

MIDWESTERN BUSINESS AND ECONOMIC REVIEW

**Number 41
Spring 2008**

In This Issue

International Financial Market Integration: An Econometric Study

Mohammed Ansari and Syed Ahmed

Evidence of the Lack of Effectiveness of Low-Income Savings Incentives

Julia M. Camp, Teresa Stephenson and Stacy R. Wade

Educating Tomorrow's Accountants: A South-Texas Survey of Employers' Perspectives on the Knowledge and Skills Required of Entry-Level Accountants

Thomas Madison, Suzanne Cory and Mark Persellin

Quality of Care in Texas Nursing Facilities Revisited

Kris Joseph Knox, Eric C. Blankmeyer, Ha-Chin Yi and J. R. Stutzman

Identifying Motivation-Based Recreational Fishing Markets

Yeong Nain Chi

Volatility Dynamics Across International Stock Markets

Rafiqul Bhuyan Rafiq, Yoshi Fukasawa and A. Sobur Molla

A Summary and Analysis of the Fasb's Proposed 'Ownership Approach' For Distinguishing Between Financial Instruments to be Classified as Liabilities Versus Equity

Konrad E. Gunderson

Disaggregated Business Fixed Investment: The Response of Structures and Equipment to Macroeconomic Fluctuations and Policies

LtCol Jeffrey S. Smith and M.H. Tuttle



BBGR

**Bureau of Business and Government Research
Midwestern State University
Wichita Falls, Texas**



Midwestern State University
Wichita Falls, Texas
<http://www.mwsu.edu>

Jesse W. Rogers
President

Friederike Wiedemann
Provost

Anthony F. Chelte
Dean
Dillard College of
Business Administration

Please direct all comments to:

Editor:

*Midwestern Business
and Economic Review*

Bureau of Business and
Government Research

Dillard College of
Business Administration

Midwestern State University
3410 Taft Boulevard
Wichita Falls, Texas 76308-2099

Telephone: (940) 397-4661

Fax: (940) 397-4693

MIDWESTERN BUSINESS AND ECONOMIC REVIEW

The *Midwestern Business and Economic Review* is published twice a year, in the fall and spring, by the Bureau of Business and Government Research. The articles published present the points of view of the individual authors and do not necessarily reflect those of the Bureau of Business and Government Research, the Dillard College of Business Administration, or Midwestern State University. The authors assume responsibility for the accuracy of facts published in the articles.

The *Midwestern Business and Economic Review* invites submission of original manuscripts and research by individuals in the public and private sector in the areas of economics and business administration. Of particular interest are topics dealing with issues relevant to Texas and the Southwestern United States. Submission requirements may be found inside the back cover.

Additional copies of this issue are available upon request for \$5.00.

EDITORIAL REVIEW BOARD

- **James Owen - Editor**
Midwestern State University
- **Brenna Barrett - Editorial Assistant**
Midwestern State University
- **Anne Davey**
Northeastern State University
- **Elizabeth Ferrell**
Southwestern Oklahoma
State University
- **Mark Frank**
Sam Houston State University
- **Jim Horner**
Cameron University
- **Adam Lei**
Midwestern State University
- **S. Hussain Ali Jafari**
Tarleton State University
- **Joshua Lewer**
West Texas A&M University
- **William T. Mawer**
Southeastern Oklahoma
State University
- **Roy Patin**
Midwestern State University
- **Robert L. Taylor**
Radford University
- **Qian Li**
Midwestern State University

Table of Contents

International Financial Market Integration: An Econometric Study <i>Mohammed Ansari and Syed Ahmed</i>	1
Evidence of the Lack of Effectiveness of Low-Income Savings Incentives <i>Julia M. Camp, Teresa Stephenson and Stacy R. Wade</i>	11
Educating Tomorrow's Accountants: A South-Texas Survey of Employers' Perspectives on the Knowledge and Skills Required of Entry-Level Accountants <i>Thomas Madison, Suzanne Cory and Mark Persellin</i>	19
Quality of Care in Texas Nursing Facilities Revisited <i>Kris Joseph Knox, Eric C. Blankmeyer, Ha-Chin Yi and J. R. Stutzman</i>	27
Identifying Motivation-Based Recreational Fishing Markets <i>Yeong Nain Chi</i>	37
Volatility Dynamics Across International Stock Markets <i>Rafiqul Bhuyan Rafiq, Yoshi Fukasawa and A. Sobur Molla</i>	41
A Summary And Analysis of the Fasb's Proposed 'Ownership Approach' For Distinguishing Between Financial Instruments to be Classified as Liabilities Versus Equity <i>Konrad E. Gunderson</i>	49
Disaggregated Business Fixed Investment: The Response of Structures and Equipment to Macroeconomic Fluctuations And Policies <i>LtCol Jeffrey S. Smith and M.H. Tuttle</i>	55

ABSTRACTS

INTERNATIONAL FINANCIAL MARKET INTEGRATION: AN ECONOMETRIC STUDY

The main purpose of this study is to examine the impact of globalization on international financial market integration. We use monthly data for ten major stock markets covering the period from January 1990 to July 2005. In order to avoid spurious results, we first apply unit root tests for determining the stationarity conditions of the data set. The Johansen and Juselius method is used to test for the existence of long run equilibrium relationships among various markets. The presence of a unit root and the existence of a long run equilibrium relationship would imply that each market individually is weak-form efficient but they are inefficient collectively. Hence, even though price movement in a given market is random, it is possible to predict price movement in one market with the help of price movement in another market. We further investigate the causal links between various markets applying both a bivariate and a multivariate approaches. The findings of this study are expected to provide valuable insights into international portfolio diversification as an investment strategy.

EVIDENCE OF THE LACK OF EFFECTIVENESS OF LOW-INCOME SAVINGS INCENTIVES

The government has a propensity to target low and moderate income taxpayers with programs designed to encourage greater savings. We surveyed a set of such taxpayers to determine the effect of the latest of these programs. We show that saving for retirement is not a priority in the lives of these taxpayers. The low priority given to saving is often due to immediate necessary costs such as housing, food, and transportation. However, this research shows that taxpayers give nonessential items and activities such as cable television and internet services more priority than saving. We also show that most of the participants were not even aware of the tax incentives available to them.

In light of these results and evidence from other studies showing that individuals will save when given the right opportunities, we support arguments in favor of modifying the current "Saver's Credit" and adopting the Automatic Individual Retirement Account (IRA) currently proposed in Congress. We also suggest an "opt-out" program offered through direct deposit or small employers along with a government match as an alternative way of packaging incentives for retirement savings. By making the retirement vehicle readily available with a transparent, immediate match, the effectiveness of the incentive should increase dramatically for those qualified.

EDUCATING TOMORROW'S ACCOUNTANTS: A SOUTH-TEXAS SURVEY OF EMPLOYERS' PERSPECTIVES ON THE KNOWLEDGE AND SKILLS REQUIRED OF ENTRY-LEVEL ACCOUNTANTS

Several studies have questioned the ability of accounting programs to adequately educate individuals for careers in accounting and have called for reforming accounting curricula to address knowledge and skills required of entry-level accountants. This paper offers the results of a survey of accounting and finance professionals employed in south Texas in public and in private accounting as to their perspectives on the knowledge and skills required of entry-level accountants. Our results indicate that perspectives between the two groups share many commonalities yet differ in several aspects, which we believe may affect accounting educators' approach to curriculum development and design.

QUALITY OF CARE IN TEXAS NURSING FACILITIES REVISITED

Recent popular press articles reinforce the conventional wisdom that, nationwide, nonprofit and independent nursing facilities provide higher quality levels of long-term care. Further, Texas regulatory inspectors have been singled out for providing quality ratings which are too high.

Previous studies of Texas nursing facility quality indicate that long-term care is comparable in profit-seeking and nonprofit facilities, independent and chain member facilities, and urban and rural homes when control variables such as facility size, intensity of care, size of nursing staff, number of care days provided and type of funding are considered.

This study updates the situation in Texas and finds mixed support for the generally accepted conventional wisdom.

IDENTIFYING MOTIVATION-BASED RECREATIONAL FISHING MARKETS

This study investigated fishing motivations of anglers who fished in Louisiana's Red River area and identified anglers' groups exhibiting common patterns of responses. Included in the questionnaire was comprised of nineteen statements regarding the reasons why people fish to discern patterns in individuals' preferences. Using the principal components analysis, these statements were condensed into three dimensions. The three clusters of respondents, named Active, Competitive and Leisure, represented Red River anglers grouped on the similarity of their fishing motivations.

VOLATILITY DYNAMICS ACROSS INTERNATIONAL STOCK MARKETS

The purpose of this paper is to investigate the time-varying risk return relationship within the GARCH framework and the persistence of shocks to volatility both in the developed and emerging markets. The non-normality of the emerging market return series data revealed by the coefficients of skewness and kurtosis suggests using non-linear models. However, using the GARCH type models, it is found that emerging markets are more volatile and there is long-term persistence in emerging markets compared to developed markets. The unique features of the study include a large sample size with updated data set that reveals the world economy and volatility (synonymous with risk) testing that reports the risk return characteristics, leading to the venues for further research on the global diversification.

A SUMMARY AND ANALYSIS OF THE FASB'S PROPOSED 'OWNERSHIP APPROACH' FOR DISTINGUISHING BETWEEN FINANCIAL INSTRUMENTS TO BE CLASSIFIED AS LIABILITIES VERSUS EQUITY

This paper provides an update of progress in the Financial Accounting Standards Board (FASB) ongoing project for defining classification and measurement guidelines for financial instruments. Ever since the Securities and Exchange Commission (SEC) ruled in 1979 that redeemable shares could no longer be classified within the stockholders' equity section of the balance sheet, the FASB has struggled to provide a framework of rules for classifying these and other hybrid financial instruments. This paper includes a summary of the classification criteria contained in the FASB's current proposed framework, the Ownership Approach, and an overview of the three approaches the FASB is considering (Ownership Approach, Ownership-Settlement Approach, and Reassessed Expected Outcomes). Implications of adopting the Ownership Approach are discussed, including financial statement effects of the new classification criteria.

DISAGGREGATED BUSINESS FIXED INVESTMENT: THE RESPONSE OF STRUCTURES AND EQUIPMENT TO MACROECONOMIC FLUCTUATIONS AND POLICIES*

This paper examines the separate behavior of equipment investment and structures investment, the two components of business fixed investment (BFI). Both are shown to respond to shocks in the other. Over the short run, equipment shocks explain a larger proportion of variation in structures, but shocks to structures play a small role in explaining equipment investment variations. Equipment and structures investment respond positively to M2 shocks and real GDP shocks. Finally, this research finds equipment investment is endogenous in the long run sense and is Granger-Caused by M2 in the short run. Conversely, tests fail to reject the null of weak exogeneity of structures investment, and this subcomponent of BFI is Granger-Caused by equipment investment in the short run.

*The views expressed in this paper are those of the authors and do not necessarily reflect the official policy or position of the U.S. Air Force, the Department of Defense, or the U.S. Government

INTERNATIONAL FINANCIAL MARKET INTEGRATION: AN ECONOMETRIC STUDY

Mohammed Ansari, College of Business, Albany State University
Syed Ahmed, School of Business, Cameron University

1. INTRODUCTION

Globalization, which has been the hallmark of the past several decades, has received considerable attention from both academicians and practitioners in the fields of economics and business. A great deal of discussion has centered on the quantification of financial market integration and its ramifications. The term 'integration' has been used in two important ways in the literature. First, it has been used to mean the sensitivity of international capital flows to changes in inter-country interest rate differentials and the second, to mean the co-movement of international financial markets (Boocha-oom and Stansell (1990)). The focus in this paper is on the second. More specifically, we are interested in determining the degree of co-movement among various markets in the 1990s and beyond. The issue of international financial integration continues to receive so much attention because it has a direct bearing on the efficacy and effectiveness of international portfolio diversification as an investment strategy. If markets move together in the temporal sense, then investing in foreign markets would have no added benefit, undermining the age-old paradigm of international diversification. The topic has been empirically investigated in many studies. 'As expected, the results vary depending on the methodology used, hypothesis tested, and on the sample period covered. However, the findings in these studies are based on 1970s, 1980s, and earlier data sets. With an accelerating pace of globalization in the 1990s and beyond, it is very likely that the linkage between world stock markets has grown stronger, rendering international diversification even less effective as an investment strategy. Thus, there is clearly a need for a re-examination of the issues. In this study, we use monthly data for ten major world stock markets covering the period from January, 1990 to July, 2005. A battery of test procedures is employed to determine the stationarity conditions of the data set. The Johansen and Juselius method is used to test for the existence of long run relationship among various markets. If a given market is found to contain unit root or a random walk, it would imply that the market is weak-form efficient. Similarly, if markets are collectively found to be cointegrated, this would suggest that globalization has significantly enhanced international financial integration and that collectively markets are not efficient. We also investigate the causal links between various markets by using both the bivariate approach imbedded in the Granger causality tests and the multivariate approach imbedded in the vector autoregressive approach. The findings of this study would provide valuable insights into international portfolio diversification as an investment strategy. The rest of the study is organized as follows. Section 2 provides a synopsis of previous studies. Section 3 describes the data and the relevant

methodology. Section 4 contains empirical results and their interpretations. Section 5 consists of summary and conclusions.

2. REVIEW OF LITERATURE

Various aspects of the issue of financial integration have been investigated extensively in numerous studies, as mentioned earlier. Here we present a brief synopsis of only a few relevant studies. Blackman *et al.* (1994), have used monthly share prices from 17 countries from 1970:01 to 1989:02 and tested for evidence of integration. To determine any shift in the degree of integration over time, they subdivided the sample period into two sub-periods, one covering from January 1970 to December 1979 and the other from January 1984 to February 1989. They argue that international financial markets were highly segmented prior to the 1980s.² But financial liberalization and many related developments in the 1980s contributed to an increased financial integration. In their investigation, presence of unit root indicated that movement in each market individually was random and hence weak-form efficient. Based on the results from the Johansen cointegration tests, they found evidence of strong long-run equilibrium relationships among these markets. This led them to conclude that these markets have become increasingly integrated in the 1980s.³

In their study on Hong Kong, Japan, Singapore, South Korea and the United States, Chan *et al.* (1992), used daily and weekly data from February 1, 1983 to May 18, 1987. They employed unit root tests and two-step Engle and Granger methodology for cointegration tests. Like, Blackman *et al.*, their findings from the unit root tests indicated that each market moves randomly and therefore, is weak-form efficient. However, their results from cointegration tests (both pair wise and higher order) indicated that there is no long-term equilibrium relationship among the markets. Therefore, one country's stock price movement cannot be used to predict movement in another country's stock prices. These results led them to conclude that international diversification is still effective. Their results seem to have corroborated the findings in Coleman (1990) and are in line with MacDonald and Taylor (1988, 1989). Dwyer and Hafer (1988) employed unit root tests to study co-movement of stock markets in West Germany, Japan, the United Kingdom and the United States. Eun and Shim (1989) have used the vector autoregression techniques to examine interdependence among various stock markets. Both these studies have found evidence of co-movement. In another study, Bhoocha-oom and Stansell (1990) have used monthly data from 1976 to 1986 and examined the co-variability of interest rates between Hong Kong, Singapore and the U.S. They have found strong evidence

of co-variability in nominal interest rates. The real interest rates for Hong Kong and the United States are found to be somewhat integrated, but those for Singapore and the United States appeared to be independent.

3. DATA AND METHODOLOGY

In this study we have used monthly data from January 1990 to July 2005 for ten major stock markets, namely, Australia (AU), Canada (CA), France (FR), Germany (GE), Hong Kong (HK), Japan (JA), Singapore (SI), Switzerland (SW), the United Kingdom (UK), and the United States (US). These markets are chosen for our study mainly because they represent the largest Asian, European and North American markets. Also, paucity of consistent data did not allow us to include some other important markets. All data points consist of closing numbers for their respective stock indices. The historical data sets have been extracted from the relevant Yahoo finance sites. However, the TSE300 data series for Canada has been obtained from <http://www.neatideas.com/data/data/tse300M.htm>. Since the objective is to determine the degree of financial integration in the 1990s and beyond, January 1990 represents the beginning period. The ending period, July 2005, represents the most recent data point available. Please see Appendix Table A for details of these markets indices.

It is well-known that most macroeconomic time series are non-stationary. This means that their means, variances and co-variances are not time independent, rendering all estimated results unreliable. Thus, testing for the presence of unit root is vitally important in any empirical study. The Augmented Dickey-Fuller (ADF) is the most commonly used technique for testing stationarity. Since this technique is now routinely used, only a brief discussion is in order. The ADF test uses an equation of the following form.

$$\Delta x_t = \alpha_0 + \alpha_1 x_{t-1} + \sum_{i=1}^p \alpha_{2i} \Delta x_{t-i} + e_t \dots \dots (1)$$

where Δ is the first difference operator and e_t is zero mean white noise error term. The null hypothesis that x_t contains a unit root (is non-stationary) amounts to testing $H_0: \alpha_1 = 0$. The null hypothesis is rejected if α_1 takes a negative value and is significantly different from zero, in which case the series is considered stationary in level or $I(0)$. The lag structure is chosen such that the error-term e_t becomes white noise. The test statistic has a special distribution (Fuller, 1976). In our study, the presence of unit root would imply that each market individually is weak-form efficient and that consecutive changes in share price cannot be explained.

In a bivariate case, each of the two series x_t and y_t can individually be non-stationary, but a linear combination of the two, say $Z_t = x_t - \sigma y_t$ can either be non-stationary or stationary. In general, two variables are considered cointegrated if both are integrated of order k but a linear combination of the two is integrated of order $k-1$. Thus, cointegration test helps determine the existence of a long-run equilibrium relationship among the set of variables in the model. Johansen (1988)

and Johansen and Juselius (1990) is the most widely used technique for testing cointegration. The test results are carefully interpreted for accepting or rejecting the null hypothesis of no cointegration. The rejection of the null hypothesis would mean that there is a long run relationship between all ten markets and that globalization has resulted in a growing integration of the financial markets, undermining international portfolio diversification as a useful strategy.

As we will see later, all variables are found to be cointegrated. As such, there is a necessary causal nexus among them. To examine the causality issue, we first adopt a multivariate approach and estimate a vector autoregressive model (VAR). This approach alleviates the omitted variable problem that can arise in a bivariate model. It also alleviates the simultaneity problem frequently encountered in a single equation model. The VAR model allows all variables in the system to interact with itself and with each other, without having to impose a theoretical structure on the estimates. Moreover, it provides a convenient method of analysing the impact of a given variable on itself and on all others with the help of variance decompositions (VDCs) and impulse response functions (IRFs). A typical VAR model has the following form,

$$C(L)Y_t = C + V_t \text{ and } \dots \dots \dots (2), \text{ with}$$

$$C(L) = I - C_1L - C_2L^2 - \dots - C_m L^m \dots \dots \dots (3),$$

where Y_t is an $n \times 1$ vector of variables, C is an $n \times 1$ vector of constants, and V_t is an $n \times 1$ vector of random variables, each of which is serially uncorrelated with constant variance and zero mean. In this model the current innovations contained in V_t are unanticipated. A joint F-test on the lagged polynomials provides information regarding the impact of the anticipated portion of the causal variables. Equation (3) represents an $n \times n$ matrix of normalized polynomials with the lag operator $L(L^k Y_t = Y_{t-1})$.

