.000	3.9760	15.7218
Word	Excel	15.90149*	2.18091	.000	10.1280	21.6750
	PowerPoint	8.77046*	2.20291	.000	2.9388	14.6022
	Windows	-9.84888*	2.21847	.000	-15.7218	-3.9760

*. The mean difference is significant at the .05 level.

GETTING TO THE HEART OF EMPLOYEES: THE HISTORY AND APPLICATION OF EMOTIONAL INTELLIGENCE FOR HUMAN RESOURCE PRACTICTIONERS

Diane Galbraith, Slippery Rock University
Susan Kelley-Stamerra

ABSTRACT

We are in the age of talent. Management of this talent exerts a powerful influence on the success of an organization. Human Resource practitioners are charged with selecting, developing, and training the workforce through talent management. One differentiator, "emotional intelligence (EI), has been shown to enhance a person's cognitive intelligence and contribute up to 390% incremental profit to a company's bottom line" (Goleman, Boyatzis, & McKee, 2002).

Plato said, "All learning has an emotional base." Not conversely, "Emotional intelligence is the ability to validly reason with emotions and to use emotions to enhance thought" (Mayer, Caruso, & Salovey, 1999). The capacity to perceive emotions, through human competencies like self-awareness, self-discipline, persistence, and empathy (Goleman et al., 2002) is a differentiating factor in educational and employment success.

This paper will review the high-stakes arena of emotional intelligence and the relevance to Human Resource practitioners. The primary objective is to identify the attributes and history of emotional intelligence. Second, the benefits of emotional intelligence will be discussed as they pertain to implementation into many human resource practices. Third, concepts that can be applied to enhance recruitment and retention of talent will be reviewed. Last, the relevance of emotional intelligence in organizations will be presented for use by organizations vying for the "best and the brightest" talent.

INTRODUCTION

Much of Human Resource Management concerns the pursuit of great talent, hiring and retaining great talent, says Tom Peters: "Give great talent wide-open spaces in which to roam! Promote great talent: Pay great talent" (2003). Talent management has become a veritable human resource imperative as the national and international demographics of industrialized countries are aging, and globalization has resulted in fierce competition for intellectual capital. Although many organizations say that their employees are key assets, few companies transform themselves into "talent magnets." Emotional intelligence may be the best indicator of goal attainment and success and a key asset in candidates and employees.

Although emotional intelligence is a relatively new term, it is a very important concept in relationships. Emotional and intellectual or cognitive intelligence are different kinds of intelligence based in different areas of the brain. While they are complementary in nature, intelligence quotient or IQ originates from the neocortex and the emotional center of the brain is located in the subcortex. When interacting with people, both their heart and their brain are engaged and the ability to read people through verbal and nonverbal communication is valuable. Possessing emotional intelligence or EI competencies, specifically in the Human Resource arena, can assist in all facets of the field.

ATTRIBUTES AND IMPLICATIONS OF EMOTIONAL INTELLIGENCE

Consider this scenario: Two employees with similar intellect and skill follow very different paths within the organization. One seems to advance far beyond the other. Is this based on "soft skills" versus technical proficiency? What accounts for this differential and success rate? Daniel Goleman (1998) believes that emotional intelligence is a better predictor of a person's path in life than pure intelligence. Many people with higher IQs end up working for others who have lower IQ's, but higher emotional intelligence.

As talent is at a premium, the most exciting part is that these concepts can be learned. Many researchers believe that the primary facets of intellect are innate, but that the attributes of emotional intelligence are teachable by example, experience, and oversight. Much research has been

conducted on the subject of emotional intelligence and the following characteristics have been identified in Primal Leadership, (Goleman et al., 2002, Appendix B):

Attributes	Implications for Employees
Self-Awareness	**can be developed**
Emotional	attuned to their inner signals
Self-Assessment	know their limitations
Self-Confidence	have a sense of presence
Self-Mgt	**can boost productivity and accomplishment**
Self-control	can manage their emotions and channel them
Transparency	live their values and beliefs
Adaptability	can multi-task and exhibit flexibility
Achievement	high personal standards to set attainable goals
Initiative	individuals control their own destiny
Optimism	helps people anticipate changes and opportunities
Social Awareness	**involves empathic listening; comprehension**
Empathy	ability to gauge emotional signals from others
Organizational	politically astute
Service	customer relationships are valued
Rel. Mgt.	**relationship with others; includes teamwork & conflict resolution**
Inspiration	create resonance through a shared vision
Influence	proficient in persuasion
Developing others	coaching and mentoring constructively
Change catalyst	recognize the need for change and barriers
Conflict mgt	ability to negotiate and redirect energy
Teamwork	ability to collaborate collegially and respectfully

THE HISTORY

In the Greek philosophy of influence, Aristotle defined the three main forms of rhetoric: ethos, pathos, and logos. Stephen Covey (2004) describes the following:

1. Ethos: your ethical nature; your personal credibility
2. Pathos: empathy; your feeling inside; your emotional quotient
3. Logos: logic; power & persuasion; your own thinking; your IQ.

Although these are not philosophical elements, but rather rhetorical ones, it is important to note the tendency toward emotion. The first two appeals, ethos (credibility or character) and pathos (emotional), are methods of persuasion using emotion and intellect. This sequence is essential, and both EI and IQ play a vital role.