It is a well-known that VAR results are sensitive to ordering of variables in the system. There are many ways in which the ten markets in this study can be arranged, making it extremely difficult to interpret the results.⁴ For these and other reasons, bivariate Granger causality tests are employed in order to supplement the findings from the VAR analysis. Granger causality tests amount to testing whether past values of a variable, y_t , together with past values of another variable, x_t , explain the current change in x_t better than the past values of x_t alone. A failure to reject the null hypothesis means that y_t Granger causes x_t . The following two equations represent standard Granger tests.

$$y_t = \sum \alpha_{1i} y_{t-i} + \sum \alpha_{2j} x_{t-j} + u_t \dots \dots \dots (4)$$

$$x_t = \sum \beta_{1i} x_{t-i} + \sum \beta_{2j} y_{t-j} + v_t \dots \dots \dots (5)$$

The following hypotheses represent all possible causal relationships.

- a. unidirectional causality from x_t to y_t exists if $\sum \alpha_{2j} \neq 0$ and $\sum \beta_{2j} = 0$
- b. unidirectional causality from y_t to x_t exists if $\sum \beta_{2j} \neq 0$ and $\sum \alpha_{2j} = 0$

Table 1a
Results from unit root tests

Drift but no time trend

variables	ADF	DF-GLS	KPSS	PP
lau	-1.17(0,14)	1.17(0,14)	1.58(11) ¹	-.09(5)
lca	-.14(0,14)	.69(0,14)	1.50(11) ¹	-.38(3)
lfr	-.87(0,13)	-.17(0,13)	1.17(11) ¹	-.91(1)
lge	-1.42(0,13)	.18(0,13)	1.18(10) ¹	-1.43(2)
lhk	-2.24(0,14)	.31(0,14)	1.20(10) ¹	-2.25(8)
lja	-2.52(0,14)	.07(0,14)	1.46(10) ¹	-2.51(2)
lsi	-2.15(0,14)	-1.65(0,14)	15(10)	-2.15(0)
lsw	-2.11(0,13)	.86(0,13)	1.32(10) ¹	-2.05(3)
luk	-1.26(0,14)	.15(0,14)	1.17(11) ¹	-1.24(4)
lus	-1.12(0,14)	.88(0,14)	1.41(11) ¹	-1.12(6)
Δ lau	-14.72(0,14) ¹	-6.61(1.14) ¹	.08(5)	-14.70(4) ¹
Δ lca	-12.22(0,14) ¹	-12.21(0,14) ¹	.09(4)	-12.17(5) ¹
Δ lfr	-12.74(0,13) ¹	-10.86(0,13) ¹	.11(1)	-12.74(0) ¹
Δ lge	-13.13(0,13) ¹	-7.0(1,13) ¹	.18(1)	-13.14(2) ¹
Δ lhk	-13.32(0,14) ¹	.91(7,14)	.21(8)	-13.33(8) ¹
Δ lja	-14.06(0,14) ¹	-10.70(0,14) ¹	.15(3)	-14.07(3) ¹
Δ lsi	-12.84(0,14) ¹	-10.51(0,14) ¹	.07(3)	-12.84(4) ¹
Δ lsw	-11.64(0,13) ¹	-11.51(0,13) ¹	.40(1) ²	-11.65(5) ¹
Δ luk	-13.26(0,14) ¹	-7.33(0,14) ¹	.18(4)	-13.26(4) ¹
Δ lus	-14.13(0,14) ¹	-13.12(0,14) ¹	.22(6)	-14.13(5) ¹

The MacKinnon critical values for rejection of hypothesis of a unit root at the 1, 5, and 10 percent levels for ADF and PP are, respectively, -3.46, -2.87, and -2.57. The critical values for DF-GLS are -2.57, -1.94, and -1.612, and for KPSS, the asymptotic critical values are .74, .46, and .35.

¹Significant at the 1% level.
²Significant at the 5% level.

Table 1b
Results from unit root tests

Drift and a time trend

variables	ADF	DF-GLS	KPSS	PP
lau	-3.07(0,14)	-2.43(0,14)	.22(10) ¹	-3.02(1)
lca	-2.41(0,14)	-1.80(0,14)	.22(10) ¹	-2.41(0)
lfr	-1.55(0,13)	-1.46(0,13)	.22(10) ¹	-1.60(2)
lge	-1.31(0,13)	-1.24(0,13)	.30(10) ¹	-1.35(2)
lhk	-2.18(0,14)	-1.36(0,14)	.34(10) ¹	-2.11(7)
lja	-3.17(0,14)	-1.85(0,14)	.11(10)	-3.18(2) ²
lsi	-2.20(0,14)	-2.19(0,14)	.15(10) ²	-2.29(1)
lsw	-1.23(0,13)	-.75(0,13)	.36(10) ¹	-1.29(2)
luk	-1.20(0,14)	-1.26(0,14)	.32(11) ¹	-1.22(3)
lus	-1.03(0,14)	-1.12(0,14)	.29(11) ¹	-.99(5)
Δ lau	-14.72(0,14) ¹	-14.0(0,14) ¹	.06(5)	-14.70(4) ¹
Δ lca	-12.22(0,14) ¹	-12.15(0,14) ¹	.08(4)	-12.18(5) ¹
Δ lfr	-12.71(0,13) ¹	-12.14(0,13) ¹	.12(1)	-12.71(0) ¹
Δ lge	-13.14(0,13) ¹	-12.23(0,13) ¹	.10(1)	-13.15(1) ¹
Δ lhk	-13.37(0,14) ¹	-13.34(0,14) ¹	.06(9)	-13.39(9) ¹
Δ lja	-14.12(0,14) ¹	-12.62(0,14) ¹	.07(4)	-14.13(3) ¹
Δ lsi	-12.81(0,14) ¹	-12.05(0,14) ¹	.06(3)	-12.81(4) ¹
Δ lsw	-11.79(0,13) ¹	-11.40(0,13) ¹	.08(4)	-11.78(6) ¹
Δ luk	-13.25(0,14) ¹	-10.76(0,14) ¹	.11(4)	-13.25(4) ¹
Δ lus	-14.14(0,14) ¹	-14.00(0,14) ¹	.14(6) ²	-14.15(5) ¹

The MacKinnon critical values for rejection of hypothesis of a unit root for test with drift and a time trend, at the 1, 5, and 10 percent levels for ADF and PP are, respectively, -4.00, -3.43, and -3.14. The critical values for DF-GLS are -3.48, -2.94, and -2.65, and for KPSS, the asymptotic critical values are, .22, .15, .12.

¹Significant at the 1% level.
²Significant at the 10% level.

c. bidirectional causality between y_t and x_t exists if

$$\sum \alpha_{2j} \neq 0 \text{ and } \sum \beta_{2j} \neq 0$$

d. no causality exists between y_t and x_t if

$$\sum \alpha_{2j} = 0 \text{ and } \sum \beta_{2j} = 0$$

4. EMPIRICAL RESULTS

Unit root tests are first employed followed by tests of cointegration to address the market integration issue, defined as the co-movement of international stock markets. All variables have been transformed into natural logarithm to minimize the scale effect. Since a time series can have a stochastic trend or a deterministic trend, we have employed unit root tests both with and without a time trend. In addition to Augmented Dickey-Fuller tests (ADF), we have applied the Phillips-Perron (1988) method (PP) to ensure that the results are consistent in the presence of a potential autocorrelation and heteroscedasticity in the data set. It is a common knowledge that the Dickey-Fuller tests suffer from power limitations. As such, we have also reported the results from the Dickey-Fuller with GLS detrending (DF-GLS), and the Kwiatkowski, Phillips, Schmidt, and Shin (KPSS) tests. In ADF and DF-GLS tests, the maximum lag length of 14 is selected based on the Schwarz Information Criterion (SIC). The automatic bandwidth selection procedure, based on the Newey-West using Bartlett kernel, has been applied for the KPSS test. It should be noted that the KPSS test assumes trend stationarity under the null hypothesis. The test results, with drift only and with both a drift and a time trend, are shown in Tables 1a and 1b. respectively.

Table 2
Results from Johansen and Juselius cointegration tests*

CE vector		λ -max statistic	Trace statistic
Null	Alternative		
$r = 0$	$r = 1$	84.06 (66.23)	416.07 (263.42)
$r \leq 1$	$r = 2$	79.29 (61.29)	332.09 (222.21)
$r = 2$	$r = 3$	64.10 (55.50)	252.72 (182.82)
$r \leq 3$	$r = 4$	55.90 (49.42)	188.626 (146.76)
$r = 4$	$r = 5$	43.38 (43.97)	132.72 (114.90)
$r \leq 5$	$r = 6$	30.60 (37.52)	89.346 (87.31)
$r \leq 6$	$r = 7$	19.52 (31.46)	58.74 (62.99)

*Numbers in the parentheses are the critical values at the five percent level.

As the tables show, the null hypothesis of unit root cannot be rejected. However, all tests in their first difference successfully reject the null hypothesis. Hence all time series data are integrated of order one, or I(1). This means that changes in share prices in each market are random, and therefore, stock price behavior in the past cannot be used to predict stock price movement in the future. We, therefore, conclude that each market is weak-form efficient. These findings are in line with those of Blackman *et al.* (1994), Chan *et al.* (1992), Coleman (1990), and MacDonald and Taylor (1988, 1989).

Next, we test for the existence of a long-run equilibrium relationship between these markets using the Johansen (1988) and Johansen and Juselius (1990) method. All estimations are based on the assumption of a linear trend in data and both intercept and a trend in cointegrating equations. The results

of the maximum eigenvalue (λ -max) and trace tests based on a lag structure of 1-6 are presented in Table 2. As the table shows, there are four cointegrating vectors according to the λ -max test and six cointegrating vectors according to the trace test. A large number of cointegrating vectors provide strong evidence in favor of high degree of market integration. These findings are consistent with Chan *et al.* (1992). In their studies, they found two and four cointegrating vectors for countries in group one and two over the period January 1984 to February 1989. A greater number of cointegrating vectors in our case suggests that the speed of financial integration has accelerated in the 1990s and beyond. It is evident that globalization has made these markets collectively more integrated. Thus, even though each market is efficient individually, they are inefficient collectively. Since share price movement in one country can be used to predict share price movement in another country, international portfolio diversification seems to have lost its effectiveness.

The existence of a long run equilibrium relationship among the variables indicates the presence of a causal nexus. Consistent with the time series characteristics of the data set, we estimate four vector autoregressive models (VAR) in first difference forms using a twelve period lag structure. A selection of the optimal lag structure is based on the Akaike Information Criterion (AIC) and the Schwarz Criterion (SC). In the first model, the impact of the US market on all other markets is captured by placing the US first, followed by all others in an alphabetical order. Following the same logic, Japan is placed first in the second model and the UK first in the third model. In the fourth model, all markets are placed according to their size and importance in international business and finance. Accordingly, we place US first, Japan second, UK third and so on. Since the coefficients from VAR estimations are extremely difficult to interpret, we rely on variance decomposition analysis. Variance decomposition analysis involves analysis of the proportion of variance of forecast error explained by a given variable. It measures the impact of a shock to one variable on itself and on all other variables in an unanticipated sense. The results of the variance decomposition analysis from each estimation are presented in Appendix Tables B, C, D, and E. In each case, we have reported only the largest value from among the twelve values regardless of the exact lag period. Because of this, the numbers in a given row do not add up to 100. To facilitate our analysis further, we have arbitrarily chosen 10 percent as a cut off point for an impact analysis. In other words, we consider a market to be exerting an influence on another market if it has explained at least ten percent of the variance of forecast error. Using this criterion, we have summarized the number of cases in which a given market has influenced another market in Table 3. As the table shows, the UK market ranks the highest, with the US and France coming close second. The UK's dominance as a world financial center is thus well supported by the evidence. Besides, the inclusion of three other European markets, namely, France, Germany, and Switzerland, has definitely provided room for the UK market to register its influence. This also explains the high ranking for the French market. Germany, with a third ranking, also seems to exert a considerable influence. In Asia, Japan ranks the highest, closely followed by Singapore and Hong Kong. It should be pointed out that the persistently declining Japanese market

Table 3
Impact ranking of various markets

markets	model 1	model 2	model 3	model 4	total	rank
AU	1	4	1	0	6	6
CA	0	6	2	0	6	6
FR	3	5	4	8	20	2
GE	4	3	3	1	11	3
HK	2	1	1	1	5	7
JA	0	7	0	1	8	4
SI	2	2	1	2	7	5
SW	0	0	1	0	1	8
UK	4	3	9	6	22	1
US	9	1	1	9	20	2

Table 4
Results from Granger causality test*

Lags	US→AU US←AU	US→CA US←CA	US→FR US←FR	US→GE US←GE	US→HK US←HK	US→JA US←JA	US→SI US←SI	US→SW US←SW	US→UK US←UK
1	2.65 ³ 1.10	5.28 ² 3.21 ³	15.35 ¹ 13.35 ¹	9.05 ¹ 4.80 ²	.33 .48	1.89 .83	.00 .70	4.07 ² .17	1.79 .03
2	1.61 .86	2.73 ³ 1.73	8.07 ¹ 9.10 ¹	4.31 ¹ 2.90 ²	.31 .82	1.64 .37	.26 .32	2.49 ³ .15	.98 .23
3	1.50 .57	2.04 ³ 1.14	6.71 ¹ 7.33 ¹	3.11 ² 2.12 ³	.48 .78	1.16 .26	.73 .29	1.61 .11	1.35 .15
4	1.12 .48	2.08 ³ 1.05	4.76 ¹ 5.54 ¹	2.52 ³ 1.81	.36 .84	1.41 .78	.60 .66	1.22 .17	2.10 ³ .18
5	1.13 .60	1.54 .97	3.73 ¹ 5.06 ¹	2.04 ³ 1.41	.32 .72	1.09 .72	.51 .46	1.50 1.16	1.66 .14
6	1.04 .77	1.35 .86	2.73 ¹ 3.42 ¹	1.76 1.20	.41 1.07	1.47 .80	.41 .94	2.27 ² 1.40	1.76 .18

*Numbers are the F-values from the Granger causality tests.

¹Significant at the one percent level.

²Significant at the one percent level.

³Significant at the one percent level.

during the sample period, with other markets doing better, has definitely eroded the influence of Japan in the world of high finance.

As it has been pointed out earlier, use of the VAR methodology has been widely criticized, inter alia, on the ground that the results from a VAR estimation are sensitive to the ordering of variables. We estimated the model using only four different orderings. However, ten markets provide far too many ordering options, which necessitates a close scrutiny of the issue of causality in a more explicit manner. To this end, we use a bivariate causality approach as imbedded in the Granger causality tests. For the sake of brevity, our focus is limited to the three dominant markets, namely, the United States, Japan, and the United Kingdom. Results of these tests using 1-6 month lag structure are presented in Tables 4, 5, and 6. Looking at Table 4, it is clear that the US market has Granger caused one or more

markets in each lag period. To be more exact, the table shows at least twenty instances of significant causation from the US market to other markets. There is also an evidence of bidirectional causation. Table 5 shows only a scant evidence of causation from Japan to other markets, while there is a strong evidence of reverse causation. Numbers in Table 6 support the dominance of the British market, with causation running from the UK market to other markets in fourteen instances. Once again, there is some evidence of a bidirectional causality. Results from the Granger causality tests imply that price movements in the US market and in the UK market can be used as a basis for predicting price movements in many other markets. These results are in line with those from the variance decomposition analysis, implying robustness in our findings. Both sets of results have revealed the dominance of the US and the UK markets. As pointed out earlier, the lackluster impact of the Japanese market in this study is primarily due to the Japanese market slide during the sample period. In short, the results from cointegration analysis, VAR analysis, and Granger causality analysis are consistent with each other. The cointegration analysis indicated that the financial markets are highly integrated, and that there is a strong evidence of co-movement among them. The results from both the VAR estimations and Granger causality tests, on the other hand, provided strong evidence of causation from the US and the UK markets to the other markets in the sample. These findings seem to indicate that because of growing international financial integration in the 1990s and beyond, international portfolio diversification is no longer effective as an investment strategy.

5. SUMMARY AND CONCLUSIONS

In this paper, we examined the impact of globalization on international financial integration. We used monthly data from January 1990 to July 2005 for ten major stock markets. The stationarity tests indicated that each market is weak-form efficient implying that price movement in every market is random and cannot be predicted. The Johansen and Juselius method for testing the existence of long run equilibrium relationship produced four to six cointegrating vectors, implying long run relationships between all markets. The variance decomposition analysis derived from the estimated VAR models showed a causal pattern, the US and the UK markets exerting significant influence on all other markets. These results were further validated by Granger causality tests. The US and the UK markets were found to Granger cause other markets, implying that price movements in these markets can be used to predict price movements in other markets. Thus, globalization seems to have greatly enhanced international financial integration. The findings of this study suggest that international portfolio diversification, as an investment strategy, has perhaps outlived its usefulness.

Table 5
Results from Granger causality test*

Lags	JA→AU JA←AU	JA→CA JA←CA	JA→FR JA←FR	JA→GE JA←GE	JA→HK JA←HK	JA→SI JA←SI	JA→SW JA←SW	JA→UK JA←UK	JA→US JA←US
1	3.55 ³ 4.48 ²	1.77 3.99 ³	.14 3.96 ²	.36 3.29 ³	.90 .29	.60 .31	.25 2.54	.60 .96	.83 1.89
2	1.82 4.14	1.16 2.83 ³	.18 4.49 ¹	.20 2.63 ³	.52 .22	1.10 .26	.04 1.32	.35 1.59	.37 1.64
3	1.50 1.38	.83 2.02	.16 2.99 ²	.29 2.19 ³	.35 .25	.82 1.10	.12 .94	.44 1.08	.26 1.16
4	1.11 1.02	.78 1.64	.20 2.27 ³	.15 1.60	.24 .31	.73 1.09	.55 .97	.26 .82	.78 1.41
5	.91 1.16	.52 1.31	.16 1.97 ³	.17 1.41	.20 .50	.60 1.98 ³	.74 .92	.24 1.33	.72 1.09
6	.75 1.38	.77 1.40	.11 1.58	.17 1.22	1.87 ³ .56	1.01 1.71	.70 .83	.22 1.60	.80 1.47

*Numbers are the F-values from the Granger causality tests.
¹Significant at the one percent level.
²Significant at the one percent level.
³Significant at the one percent level.

Table 6
Results from Granger causality test*

Lags	UK→AU UK←AU	UK→CA UK←CA	UK→FR UK←FR	UK→GE UK←GE	UK→HK UK←HK	UK→JA UK←JA	UK→SI UK←SI	UK→SW UK←SW	UK→US UK←US
1	.75 .23	1.27 .03	9.99 ¹ 5.37 ²	16.43 ¹ 2.68 ³	.03 1.45	.95 .60	.04 .10	2.33 .31	.03 1.79
2	2.34 ³ .83	1.18 .57	5.10 ¹ 2.74 ¹	8.15 ¹ 1.28	.21 .70	1.60 .34	.01 .22	1.48 .25	.23 .98
3	2.32 ³ .79	.76 .40	4.65 ¹ 3.35 ²	5.80 ¹ 1.20	.14 .72	1.08 .43	.35 .14	1.07 .36	.15 1.35
4	1.74 .88	.71 1.03	3.49 ¹ 3.40 ¹	4.90 ¹ 1.60	.14 .60	.82 .26	.64 .06	.95 1.07	.18 2.10 ³
5	1.35 .76	.57 .94	2.78 ¹ 2.61 ²	3.76 ¹ 1.33	.12 .48	1.33 .24	.51 .29	1.77 2.04	.14 1.66
6	1.25 .82	.49 .83	1.91 ³ 2.55 ²	3.28 ¹ 1.17	.12 1.06	1.60 .20	.61 .61	1.78 1.73	.18 1.76

*Numbers are the F-values from the Granger causality tests.
¹Significant at the one percent level.
²Significant at the one percent level.
³Significant at the one percent level.