Harvard psychologist and educator Howard Gardner (1983) was one of the earliest theorists to propose a distinction between emotional and intellectual competencies in his model of "multiple intelligences." Gardner (1983) argued against the one-dimensional view of intelligence based mostly on linguistic and logical mathematical intelligence and developed a conceptual framework including intrapersonal and interpersonal intelligence - two more of the seven intelligences. Testing based purely on IQ attributes was too limited according to Gardner, and attention should be given to other intelligences that would better portray the range of human potential as exemplified by artists, architects, entrepreneurs, etc. This theory has since been adopted by educators to liven the classroom by using different delivery techniques that capture the attention of students' unique minds and address their various learning styles.

The actual term, emotional intelligence, was created by Salovey and Mayer (1990). They described this concept as "a form of social intelligence that involves the ability to monitor one's own and others' feelings and emotions to discriminate among them and to use this information to guide one's thinking and action." Daniel Goleman, a science writer for The New York Times and a Harvard trained psychologist, was intrigued by this concept and was interested in the elements of success beyond traditional cognitive tests (Cherniss, 2000).

Hunter and Hunter's research (1984) on IQ suggests that tests for intelligence account for only 25% of the variance as a predictor of job performance. Other research believes that number is closer to 10%. There is also evidence that emotional and social skills help cognitive functions and they are

interrelated. These authors to date showed that IQ was the highest predictor of job performance.

More recently, pure cognitive abilities, combined with emotional intelligence, have proven to greatly enhance performance. According to research on accounting partners by Goleman, Boyatzis, and McKee (2002), significant strengths in analytic ability added 50% more profitability, while strengths in self-management competencies added 78%, and strengths in social skills added 110% more incremental profits.

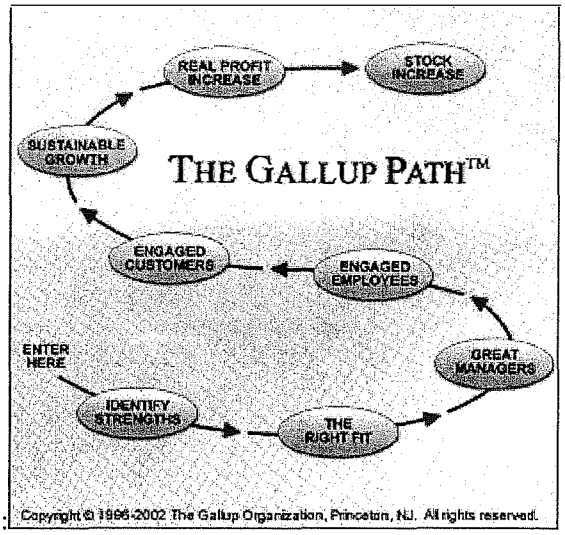
Quantitative social science research on leaders and performance has been scant according to anthropologist Laura Nader (1996) because CEO's and other senior managers who are in powerful positions resist any objective assessment of their abilities including IQ tests. In contrast, qualitative research (Fernandez-Araoz, 2001) indicates that IQ measures alone fail to account for large portions of the variance related to performance and success, especially among senior leadership. Research by Spencer and Spencer (1993) suggests that IQ alone does not predict performance as well as competencies that include cognitive, emotional, and social abilities. Cognition and emotion are interwoven through connections between the emotional centers and the neocortex and are not independent (Davidson, 2000). Therefore the definitions of emotional intelligence combine both cognitive and the emotional abilities.

THE BENEFITS

Most organizations recognize that human capital in the form of the key employees is one of the last competitive differentiators in industrialized countries. For Human Resource Managers to capitalize on the strengths of their people, they must create emotional engagement in order to retain these "A" players.

A movement toward an emotion-driven economy is rooted in extensive research by the Gallup organization. Gallup engaged 10 million customers, 3 million employees, and 200,000 managers in a global study across industry and job type. This research was based on the emotional center of the brain – the amygdale - that is the key to the way human beings process information and control behavior.

The world's greatest companies are becoming aware that they are competing in an emotion-driven economy, based on this tiny part of the brain that influences emotional responses and relationships (Gopal, 2004). Gallup believes that the following pathway is imperative for companies to survive and flourish:



The first benefit, according to this research, is that emotional engagement and emotional intelligence are keys to engaged employees, engaged customers, and sustainable growth.

The second benefit of emotional intelligence is that it contributes to improved performance and productivity based on an employee's ability to perceive, identify, and manage his/her emotions, which is increasingly more important in our age of change. People who are relationship-oriented benefit both internal and external customers. Studies conducted in the U.S. Navy revealed that the most effective leaders were warmer, more sociable, outgoing, and emotionally expressive - all of which are EI competencies (Cherniss, 2000).

Employees are also now considered free agents who are more informed and free to manage their own careers. Emotional intelligence makes these people more marketable.

The third benefit to Human Resource professionals is that EI capabilities and professional development training programs that enhance EI in employees can be a retention tool. Reducing the parade of talented employees out of an organization can be a huge economic advantage. HR departments that are truly employee-centered and value servicing their employees will also be communication centers to help people develop and to provide feedback. Human nature indicates that employees perform better when they feel good about themselves and when the organizations with which they are affiliated

are vested in their personal and professional development. It follows logically that a culture formed with intellectual and emotional proficiency should be a rewarding, gratifying place to work.

Other benefits include:

- A more harmonious culture and work relationships
- A linkage to laughter and humor in the workplace
- Greater productivity
- Enhanced listening skills
- Better adaptation to diverse cultures and languages (Guss, 2005).

Teaching management skills to undergraduates can also build emotional intelligence. In a study by Clark, Callister, and Wallace (2003), 121 students taking a 16 week management course significantly improved their emotional intelligence scores based on a pre-test/post-test while a control group of 113 taking other business courses did not. This study addressed the need to develop interpersonal skills in young adults as a success factor in life.

Students using an experiential exercise designed by Gibson (2006) explore emotional episodes from their respective work experiences to learn about individual and organizational effectiveness. Until recently, workplace emotions were to be left at the door and not discussed. Emotions at work are shown to be a central component of the workplace.

In contrast, ignoring emotional intelligence or the intelligent voice of the heart, can have a detrimental impact on the body, according to Doc Childre and Bruce Cryer (1999). Frustration and anxiety can lead to stress and these emotional states can impact the rhythm of the heart and diminish brain function, causing reasonably smart people to do relatively "dumb" things.

In a series of studies that spanned 20 years, Leitner and Robichaud (1997) focused on the cases of "burnout" in thousands of employees. The six primary ways that organizations de-motivated their employees were as follows:

1. work overload
2. lack of autonomy
3. skimpy rewards
4. loss of connection
5. unfairness
6. value conflicts

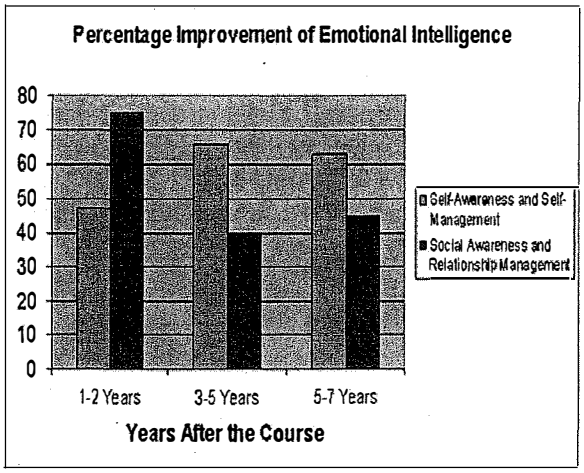
The old philosophy of coercion and control is ineffective today. No longer is simple authority an effective management tool. No longer can managers expect high returns from their workers simply because they demand those returns in exchange for a paycheck. This chronic, uninspired workplace will cease to exist in the long run. The advantages for a company that acknowledges a person's IQ and EI and creates a supportive culture for their employees are clear.

LEARNED CONCEPTS

The best news about emotional intelligence is that it is learnable, and it is an important factor in long-term effectiveness. As we age, EI skills often improve.

The 133 item Bar-On Emotional Quotient Inventory was the first EI instrument ever developed to test these competencies. This skills inventory created by Reuven Bar-On, a clinical psychologist from Israel, also measures similar characteristics in five scales: Intrapersonal, Interpersonal, Adaptability, Stress Management, and General Mood, including happiness and optimism. Extensive empirical research has supported the theoretical scales, and these inventories have been shown to be psychometrically sound. Emotional intelligence is a reflection of the way a person interacts or applies knowledge to an immediate situation and addresses the emotional, personal, social, and survival dimensions of intelligence (Bar-On, 1997).

Although the impact of genetics on behavior is recognized, there is evidence that EI competencies can be both measured and improved. In a study conducted at Case Western Reserve University, students participated in competency-building activities to assess emotional and cognitive intelligence. Although this was just one study, the following chart shows significant progress also sustained over time (Boyatzis, Cowan, & Kolb, 1995). These effects are much larger and sustained over time compared to traditional formal education and the effects observed in typical corporate leadership development training. The average increase in social and emotional competencies has been 2%, whereas this study indicates that it is possible to develop emotional intelligence and sustain such changes over time.



SELECTION & TRAINING

Organizations should consider integrating emotional intelligence based competencies into their hiring criteria. Due to the value of personal and organizational effectiveness associated with EI capabilities, these attributes, combined with other technical or business expertise, should be an essential component in the selection process.

More organizations are offering emotional intelligence training for employees. Human Resource Managers can help develop employees through the use of 360 degree instruments that measure emotional intelligence. Most people have difficulty being totally objective and tend to rate themselves higher on positive behavioral attributes, so this can be a good self-test and comparison with colleagues and management. In addition, HR can help people recognize that EI can be learned and increased throughout life stages. Training can focus on the identification of tendencies or shortcomings so employees can focus on improving areas of their personal/professional lives, such as acknowledging certain habits, reluctance to change, or other tendencies that could interfere with proper judgment or decision-making behaviors.

Measurements of EI vary from self-assessment and peer assessment to management – subordinate based on who is conducting the assessment and the purpose. According to proponents, emotional intelligence can be used to assess leadership skills such as conflict management, self-esteem, motivation, and adaptability.

Goleman (1998) purports that emotional intelligence is twice as important to people's success as raw intellect or technical knowledge. He believes when employees are promoted on the basis of technical ability and then fail in their new positions, it is because they were promoted for the wrong reasons (Fisher, 1998). Promotion now needs to incorporate emotional competencies as they become crucial for success in the progression up the career ladder.