FOOTNOTES

¹ A partial list of earlier studies include, Argy and Hodjera (1973); Bhoocha-oom and Stansell (1990); Blackman *et al.* (1994); Chan *et al.* (1992); Cheung and Mak (1992); Coleman (1990); Cumby and Miskin (1984); Dwyer and Hafer (1988); Eun and Shim (1989); Haney and Lloyd (1978); Lessard (1976); Logue *et al.* (1976); Makaridakis and Wheelwright (1974); Moldonado and Saunders (1981); and Watson (1980).

² Jorion and Schwartz (1986) have shown that markets were segmented prior to 1980. Lessard (1976), using data from 16 countries over 59-73, have also found that markets were segmented and that risk could be reduced by international diversification.

³ Some other studies which found evidence of financial integration include Arg and Hodjera (1973), Cumby and Miskin (1984), Fase (1976), Logue *et al.* (1976).

⁴ VAR methodology has been criticised on several grounds. For instance, it has been argued that VAR results are not robust (See, e.g., King, (1983); Runkle, (1987); and Spencer (1989). Sims, (1987, 1989); and Todd (1990), on the other hand, have defended the robustness of VAR results. Similarly, Sargent, (1979) has questioned the use of VAR results for conditional forecasts, but Litterman, (1984) has defended this practice. Also, see, Cooley and LeRoy, (1985); and Darnell and Evans, (1990) for some additional criticisms. Despite criticisms, VAR remains one of the most widely used methodologies in empirical investigation.

REFERENCES

Agénor, Pierre-Richard. "Benefits and Costs of International Financial Integration: Theory and Facts." The World Bank, Washington, DC. September 2001.

Argy, V. and Z. Hodjera (1973), "Financial Integration and Interest Rate Linkages in Industrial Countries, 1958-71," *International Monetary Fund and Staff Paper* 20, March: 1-77.

Bhoocha-oom, A. and S.R. Stansell (1990), "A Study of International Financial Market Integration: An Examination of the US, Hong Kong and Singapore Markets," *Journal of Business Finance and Accounting*, 17:193-212.

Blackman, S. C., K. Holden and W.A. Thomas (1994), "Long-term Relationship between International Share Prices," *Applied Economics*, 4: 297-304

Chan, K. C., B. E. Gup and M. S. Pan (1992), "An Empirical Analysis of Stock Prices in Major Asian Markets and the United States," *The Financial Review*, 27: 289-307.

Cheung, Y. and S. Mak (1992), "The International Transmission of Stock Market Fluctuation between the Developed Markets and the Asian-Pacific Markets," *Applied Financial Economics*, 2: 43-47.

Coleman, M. (1990), "Cointegration-based Tests of Daily Foreign Exchange Market Efficiency," *Economic Letters*, 32: 53-59

Cooley, T. F. and S. F. LeRoy (1985), "Atheoretical Macroeconomics: A Critique," *Journal of Monetary Economics*, 16: 283-308.

Cumby, R.E. and F.S. Miskin (1984), "The International Linkage of Real Interest Rates: The European-U.S. Connection," *Working Paper*, New York University, July.

Darnell, A.C. and L.J. Evans (1990), *The Limits of Econometrics*. Aldershot, GB: Edward Elgar.

Dickey, D. A. and W.A. Fuller (1979), "Distribution of the Estimators for Autoregressive Time Series with a Unit Root," *Journal of American Statistical Association*, 74: 427-431.

Dwyer, G.P. Jr. and R.W. Hafer (1988), "Are National Stock Markets Linked? Federal Reserve Bank of St. Louis Economic Review, November/December: 3-14.

Edison, H. J., R. Levine, L. Ricci and T. Slok, "International Financial Integration and Economic Growth" International Monetary Fund, working paper, August 2002

Engel, R. F. and C. W. J. Granger (1987), "Cointegration and Error-Correction: Representation, Estimation and Testing," *Econometrica*, 55: 251-276.

Eun, C. S. and S. Shim (1989), "International Transmission of Stock Market Movements," *Journal of Financial and Quantitative Analysis*, 24:241-256.

Fase, M. M. G. (1976), "The Interdependence of Short-term Interest Rates in the Major Centers of the World: Some Evidence for 1961-1972," *Kyklos*, 29: 63-96.

Fuller, W. A. (1976), *Introduction to Statistical Time Series*, New York: Wiley and Sons.

Gabel, I. (2005), "Averting Crisis? Assessing Measures to Manage Financial Integration in Emerging Economies", in Epstein, Gerald, "Financialization and the World Economy". Edward Wager.

Haney, Richard, L. Jr. and W.P. Lloyd (1978), "An Examination of the Stability of the Inter-temporal Relationship among National Stock Market Indices," *Nebraska Journal of Economics and Business*, 17: 55.65.

Hendershott, P.H. (1967), "The Structure of International Interest Rates: The U.S. Treasury Bill Rate and the Eurodollar Deposit Rate," *Journal of Finance*, September: 455-465.

Johansen, S. (1988), "Statistical Analysis of Cointegration Vectors," *Journal of Economic Dynamics and Control*, 12: 231-254.

- Johansen, S. and K. Juselius (1990), "Maximum Likelihood Estimation and Inference on Cointegration with Application to the Demand for Money," *Oxford Bulletin of Economics and Statistics*, 52:169-221.
- Jorion, P. and E. Schwartz (1986), "Integration versus Segregation in the Canadian Stock Market," *Journal of Finance*, XLI: 603-616.
- King, S. (1983), "Real Interest Rates and the Interaction of Money, Output, and Prices," Mimeo, Evanston: Northwestern University.
- Kose, M., E. Prasad, K. Rogoff and S. Wei (2007), "Financial Globalization – Beyond the Blame Game", *Finance and Development*, 44 (1): 9-15).
- Lane, P. and G. Milise-Ferretti, "International Financial Integration" *Staff Papers*, International Monetary Fund, Vol. 50, Special Issue, 2003.
- Leiderman, L. (1984), "On the Monetary-Macro Dynamics of Colombia and Mexico," *Journal of Development Economics*, 14:183-210.
- Lessard, D.R. (1976), "World Country and Industry Relationships in Equity Returns: Implications for Risk Reduction through International Diversification," *Financial Analysts Journal*, Jan, and Feb: 32-38.
- Litterman, R.B. (1984), "Forecasting and Policy Analysis with Bayesian Vector Autoregression Models," Federal Reserve Bank of Minneapolis, *Quarterly Review*, Fall: 30-41.
- Logue, D.E., M.A. Slant and R.J. Sweeney (1976), "International Integration of Financial Markets: Survey, Synthesis and Results," *Eurocurrencies and the International Monetary System*, Carl H. Stem, John H. Makin, and Dennis Logue, eds. Washington, D.C.: American Institute for Public Policy Research, 91-138.
- MacDonald, R. and M.P. Taylor (1989), "Foreign Exchange Market Efficiency and Cointegration: Some Evidence from Recent Float," *Economic Letters*, 29: 63-68.
- MacDonald, R. and M.P. Taylor (1988), "Metal Prices Efficiency and Cointegration: Some Evidence from the London Metal Exchange," *Bulletin of Economic Research*, 40: 235-239.
- Mak, H. (1983), "The International Equality of Interest Rates," *Working Paper*, University of Chicago.
- Makaridakis, S. G. and S. C. Wheelwright (1974), "An Analysis of the Interrelationships among the Major World Stock Exchanges," *Journal of Business Finance, and Accounting*, 1:195-216.
- Miskin, F.S. (1982), "Are Real Interest Rates Equal Across Countries? An Empirical Investigation of International Parity Conditions," *Working Paper NO. 1048*, National Bureau of Economic Research.
- Moldonado, R. and A. Saunders (1981), "International Portfolio Diversification and the Inter-temporal Stability of International Stock Market Relationships 1957-1978," *Financial Management*, 10: 54-63.
- Perron, P. (1988), "Trends and Random Walks in Macroeconomic Time Series," *Journal of Economic Dynamics and Control*, 12: 297-332.
- Phillips, P.C.B. and P. Perron (1988), "Testing for a Unit Root in Time Series Regression," *Biometrika*, 75:335-346.
- Runkle, D. (1987), "Vector Autoregression and Reality," *Journal of Business and Economic Statistics*, 5: 437-442.
- Sargent, T.J. (1979), "Estimating Vector Autoregression Using Methods not Based on Explicit Economic Theories," Federal Reserve Bank of Minneapolis, *Quarterly Review*, Summer: 8-14.
- Sims, C.A. (1987), "Comments," *Journal of Business and Economic Statistics*, 5: 443-449.
- (1989), "Models and their Uses," *American Journal of Agricultural Economics*, 71: 489-494.
- Spencer, D.E. (1989), "Does Money Matter? The Robustness of Evidence from Vector Autoregression," *Journal of Money, Credit and Banking*, 21: 442-454.
- Todd, R. (1990), "Vector Autoregression Evidence on Monetarism: Another Look at the Robustness Debate," Federal Reserve Bank of Minneapolis, *Quarterly Review*, Spring: 19-37.
- Watson, J. (1980), "The Stability of Inter-Country Correlation Coefficients: A Note," *Journal of Business Finance, and Accounting*, 7: 297-303.

APPENDIX TABLES

Appendix Table A

Major stock market indices and their symbols

<u>Country</u>	<u>Index symbol</u>	<u>Start dates</u>	<u>Variable symbol</u>
Australia	AORD	1990:01	AU
Canada	TSE300	1990:01	CA
France	FCHI	1990:03	FR
Germany	GDAXI	1990:11	GE
Hong Kong	HSI	1986:12	HK
Japan	N225	1990:01	JA
Singapore	STI	1990:01	SI
Switzerland	SSMI	1990:11	SW
UK	FTSE	1990:01	UK
USA	GSPC	1990:01	US

Source: All data have been extracted from respective sites on Yahoo finance. The TSE300 data series for Canada has been obtained from:

<http://www.neatideas.com/data/data/tse300M.htm>.

Note: Due to data unavailability, the beginning period for France is March 1990, while for Germany and Switzerland the beginning period is September 1990.

Appendix Table B

Decomposition of variance forecast error model 1

proportion of variance of forecast error explained by

dependent variable	US	AU	CA	FR	GE	HK	JA	SI	SW	UK
US	100	7	9	6	8	6	2	6	4	7
AU	27	73	4	5	15	7	3	4	6	11
CA	61	7	38	4	13	6	2	3	3	12
FR	61	8	6	36	6	7	2	4	2	6
GE	58	6	7	19	23	9	1	8	3	5
HK	43	5	8	5	12	52	3	8	6	7
JA	21	28	7	5	6	5	41	13	6	19
SI	32	8	7	7	11	14	7	40	6	9
SW	38	8	6	11	5	8	6	12	43	20
UK	69	7	6	13	6	10	4	6	5	25

Ordering: US AU CA FR GE HK JA SI SW UK

Appendix Table C

Decomposition of variance forecast error model 2

proportion of variance of forecast error explained by

dependent variable	JA	AU	CA	FR	GE	HK	SI	SW	UK	US
JA	100	3	8	4	6	2	12	8	11	15
AU	48	52	6	6	16	7	4	5	12	2
CA	30	7	67	4	11	8	3	3	9	7
FR	25	8	17	51	4	6	3	2	6	6
GE	13	7	22	36	25	9	7	3	5	7
HK	8	17	26	5	12	50	8	6	8	2
SI	9	27	11	11	9	15	42	6	9	4
SW	11	18	9	21	6	5	11	46	13	9
UK	11	21	20	21	9	9	6	6	24	8
US	21	8	34	12	8	6	5	4	5	26

Ordering: JA AU CA FR GE HK SI SW UK US

Appendix Table D

Decomposition of variance forecast error model 3

proportion of variance of forecast error explained by

dependent variable	UK	AU	CA	FR	GE	HK	JA	SI	SW	US
UK	100	6	7	12	5	7	4	5	5	8
AU	27	73	6	6	16	5	4	4	7	2
CA	36	9	59	8	12	4	4	2	4	7
FR	59	8	7	37	4	6	2	4	2	6
GE	55	5	9	20	23	8	2	7	3	7
HK	44	6	13	6	13	46	4	8	8	2
JA	12	41	9	10	5	4	37	8	11	15
SI	42	6	7	9	8	11	8	40	7	4
SW	46	8	6	15	5	3	5	13	44	9
US	69	6	11	9	5	3	2	5	4	26

Ordering: UK AU CA FR GE HK JA SI SW US

Appendix Table E

Decomposition of variance forecast error model 4

proportion of variance of forecast error explained by

dependent variable	US	JA	UK	HK	SI	GE	FR	CA	AU	SW
US	100	3	9	6	6	4	10	9	2	3
JA	21	79	16	2	7	5	9	8	7	8
UK	69	7	35	6	3	4	13	9	4	5
HK	43	3	7	53	10	7	11	7	4	7
SI	32	5	12	11	46	5	12	6	5	7
GE	58	2	10	7	8	37	11	8	2	3
FR	61	6	10	5	4	11	23	8	3	2
CA	61	5	11	7	4	8	11	28	4	4
AU	27	26	9	5	6	9	13	4	33	7
SW	38	7	24	4	13	4	12	9	3	26

Ordering: US JA UK HK SI GE FR CA AU SW

EVIDENCE OF THE LACK OF EFFECTIVENESS OF LOW-INCOME SAVINGS INCENTIVES¹

Julia M. Camp, Providence College

Teresa Stephenson, University of Wyoming

Stacy R. Wade, Western Kentucky University

INTRODUCTION

The Government and other advocacy groups are constantly developing programs, products, and incentives to promote financial literacy and savings, specifically retirement savings (e.g. www.feedthepig.org; the “Saver’s Credit”). While these programs can be beneficial to those that use them, many U.S. taxpayers - in particular low-income taxpayers - still are not saving. Many of these individuals place a low priority on saving money. The low priority is sometimes due to having only enough money to cover essentials; however, we find that cable, internet, and travel are also valued more highly than saving. While incentive programs should be able to motivate those individuals who are not spending all of their net pay on necessities, the very people whom these programs target frequently are least able to understand and take advantage of them.

In 2005, the Urban Institute held a roundtable on retirement policy and current trends. Participants called for more research on low-income savings behavior (Bell et al. 2005). While many individuals assume low-income taxpayers do not save, nor do they have high priorities towards saving, evidence to support this assumption is not readily available. This paper presents survey data collected about the spending and savings habits and priorities of low and moderate income taxpayers. While taxpayers are aware of the need to save for retirement, many do not have the opportunity, nor feel it is a priority in comparison with their other needs. Although the government continues to develop savings programs and tax incentives specifically aimed at lower income individuals, evidence from our survey shows that one in particular, the “Saver’s Credit,” appears to be ineffective in promoting savings among these individuals and families.

The results of our survey suggest support for proposed changes to the current credit and support for the proposed “Automatic IRA”² that is currently being debated in Congress. The results further support the argument that individuals will take advantage of savings vehicles if readily accessible and will increase participation in retirement programs offering a “match” from their employer or the government. Perhaps the most effective incentive is the offering of an “opt out” retirement vehicle through an employer-sponsored plan. These employment-related opportunities stimulate participation even when the employer is not contributing to the plan.

The purpose of this paper is to discuss the importance of savings (particularly among low-income taxpayers), to present some evidence that incentive programs are not effective, and

to examine the savings priorities of low-income taxpayers. The next section presents the motivation and background of the current status of savings in the U.S. and current sources of savings. The final sections will discuss our survey of taxpayers, present the results of their savings priorities, and discuss recent proposals for improving government incentives.

BACKGROUND AND PRIOR LITERATURE

Generally speaking, Americans are not very good at saving money. In fact, many individuals are not even aware of how savings affect one’s ability to sustain a comfortable standard of living in retirement. Seventy-six million baby boomers are approaching retirement age (Johnson et al. 2006), and a recent study found that approximately 32 percent of them are at risk of not being financially prepared for retirement (Munnell et al. 2007).

According to the 2007 Employee Benefit Research Institute’s (EBRI) Retirement Confidence Survey, 49 percent of workers that actually are saving for retirement report total savings and investments (not including primary residence and defined benefit plans) of less than \$25,000 (Helman et al. 2007). That same survey shows that retirement benefits are often misunderstood or misinterpreted. While 41 percent of workers indicate they or their spouse currently have a defined benefit plan, 62 percent say they expect to receive retirement income from such a plan. Many also expect to receive health insurance in retirement through an employer, yet many employers no longer offer this benefit to retirees. The survey also states that most individuals do not realize the costs they will have to bear for medical insurance and prescriptions alone during retirement, not even considering other costs necessary to them during the same time.

Johnson et al. (2006) point out that the net national savings rate in 2003, which includes personal savings as well as government savings, was 1.6 percent; a rate below that of many other countries including China (38.6%), India (15.2%), Japan (10.8%), and Mexico (8.2%). According to the Bureau of Economic Analysis³ the personal savings rate not including government savings dropped to a negative rate in 2005. Those households that make up the lower-income half of all Americans only have an average net worth of \$23,000 with those in the bottom quartile of income having a negative net worth (Johnson et al. 2006) meaning that, on average, households in the bottom quartile spend more than they earn.

In conclusion, this trend is especially troubling given the aging of America and the increasing longevity of the population.

With life expectancies increasing, a considerable number of individuals will spend one-third of their lives or more past the traditional retirement age of 60. Without adequate savings, these retirees will be reliant on a shaky Social Security system, public assistance, and/or working further into their twilight years.

SOURCES OF RETIREMENT SAVINGS

Bell et al. (2005) discuss the view of retirement savings as a “three-legged stool” with the three legs consisting of Social Security benefits, pension or employer-related retirement vehicles, and personal savings. They also observe that this stool looks unstable for many individuals, especially those who are struggling financially prior to retirement. Most poor and low-income earners do not work in jobs where employers provide retirement benefits. Many of these workers are planning to sustain themselves in retirement by relying on Social Security benefits and the equity in their home if they are fortunate enough to own their home.

Social Security Benefits

The Social Security Administration (SSA) claims that sixty percent of those retired persons over 64 years old depend on Social Security for the majority of their livelihood. For those retirees in the lowest income quintile, Social Security benefits comprise 82.9 percent of their retirement income. Those households depending almost exclusively on Social Security are below the poverty line. Consequently, public assistance programs make up approximately 8.4 percent of their income. Half of retirees over age 65 receive less than \$16,000 per year from all income sources (SSA 2006, 2007).

Although Social Security has not been able to provide a luxurious income for retirees in the past, it has been solvent. Unfortunately, the outlook for Social Security in its present form is dim. The Social Security Administration projects that tax revenues will fall short of benefits by the year 2017 with exhaustion of the fund projected by 2041 (SSA 2007). Therefore, the overall benefit received from this source is uncertain. The instability of Social Security and the number of individuals leaving the work force over the next several years is alarming.

There are also eligibility issues with Social Security. The age at which one becomes eligible for full Social Security benefits has gradually increased since 1983. According to the EBRI Retirement Confidence Survey, only a small minority of workers are aware of the age at which they are eligible for full benefits. Fifty-one percent of workers believe they are eligible sooner than they actually will be eligible and two out of ten workers do not know when they will be eligible (Helman et al. 2007).

Employee-sponsored Retirement Plans

The second leg of the stool described in Bell et al. (2005) is employer-sponsored retirement plans. They claim that these vehicles provide a relatively easy way for employees to set aside money for retirement if they work for a company offering a plan.