THE RELEVANCE TO HUMAN RESOURCE MANAGEMENT

Human capital is today's bread and butter. According to Goleman (1998), "the premium on emotional intelligence will only rise as organizations become increasingly dependent on the talent and creativity of the workers. Even now, 77% of American knowledge workers say they decide what to do on the job, rather than being told by someone else." The proliferation of telecommuting, virtual teams, contingency workers, etc. will continue adding to the free agent mentality. Employees are working more autonomously, less for companies and more for themselves. EI competencies such as trustworthiness, self-awareness, and self-control will emerge as essential characteristics in 21st century employees. Emotional intelligence such as humor in the workplace can lighten an otherwise dark or pressurized situation.

Educators, Human Resource practitioners, and parents should take an active interest in preparing students for the contemporary workforce. This will include;

- Recognizing and understanding the value of emotional intelligence
- Cultivating and teaching emotional competencies
- Revamping curriculum and training to encompass EI
- Creating cultures and classrooms that nurture EI characteristics to increase joy in the environment.

Too often, unexpressed or marginalized feelings have been ignored to the detriment of a culture and at great cost to organizations. Problems swept under the rug never disappear; they simply manifest themselves in poor morale, diminished creativity, reduced motivation, or unproductive behavior. People, by definition, are relational beings who have a need to express themselves. Human Resource departments must be the frontrunners who lead the charge for their employees by providing a forum for the expression of feelings. The best and most effective teams have an esprit de corps where individuals feel trusted and respected. Helping people

manage their emotions and develop EI competencies creates a greater place to work.

An emotionally intelligent organization such as Egon Zehnder International, a global executive search firm, has the following four dimensions:

1. IQ – problem solving, logical reasoning, analytic ability
2. EI - building working relationships; team player; empathic listener
3. EI – getting things done; drive; energy; independent; imaginative
4. EI – personal fit; honesty; sense of humor; friend; outside interests (Goleman, 1998).

We can all create environments, focusing on human nature, to prove that people do matter and they deserve to be treated with respect. Human Resource professionals have an obligation to develop people-centered cultures and if you don't someone else will!

LIMITATIONS

There are detractors regarding emotional intelligence as a concept versus a theory. Schmitt, an industrial psychologist who has studied intelligence testing at the University of Iowa has stated that general mental ability tests only measure the productivity of employees 50% of the time. He questions the amount of research on EI though and believes that people like the sound of emotional intelligence more than general mental ability or IQ. Similarly Frank Lindy, business consultant and former Pennsylvania State University professor of psychology, believes that measuring personality traits and some mental ability makes sense although it takes massive amounts of time and effort to obtain significant improvement in them (Boyatzis & Burrus, 1995).

Also, within the emotional intelligence paradigm, three posited theories are outlined earlier. Each theory has attempted to understand the skills, traits, and abilities associated with emotional intelligence. Since there is no one correct version, this has created some confusion. The emotional intelligence construct is still relatively new and whether it can be termed a theory or not does not detract from the volume of traits and abilities that are not accounted for in the measurement of pure cognitive intelligence.

FUTURE RESEARCH

Some organizations, like Western Union, in Calgary, Canada are already using established emotional intelligence tests like BarOn's Emotional Quotient Inventory, (EQ-i), to test potential candidates, and to measure job applicant skills (Martinez, 1997). This type of testing seems to be on the rise, due to the stiff competition for qualified employees.

Maybe recruiters and managers have been screening some of the wrong attributes in the past. Selecting the right people is an acquired skill, and EI tests may shed a new light, leading to better hiring decisions and improved retention rates. Jim Collins (2001) discusses the need to get the right people on the bus to build superior teams and then determine what needs to be accomplished.

Future research will be conducted to determine the attributes of Human Resource Managers and practitioners to see if they are truly competent in these areas. Superior teams must begin in Human Resources, since they have a part in every hiring decision. Measuring these qualities in a company's decision makers will surely prove enlightening. From that point, staffers could attend training to learn additional skills if they were found to be lacking. Also, it would be interesting to compare and contrast EI skills in HR Managers versus managers in other functional departments.

One of the next research projects should be concentrated in these areas, because a gap exists in the measurement and application of EI competencies, particularly in Human Resources, whose primary function is to attract, develop, and retain the best talent possible.

CONCLUSION

The greatest danger for most of us
is not that our aim is too high and we miss it,
but that it is too low and we reach it.
Michelangelo

People matter now more than ever. The human element can no longer be ignored. Human Resource departments can not afford to set the bar too low anymore, especially with the impending skills shortage. Departments need to become proficient talent scouts with well-defined strategic plans for attracting, developing, and retaining top employees. In order for Human Resources to gain a seat at the table and be involved in strategic decision-

making, they must become the master architects in the war for talent (Peters, 2003).

Emotional intelligence, however, may still be a tough sell in some organizations. There is no simple solution to guarantee bottom line results, but people must be treated as key assets. Most people have an innate desire for a sense of significance and to feel that their work contributions matter. Consider the opening vignette about two individuals with similar intellect but very real differences in success rates. If emotional intelligence is linked to productivity and improved relationships, why, as a Human Resource Manager, would not you screen and hire using testing that includes EI skills, then train and develop employees based on these competencies?

Companies need a competitive edge and most agree that the edge will be achieved through the organization's human capital. Every business is vying for the limited talent that will help transform them into global players and profitable entities. Talent management may be the last frontier for true differentiation and will only grow as a corporate imperative. Marcus Buckingham captured this concept: "Discover what is unique about each person and capitalize on it" (2005). EI and IQ together help uncover people's unique talents that can be parlayed into productivity. In the war for talent, organizations can not afford to lose any battles, particularly by overlooking proven success factors, emotionally and intellectually. Tom Peters (2003) said, "People are obsessed with attracting talent. Pursue the best!"

The equation is simple: IQ (brain) + EI (heart) = the best organizational success.

REFERENCES

Bar-On, R. (1997). *Bar-On emotional quotient inventory: User's manual.* Toronto: Multi-Health Systems.

Boyatzis, R. E., & Burrus, J. A. (1995). The heart of human resource development: Counseling competencies. *The Consortium for Research on Emotional Intelligence in Organizations.* Retrieved September 19, 2006, from www.eiconsortium.org.

Boyatzis, R. E., Cowan, S. S., & Kolb, D. A. (1995). *Innovations in professional education: Steps on a journey to learning.* San Francisco: Jossey-Bass.

Buckingham, M. (2005). *The one thing you need to know: About great managing, great leading, and sustained individual success.* New York: Free Press.

Cherniss, C. (2000). *Emotional intelligence: What it is and why it matters.* Paper presented at the Annual Meeting of the Society for Industrial and Organizational Psychology, New Orleans, LA, April 15, 2000.

Childre, D., & Cryer, B. (1999). *From chaos to coherence.* Boston: Butterworth-Heinemann.

Clark, S., Callister, R., & Wallace, R. (2003). Undergraduate management skills courses and students' emotional intelligence. *Journal of management education, 27* (1), 3-23.

Collins, J. (2001). *Good to great.* New York: HarperCollins.

Covey, S. R. (2004). *The 8th habit: From effectiveness to greatness.* New York: Free Press.

Davidson, R. J. (2000). Cognitive neuroscience needs affective neuroscience (and vice versa). *Brain and Cognition, 42* (1), 89-92.

Fernandez-Araoz, C. (2001). The challenge of hiring senior executives. In C. Cherniss and D. Goleman (Eds.). *The emotionally intelligent workplace* (pp. 182-206). San -Francisco: Jossey-Bass.

Fisher, A. (1998). Success secret: A high emotional IQ. *Fortune, 138*(8), 293-4.

Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences.* New York: BasicBooks.

Gibson, D. E. (2006). Emotional episodes at work: An experiential exercise in feeling and expressing emotions. *Journal of Management Education, 30* (3), 477-500.

Goleman, D. (1998). *Working with emotional intelligence.* New York: Bantam Books.

Goleman, D. (1995). *Emotional intelligence: Why it can matter more than IQ.* New York: Bantam Books.

Goleman, D., Boyatzis, R., & McKee, A. (2002). *Primal leadership: Realizing the power of emotional intelligence.* Boston, MA: Harvard Business School Press.

Gopal, A. (2004). Managing in an economy of emotions, not reason (Part 1). *Gallup Management Journal*. Retrieved September 23, 2004, from http://gmj.gallup.com

Guss, E. (2005) *Emotional intelligence: Our most versatile tool for success.* A SHRM white paper.

Hunter, J. E., & Hunter, R. F. (1984). Validity and utility of alternative predictors of job performance. *Psychological Bulletin, 76* (1), 72-93.

Leitner, M. P., & Robichaud, L. (1997). Relationships of occupational hazards with burnout: An assessment of measures and models. *Journal of Occupational Health Psychology*, *2*(1), 35-44.

Martinez, M. N. (1997). The smart that counts. *Society for Human Resource Management*. Retrieved May 15, 2006, from www.shrm.org/hrmagazine/articles/1197COV.asp

Mayer, J., Caruso, D., & Salovey, P. (1999). Emotional intelligence meets traditional standards for an intelligence. *Intelligence*, *27*(4), 267-298.

McCracken, D. (2000). Winning the talent war for women: Sometimes it takes a revolution. *Harvard Business Review*, *78*(6), 3-8.

Michaels, E., Handfield-Jones, H. & Axelrod, B. (2001). *The war for talent.* Boston, MA: Harvard Business Press.

Nader, L. (1996). *Naked science: Anthropological inquiries into boundaries, power and knowledge.* London: Routledge.

Peters, T. (2003). *Re-imagine: Business excellence in a disruptive age.* London: Dorling Kindersley.

Salovey, P., & Mayer, J. (1990). Emotional intelligence. *Imagination, cognition, and personality, 9*(3), 185-211.

Simmons, S., & Simmons, J. C. (1997). *Measuring emotional intelligence: The groundbreaking guide to applying the principles of emotional intelligence.* Arlington, TX: The Summit Publishing Group.

Spencer, L. M. Jr., & Spencer, S. M. (1993). *Competence at work: Models for superior performance.* New York: Wiley.

Diana D. Galbraith is a professor at Slippery Rock University. Her research interests include human resources, and organizational behavior and leadership. She is pursuing a doctorate in leadership.

Susan Kelley-Stamerra is a technical writer and editor from Pittsburgh, PA. Her area of specialization is political and corporate rhetoric. She has recently worked with the City of Pittsburgh and Slippery Rock University. She is pursuing her PhD in Rhetorical Studies.