Unfortunately, many smaller businesses are unable or unwilling to provide this benefit. As of 2003, 73 percent of employees who work for firms with fewer than 25 employees do not have an employer-sponsored plan compared to only 32 percent of workers who work for firms with 100 or more employees. In addition, many larger companies not only provide the retirement vehicle, but they often contribute funds toward the retirement of their employees. The authors continue discussing how a disproportionate number of low income workers tend to work for smaller companies where employer-sponsored plans are not traditionally available to them. Since many of these businesses are not able to offer retirement benefits to their workers, these individuals are at a disadvantage. Not only are they denied the financial benefit of employer contributions, they are also not provided with readily available financial instruments to which to contribute retirement money.

Less financially sophisticated workers may not know how to go about setting up retirement accounts. When the employer makes accounts available, it provides a much easier path for employees to follow. When this is not an option, these employees must search out retirement vehicles on their own — a process that can be intimidating even for financially savvy persons. Because most plans require a positive action on the part of the saver, and because a plethora of confusing options are available, many people that are eligible for employer provided or tax-incentivized programs procrastinate making a decision (Gale et al. 2006). One recent change in companies, as required by the recent Pension Protection Act of 2006, is an “opt-out” rather than “opt-in” program. Research has shown that these “opt-out” programs do tend to have more participation, as individuals are more likely to stay in the program than leave (Madrian and Shea 2001).

Personal Savings

The third leg of the stool is personal savings. The Bureau of Economic Analysis measures personal saving as the difference between disposal personal income (i.e. income after subtracting taxes) and personal outlays. In March and April 2007, the personal saving rate was a negative 0.7 percent and a negative 1.3 percent, respectively. Negative personal saving indicates that on average personal expenditures are exceeding average disposable personal income. In order for this to happen, consumers must be using borrowed funds (which may come from credit cards or home equity financing), selling assets, or using prior savings. In this instance, even if individuals are “saving,” they are, in essence, using borrowed funds to do so. Consequently, saving from current income may be near zero or negative.

CURRENT INCENTIVES

The government recognizes the need for people to take more financial responsibility for their future in retirement. Congress has provided a number of tax incentives associated with retirement planning. The government allows a tax deduction to businesses for the funds contributed toward employee’s retirement and also encourages individuals to participate in the plans by offering tax incentives such as deferring income taxes

on contributions to various retirement vehicles and allowing either tax-deferred or tax-free growth if the conditions of the plans are met. However, only the middle and upper income families can fully benefit from the vast majority of these incentives. In addition, most of these plans benefit taxpayers in a higher marginal bracket more than those in lower income brackets (Gale et al. 2006). The need for better savings programs for the middle and low income population is a frequent topic in the popular press (cf. Quinn 2007). The top 20 percent of income earners reap the benefit of seventy percent of the tax incentives for retirement vehicles such as 401(k)-type plans and IRAs (Duflo et al. 2005b). Tax incentives for savings are most effective when taxpayers have the wherewithal to contribute and when the magnitude of the tax savings is salient to the individual (Frischmann et al. 1998). Middle and upper income families meet these two conditions more frequently. These families have larger disposable incomes and they are in a higher tax bracket. Since they are in a higher marginal tax bracket than low income families, the value of the tax deduction is larger.

One incentive dubbed the “Saver’s Credit” (formerly called the Retirement Savings Contributions Credit or Credit for Qualified Retirement Savings Contributions) was implemented in 2001 to entice low to moderate income taxpayers to set aside funds for retirement. The applicable Internal Revenue Code is as follows:

SEC. 25B. ELECTIVE DEFERRALS AND IRA CONTRIBUTIONS BY CERTAIN INDIVIDUALS.

25B(a) ALLOWANCE OF CREDIT. --In the case of an eligible individual, there shall be allowed as a credit against the tax imposed by this subtitle for the taxable year an amount equal to the applicable percentage of so much of the qualified retirement savings contributions of the eligible individual for the taxable year as do not exceed \$2,000.

The IRC goes on to explain that for joint returns, for example, it ranges from a 50 percent credit for adjusted gross income (AGI) of under \$30,000 to zero if the AGI is over \$50,000. The other filing statuses have similar percentages and limits. These income limits are subject to indexing for inflation rounded to the nearest \$500. Under eligibility for this credit dependents and full-time students are explicitly excluded (IRC Section 25B(c)(2)). Eligible contributions are spelled out in IRC Section 25B(d) and include contributions to IRAs and employer sponsored retirement plans.

This credit originally expired on December 31, 2006 but the Pension Protection Act of 2006 made it permanent. The incentive to save for retirement is the eligibility for a nonrefundable tax credit of up to 50 percent of the taxpayer’s contribution to an individual retirement account or for participation in an employer’s 401(k) or similar plan. The maximum credit available is \$1,000. So, if a qualifying individual contributes \$2,000 to a retirement plan, the government will reduce their tax liability by \$1,000. This credit effectively results in a 100 percent matching of funds. Since the taxpayer is receiving a credit rather than a deduction, there is no longer a tax

disadvantage for being in a low marginal tax bracket relative to a higher marginal tax bracket.

While the motivation behind the credit is admirable, it fails to be very effective as an incentive for the intended population. The problems with the credit have been widely publicized (i.e. Bell et al. 2005; Gale et al. 2005). The main complaint is that the credit is nonrefundable. Because the credit is nonrefundable, only about one-seventh of the 59 million taxpayers who had income low enough to qualify for the 50 percent credit in 2005 were able to receive *any* benefit from the subsidy. For those with a tax liability, less than one in 1,000 filers would have received the full benefit of the maximum credit had they made a contribution of the full amount (Duflo et al. 2005a). The other taxpayers with income low enough to qualify did not have a tax liability and hence were unable to receive any benefit. In addition, the amount of the credit phases out rapidly as income rises.

Another problem that we have not seen publicized as widely, but that we found in our study, is the lack of awareness of this credit. Despite the fact that both survey and archival data show an association between the use of paid preparers and taxpayers with low tax knowledge, individuals in a low income bracket typically do not have financial advisors (Collins et al. 1990; Dubin et al. 1992). While they engage paid preparers, the services often come from family friends or national chain-based preparers who do not likely render detailed financial planning services (Frischmann et al. 1998). Consequently, these taxpayers are simply not aware of the credit in time to plan for its use. In our survey of 105 taxpayers entering a VITA site, only two individuals were familiar with the Saver’s Credit. Furthermore, many of these taxpayers do not work for employers that offer retirement savings plans. Therefore, they are not using any type of tax incentive to supplement retirement savings even in the unlikely event that they are saving at all.

SURVEY AND RESULTS

We surveyed one hundred six taxpayers at a VITA site in the mountain region of the United States. We dropped one participant who did not complete the questionnaire. Seventy-seven percent of the participants reported a family income level before taxes of under \$30,000. Table 1 shows that participant gender is nearly even and most participants have at least some college education. To create an incentive to complete the survey while waiting to be served at the VITA site, the participants were informed that ten \$25 gift certificates would be randomly awarded to people that had completed the survey at the end of the tax season. None of the taxpayers approached refused to complete the survey; however, in a couple of cases they were called before filling it out or left before finishing it. This should not create a self-selection bias because this was a function of where they were on the waiting list and how fast the line was moving.

The survey asked participants to rank spending items for two separate questions. The first question asked participants to rank the importance of specific items on a scale of one to five

TABLE 1
DESCRIPTIVE STATISTICS

<i>n=105^a</i>		
	<i>n</i>	<i>%</i>
Age		
Under 25	42	40.4
25 and Over	63	59.6
Gender		
Female	48	46.6
Male	55	53.4
Income		
Less than \$15,000	40	38.8
\$15,001 - \$30,000	39	37.9
\$30,001 - \$50,000	15	14.6
\$50,001 - \$75,000	4	3.9
Over \$75,000	5	4.8
Level of Education		
High School	8	7.9
Some College	37	36.6
College Graduate	23	22.8
Some Post-undergraduate College	12	11.9
Graduate Degree	19	18.8
Post-Graduate Degree	2	2.0
Currently saves for retirement	26	25.2
Currently saves for other needs (does not include retirement)	63	61.2

^a For some of the items (e.g., gender, income), responses were not available for all of the participants.

TABLE 2
MEAN VALUES FOR SURVEY RESPONSES
Ranking of Importance

<i>n = 105^a</i>	<i>Mean^b</i>
Household expenses: mortgage, rent, utilities, etc.	4.25
Car and transportation expenses	4.12
Daycare/Childcare expenses	3.94
Food – groceries/fast food	3.82
Education expenses	3.81
Medical expenses	3.51
Credit card payments	3.28
Cable/cell/internet	3.13
Savings other than retirement	3.12
Pet care and supplies	3.04
Travel	2.71
Retirement savings	2.68
Entertainment	2.68
Clothing and accessories	2.44
Charity	2.19
Cigarettes/alcohol	1.96
Lottery	1.10

^a For some of the items (e.g., daycare, cigarettes), responses were not available for all of the participants.
^b Scale: 1=no importance – 5=extremely important

TABLE 3
MEAN VALUES FOR SURVEY RESPONSES
Percentage of Income Spent on Items

<i>n = 105^a</i>	<i>Mean^b</i>
Household expenses	5.22
Groceries and fast food	4.13
Car and transportation expenses	3.86
Education expenses	3.26
Credit card payments	2.92
Entertainment	2.76
Daycare/Childcare	2.67
Savings other than retirement	2.64
Pet care	2.58
Cable/cell/internet	2.57
Clothing and accessories	2.53
Travel	2.48
Medical expenses	2.45
Cigarettes/alcohol	2.44
Retirement Savings	2.15
Charity	1.59
Lottery	1.06

^a For some of the items (e.g., daycare, cigarettes), responses were not available for all of the participants.
^b Income Percentage: 1 = 0%, 2 = 1-5%, 3 = 6-10%, 4 = 11-20%, 5=21-30%, 6=31-40%, 7 = >40%

anchored with not important and extremely important (see Table 2). The second question asked participants to report on a one to seven scale what percentage of income they actually spend on these same items (see Table 3 for specific percentages).

Based on our survey, we propose that a large problem with encouraging low-income taxpayers to save for retirement is the feeling that saving is not a priority in their lives. As expected, participants prioritized expenses related to housing, food, and transportation higher priority than savings. But, on average, cable/cellular/internet services, credit card payments, and travel ranked as higher priorities than saving for retirement. Other expenses ranking highly on the scale were car and transportation, daycare/childcare, food and education. The lowest spending priorities were charitable giving, cigarettes, alcohol, and playing the lottery. Savings (other than retirement) ranks higher than retirement savings; however, both are in the bottom half of the items.

While 73 percent of the participants seem to realize the importance of saving for retirement, few actually contribute very much to a current retirement plan. Only 25 percent of the participants are currently saving for retirement. Retirement savings averaged 2.15 (on a seven-point scale) indicating that on average, participants are only saving one to five percent of their income for the future.

Ninety-four of the 105 individuals surveyed consider savings (other than for retirement) to be at least somewhat important. Of these participants, 63 currently save some of their income (61%) although two of the respondents noted that while they tried to save, their current savings balance was very low. Consequently, setting aside money each month does not ensure that the money remains in savings or builds over time. Savings averaged 2.64 (on a seven-point scale) indicating that, on average, participants are saving between one and five percent of their income.

We asked participants an open ended question, “If you had extra money to do whatever you wanted (spend on something, save, donate, etc), what would you specifically do with it?” Out of 84 participants who answered the question, 32 mentioned something about savings, including retirement. One participant indicated that the answer would depend on the amount received. These answers tell us that many of our participants do consider savings and retirement; however, they may not have the opportunity to contribute to these kinds of accounts.

Our survey requested information about the participants’ knowledge of the credit as well as preference in regards to saving match programs. We surveyed the individuals before entering the VITA center; therefore they had not had any tax assistance for the year at the time of the survey. Only two out of 105 participants were aware of the credit (1.9%). Of those two, only one had been eligible and able to take the credit in the past. In another study done by the Transamerica Center for Retirement Studies, only nine percent of adults who were eligible for the credit were aware of it. Out of all taxpayers in their survey, only 16 percent were familiar with the credit. These numbers clearly show a lack of awareness of the credit. Nevertheless, the credit, originally a temporary provision for

2002, became a permanent part of the Internal Revenue Code last year.⁴

DISCUSSION

While the more immediate spending needs take priority over savings, there is evidence that individuals will save more money if they have a relatively easy route and the opportunity to do so. There is also evidence that tax incentives can provide motivation to save when they are salient and publicized. A prior study by Shapiro and Slemrod (2003) on tax rebates similar to the tax stimulus package granted in 2008 shows that taxpayers often try to save or pay off debt with the money received. While the most recent tax rebate was granted under a context encouraging consumer spending, the survey conducted by Shapiro and Slemrod on the similar tax rebate granted in 2001 showed that only 21.8 percent of taxpayers receiving money planned to increase spending (Shapiro and Slemrod 2003). The majority of recipients planned to either save the money (32.0 percent) or pay down debt (46.2 percent). This trend was more pronounced at the lower income levels with only 18.25 percent of respondents earning \$35,000 or less stating that they were planning to spend the rebate. Follow-up questions administered after the rebate was distributed showed similar results with only 24.9 percent of the total sample spending their rebate. Alternatively, Souleles (1999) showed that two-thirds of regular tax refunds are spent within the quarter received. The difference in the two studies may indicate that taxpayers have a different mindset regarding tax refunds than tax rebates.

Employer-provided retirement plans appear to have the biggest impact on retirement savings. Bucks et al. (2006) shows that 89.4 percent of employees working for an employer offering a retirement plan choose to contribute. In the lowest 20 percent of the distribution, 49.4 percent contribute whether or not they receive any matching funds from the employer (Bucks et al. 2006). In our survey, 69 percent of the individuals stated that they would contribute if their employer offered a match and another 24 percent indicated that they might contribute. Data collected by the U.S. Census Bureau shows that individuals earning from \$30,000-\$50,000 are almost 20 times more likely to save when their employer provides the retirement vehicle than when they have to seek out individual retirement programs such as IRA's (Johnson et al. 2006).

While the government does, in effect, offer a "match" through the Saver's Credit for those eligible to receive the full benefit of the credit, very few taxpayers take advantage of the credit. Several suggestions have been set forth outlining potential reforms to the Saver's Credit to enhance its effectiveness. One of the most popular ideas has been for the government to offer a true "match" rather than a credit and to remove the current tax liability limit. Under the current system, the taxpayer deposits the entire contribution into a retirement account and receives a credit on his taxes at the time of filing. The credit *may* be equal to 50 percent of his contribution, resulting in a "match;" however, if his tax liability is less than 50 percent of the original contribution, it will only be a partial match. He will only receive a credit to the extent of his tax liability. In essence, removing the tax liability limit would have the same tax effect as having a

refundable credit (Johnson et al. 2006; Dufflo et al. 2005a; Dufflo et al. 2005b).

If taxpayers are aware of the incentive and are able to set aside a little savings from each paycheck while immediately receiving a government match, they are more likely to be able to contribute. The motivation of seeing their savings "double" would likely encourage continued savings and increase the level of priority placed on saving money. The IRS can handle this type of arrangement similarly to the Advanced Earned Income Credit (AEIC) whereby employers add the tax benefit to the compensation earned for the pay period.

The idea of a government match complements the current legislation in Congress concerning the "Automatic IRA." Under the proposed legislation, small businesses in operation for at least two years that have ten or more employees would be required to automatically deduct money from employee paychecks and deposit those funds into retirement accounts (Iwry and John 2006). Employees could "opt-out" if they choose, but the automatic enrollment provision insures that a higher percentage of participation will result.

Although the majority of small businesses are not able to offer a host of employee benefits, they would likely have the ability to handle the Automatic IRA and/or facilitate a government matching program. If the employer is deducting the retirement contribution from employee pay, the employer could administer the government match much like administering the AEIC. While the process would place an additional burden on the business owner, it would help build employee morale and encourage personal responsibility for savings. This avenue also allows individuals to use a "pay as you go" system for retirement rather trying to contribute a lump sum to an account.

For individuals not choosing to contribute to retirement accounts throughout the year or choosing to "opt out" of employer sponsored programs, the government could match the direct deposit of a tax refund deposited in an IRA. The IRS has a procedure to electronically deposit all or a portion of a taxpayer's tax refund into a savings account – including IRAs -- provided the financial institution administering the IRA accepts direct deposits.⁵ The government could match those funds when the refund was distributed. The IRS already has the administrative capability to administer such a program.

There would need to be safeguards in place. While "gaming" of the saver's credit does not appear to have happened just yet, it will not be long before individuals realize they can simply withdraw "matched" funds for a small price – a ten percent penalty for early withdrawal and income tax assessed on the funds. A required vesting period for at least a portion of the funds the government effectively contributed is advisable. Also, there would need to be guidelines in place to assuring that government matching discontinued when income levels exceeded the level required to qualify for the funds.

CONCLUSION AND FUTURE RESEARCH

Our survey asked selected taxpayers to evaluate the importance of specific spending items in their life and to give an approximate percentage of income spent on each item listed. We also requested information on their knowledge of the “Saver’s Credit” as well as preference in regards to saving match programs. The results suggest that savings and retirement savings are known to be important, but not a financial priority for many of the individuals. Only two out of 105 participants had even heard of the Saver’s Credit, suggesting that as a credit, the people who should know of its existence are not getting the message of its availability.

In light of these results and evidence from other studies showing that individuals will save when given the right opportunities (i.e. Johnson et al. 2006; Duflo et al. 2005a; Frischmann et al. 1998), we support arguments in favor of modifying the current “Saver’s Credit” and adopting the Automatic IRA currently proposed in Congress. By making the retirement vehicle readily available with a transparent, immediate match, the effectiveness of the incentive would increase dramatically for those qualified. Research indicates a “match” would be more salient to individuals and provide enhanced motivation for personal savings. In our study, 55 percent of participants indicated they would contribute to a retirement plan if the government matched their funds and another 38 percent indicated they might contribute. Duflo et al. (2005) demonstrated that the percentage of taxpayers contributing to an IRA with a government match was three to four time higher than those contributing with the existing Saver’s Credit. The study also showed that the amount of the contribution was four to eight times higher than contributions with only the Saver’s Credit. The research concluded that matching funds increased the magnitude and frequency of contributions to IRA’s.

The drawbacks include the increased cost to the government as more individuals would likely take advantage of the incentive. However, increasing retirement savings currently will help to reduce reliance on public assistance in later years. Another disadvantage is the increased regulations on small businesses. While this is never a desirable outcome, it may provide real assistance to individuals and society by helping to provide the means to build up some financial security.

Perhaps the biggest drawback at present is its potential impact on federal assistance. Many social programs such as Food Stamps and Temporary Assistance for Needy Families determine eligibility in part on the family’s asset base. While employer sponsored retirement plans are often exempt from these calculations, IRA’s are often included in the asset base. Therefore, any retirement savings in these accounts reduce the eligibility of a family for government assistance. Since many of the programs, such as Food Stamps, are regulated by state government, there may be difficulty in exempting retirement savings from all states. However, even if the contributions go to an IRA of the employee’s choosing, there might be avenues for exempting funds contributed and matched through the government.

Future research and consideration should focus on directing the tax credits to small businesses who offer matching programs rather than to the taxpayer directly. While our participants indicated they had no preference between a government versus an employer match when rated on a five-point scale, they did indicate more strongly that they would participate in an employer-sponsored matching program (69% participation) than a government matching program (55% participation). By providing additional tax credits to small businesses that direct funds to retirement plans for low income earners, the provisions could encourage individuals to work. Thus, they may be less reliant on the government in their twilight years.

Regardless of the program, the results of our study do further the conclusion that savings and retirement savings are at critically low levels. The effectiveness of current and future savings incentives is vital to insure that Americans are not wanting later in life.