INTEGRATING INFORMATION TECHNOLOGY IN UNDERGRADUATE TAX ACCOUNTING CURRICULUM: A PILOT STUDY

A. Blair Staley, Bloomsburg University of Pennsylvania
Charles J. Russo, Parente Randolph, LLC

ABSTRACT

The use of information technology has become a key part of teaching accounting curricula. Individual and corporate tax courses are changing how the curriculum is delivered. Tax preparation software, tax research databases, spreadsheets, the Internet, and specialized software can be integrated into the tax curriculum to provide students hands-on experience with technology used in the field and to improve the learning process. This paper presents the experiences of integrating information technology in undergraduate tax accounting curriculum at a medium-size, AACSB-I accredited, regional state university.

INTRODUCTION

Albrecht and Sack's seminal 2000 study on improving accounting education called on accounting programs to produce accounting graduates that possess information technology skills and recommended that accounting programs include "technology assignments to teach technology" (p. 64). Despite this call from Albrecht and Sack and others (see Albrecht and Sack for an extensive discussion of and references to other studies calling for programs to produce accounting graduates who possess information technology skills), research indicates coverage of information technology will be lower than faculty members' perceived level of the importance (Chang & Hwang, 2003), and that information technology is a lower priority for educators than practitioners (Albrecht & Sack, 2000). This paper presents our experiences integrating information technology in undergraduate tax accounting curriculum at a medium-size, AACSB-I accredited, regional state university.

UNDERGRADUATE TAX ACCOUNTING CURRICULA

The undergraduate, tax accounting curricula consists of two courses, Federal Tax Accounting and Advanced Federal Tax Accounting. Consistent with the traditional approach to teaching accounting, Federal Tax Accounting covers an introduction to taxation, individual taxation, and the Schedule C. Advanced Federal Taxation covers the taxation of corporations, partnerships and other flow-through entities, as well as estates and trusts. In addition, students have the ability to participate as volunteers (and without course credit) in the university's Volunteer Income Tax Assistance program, a program that prepares and electronically files approximately 180 state and federal tax returns.

Federal Tax Accounting

After three years of trial and error, information technology is now integrated in the Federal Tax Accounting course in a number of different ways – through tax preparation software, through spreadsheets, through tax research databases, through the Internet, through online course platforms, and through specialized software.

Tax Preparation Software

Tax preparation software is integrated in Federal Tax Accounting in two ways. First, students prepare tax returns using TurboTax. TurboTax now comes bundled with the West taxation texts (Willis, Hoffman, Maloney, & Raabe, 2007). Because accounting students are likely to use such software for their own returns and because accounting students are likely to be asked, by other *pro se* filers, questions about such tax preparation software, it is important that students become familiar with such software, even if they are unlikely to use it for professional tax preparation work. Students are required to e-mail their tax returns to the instructor, so that the instructor can tell by the file type that TurboTax was used to prepare the returns.

Second, students prepare tax returns using ProSeries. ProSeries is now available with no charge from Intuit as part of Intuit's Educational Institute Software Program (See http://www.proseries.com/training/edu_program_overview.aspx). Again, students are required to e-mail their tax returns to the

Tax Research Software

In addition to preparing returns using tax preparation software, students perform research on tax law using CCH Tax Research Network, which is available on-line to accounting students (RIA tax research comes bundled with the West texts, for those without such access). Students use the CCH Tax Research Network to prepare tax memoranda on various hypothetical fact situations for hypothetical clients. Students are required to research classical tax cases, such as *Comm'r v. Flowers* (1945) and *Corn Products* (1955). Topics include travel away from home, the classification of various property transactions as inventory or § 1231 property or as capital property, and the like. The department also arranged for professional trainers from Commerce Clearing House to train students on CCH Tax Research Network.

Internet

In addition to preparing returns using tax preparation software and to using tax research software, students are required to use the Internet to gather information related to taxation. Students are required to retrieve forms from the IRS, retrieve information from the principal Enrolled Agent web site, and retrieve information from various courts' websites.

Advanced Federal Tax Accounting

Multiple technologies are currently integrated into the Advanced Tax curriculum including a course website, professional tax software, online tax research databases, spreadsheet, and word processing software. Additional software currently used in the field is demonstrated in class.

The course website includes announcements, course information, staff information, email, threaded discussion, automated class lectures, selected text solutions, grading and links. Students submit assignments through the digital drop box and have real time access to their grades.

ProSeries professional tax software is used for multiple assignments. The software is licensed to the University through Intuit. Students have been required to prepare tax returns for C-corporations, S-corporations, and partnerships. Students have also completed a C-corporation tax return using TurboTax for Business. Similarities and differences in the software interfaces and functionality are highlighted through the assignments and resulting class discussion. In addition, students have been provided with in-class demonstrations of Ultra Tax, and Pro System Fx to provide a broad exposure to professional tax software.

Electronic spreadsheets are used extensively by tax professionals in the field. Many tax return supporting schedules and advanced calculations are performed using spreadsheets. Students have been required to submit Excel assignments on the course website. Students are required to create a spreadsheet for Form 1120 Schedule M-1 and additional supporting statements.

Students complete basis calculations in Excel for multiple years for an S-Corporation with three shareholders. The S-corporation has losses in the early years which reduce stock basis to zero. This results in shareholder loans to the corporation to create additional basis in debt. Losses completely eliminate both stock and debt basis. In the out years, the entity passes through enough income to restore debt basis, restore stock basis, and provide for cash distributions to the shareholders.