ENDNOTES

- ¹ Data is available by request from the authors
- ² Senators Jeff Bingaman (D-NM) and Gordon H. Smith (R-OR) introduced The Automatic IRA Act of 2007 (S. 1141) in the 110th Congress. Representatives Richard Neal (D-MA) and Phil English (R-PA) introduced identical legislation in the House.
- ³ <http://www.bea.gov/national/nipaweb/Nipa-Frb.asp> accessed on 11/17/07
- ⁴ <http://www.irs.gov/newsroom/article/0,,id=175591,00.html> accessed 11/17/07
- ⁵ See the Instructions for Form 8888 available at www.irs.gov

REFERENCES

- Bell, E., A. Carasso, and C.E. Steuerle. 2005. *Strengthening Private Sources of Retirement Savings for Low-Income Families*, Opportunity and Ownership Project Brief No. 5, September 2005. The Urban Institute, Washington, D.C.
- Bucks, B.K., A.B. Kennickell, K.B. 2006 Moore. *Federal Reserve Bulletin* vol. 92 (February 2006), pp A1-A38.
- Collins, J. and V. Milliron and D.R. Toy. 1990 Factors Associated with Household Demand for Tax Preparers. *The Journal of American Taxation Association* 12 (Fall): 9-25.
- Duflo, E., W. Gale, J. Liebman, P. Orsag, E. Saez. 2005a. *Saving Incentives for Low- and Middle-Income Families: Evidence from a Field Experiment with H&R Block*, Retirement Security Project Policy Brief No 2005-5, May 2005.
- _____. 2005b. *A New Government Matching Program for Retirement Saving*, Retirement Security Project, Research and Analysis Discussion Papers Archive, June 2005.

- Dubin, J., M. Graetz, M. Udell, and L. Wilde. 1992. The Demand for Tax Return Preparation Services. *The Review of Economics and Statistics* 74: 75-82.
- Frishmann P.J., S. Gupta, and G.J. Weber. 1998. New Evidence on Participation in Individual Retirement Accounts. *The Journal of American Taxation Association* 20 (Fall): 57-82.
- Gale, W.G., J. M. Iwry, P.R. Orszag. 2005. *The Saver's Credit: Expanding Retirement Savings for Middle- and Lower-Income Americans*. The Retirement Security Project No 2005-2.
- Gale, W.G., J. Gruber, P.R. Orszag. 2006. *Improving Opportunities and Incentives for Saving by Middle- and Low-Income Households*, White Paper 2006-02, The Brookings Institution.
- Helman, R., M. Greenwald & Associates, J. Vanderhei, C. Copeland. 2007. *The Retirement System in Transition: The 2007 Retirement Confidence Survey*. EBRI Issue Brief No. 304. Washington DC: EBRI, April. www.ebri.org
- Internal Revenue Code Section 25B
- Iwry, J.M. and D.C. John. 2006. *Pursuing Universal Retirement Security through Automatic IRA's*. Working Paper. The Brookings Institution, February 2006.
- Johnson, S.N., L. Mensah, C.E. Steuerle. 2006. *Savings in America: Building Opportunities for All* Global Markets Institute, Goldman Sachs, Spring 2006.
- Madrian, B.C., and D.F. Shea 2001. The Power of Suggestion: Inertia in 401(k) Participation and Savings Behavior, *Quarterly Journal of Economics* 116(4): 1149-187.
- Munnell, A.H., A. Webb, F. Golub-Sass. 2007. *Is There Really A Retirement Savings Crisis? An NRRI Analysis*, An Issue in Brief: Center for Retirement Research at Boston College, Number 7-11 August 2007.
- Quinn, J.B. 2007. *A Nest Egg for Low Earners*. Newsweek, Feb. 26, 2007.
- Shapiro, M.D. and J. Slemrod. 2003. Consumer Response to Tax Rebates, *The American Economic Review* March 2003 93(1): 381-96.
- Social Security Administration. 2007. *2007 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds* Washington, D.C.: Social Security Administration, May 1, 2007.
- Social Security Administration. 2006. *Income of the Population 55 or Older, 2004*. Washington, D.C.: Social Security Administration, May 2006.
- Souleles, N.N. 1999. The Response of Household Consumption to Income Tax Refunds, *The American Economic Review* September 1999 89(4): 947-58.
- Transamerica Center for Retirement Studies. 2007. *Tax Savings for Low Income Workers*. July 17, 2007. www.itsasurvey.com.
- U.S. Department of Labor 2007. *Consumer Expenditures in 2005*. U.S. Bureau of Labor Statistics Report 998, February 2007.

EDUCATING TOMORROW'S ACCOUNTANTS: A SOUTH-TEXAS SURVEY OF EMPLOYERS' PERSPECTIVES ON THE KNOWLEDGE AND SKILLS REQUIRED OF ENTRY-LEVEL ACCOUNTANTS

Thomas Madison, St. Mary's University

Suzanne Cory, St. Mary's University

Mark Persellin, St. Mary's University

INTRODUCTION

The quality of accounting education programs and their graduates has been the subject of much discussion over the last two decades. The efficacy of accounting curricula to adequately prepare individuals for professional accounting careers has been questioned by both practitioners and academicians alike.¹ The perceived failure of the educational community to address the concerns noted in earlier studies motivated the major professional accounting organizations (i.e., AAA, AICPA, IMA, and the former "Big 5" public accounting firms) to fund a research endeavor that would result in a "high-level thought piece, backed by empirical evidence where possible, that would motivate serious change in accounting education." That research, conducted by Albrecht and Sack (2000), hereafter A & S, found that accounting education had not changed substantively in response to the demands of the profession and concluded that further inaction by the academic community could put the continued viability of accounting programs at risk. The authors offered numerous recommendations regarding how accounting programs could embark upon curriculum revision, including a strategic plan that the revisionists of each program could employ in the process. The suggested strategic plan would require each accounting program to assess the external environment in which it operates, including an analysis of the needs of employers of the program's graduates and the perspectives of employers regarding the educational preparedness of graduates.

MOTIVATION

There appears to be almost universal support for the notion that the current curricula of many accounting programs must be revised to ensure graduates attain the knowledge and skills required of an ever-changing profession. There is considerably less consensus, however, as to what the revised accounting curricula should be. The A & S report has served as the impetus and blueprint for many studies regarding the state of accounting education and methods for improvement in the quality and nature of accounting education.² Yet, in our opinion, published studies tend to suffer from two shortcomings.

First, extant studies were published (or at least the data for them were gathered) prior to the monumental upheaval in the accounting world that followed the scandals associated with Enron and WorldCom, which resulted in the passage of Sarbanes-Oxley (SOX). For example, data for the A & S study were gathered during the technology and internet boom of the late 1990s when it was common knowledge that many students

were abandoning or ignoring accounting programs in favor of computer and information systems and other related degrees. This trend was driven, at least in part, by the strong employment market that existed for computer/information systems and other related degrees. A & S also preceded the highly publicized events relating to Enron, WorldCom, Global Crossing, and others that stirred considerable interest in independence, the state of auditing, and the reliability of corporate accounting. In addition, the audit landscape has been considerably altered by the passage of SOX, the creation of the Public Company Accounting Oversight Board (PCAOB), and SOX Section 404 compliance.

Second, we found no studies designed to determine whether the expectations of public accounting firms regarding accounting education might differ from the expectations of corporate accounting and finance departments of industrial firms, service organizations or governmental agencies (i.e., non-public accounting). If differences exist regarding the skills desired by employers engaged in public accounting versus other employers of accountants, then such differences must be considered in any curriculum revision. No published studies we examined were designed to capture any differences that might exist between the skills desired of accountants employed in public accounting and those employed in other accounting fields.

SAMPLE

Accountants employed in public accounting and in industry are the logical individuals to survey when the subject of interest is the content of accounting curricula and necessary skills valued by employers. In prior studies, restricting the sample to practicing CPAs has generated questions concerning the validity of results. For example, the A & S study has been criticized for reporting "Big 4" (then "Big 5") and large, research university viewpoints only, but many accounting students do not matriculate in large, research institutions and most will not be employed in "Big 4" firms. Alternatively, because small firms are the predominant form of public accounting practice, samples drawn from CPA membership lists will likely be primarily composed of members practicing in small firms (Huefner 1998).

The groups from which we sought responses included accountants employed in public accounting firms ("public accounting group") as well as those employed in other accounting positions ("private accounting group"). In order to accomplish this goal, we distributed our survey instrument to 2,300 individuals who were either members of a large, regional CPA society in south Texas, members of the Institute of

Management Accountants in the same area, or employers who had interviewed on our campus during the previous three years. Four hundred sixty four individuals returned usable surveys for a response rate of approximately 20%.

Our response rate is comparable to that reported in similar studies. For example, A & S report a response rate of approximately 20%. Burnett (2003) reports 27.6% from employers and 21.7% from private corporations and non-Big 5 firms. Ulrich et al. (2003) report 27.2% from a random sample of national firms with at least 50 professionals. Sedki, Madison, and Treacy (2003) report 16% from a random sample of CPA firms registered with the Texas State Board of Public Accountancy.

In accordance with the recommendation made by A & S, we focused our attention on the external environment in which we operate. Therefore, our sample is limited to the south Texas geographic area, but the respondents represent a broad spectrum of those whose viewpoint of accounting education is important. Respondent characteristics are reported in Table 1.

Table 1
Characteristics of Respondents

Number of Respondents in Public Accounting Firms	199
Number of Respondents in Industry/Government	265
Total Respondents	464
Respondents Reporting Nature of Work	238
Tax	22%
Audit/Assurance	10%
Corporate Accounting/Financial	27%
Other*	41%
*Includes internal audit, general public accounting, financial services, consulting, real estate, and wealth management	
Median number of professionals in public accounting firms - 11	
Median number of employees in industry/government respondents - 50	
Number of public accounting firm respondents reporting more than 50 employees - 46	
Number of industry/government respondents reporting more than 50 employees - 59	

Table 2
Average Importance of Courses, Skills, and Other Topics
Full Sample

Rank	Courses, Skills, Other Topics	Average Response for Importance 0% = Least Important 100% = Very Important
1	Spreadsheet Skills	97%**
2	Financial Accounting Courses and Financial Accounting Research	90%**
3	Management Skills	73%**
4	Business Environmental Concepts Courses	67%**
5	Tax Courses	61%
6	Audit Courses and Topics	61%**
7	Project Management and Systems Analysis	41%
8	Global/Cultural Awareness	40%**
9	Other Computer and Technology Skills	28%
** <i>t</i> -tests indicate significantly different from next lower group at $p < .01$.		

SURVEY INSTRUMENT

Our initial survey instrument included questions about courses, knowledge and skills that were used in A & S. We circulated a pilot survey to several accounting professionals engaged in supervisory or recruiting functions who critiqued the survey for clarity and helped to ensure that we had not omitted any important, relevant topics. Based on the feedback we received on the test instrument, minor changes and additions were made to some of the questions. Most of the suggested revisions reflected events and evolving trends occurring in the accounting profession after the A & S study. Nevertheless, our final survey instrument was still comparable to those used by A & S and others who have performed similar studies (e.g., Burnett, 2003; Ulrich et al., 2003).

Our survey most resembles prior studies with respect to a series of three questions. We used a Likert scale for each of these questions. First, we asked respondents to evaluate the importance of course coverage for a number of common accounting topics and courses with the end points of responses being “not important (no courses)” to “very important (more than one course).” Second, respondents were asked to rank the importance of coverage for a variety of professional skills. The end points of responses for this question were from “this skill is not important” to “this skill should be the primary focus of some classes.” Finally, we asked respondents to rank the importance of several other skills and topics with the end points being “not important for new hires to possess” to “critical for new hires to possess.”

ANALYSIS AND RESULTS

To improve clarity, we converted the intervals on our Likert scales to percentages for each of our three questions. We established the end points of each question as 0% and 100%, thus preserving the magnitude of the differences among respondents (Sekaran, 1992). Like A & S, our questionnaire was quite lengthy in that it requested respondents to provide information about the importance of 22 courses, 18 professional skills and 34 other skills/topics. Given the amount of information collected, we used a principal components factor analysis to determine common factors and make our analysis more manageable (Pedhazur and Schmelkin 1991). With the exception of spreadsheet skills, all Courses, Skills, and Other Topics are multi-item factors with items loading at .60 and above. We discarded items which cross-loaded at .4 and above. This resulted in 42 items from our questionnaire loading on nine factors, which we refer to as Courses, Skills, or Other Topics. (See the appendix for a complete list of the items that form each factor.) We compute an average importance score for each factor and report the results across the full sample for both “public” and “private” accountants in Table 2. We then report the results from those involved in public accounting and private accounting separately in Tables 3 and 4, respectively.

Interestingly, our respondents report that knowledge of spreadsheet skills is the most important element of accounting curriculum. The second most important element seems to be financial accounting courses, such as intermediate accounting

and financial accounting research. Across the full sample, tax courses and audit courses and topics are viewed with equivalent importance. At a lower level of importance, our respondents rate project management and systems analysis and global/cultural awareness equivalently.

The fact that differences that do exist are significant at a p value $< .01$ indicates our respondents have strong preferences regarding the importance of courses, topics, and skills in accounting curricula. Results for the full sample are generally consistent with prior studies and with A & S, but do not reveal whether preferences might differ among respondents from the public accounting group and respondents from the private accounting group. We therefore analyze the results separately and report the results for respondents from the public accounting group in Table 3.

For the public accounting group, tax courses have relatively more importance than for the full sample. Audit courses and topics are also relatively more important. Yet, for public accountant respondents, management skills and courses relating to the business environment are still highly ranked. In fact, management skills are more highly ranked than audit courses and topics. Consistent with the full sample, global/cultural awareness, project management and systems analysis, and other computer and technology skills are viewed as relatively less important. We next report, in Table 4, the results for the private accounting group, which represents respondents who are employed in industry and government.

The private accounting group is comparable to both the full sample and the public accounting group in that spreadsheet skills, financial accounting courses and research, and management skills are considered the most important elements of accounting curricula, followed by courses relating to the business environment. Interestingly, the private accounting group rates the importance of audit courses and topics more highly than project management and systems analysis and tax courses, which are viewed with equivalent importance. We next compare the private accounting group and the public accounting group directly and report the results in Table 5. Both groups rank the acquisition of spreadsheet skills equivalently, and both rank financial accounting courses and financial accounting research as the second most important elements of accounting curricula. The public accounting group does place relatively more importance on financial accounting than does the private accounting group. The difference with which the two groups rank tax courses shows the most divergence between the two groups. Tax courses are ranked the third most important element by the public accounting group and between sixth and seventh by the private accounting group. Management skills, courses relating to the business environment, and audit courses and topics form the next tier of topics/courses in order of importance. Finally, the private accounting group ranks project management and systems analysis, and other computer and technology skills as more important than does the public accounting group.

Table 3
Average Importance of Courses, Skills, and Other Topics
Public Accounting Group

Rank	Courses, Skills, Other Topics	Average Response for Importance 0% = Least Important 100% = Very Important
1	Spreadsheet Skills	96%*
2	Financial Accounting Courses and Financial Accounting Research	93%**
3	Tax Courses	82%**
4	Management Skills	73%**
5	Business Environmental Concepts Courses	66%
6	Audit Courses and Topics	63%**
7	Global/Cultural Awareness	38%
8	Project Management and Systems Analysis	38%**
9	Other Computer and Technology Skills	25%

** t -tests indicate significantly different from next lower group at $p < .01$
* t -tests indicate significantly different from next lower group at $p < .05$

Table 4
Average Importance of Courses, Skills, and Other Topics
Private Accounting Group

Rank	Courses, Skills, Other Topics	Average Response for Importance 0% = Least Important 100% = Very Important
1	Spreadsheet Skills	98%**
2	Financial Accounting Courses and Financial Accounting Research	86%**
3	Management Skills	74%**
4	Business Environmental Concepts Courses	68%*
5	Audit Courses and Topics	59%**
6	Project Management and Systems Analysis	45%
7	Tax Courses	45%
8	Global/Cultural Awareness	42%**
9	Other Computer and Technology Skills	30%

** t -tests indicate significantly different from next lower group at $p < .01$
* t -tests indicate significantly different from next lower group at $p < .05$

Table 5
Student's t -test for Differences Between
Public Accounting Group and Private Accounting Group

Courses, Skills, Other Topics	Average Importance Public Accounting Group	Average Importance Private Accounting Group	t -test	Significance (n/s = not significant)
Spreadsheet Skills	96%	98%	-1.80	n/s
Financial Accounting Courses and Financial Accounting Research	93%	86%	5.60	$p < .01$
Tax Courses	82%	45%	16.69	$p < .01$
Management Skills	73%	74%	-0.067	n/s
Business Environment and Concepts	66%	68%	-1.46	n/s
Audit Courses and Topics	63%	59%	1.79	n/s
Project Management and Systems Analysis	38%	45%	-2.85	$p < .05$
Global/Cultural Awareness	38%	45%	-1.68	n/s
Other Computer and Technology Skills	25%	30%	-2.42	$p < .05$

DISCUSSION

Our study raises issues not addressed in prior studies. First, we segregate results for accountants employed in public firms from those employed in industry/government. Second, we employ a factor analysis to show that multiple survey items are viewed as representing common curricular themes to our study's respondents. The factor analysis enables us to identify broader areas of course topics and skills, and their relative importance, than does an examination of variable means as reported in A & S and others (e.g., Ulrich et al., 2003). Finally, the use of scales asking the respondents for the degree of importance with which they viewed courses, skills, and other topics allows us to rank the relative importance of these items.³

Spreadsheet abilities are consistently ranked as the most important skill new hires should have, with respondents considering it more important than basic and advanced financial accounting coursework. A & S report that spreadsheet skills are the highest rated technical skill, but they do not report how their respondents viewed its relative importance compared to courses and other skills. In the same manner, A & S report that basic financial accounting is rated most important among course topics, but they do not report its relative importance compared to technology or other skills.

The importance of spreadsheet skills and financial accounting courses is clearly evident in A & S, but it is difficult to extrapolate from the results of that study to assess the relative importance of other variables and the broader underlying areas to which they relate. For example, the professional skills which comprise management skills are ranked anywhere from first to seventeenth from among twenty-two skills in the A and S study. Additionally, the A & S results do not allow any comparison of the management related skills to the other skill areas or to course topics. By using factor analysis, we surmise that management related skills are considered the third most important component of an accounting education. They are not rated, collectively, as important as spreadsheet skills or financial accounting coursework, but they are, as a group, considered more important than business environmental concepts, tax coursework, and audit coursework.

Course topics that relate to the business environment are ranked from third to twelfth from among eighteen courses in A & S. We use factor analysis to determine that collectively, business environment related courses are considered the fourth most important component of an accounting education. Further, business environment concepts were rated as significantly more important than tax and audit coursework, some other skills, and some technology skills.

Finally, our analysis shows that, with the exception of spreadsheet proficiency, technology-related skills are ranked last in importance among the course topics, professional skills, and other skills/topics. This result is somewhat different from that reported by A & S, but recall that the time frame for their study occurred during the technology and dot com boom when a very strong employment market existed for computer/information systems and other related skills and degrees.

IMPLICATIONS FOR ACCOUNTING EDUCATORS

The debate over accounting curricula creates challenges for accounting educators. Few would argue that a narrow exposure to accounting techniques, auditing standards, and tax rules is all students need to be successful in their professional careers. Yet, our results, as well as the results reported from other studies, indicate that traditional accounting course content is among the most important elements of an accounting education. Given the expectations of employers, the constraints on time and length of an accounting degree, and the demands of other external stakeholders for accountability with respect to assessment and certification exams, how do educators make tradeoffs between teaching traditional course content and teaching professional and other skills? We think that the results of this study offer some guidance on this issue.

First, it is important for accounting programs to recognize that employers of south Texas accounting graduates do not have uniform expectations about course content and key skills and abilities. The results of our study indicate a number of differences between south Texas public accounting firms and south Texas employers of accountants in other types of businesses. The most noticeable difference is the greater degree of relative importance placed on tax coursework by public accounting firms.

Second, it appears that the only skill that all employers agree is more important than accounting coursework is skill in the use of spreadsheets. It is our observation that this is implicitly recognized by authors of accounting text books because most of these texts now include a number of spreadsheet exercises and problems. The results of our study indicate that accounting instructors should strongly consider incorporation of these spreadsheet assignments in their courses.

Third, all accountants agree that basic financial accounting coursework is the second most important element of an accounting education. Thus, it would seem that, with the exception of spreadsheet skills, instructors should be careful about sacrificing financial accounting course content in order to develop other skills. Our survey specifically identified the financial accounting factor as including intermediate accounting, advanced accounting (including consolidations), and financial accounting research. Our *t*-tests for the individual course topics indicated that both groups considered intermediate accounting significantly more important than advanced accounting and advanced accounting was significantly more important than financial accounting research ($p < .01$). Further, both groups rated intermediate accounting as being sufficiently important to warrant more than one course. This result is somewhat inconsistent with results reported by A & S, who report that financial accounting is the most important course, but also report anecdotal comments that intermediate accounting should be limited to one semester.

Fourth, management skills and courses dealing with the contemporary business environment are highly rated by both public and private accountants. Courses dealing with the

contemporary business environment may pose fewer issues for accounting educators because the CPA Exam's Business and Environmental Concepts (BEC) topics (business law, business strategy, economics, and electronic commerce) match fairly well with core business courses that are commonly taught. (E.g., electronic commerce is often covered in required management/accounting information systems classes and business strategy is commonly taught in required business capstone or policy classes.)

In our opinion, the professional skills that comprise the management factor may pose more of a dilemma for south Texas accounting educators. Some skills were very specific, i.e., written communication skills and oral presentation. Some were much less specific, i.e., interpersonal skills and professional demeanor. To what extent is the development of professional skills better left to faculty outside of the accounting department? If the responsibility of developing professional skills lies with accounting educators and such development occurs within accounting courses, other course content presumably must be sacrificed. The results of our study indicate that educators should be very careful about sacrificing course content in financial accounting courses, e.g., intermediate accounting.

In order to better understand the importance with which public and private accountants viewed management skills, we ranked the related professional skills and conducted *t*-tests to determine the relative importance of each skill compared to other skills. From the results reported in Table 6, it can be seen that considerable agreement exists between the two groups with respect to the most important management skills.

Our south Texas respondents rated management skills similarly to those in A & S. In our study, both groups ranked written communication skills, oral presentation skills, interpersonal skills, leadership skills, and the ability to work in teams as important parts of accounting curricula. They differed somewhat on skills relating to exhibiting a professional demeanor and skills relating to performance measurement.

CONCLUSION

Our results indicate that suggestions by A & S that each school must evaluate its program in terms of its own internal and external stakeholders, are valid. In terms of our south Texas program, it seems that traditional financial accounting courses probably require the least revision. For students aiming for a career in public accounting, audit and tax courses also remain a priority. For all accounting students, exposure to course content about the business environment, as well as courses that have some focus on the development of management skills, should also have priority. For our south Texas employment market and program, required accounting courses for which some course content could be sacrificed for the development of management skills would include cost accounting, governmental and not-for-profit accounting, as well as accounting electives.⁴

Several of our results are comparable to those reported by A & S. Ability to use spreadsheets and knowledge of basic financial accounting are reported as very important in both studies. The acquisition of management skills is rated highly in both studies, as is knowledge of business environmental concepts. Unlike the A & S study and others, our methodology allows comparison of the relative importance of these educational areas. In the time frame in which our study was completed, audit coursework seems more important than it did during the time of the A & S study. A & S report audit coursework as sixth most important. Our public accounting respondents rate it sixth also, but view it with no less importance than the class of courses ranked fifth - business environment and concepts. Our private accounting respondents rank audit coursework fifth, but view it with no less importance than the class of courses they rank fourth, also business environment and concepts. We do not find this surprising, given the extensive coverage of audit failures and impropriety in corporate reporting associated with the failure of a number of high-profile companies subsequent to the A & S study.⁵

LIMITATIONS AND FUTURE RESEARCH

Our study included respondents from one geographic area, more specifically, south Texas. Although it included a large number of respondents from a variety of employers, one can still question whether the composition of the sample permits generalization to a broader group. Second, our survey included a large number of questions about the relative importance with which respondents viewed accounting courses, professional skills, and other topics and skills. Our implications arise from a comparison of the relative rankings of these survey items. Forced rankings among the survey questions may result in conclusions that vary somewhat from those reported here.

The results of our study provide a platform for future research regarding accounting professionals' view of the components of accounting education. We suggest its replication across a broader geographic sample. In addition, since both our results and those of A & S indicate that the relative importance of some skills is similar to that of accounting course work, subsequent research could employ some forced ranking mechanisms to provide more evidence of the relative importance with which

Table 6
Management Skills Rankings
Public Accounting Group and Private Accounting Group

Management Skills	Rank Public Group	Mean Public Group	Rank Private Group	Mean Private Group	T-Test for Means
Written Communication Skills	1	87%	1	86%	1.09
Oral Presentation	2	81%	2	81%	-0.07
Interpersonal Skills	3	81%	3	81%	0.07
Professional Demeanor	4	79%	6	75%	*2.35
Leadership	5	76%	5	77%	-0.67
Ability to Work in Teams	6	76%	4	79%	-1.84
Continuous Learning	7	68%	7	70%	-0.93
Project Management	8	68%	8	68%	-0.23
Performance Measurement	9	61%	9	66%	*-2.40
Resource Management	10	60%	10	60%	-0.01
Negotiation	11	59%	11	56%	0.85

* *t*-tests indicate significantly different $p < .05$

respondents view course content and skills. Finally, our study reveals the potential for differences to exist among different types of employers of accounting graduates. We therefore suggest that future studies be designed such that they can separate the responses of accountants in public accounting firms from those of accountants in industry and government.

REFERENCES

- Accounting Education Change Commission (AECC). "Objectives of Education for Accountants: Position Statement Number One," *Issues in Accounting Education*, 5 (No. 2, 1990), 307-12.
- Accounting Education Change Commission (AECC). "Position and Issues Statements of Accounting Education Change Commission," *Accounting Education Series*, 13. Sarasota, FL: American Accounting Association, 1996.
- Albrecht, W. S. & R. J. Sack. "Accounting Education: Charting the Course through a Perilous Future," *Accounting Education Series*, 16. Sarasota, FL: American Accounting Association, 2000.
- American Accounting Association, Committee on the Future Structure, Content, and Scope of Accounting Education (The Bedford Committee). "Future Accounting Education: Preparing for the Expanding Profession," *Issues in Accounting Education*, 1 (No. 1, 1986), 168-95.
- American Institute of Certified Public Accountants (AICPA). "CPA Vision Project identifies top five issues for profession," *The CPA Letter*, 1 (No. 12, 1998).
- Arthur Andersen & Co., Arthur Young, Coopers & Lybrand, Deloitte Haskins & Sells, Ernst & Whinney, Peat Marwick Main & Co., Price Waterhouse, and Touche Ross. *Perspectives on Education: Capabilities for Success in the Accounting Profession*. (The White Paper). New York: NY, 1989.
- Barsky, N. P., A. H. Catanach, Jr. and B. M. Kozlowski. "Creating Strategic Responses to Critical Risks Facing Accounting Education," *Issues in Accounting Education*, 18 (No. 4, 2003), 445-62.
- Burnett, S. "The Future of Accounting Education: A Regional Perspective," *Journal of Education for Business*, 78 (No. 3, 2003), 129-34.
- Huefner, R. J. "The Future of Non-CPA Ownership," *CPA Journal*, 68 (No. 2, 1998), 14-19.
- Pedhazur, E.J. and Schmelkin, L.P. (1991). *Measurement, Design, and Analysis*. Lawrence Erlbaum Publishers. Hillsdale, NJ.
- Sedki, S., T. F. Madison and W. Treacy. "Crossing the Border: An Update on Reciprocal International Licensure," *Today's CPA*, 31 (No. 3, 2003), 28-34.

Sekaran, U. *Research Methods for Business: A Skill-Building Approach*. 2nd Ed. John Wiley & Sons, 1992.

Siegel, G. and J. E. Sorensen. *What Corporate America Wants in Entry-level Accountants*. A Joint Research Project of the Institute of Management Accountants and the Financial Executives Institute. Montvale, NJ: The Institute of Management Accountants, 1994.

The 2000-2001 Auditing Section Education Committee, American Accounting Association. "Challenges to Audit Education for the 21st Century: A Survey of Curricula, Course Content, and Delivery Methods," *Issues in Accounting Education*, 18 (No. 3, 2003), 241-63.

Ulrich, T. A., A. R. Michenzi and W. E. Blouch. "CPAs Assess the Development of Professional Skills of Recent Accounting Graduates," *Journal of the Academy of Business Education*, (Spring 2003), 126-137.

ENDNOTES

- ¹ For example, the American Accounting Association's Bedford Report in 1986, the then Big 8's White Paper in 1989, the AICPA's CPA Vision Project in 1998, and Siegel and Sorensen (1994) all called for changes in accounting education.
- ² Burnett (2003), Ulrich, Michenzi, and Blouch (2003), and Barsky, Catanach, and Kozlowski (2003) are examples.
- ³ The use of comparable scales regarding perceptions of the degree of importance provides one basis for discussing the relative importance with which items are viewed. A forced ranking of items could also provide evidence regarding the relative importance with which respondents viewed particular items.
- ⁴ A& S do not report results for governmental and not-for-profit accounting; consequently, it was omitted from our pilot survey. Critiques of our survey from accounting professionals did not include suggestions that it be added and we therefore concluded it may have been ranked less important than management skills.
- ⁵ Ethics cross-loaded and was dropped from the factor analysis. When considered as a separate item, both public and private accountants ranked it highly. Interestingly, ethics is not included in the A & S questionnaire.

Appendix

Courses, Skills, Other Topics from Factor Analysis	Questionnaire Item(s) Loading on Each Factor
Spreadsheet Skills	Spreadsheet Software (e.g. Excel)
Financial Accounting Courses and Financial Accounting Research	Basic Financial Accounting (e.g. Intermediate Accounting, Financial Accounting Research (e.g. FASB or AICPA databases)
Tax Courses	Personal Income Tax Topics, Corporate Tax Topics , Tax Research
Management Skills	Written Communication Skills, Oral Presentation, Interpersonal Skills, Professional Demeanor, Leadership Ability to Work in Teams, Continuous Learning, Project Management, Performance Measurement, Resource Management, Negotiation
Business Environment and Concepts	Business Law, Business Strategy, Economics, Electronic Commerce, Finance
Audit Courses and Topics	Auditing/Assurance Services, Internal Auditing, Fraud Examination, Sarbanes-Oxley, Auditing Through the Computer
Project Management and Systems Analysis	Project Management, Systems Analysis
Global/Cultural Awareness	Foreign Language, Awareness of Global Issues, Sensitivity to Cultural Diversity, Sensitivity to Environmental Issues, Awareness of Changing Demographics
Other Computer and Technology Skills	Data Analysis/Use of ACL, Web Design, Graphics Software (e.g. Adobe), Intranets, Extranets, Operating Systems other than Windows, Client/Server Management, Information Systems Planning
All factors have eigenvalues greater than 1.	Items loaded at .6 or above with no cross loadings of .4 or above. We use the importance of each item to compute an average importance score for each factor.

QUALITY OF CARE IN TEXAS NURSING FACILITIES REVISITED

Kris Joseph Knox, Texas A&M University at Galveston

Eric C. Blankmeyer, Texas State University-San Marcos

Ha-Chin Yi, Texas State University-San Marcos

J. R. Stutzman, Texas State University-San Marcos

MOTIVATION AND PURPOSE

Using the initial results of an aggregate quality of long-term care measure, previous research indicates that there appears to be little significant difference in quality between profit-seeking and nonprofit nursing facilities in Texas (Knox, Blankmeyer and Stutzman, 2003). These findings are somewhat contrary to conventional wisdom which argues that the quality of care in nonprofit nursing facilities exceeds that provided by profit-seeking facilities.

For example, an article in *Consumer Reports* (September, 2006) provides strong support for conventional wisdom. Further, specifically directed toward Texas, the General Accounting Office questions the ability of Texas state nursing facility inspectors to adequately assess quality in nursing homes by either understating the seriousness of deficiencies or omitting them (Pear, 2006). In light of these recent reports, along with the possibility of forthcoming standard setting and uniform measurement and reporting of outcomes (Broder, 2006), and the potential increasing demand for long-term care, a continuous re-examination of long-term care quality is appropriate.

The purpose of this study is to revisit the quality of care issue in Texas using the most recent available data. We use a modified, reduced form, translog, quality-function model similar to the one found in Knox et al. (2003) to explain industry quality in 1999 and 2003. Additionally, we analyze quality differences in the model from one period (1999) to the next (2003). The quality measure is the multidimensional Quality Reporting System (QRS) rating of each Texas nursing facility by the Texas Department of Human Services (TDHS) (currently, the Texas Health and Human Services Commission). Using QRS values as the dependent variable, classical linear regressions are used to compare quality in the profit-seeking and nonprofit ownership forms, chains versus independent facilities, and urban versus rural homes controlling for facility size, case mix, occupancy rates, funding mix and staff turnover.

Knox et al. (2003) find that facility location, ownership form and chain membership status have little impact on long-term care quality. However, control variables in their model indicate that quality is negatively related to facility size, the proportion of residents dependent upon Medicaid and more intensive resident care needs. On the other hand, a facility providing more resident days (i.e., having higher occupancy) tends to have a higher quality of care level. The number of Registered Nurses and staff turnover rates were not statistically significant. In a study unrelated to Texas, the findings of no statistical

difference in the average quality measures for profit-seeking and nonprofit facilities when control variables are considered are supported in situations when residents and their families have reliable information about quality of care (i.e., no asymmetric information) in a nursing facility (Chou, 2002).

Our analyses indicate that the use of more current data contradicts, somewhat, the results of Knox et al. (2003); particularly with respect to their ownership form conclusion. That is, nonprofit nursing facilities appear to be providing higher quality levels of care when firm size, case-mix, the number of resident days provided, funding-mix and staff turnover variables are considered. Interestingly, our difference analysis results show no significant change in average quality levels in the Texas nursing facility over this period; however, a negative change in average quality may possibly occur in either chain member facilities or as a result of an increase in difficulty of resident care.

SELECTED LITERATURE

The quality of long-term care has been a serious concern since the nursing home scandals in the early 1970s (Giacalone, 2001). Nursing facility care is now compared with numerous quality indicators obtained from regulatory inspections and routinely collected clinical data (Phillips, Zimmerman, Bernabei, & Jonsson, 1997). However, the quality of quality measurement in nursing facilities is still very much in doubt and reflects many issues including conceptual problems, selection and technical problems associated with measurement techniques, reliability and validity of information and comparative application of measures (Mor, Berg, Angelelli, Gifford, Morris, & Moore, 2003). Clearly, the issues of quality of care in nursing facilities are perplexing and unresolved. More than fifteen years ago, Davis (1991) remarked that the “literature on nursing home quality consists of a morass of findings that are largely inconsistent due to disparate methods of defining and measuring quality” (p. 130).

In an earlier historical and comprehensive literature review of the nursing facility industry, Hawes and Phillips (1986) indicate that quality comparisons are dependent upon the dimension of quality used; however, they conclude that despite measurement limitations (e.g., lumping all nonprofits into the same ownership category), resource input measures, licensure violations, complaints and outcome-oriented measures all lead to a finding that nonprofit facilities provide superior quality—particularly in religious-affiliated homes. Since then, the literature on nursing facility quality has grown rapidly. A

Table 1
1999 Texas Nursing Facility Industry Profile Summary

Facility & Characteristics	Profit Seeking π	Nonprofit $n\pi$	Chain		Independent		Urban		Rural	
			π	$n\pi$	π	$n\pi$	π	$n\pi$	π	$n\pi$
Number of Facilities (1032) (Avg/MSA) (Avg/County)	871	161	756	82	115	79	461 (17.07) (9.41)	82 (3.04) (1.67)	410 (2.00)	79 (.39)
Number of Beds (114,405) (Avg/MSA) (Avg/County)	97,308	17,097	85,882	9,005	11,428	8,090	57,445 (2,128) (1,172)	10,487 (388) (214)	39,864 (195)	6,609 (32)
Average Number of Beds (Combined)	111.72	106.19	113.60 (113.23)	109.82	99.37 (100.61)	102.42	124.61 (125.11)	127.89	97.22 (95.03)	83.66
Occupancy Rate (percent) (Combined)	72	80	71 (72)	78	75 (78)	83	75 (76)	84	68 (69)	77
Average Number of Resident Days/Year (Combined)	29,103	30,765	29,457 (29,657)	31,494	26,776 (28,092)	30,009	33,906 (34,653)	38,855	23,703 (23,488)	22,368
Medicaid Resident Days (percent) (Combined)	75	66	75 (74)	71	73 (69)	62	75 (73)	65	75 (74)	68
Medicaid Revenue/Total Resident Revenue (percent) (Combined)	68	63	68 (67)	66	71 (66)	59	66 (65)	60	70 (69)	65
Average Cost (dollars): Resident Care (Combined)	1,584,602	1,965,034	1,615,095 (1,645,534)	1,926,163	1,384,140 (1,637,120)	2,005,381	1,914,221 (2,016,127)	2,589,034	1,213,981 (1,230,679)	1,317,338
Administrative (Combined)	346,616	343,055	364,570 (366,064)	379,842	228,588 (259,652)	304,871	419,501 (424,816)	454,701	264,665 (258,607)	227,170
Capital (Combined)	454,742	428,342	473,115 (475,248)	494,913	333,957 (344,254)	359,242	544,744 (546,973)	559,340	353,511 (343,633)	292,369
Average TILE Ranking (Combined)	7.64	7.82	7.63 (7.64)	7.76	7.70 (7.77)	7.87	7.55 (7.57)	7.68	7.74 (7.77)	7.96
Average Employee Turnover (times) (Combined)	2.67	1.96	2.68 (2.62)	2.02	2.60 (2.31)	1.90	2.88 (2.74)	2.00	2.44 (2.35)	1.93
Average Quality Rating (QRS) (Combined)	59.28	61.40	58.78 (58.80)	59.01	62.64 (63.19)	64.05	57.11 (57.28)	58.21	61.67 (62.15)	64.83

Facility & Characteristics	Urban				Rural			
	Chain		Independent		Chain		Independent	
	π	$n\pi$	π	$n\pi$	π	$n\pi$	π	$n\pi$
Number of Facilities (1032) (Avg/MSA) (Avg/County)	405 (15.00) (8.27)	49 (1.82) (1.00)	56 (2.07) (1.14)	33 (1.22) (.67)	351 (1.71)	33 (.16)	59 (.29)	46 (.22)
Number of Beds (114,405) (Avg/MSA) (Avg/County)	51,334 (1,901) (1,048)	5,804 (215) (119)	6,113 (226) (125)	4,683 (173) (96)	34,545 (169)	3,201 (16)	5,315 (26)	3,410 (17)
Average Number of Beds (Combined)	126.75 (125.85)	118.45	109.16 (121.30)	141.91	98.42 (98.30)	97.00	90.08 (83.08)	74.09
Occupancy Rate (percent) (Combined)	75 (76)	83	76 (79)	85	67 (67)	70	75 (78)	81
Average Number of Resident Days/Year (Combined)	34,472 (34,663)	36,235	29,809 (34,606)	42,764	23,671 (23,738)	24,454	23,897 (22,571)	20,871
Medicaid Resident Days (percent) (Combined)	74 (74)	68	74 (69)	60	75 (75)	75	73 (69)	63
Medicaid Revenue / Total Resident Revenue (percent) (Combined)	66 (65)	62	69 (64)	56	70 (70)	71	72 (67)	61
Average Cost (dollars): Resident Care (Combined)	1,961,070 (2,003,504)	2,354,233	1,575,403 (2,080,516)	2,937,678	1,215,893 (1,222,309)	1,290,544	1,202,603 (1,261,289)	1,336,559
Administrative (Combined)	438,607 (440,387)	455,095	281,321 (345,391)	454,115	279,142 (278,193)	268,103	178,536 (186,978)	197,805
Capital (Combined)	563,121 (564,020)	571,456	412,084 (460,014)	541,350	369,262 (370,293)	381,259	259,803 (246,133)	228,600
Average TILE Ranking (Combined)	7.55 (7.56)	7.69	7.59 (7.62)	7.67	7.73 (7.74)	7.86	7.80 (7.90)	8.02
Average Employee Turnover (times) (Combined)	2.87 (2.78)	1.99	2.90 (2.57)	2.01	2.46 (2.42)	2.08	2.31 (2.09)	1.82
Average Quality Rating (Combined)	56.27 (56.33)	56.81	63.86 (62.49)	60.32	61.67 (61.71)	62.21	61.68 (63.74)	66.94

sample of more recent findings includes Davis, Freeman and Kirby (1998), who assert that a case-mix system of Medicaid reimbursement encourages facilities to accept intensive-care patients. (Texas uses a system of this type.) However, it seems that increases in efficiency and profitability lower the quality of resident care. The findings of lower quality via increased efficiency and profitability are substantiated by Cohen and Spector (1996). They also show that the method of Medicaid reimbursement influences the ratio of registered nurses (RNs) to patients and that a more skilled staff is correlated with better quality of resident care. In addition, profit-seeking facilities use fewer RNs and more licensed vocational nurses than nonprofit homes. Furthermore, although trade-offs are made based on the wage differentials between professional and nonprofessional nursing care, Zinn (1993) notes that there is a higher percentage of professional nurses in nonprofit facilities, which suggests a higher quality of outcomes relative to those of profit-seeking facilities.