Students have also been required to submit an Excel spreadsheet for allocation of partnership income and losses. This assignment involves a limited partnership with losses in excess of capital contributions, allocations to general and limited partners, and personal guarantees of debt by selected limited partners. Students provide calculations to limit pass-through losses to the limited partners with the excess losses passed through only to the general partners who have basis in partnership debt. In addition, the general partner is another partnership providing students with exposure to tiered partnership arrangements. Students also create an Excel spreadsheet for Form 1041 Trust calculations including distributable net income (DNI) and trust taxable income.

Students in Advanced Taxation are required to use the CCH online research databases for federal tax research. Tax research papers are submitted in word processing software formatted as facts, issues, discussion, conclusions/recommendations.

Additional technologies demonstrated in class include FAS depreciation software, PPC tax research databases, specialized software such as Steve Leimburg's number cruncher, present value, and amortization software. There is additional discussion of the paperless office, the extensive use of notebook computers in the field, personal data

assistants, wireless communications, and integration of tax software with other software such as CCH Trial Balance and Audit Vision.

Volunteer Income Tax Assistance Program

Although not an official part of the accounting curriculum, students are encouraged to participate in the university's Volunteer Income Tax Assistance Program (VITA). To help students gain an understanding of information technology, the program began filing tax returns electronically as part of its Volunteer Income Tax Assistance. The program uses the TaxWise software provided by the IRS. In previous years, students prepared and electronically filed approximately 180 state and federal tax returns.

METHODOLOGY

Although this paper is intended to be primarily descriptive, administrative data are available to evaluate students' experiences. Students' experiences are formally evaluated in Federal Tax Accounting with an anonymous supplemental questionnaire that is administered at the same time as the formal class evaluations. This administrative questionnaire was developed before the authors' teaching the class. It contains several limitations. For example, it was intended to assess student perceptions on knowledge, skills, and abilities gained in Federal Taxation in total, and not as a result of specific pedagogical techniques. The administrative questionnaire also contains no demographic data and no data on students' performance in this or other accounting class. The administrative questionnaire also contains double-barreled questions (because the questionnaire was intended to be used for administrative purposes, it was decided that it was more important to continue to use this questionnaire, despite its limitations, to provide for comparability over time).

Nonetheless, it was decided that the data provide some information on integration of information technology in the undergraduate tax accounting curriculum.

Questionnaire

The administrative questionnaire has two questions, questions 4 and 6, that are generally related to integration of information technology in the undergraduate tax accounting curriculum. The questionnaire is reproduced in the appendix.

Question 4 generally relates to the use of information technology for tax preparation. Question 6 generally relates generally relates to the use of information technology for tax research.

Analysis

To analyze the data, arithmetic means were computed for each of the six semesters from the Fall 2003 through the Spring 2006. A simple, time-series regression analysis was then performed, with a dummy variable included to indicate the introduction of TurboTax and ProSeries in Federal Tax Accounting course and TaxWise in the VITA program in the fall of 2005, and CCH tax research training in the Spring 2004.

RESULTS

Table 1 shows the mean responses to these questions for the past six semesters.

Table 1
Means of the Responses to Question 4 and Question 6 by Semester

Semester	Question 4 (Information Technology for Tax Preparation)	Question 6 (Information Technology for Tax Research)
Fall 2003	4.21	4.68
Spring 2004	4.63	4.84
Fall 2005	3.68	4.32
Spring 2005	4.47	4.84
Fall 2006	4.45	4.70
Spring 2006	4.29	4.74

Tables 2 and 3 show the result of the time-series regression analysis.

Table 2
Summary of Regression Analysis for Question 4 (Information Technology for Tax Preparation)

Variable	Standardized Beta Coefficient	T	p
Time	-0.03	-0.17	0.88
Dummy Variable for the Introduction of TurboTax and ProSeries in Federal Tax Accounting course and TaxWise in the VITA program in the fall of 2005	0.21	0.33	0.76

Note: $R^2 = .011$.

Table 3
Summary of Regression Analysis for Question 6 (Information Technology for Tax Research)

Variable	Standardized Beta Coefficient	t	p
Time	0.18	0.23	0.83
Dummy Variable for the Introduction of Professional Training for CCH Tax Research Software in the Spring 2004	-0.10	-0.13	0.90

Note: R^2 =.018.

The regression analyses indicate a positive, but not significant effect from the introduction of using TurboTax and ProSeries in Federal Tax Accounting and TaxWise in the VITA program in the Fall of 2005 and students' perceptions of their abilities to prepare tax returns by hand and by computer. The regression analyses indicate a negative, and not significant effect from the introduction of professional training on CCH Tax Research Network, and their abilities to use the Internet as a tool for tax research and to obtain various tax documents.

DISCUSSION

This paper details what we have done to integrate information technology in our undergraduate tax accounting curriculum. We have integrated information technology to build students' information technology skills in general, on the assumption that the more students use information technology, the more they will be comfortable with it, regardless of its application. We have integrated information technology to improve students' ability to prepare tax returns. We have integrated information technology to improve students' ability to perform tax research and to prepare tax memoranda. We describe the information technology used, and where others may acquire this technology (generally at no additional cost to the institution).

Informal discussions with students indicate positive experiences with this integration of information technology in the undergraduate tax accounting curriculum. For example, recent accounting graduates told us that integrating ProSeries in the undergraduate tax accounting curriculum was "very helpful" and "beneficial" as it enabled them to very quickly master the professional tax software used by the public accounting firms at which they are employed. These former students also told us that the professional CCH Tax Research Training and the assignments to retrieve cases from it were "very helpful in their work" (in student argot, helped "big time"). Indeed, these former students told us that they did not realize at the time how beneficial learning how to use the CCH Tax Research software would be to them. Former students also told us that retrieving forms and documents from the IRS website was beneficial to them in their professional careers. In sum, informal discussion with former students indicated that all of the aspects of integrating information technology in undergraduate tax accounting curriculum were helpful in that they were provided knowledge, skills, and abilities with the tools that they have had to use at public accounting firms at which they are employed.