On the other hand, surveys indicate that RN staffing ratios are not significant predictors of quality (Steffen & Nystrom, 1997). In questionnaires mailed to family members of residents, Steffen and Nystrom (1997) find that nursing home size is negatively correlated with resident care; however, they do agree with Cohen and Spector that nonprofits provide a higher quality of service than profit-seeking facilities.

Residents' diagnostic health profiles and demographic backgrounds are found to be effective predictors of quality outcomes; however, facility attributes (e.g., ownership status, number of beds, and nursing staff composition and skill levels) are not (Porrell, Caro, Silva, & Monane, 1998).

A greater emphasis on clinical outcomes as quality measurement has resulted from the passage of the Nursing Home Reform Act of 1987 (Zinn, Weech, & Brannon, 1998). For example, inappropriate drug usage (either over- or misprescribed) has been used as a quality measure (Spore, Mor, Larrat, Hawes, & Hiris, 1997). Furthermore, use of physical restraints and psychotropic medication has been examined in traditional and special care units for Alzheimer nursing facilities (Phillips, Hawes, & Fries, 1993; Phillips, Spry, Sloan, & Hawes, 2000). In Texas, less use of physical restraints (i.e., implied higher quality) reduces nursing time costs (which average 60% of typical facility costs). Unfortunately, organizational structure differences were not examined. Bedsores, incontinence, and urinary tract infections have been used as quality indicators in many studies (Mor et al., 2003).

Unfortunately, nursing-facility studies often assume that if costs increase, quality goes up (e.g., Luksetich, Edwards, & Carroll, 2000; Vitaliano, 2003). However, cost seems to be a poor proxy for quality of care; and when independent measures of quality of care exist, they are often only weakly correlated with measures of nursing inputs.

DATA

All our data except the quality measure are from the 1999 and 2003 Texas Medicaid Nursing Facility Cost Reports (TDHS, 1999 & 2003). Quality data are based on the QRS rating of each Texas nursing facility by state regulators (TDHS, 2000). The TDHS gathers data through annual cost reports for all facilities receiving Medicaid reimbursement (approximately 95% of all Texas nursing facilities are approved) and regulates all nursing facilities in Texas.

Tables 1 and 2 provide a detailed industry profile. In 2003, nonprofit facilities make up about 18% of all nursing facilities in Texas. Approximately 68% of all nursing home residents in Texas are Medicaid beneficiaries and generate 60% of the facilities' revenues. Revenues are also reported for private-pay and Medicaid/Medicare residents; however, most costs cannot be allocated among these groups of residents. Texas is one of the few states having an excess supply of beds. Occupancy rates typically average 70-75% with nonprofit facilities having an approximate 80% occupancy rate.

Most of the variables in the Tables are self-explanatory. However, the TILE (Texas Index for Level of Effort) ranking and the QRS merit some discussion. TILE is an index used to measure a facility's case mix and hence its Medicaid reimbursement. There are 11 categories based on the activities-of-daily-living criteria. Reimbursement for a resident in a given category is the same for all facilities statewide. This per-diem reimbursement is an inflation-adjusted, prospective rate. It is based on the average costs of all participating facilities' three cost centers: patient care, general and administrative overhead, and capital costs. For 1996, the average TILE reimbursement rate was \$66.52 per patient day compared with the \$90.18 national average (Texas Health Care Association, 1997). "Texas has relatively low Medicaid rates for nursing home care; in fact, Texas was ranked 45th among all states in 1999" (Morgan, Anderson, DeMoss, Johnson, Wilson, Madden, Mullan, & Wassenich, 2000, p. 10).

The quality-of-care measure is the QRS index value, a simple average of four components. Two components, the Potential Advantages Score (PAS) and the Potential Disadvantages Score (PDS), are derived from a detailed quarterly assessment of each resident by nursing home staff. The assessment, which evaluates the resident's health and quality of life, is based on the Center for Health Systems Research and Analysis (CHSRA) quality indicators adopted by the Health Care Financing Administration (HCFA) for use in monitoring nursing-facility performance. This assessment is "not independently verified by the Department of Human Service" (TDHS, 2000, p. 2). The PAS uses HCFA quality indicators to identify potentially superior performance. It measures adverse conditions "that appear to be less common among residents in the facility than they are among residents in 90 percent of all other facilities" (TDHS, 2000, p. 2). A low number of deficiencies (quality indicators) implies a favorable PAS score. Conversely, the PDS reflects adverse conditions that occur with exceptional frequency in the facility. A low number of deficiency indicators

Table 2
2003 Texas Nursing Facility Industry Profile Summary

Facility & Characteristics	Profit Seeking π	Nonprofit $n\pi$	Chain		Independent		Urban		Rural	
			π	$n\pi$	π	$n\pi$	π	$n\pi$	π	$n\pi$
Number of Facilities (1012) (Avg/MSA) (Avg/County)	834	178	706	98	128	80	456	95	378	83
							(16.89) (9.31)	(3.52) (1.94)	(1.84)	(.41)
Number of Beds (112,750) (Avg/MSA) (Avg/County)	93,992	18,758	80,844	10,781	13,146	7,979	56,698	12,162	37,294	6,596
							(2,100) (1,157)	(450) (248)	(182)	(32)
Average Number of Beds (Combined)	112.70	105.38	114.51 (113.96)	110.01	102.70 (101.55)	99.71	124.34 (124.97)	128.02	98.66 (95.20)	79.47
Occupancy Rate (percent) (Combined)	68	78	68 (68)	75	70 (75)	82	71 (72)	80	64 (66)	75
Average Number of Resident Days/Year (Combined)	27,712	30,049	27,965 (28,258)	30,375	26,316 (27,598)	29,649	31,679 (32,680)	37,488	22,926 (22,676)	21,533
Medicaid Resident Days (percent) (Combined)	70	65	70 (69)	66	71 (68)	63	69 (67)	62	72 (71)	68
Medicaid /Total Resident Revenue (percent) (Combined)	60	59	58 (59)	59	68 (64)	58	57 (56)	54	63 (63)	64
Average Cost (dollars): Resident Care (Combined)	1,894,994	2,383,294	1,914,555 (1,958,514)	2,275,203	1,787,106 (2,067,336)	2,515,705	2,234,732 (2,379,271)	3,073,056	1,485,151 (1,504,714)	1,593,807
Administrative (Combined)	406,020	454,773	429,362 (432,889)	458,294	277,274 (343,884)	450,460	478,566 (498,374)	593,451	318,504 (314,461)	296,046
Capital (Combined)	451,161	447,174	463,423 (463,303)	462,438	383,530 (400,816)	428,475	521,644 (530,316)	571,940	366,134 (355,014)	304,369
Average TILE Ranking (Combined)	7.32	7.60	7.29 (7.32)	7.53	7.52 (7.59)	7.69	7.25 (7.27)	7.39	7.41 (7.49)	7.84
Average Employee Turnover (times) (Combined)	2.27	1.95	2.27 (2.23)	1.96	2.27 (2.14)	1.94	2.30 (2.25)	2.00	2.23 (2.17)	1.89
Average Quality Rating (QRS) (Combined)	58.27	66.33	57.64 (58.25)	62.69	61.74 (65.19)	70.61	56.99 (58.22)	64.07	59.82 (61.46)	68.93

Facility & Characteristics	Urban				Rural			
	Chain		Independent		Chain		Independent	
	π	$n\pi$	π	$n\pi$	π	$n\pi$	π	$n\pi$
Number of Facilities (1012) (Avg/MSA) (Avg/County)	394 (14.59) (8.04)	61 (2.26) (1.25)	62 (2.30) (1.27)	34 (1.26) (.69)	312 (1.52)	37 (.18)	66 (.32)	46 (.22)
Number of Beds (112,750) (Avg/MSA) (Avg/County)	49,573 (1,847) (1,012)	7,664 (284) (156)	7,107 (263) (145)	4,498 (167) (92)	31,250 (152)	3,117 (15)	6,042 (30)	3,479 (17)
Average Number of Beds (Combined)	125.87 (125.84)	125.64	114.58 (120.85)	132.29	100.16 (98.47)	84.24	91.55 (85.01)	75.63
Occupancy Rate (percent) (Combined)	70 (71)	79	74 (77)	84	64 (64)	68	67 (72)	80
Average Number of Resident Days/Year (Combined)	31,835 (32,419)	36,189	30,683 (33,919)	39,819	23,077 (22,835)	20,789	22,214 (22,180)	22,132
Medicaid Resident Days (percent) (Combined)	68 (68)	64	72 (67)	57	72 (72)	70	71 (69)	66
Medicaid Revenue / Total Resident Revenue (percent) (Combined)	55 (55)	56	67 (61)	50	62 (63)	65	68 (66)	64
Average Cost (dollars): Resident Care (Combined)	2,250,400 (2,326,226)	2,815,987	2,135,166 (2,630,681)	3,534,268	1,490,442 (1,479,120)	1,383,641	1,460,140 (1,584,469)	1,762,854
Administrative (Combined)	499,819 (507,031)	553,614	343,511 (457,3344)	664,922	340,388 (336,228)	301,144	215,052 (246,633)	291,945
Capital (Combined)	532,318 (534,503)	548,622	453,813 (510,466)	613,776	376,421 (370,477)	320,352	317,506 (306,830)	291,513
Average TILE Ranking (Combined)	7.22 (7.23)	7.35	7.46 (7.46)	7.47	7.37 (7.42)	7.82	7.59 (7.70)	7.86
Average Employee Turnover (times) (Combined)	2.30 (2.26)	2.01	2.35 (2.23)	1.99	2.23 (2.20)	1.89	2.20 (2.07)	1.90
Average Quality Rating (Combined)	56.31 (56.72)	60.84	61.28 (64.28)	69.56	59.31 (59.99)	65.74	62.17 (65.98)	71.40

implies a favorable PDS score. Obviously, a nursing home's overall quality index is raised by either favorable PAS or PDS scores. The other two components of the QRS rating focus on deficiencies actually observed and verified by state regulators (compliance with state and federal regulation components), whether in response to complaints or in the course of regular inspections. For survey and investigative scores, "The number of deficiencies does not determine the compliance score; it is the nature, scope, and severity of the most severe deficiency that determines the score" (TDHS, 2000, p. 3).

The TDHS cautions that the QRS ratings "are based on a reporting period that tends to indicate each facility's recent performance. QRS ratings do not indicate facility performance over the long run" (2000, p. 1). TDHS also emphasizes that a nursing home providing superior care may nevertheless have an unfavorable PAS or PDS score if many residents are very sick or infirm. Although the QRS ratings are an imperfect index of quality of care in Texas nursing facilities, no other available proxy seems more valid conceptually or has greater informational content.

ESTIMATION MODELS

To our knowledge, an explicit "theory of quality" does not exist. This is not surprising given the nature of quality and some of the conceptual issues noted by Mor et al. (2003). These include: (1) Whose concept of quality is being applied?; (2) Does a defined quality process ensure quality outcomes? (Ramsey, Sainfort, & Zimmerman, 1995); (3) Are the goals of each product or service supplier the same and are those of the demanders equivalently comparable?; (4) Are suppliers accountable for the final outcome?; (5) Is it possible that performance measures of quality do not reflect supplier quality in ways which are relevant to the perception of product or service demanders?; (6) Are the measures of quality understood by all interested parties? and (7) Are the measures of quality transparent and replicable? Our view is that the issues of the quality of long-term care are evolving through numerous studies and empirical analyses.

We use two modeling approaches to compare Texas nursing facility quality in 1999 with that in 2003. We estimate a modified, reduced form, translog function for both time periods using ordinary least squares (OLS) regression and the more robust RDL1 method.¹ Further, a difference regression model is also estimated.

The quality function model is:

$$QRS = \beta_0 + \beta_1 URBAN + \beta_2 FOR-PROFIT + \beta_3 CHAIN + \beta_4 \ln CSMX + \beta_5 \ln BEDS + \beta_6 \ln DAYS + \beta_7 FUNDING + \beta_8 TURNOVER + e \quad (1)$$

where the dependent variable, QRS, is the Quality Rating System reported by the Texas Department of Human Services. The dummy variables are: *URBAN* (1 = urban, 0 = rural)

which classifies a facility as being urban if it is in one of the 28 Metropolitan Statistical Areas (MSAs) in Texas and all others are rural; *FOR-PROFIT* (1 = profit-seeking, 0 = nonprofit) designates profit-seeking facilities from nonprofit nursing homes; and *CHAIN* (1 = chain member, 0 = independent) indicates whether or not the facility is a member of a chain of nursing homes. The independent, control variables are: *FUNDING* which is the percentage of facility revenues from Medicaid; *TURNOVER* which is the ratio of actual to normal staffing for nurses (RNs and LVNs) and aides each year; *ln CSMX* which is the TILE index multiplied by minus 1 and represents the nursing facility's level of care and supervision provided to residents; *ln BEDS* which provides a measure of the size of each facility via the total number of licensed beds; *ln DAYS* in the number of resident days provided by each facility; and *e* is the error term.

We also experimented with differences in quality between 1999 and 2003 using an *ad hoc* difference model. The difference model is:

$$\Delta \ln QRS = \beta_0 + \beta_1 URBAN + \beta_2 FOR-PROFIT + \beta_3 CHAIN + \beta_4 \Delta \ln OCCU + \beta_5 \Delta \ln CSMX + \beta_6 \Delta \ln TCOST + \beta_7 \Delta \ln DAYS + e \quad (2)$$

where Δ represents the difference in the natural logarithms of the continuous-valued variables (2003 values minus 1999 values). All variables except *OCCU* and *TCOST* have been previously defined. *TCOST* is the total cost of each facility's operation and *OCCU* is the occupancy rate for each facility.

EMPIRICAL RESULTS

The key objective of this research is to either provide additional support for the Knox et al. (2003) finding that no statistical difference in quality of care in Texas nursing facilities exists between profit-seeking and nonprofit homes given appropriate control variables are considered or verify the conventional wisdom that nonprofit nursing facilities provide better long-term care quality than profit-seeking homes, even in Texas.

Independent Variables	1999		2003	
	Coefficient	p-value	Coefficient	p-value
URBAN	-1.346	0.225	-1.932	0.063**
FOR-PROFIT	1.239	0.420	-5.403	0.000*
CHAIN	-1.904	0.174	-5.613	0.000*
ln CSMX	-15.273	0.006*	-9.278	0.034*
ln BEDS	-11.102	0.000*	-0.375	0.764
ln DAYS	-0.139	0.949	-2.703	0.003*
FUNDING	-6.550	0.057**	-9.056	0.002*
TURNOVER	-1.030	0.005*	-1.332	0.024*
CONSTANT	89.545	0.000*	88.458	0.000*
Sample size	894		946	
R-square	0.117		0.098	

* Statistically significant at the 95 percent confidence level.
** Statistically significant at the 90 percent confidence level.

Table 3 gives the estimated parameters for the quality function (Equation 1). To summarize, in 1999, there appears to be no quality difference between organizational types, where the facility is located or whether or not the facility is a member of a chain of facilities. Larger facilities and those providing more intensive care have statistically significant lower quality levels. Further, those facilities having high staff turnover rates and those with higher levels of Medicaid funding (10% significance level) also experience a negative impact in quality of care. These results initially support the Knox et al. (2003) finding using 1998 data regarding the ownership controversy. Further, we concur that neither facility location or chain membership significantly influence the quality of long-term care. Finally, similar results for the control variables, facility size, case-mix intensity and Medicaid funding are found. Staff turnover was not significant in Knox et al. (2003).

However, our findings in 2003 yield a little different picture. Conventional wisdom is now strongly supported along with chain members and urban facilities (10% significance level) contributing to lower quality levels as well. The significance status of the control variables of case-mix intensity, Medicare funding and nurse turnover rates remain the same; however, facility size is no longer significant yet the number of resident days provided does become significant.

Robust regression results are similar to OLS findings for both periods. They are not included for brevity. The switch in facility size and number of resident days provided may reflect that the

estimated coefficients for these variables are rather collinear (correlation = -0.826) in 1999 and, in 2003, the correlation is negligible (-0.084).

We also estimate Equation 1 where the control variables are deleted. Point estimates for 1999 show that typical urban facilities and chain members have lower quality than rural and independent facilities, respectively. However, quality differences between ownership types are still insignificant. In 2003, urban, chain members and profit-seeking facilities provide significantly lower quality than their counterparts. Table 4 provides these results. Although robust estimates are similar, they have been omitted for brevity.

Our difference model (Equation 2) provides additional information in Tables 5. As the intercept is not significant, it is plausible that the change in average quality is negligible over the 1999-2003 period. However, OLS regression indicates that only chain members appear to have provided lower levels of long-term care quality (above the 90% confidence level); the decrease is 6.7 percent. When robust regressions are considered, only facilities accepting residents requiring more intensive care (i.e., CSMX) show a decrease in quality of care of approximately 2.6 percent for a 10% increase in case mix intensity. All other explanatory variables are insignificant.