While this paper is intended to be primarily descriptive in nature, these informal discussions with our former students are weakly supported by the data in regard to tax preparation, which indicate a positive but not significant effect from the integration of information technology on students' perceptions of their ability to prepare tax returns, but are not supported by the data in regard to their ability to conduct tax research. Perhaps the latter result is due to the small sample size or because non-professional instruction was done before the introduction of professional instruction.

Of course, the integration of information technology in the undergraduate accounting curriculum is in no way intended to replace manually preparation of tax returns. Students are still required to manually prepare federal tax returns both for homework and on examinations. When using information technology to prepare returns, students are also encouraged to manually prepare returns first, and manually prepared returns are taken into consideration in awarding partial credit for returns prepared with tax software.

The integration of information technology for tax research is also not intended to replace students' writing tax memoranda. Indeed, the professional training on the CCH Tax Research Network is directly tied to preparation of tax memoranda, and students are required to use the CCH Tax Research Network to conduct research and prepare memoranda. The information technology enables us to demand more and more sophisticated memoranda.

Regarding future research, clearly more statistical analysis needs to be done with the limited

survey data available. For example, where possible, such control variables as class grade point average and student grade point average need to be included. Further, the survey, which was inherited by the authors, needs to be refined. For example, both questions are double-barreled questions; a student may have increased ability to prepare tax returns by computer and less ability to prepare it by hand, and this would stilt responses to question 4 in regards to information technology. The authors need to develop a revised survey instrument to collect data related to course objectives, technology needs, and a proposed notebook computer requirement. The authors also need to collect data from the Advanced Federal Taxation course.

Regarding future programmatic concerns, our future plans under consideration include making the VITA a separate course, which would expose students to the additional use of information technology.

CONCLUSION

Contrary to commonly held expectations, incoming accounting students have limited information technology skills (Stoner, 1999). This paper explains what we have done to integrate information technology in the tax accounting curriculum through tax preparation software, spreadsheets, tax research databases, the Internet, online course platforms, and specialized software.

While more research needs to be done on the effect of integrating information technology in the tax accounting curriculum, this paper contains information that will help other universities that wish to integrate information technology in their tax accounting curriculum. It provides no-additional-cost sources for universities for information technology for both tax preparation and tax research. It also provides examples of assignments and projects for tax preparation and tax research that use informational technology. We believe that such information will help universities meet Albrecht and Sack's (2000) call to improve accounting education by helping produce accounting graduates that possess information technology skills and by including "technology assignments to teach technology" (p. 64).

REFERENCES

Albrecht, W. S., & Sack, R. J. (2000). *Accounting education: Charting the course through a perilous future* (Accounting Education Series Volume 16). Sarasota, FL: American Accounting Association. Retrieved April 4, 2006 from http://aaahq.org/pubs/AESv16/toc.htm

Chang, C. J., & Hwang, N. R. (2003). Accounting education, firm training and information technology: A research note. *Accounting Education: An International Journal, 12*(4), 441-450.

Comm'r v. J. N. Flowers, 326 U.S. 465 (1945).

Corn Products Refining Company, Petitioner v. Comm'r 350 U.S. 46 (1955).

Stoner, G. (1999). IT is part of youth culture, but are accounting undergraduates confident in IT? *Accounting Education: An International Journal, 8*(3), 217–37.

Willis, E., Hoffman, W.H., Maloney, D.M., & Raabe, W.A. (2007). *West federal taxation 2007: Comprehensive (with RIA and Turbo Tax basic/business)*. Mason, OH: Thomson South-Western.

A. Blair Staley, Nova Southeastern University, is an associate professor and MBA program coordinator at Bloomsburg University. His research interests include behavioral issues in accounting, federal taxation and accounting pedagogy.

Charles L. Russo, is a senior tax manager at Parente Randolph, LLC. His research interests include federal and international taxation and behavioral issues in accounting.

APPENDIX

XYZ University
Faculty and Course Evaluation Form
Supplemental Questions
Federal Tax Accounting
Semester

For each area listed below, please select the response that best describes your personal level of knowledge or understanding gained from this course:

5 Strongly Agree 4 Agree 3 Neither Agree or Disagree 2 Disagree 1 Strongly Disagree

1. I have a technical and conceptual understanding of individual taxation.

   5 4 3 2 1

2. I have an appreciation of the historical and theoretical issues behind tax legislation.

   5 4 3 2 1

3. I have an ability to identify professional and scholarly publications needed for continued professional development.

   5 4 3 2 1

4. I have an ability to prepare individual tax returns by hand & by computer.

   5 4 3 2 1

5. I have an understanding of the difference between tax accounting and financial accounting.

   5 4 3 2 1

6. I have the ability to use the Internet as a tool for tax research and to obtain various tax documents.

   5 4 3 2 1

NORTHEASTERN JOURNAL
OF BUSINESS, ECONOMICS
AND TECHNOLOGY
Clarion University of Pennsylvania
College of Business Administration
Clarion, PA 16214