DISCUSSION

Our results are somewhat mixed and probably raise more questions than provide answers. The 1999 findings essentially support those of Knox et al. (2003). This is expected as the QRS data are similar and Knox et al. use 1998 Medicaid cost report data and we use 1999 information. However, in 2003, we would argue that our findings support the conventional wisdom that nonprofit and independent facilities provide higher levels of long-term care. The key question is, of course: What might cause a quality change in long-term care from being comparable in nonprofit and for-profit Texas facilities to that of nonprofits providing significantly better care?

At least three explanations merit consideration. First: How valid is the QRS measure? Second: Is the GAO correct in asserting that a decline in reported serious deficiencies in Texas is possibly a result of a significant number of inexperienced surveyors? If so, does this bias reporting in favor of nonprofit and independent facilities? Third: Does the fact that over fifty percent of Texas nursing facilities filed for bankruptcy during this period have any significant impact on the quality of long-term care in Texas?

The TDHS QRS index measure, as noted previously, is in part based on facility evaluations that are not independently verified by the regulator; and the TDHS strongly cautions users on the interpretations and implications of the index (TDHS, 2000, p. 1). Additionally, the measure does not include the levels of specific clinical data advocated by many researchers (Zinn et al., 1998; Spore et al., 1997; Phillips et al., 1993 & 2000). The problematic nature of quality measurement has precluded a consensus on the adequacy of long-term care in Texas and elsewhere (Mor et al., 2003).

Instrumental Variables	1999		2003	
	Coefficient	p-value	Coefficient	p-value
URBAN	-4.647	0.000*	-2.667	0.006*
FOR-PROFIT	-0.838	0.588	-6.433	0.000*
CHAIN	-3.671	0.011*	-5.552	0.000*
CONSTANT	65.740	0.000*	70.768	0.000*
Number of Observations	894		946	
R-square	0.033		0.070	

* Statistically significant at the 95 percent confidence level.

Independent Variables	OLS		RDL1	
	Coefficient	p-value	Coefficient	p-value
URBAN	0.020	0.485	0.012	0.623
FOR-PROFIT	-0.014	0.720	0.010	0.765
CHAIN	-0.067	0.066**	-0.043	0.165
$\Delta \ln$ OCCU	0.048	0.801	-0.112	0.487
$\Delta \ln$ CSMX	0.044	0.769	-0.259	0.042*
$\Delta \ln$ TCOST	0.090	0.412	0.131	0.160
$\Delta \ln$ DAYS	-0.151	0.495	-0.018	0.923
INTERCEPT	0.042	0.391	-0.001	0.991
Sample size	809		790	
R-square	0.007		0.011	

*Statistically significant at the 95 percent confidence level.
**Statistically significant at the 90 percent confidence level.

Although the 2003 quality function indicates that quality is no longer comparable in nonprofit and for-profit facilities, our difference model sheds a different light and may provide insight into the second question above. The difference model indicates no change in the average QRS index in Texas. Further, there appears to be no change in quality between nonprofit versus for-profit nursing homes and urban versus rural facilities. Only chain members show a decrease in quality of 6.7 percent; however, the decrease is only significant for our OLS model and it does not hold in the more robust RDL1 regressions. Thus, we cannot concur with the GAO assertion (Pear, 2006) that inexperienced regulators are too lenient in their quality ratings. However, based on our 2003 quality function results, if the GAO assertion is correct, we would suggest that a “conventional wisdom bias” appears in their evaluations. On the other hand, our conclusions are limited here because our models use Medicaid cost report data and corresponding quality data. As Medicaid data is lagged by approximately two years, our information is slightly dated. Texas cost report data are lagged approximately two years so that 2004 information will become available in the spring of 2007. Quite possibly, the General Accounting Office is using more current 2005-2006 quality information.

Anecdotal evidence suggests that bankruptcy may lead to a decline in nursing facility quality of care (Duhigg, 2007). Supposedly, new owners, through private-equity funding, have substantially reduced care expenditures and thwarted the legal system’s process for motivating quality improvement. Unfortunately, we are unable to either verify or repudiate this evidence at this point. We did investigate merger and acquisition data using the Securities Data Company’s (SDC) U.S. Mergers and Acquisitions Database and found only one major takeover of 49 facilities in Texas. We do note a decline in quality of care provided by chain facilities, which compose approximately 80 percent of all facilities in Texas. Over 88 percent of chains are profit-seeking organizations and most vulnerable to filing for bankruptcy. Further, we should also note that the number of nonprofit facilities increased by 10.6 percent between 1999 and 2003 which may help explain the relative quality improvement of nonprofit facilities in our 2003 quality function. Apparently, the decline in chain quality was offset by the increase in nonprofit facilities and allowed Texas to have an aggregate level of stable care quality over the 1999-2003 period.

Finally, we acknowledge that our models’ goodness of fit (R-square values) measures are very low even by the standards of cross-sectional regression. Most of the inter-firm variation in quality is not explained. One known problem with our models is the use of the case-mix (or TILE) variable as a control variable. In Texas, there are 11 case classifications for residents and that classification is how nursing facilities are typically reimbursed. However, the residents are classified by the nursing facility personnel. Clearly, reliability issues and audit disagreements are present. In fact the TILE classification system may already be outmoded. Banaszok-Holl, Zinn and Mor (1996) indicate that nursing homes are developing specialty care units for Alzheimer’s, subacute care, head trauma, and so on based on (a) hospital-to-nursing home ratios, (b) health maintenance organization (HMO) penetration, (c) ratio of Medicare to

Medicaid residents, (d) market competition, (e) moratoria on new construction, (f) stringent Medicaid reimbursement payments, (g) organizational structure and (h) facility size.

Further, because of the bankruptcy crises precipitated by the Balanced Budget Act 1997 (Lagnado, 2004), Congress passed additional financial legislation to help keep nursing facilities from closing; that is, the Balanced Budget Refinement Act of 1999 and the Beneficiary Improvement and Protection Act of 2000 (CMS, 2003). This has apparently changed some of the public-funding reimbursement procedures which had been structured on the case-mix determination. That is, the Texas Index for Level of Effort (TILE) may no longer be viable as a proxy for the price of long-term care. Needless to say, distortions in our models’ explanatory variables cast doubt on the reliability of our findings.

In summary, although we lean toward Texas beginning to reflect conventional wisdom, without further investigation, we are reluctant to claim that the Texas nursing facility industry either does or does not conform to the perceptions of many researchers and practitioners. The issue of quality remains both perplexing and challenging and warrants continued analysis.

ENDNOTE

¹ Hubert and Rousseeuw (1997b) discussed robust linear regression when the regressors include continuous-valued variables and dummy variables. The authors showed that this situation leads to conceptual and computational issues for robust regression. To address these issues, they propose the RDL1 method, a three-step procedure based on the reasonable assumption that the dummy variables themselves have been constructed correctly. This means, for example, that all the nursing facilities have been grouped accurately as urban or rural, chain member or independent, and nonprofit or profit-seeking. Any data grossly inconsistent with the model are therefore restricted to the continuous-valued independent variables or the dependent variable.

The first RDL1 step identifies high-leverage observations among the continuous-valued independent variables. Their mean vector and covariance matrix are estimated robustly, and for each observation a robust distance (RD) from the mean vector is computed. Data with large RDs are probable high-leverage points, which lie far from the majority of observations and can distort an OLS regression. These leverage points are down weighted accordingly.

The second RDL1 step deals with outliers in the dependent variable. The L1 regression minimizes the total absolute error instead of the total squared error. It detects observations on the dependent variable whose vertical distances from the regression line are very large. In the third step, residuals from the weighted L1 regression are standardized in a robust way; and observations whose residuals exceed 2.5 in magnitude are dropped from the sample. Finally, ordinary least squares (OLS) is applied to the purged sample to obtain the RDL1 regression coefficients which we report.

The RDL1 procedure highlights data that are significantly at variance with the linear model. These unusual observations need not be ignored; they can contribute to the evaluation of the model. For example, they may identify exceptionally efficient or inefficient nursing facilities, or facilities with atypical quality levels or wage rates. Hubert and Rousseeuw (1997a) provided an instructive application of RDL1.

REFERENCES

- Banaszok-Holl, J., J. S. Zinn, and V. Mor. 1996. The impact of market and organizational characteristics on nursing care facility service innovation: A resource dependency perspective. *Health Services Research* 31(1): 97-117.
- Broder, D. S. 2006. Health Secretary says president will order quality care standards. *San Antonio Express-News*, August 7, 3A.
- Centers for Medicare and Medicaid Services (CMS). 2003. *Health care industry market update. Nursing facilities*. Washington, D.C., May 20, CMS, 1-26.
- Chou, S-Y. 2002. Asymmetric information, ownership and quality of care: An empirical analysis of nursing homes. *Journal of Health Economics* 21: 293-311.
- Cohen, J. W., and W. D. Spector. 1996. The effect of Medicaid reimbursement on quality of care in nursing homes. *Journal of Health Economics* 15: 23-48.
- Davis, M. A. 1991. On nursing home quality: A review and analysis. *Medical Care Review* 48(2): 129-66.
- Davis, M. A., J. S. Freeman, and E. C. Kirby. 1998. Nursing home performance under case-mix reimbursement: Responding to heavy-care incentives and market changes. *Health Services Research* 33(4, Pt. 1): 815-34.
- Duhigg, C. 2007. At many homes, more profit and less nursing. *The New York Times*, September 23, A1: 20-21.
- Giacalone, J. A. 2001. *The U. S. nursing home industry*. Armonk, NY: M. E. Sharpe.
- Hawes, C., and C. D. Phillips. 1986. The changing structure of the nursing home industry and the impact of ownership on quality, cost and access. In *For-profit enterprise in health care*, ed. B. H. Gray, 492-541. Washington, DC: National Academy Press.
- Hubert, M., and P. J. Rousseeuw. 1997a. A regression analysis with categorical covariables, two-way heteroscedasticity, and hidden outliers. In *The practice of data analysis: Essays in honor of John W. Tukey*, ed. D. R. Brillinger et al., 193-202. New Jersey: Princeton University Press.
- Hubert, M., and P. J. Rousseeuw. 1997b. Robust regression with both continuous and binary regressors. *Journal of Statistical Planning and Inference* 57: 153-63.
- Knox, K. J., E. C. Blankmeyer, and J. R. Stutzman. 2003. Quality care in Texas nursing facilities. *Midwestern Business and Economics Review* 31: 1-11.
- Lagnado, L. 2004. Hospital found "not charitable" loses its status as tax exempt. *The Wall Street Journal*, February 19, B1.
- Luksetich, W., M. E. Edwards, and T. M. Carroll. 2000. Organizational form and nursing home behavior. *Nonprofit and Voluntary Sector Quarterly* 29(2): 255-79.
- Mor, V., K. Berg, J. Angelelli, D. Gifford, M. Morris, and T. Moore. 2003. The quality of quality measurement in U.S. nursing homes. *Gerontologist* 43, Special Issue 11: 37-46.
- Morgan, C., B. Anderson, M. DeMoss, M. Johnson, C. Wilson, J. Madden, C. Mullan, and L. Wassenich. 2000. *A continuum of care: Health issues for older adults*. Austin, TX: League of Women Voters of Texas Education Fund.
- Nursing homes: Business as usual. 2006. *Consumer Reports*, September, 38-41.
- Pear, R. 2006. Nursing home audits faulted. *San Antonio Express-News*, January 16, 13A.
- Phillips, C. D., C. Hawes, and B. E. Fries, B. E. 1993. Reducing the use of physical restraints in nursing homes: Will it increase costs? *American Journal of Public Health* 83(3): 342-48.
- Phillips, C. D., K. M. Spry, P. D. Sloane, and C. Hawes. 2000. Use of physical restraints and psychotropic medications in Alzheimer special care units in nursing homes. *American Journal of Public Health* 90(1): 92-6.
- Phillips, D. C., D. Zimmerman, R. Bernabei, and F. V. Jonsson, F. V. 1997. Using the resident assessment instrument for quality enhancement in nursing homes. *Age and Ageing* 26 (Supplement 2): 77-81.
- Porrell, F., F. G. Caro, A. Silva, and M. Monane. 1998. A longitudinal analysis of nursing home outcomes. *Health Services Research* 33(4): 835-65.
- Ramsey, J. D., F. Sainfort, and D. Zimmerman. 1995. An empirical test of the structure, process, and outcome quality paradigm using resident-based nursing facility assessment data. *American Journal of Medical Quality* 10: 63-75.
- Spore, D. L., V. Mor, P. Larrat, C. Hawes, and J. Hiris. 1997. Inappropriate drug prescriptions for elderly residents of board and care facilities. *American Journal of Public Health* 87(3): 404-9.
- Steffen, T. M., and P. C. Nystrom. 1997. Organizational determinants of service quality in nursing homes. *Hospital & Health Services Administration* 42(2): 179-91.

- Texas Department of Human Services. 1999. *Texas Medicaid nursing facility 1999 cost report*. Austin, TX: Author.
- Texas Department of Human Services. 2000. *How QRS rates nursing homes*. Austin, TX: Author.
- Texas Department of Human Services. 2003. *Texas Medicaid nursing facility 2003 cost report*. Austin, TX: Author.
- Texas Health Care Association. 1997. *Basic facts about Texas nursing facilities*. Austin, TX: Author.
- Vitaliano, D. F. 2003. Do not-for-profit firms maximize profit? *The Quarterly Review of Economics and Finance* 43: 75-87.
- Zinn, J. S. 1993. The influence of nurse wage differentials on nursing home staffing and resident care decisions. *The Gerontologist* 33(6): 721-29.
- Zinn, J. S., R. J. Weech, and D. Brannon. 1998. Resource dependence and institutional elements in nursing home TQM adoption. *Health Services Research* 33(2): 261-73.

IDENTIFYING MOTIVATION-BASED RECREATIONAL FISHING MARKETS

Yeong Nain Chi, School of Business, The University of Texas at Brownsville

INTRODUCTION

Recreational fishing has been receiving much publicity as an economic development strategy for local communities (Ditton, et al., 2002). With abundant wildlife and fisheries resources and habitats, Louisiana offers outdoor lovers a varied assortment of wildlife-based recreation alternatives year round. Of all the recreational opportunities available to people in the United States, angling appears to hold a special place with recreationists. In 2001, 970 thousand Louisiana residents (78%) and nonresidents (22%) 16 years old and older fished, and incurred \$703 million of fishing expenses in Louisiana (U.S. Fish and Wildlife Service, 2002).

As a description of a nature-based recreational activity, the title “fishing” is perhaps a bit simplistic in its emphasis on the pursuit and capture of piscine quarry. Rather, the practice of recreational fishing is a multivariate experience comprised of various elements, such as, the capture of fish, the enjoyment of the outdoors, and opportunities for rest, relaxation, and social interaction, to name a few. Each element will play a varying role in motivating different anglers to take part in fishing.

Understanding fishing motivations of Louisiana anglers could be critical in influencing their participation in recreational angling. Understanding what motivates people to participate in angling could give managers insight regarding the needs and interests of their different user groups. It could also assist in serving and attracting diverse angler market segments with different interests and motivations.

Lacking information regarding the reasons of motives for angling between different angler segments, especially in the State of Louisiana, it is difficult to attract diverse angler markets with different motivations and interests. The objectives of this study were to understand fishing motivations of anglers who fished in Louisiana’s Red River area and to identify groups of anglers’ who exhibit common patterns of responses.

METHODS

The data used in this study were extracted from the 2004 Louisiana Fishing Survey - The Red River (Kelso, et al., 2004). This survey was mailed to anglers in Louisiana parishes surrounding the Red River to elicit their participation, fishing preferences, preferred fishing locations, expenditures, and angler attitudes. Respondents were asked to indicate why people fish in the Red River, using a scale that ranged from 1 (Not Important) through 5 (Extremely Important). This study

examined the patterns of responses from the 1,452 anglers who provided complete responses for all nineteen statements. Descriptive statistics of fishing motivations of Red River anglers in this sample are shown in Table 1.

Responses to the nineteen items were factor analyzed using a principal components approach and a varimax rotation to delineate the underlying dimensions associated with fishing motivations. Next, a cluster analysis of respondents was conducted using the three identified factor scores. Using a K-means technique, three cluster groups were identified.

RESULTS

The factor loading and corresponding reliabilities (using Cronbach’s alpha) of the three resulting factors are shown in Table 2. The Bartlett’s test of Sphericity showed that nonzero correlations exist at the significance level of 0.001. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy of 0.91 met the fundamental requirements for factor analysis. The internal consistency coefficient score of nineteen fishing motivations showed Cronbach’s alpha of 0.88 was acceptable. Each of these three factors had a satisfactory Cronbach’s alpha of 0.83, 0.82 and 0.76, respectively, with explained a cumulative 53% of the variance in statement response.

An initial interpretation of these factors suggested that Factor 1 emphasized *Relaxation* comprised nine motivations (structure coefficients ranging from 0.72 to 0.54) and explained 22.0% of the variance with an eigenvalue of 4.19. Factor 2 emphasized *Experience* comprised six motivations (structure coefficients

Motivation	1	2	3	4	5	Mean	S.D.
To be outdoors	30	34	160	592	636	4.22	0.88
For family recreation	91	97	228	556	480	3.85	1.14
To experience new and different things	165	211	403	423	250	3.26	1.23
For relaxation	39	19	139	512	743	4.31	0.90
To be close to the water	113	132	393	471	343	3.55	1.17
To get away from the demands of other people	106	104	207	414	621	3.92	1.23
For the experience of the catch	78	91	336	450	497	3.82	1.13
To test equipment	526	344	366	135	81	2.24	1.20
To be with friends	107	135	311	537	362	3.63	1.17
To experience unpolluted natural surroundings	88	68	233	513	550	3.94	1.13
To win a trophy or prize	997	181	147	60	67	1.64	1.11
To develop fishing skills	309	202	427	316	198	2.93	1.32
To get away from the regular routine	64	51	239	531	567	4.02	1.04
To obtain a very large fish	490	267	319	161	215	2.55	1.43
For the challenge of the sport	202	134	381	406	329	3.36	1.30
For the fun of catching fish	32	38	235	519	628	4.15	0.94
To experience adventure and excitement	92	112	370	473	405	3.68	1.14
Competition with other anglers	852	202	214	92	92	1.88	1.24
To catch a lot of fish	361	214	424	212	241	2.83	1.39

ranging from 0.75 to 0.51) and explained 16.4% of the variance with an eigenvalue of 3.12. Factor 3 emphasized *Skill* comprised four motivations (structure coefficients ranging from 0.80 to 0.55) and explained 14.4% of the variance with an eigenvalue of 2.74.

The three clusters of respondents represent Red River anglers grouped on the similarity of their fishing motivations. Cluster means for the three factor scores are shown in Table 3. Cluster

Motivation	Relaxation	Experience	Skill
For relaxation	0.72		
To be outdoors	0.69		
To experience new and different things	0.64		
For family recreation	0.63		
To get away from the regular routine	0.63		
To experience unpolluted natural surroundings	0.62		
To be close to the water	0.60		
To get away from the demands of other people	0.60		
To be with friends	0.54		
For the fun of catching fish		0.75	
For the experience of the catch		0.73	
To catch a lot of fish		0.64	
For the challenge of the sport		0.64	
To obtain a very large fish		0.61	
To experience adventure and excitement		0.51	
To win a trophy or prize			0.80
Competition with other anglers			0.78
To test equipment			0.60
To develop fishing skills			0.55
Eigenvalue	4.19	3.12	2.74
% of Variance	22.06	16.40	14.44
Cumulative %	22.06	38.46	52.90
Cronbach's Coefficient Alpha	0.83	0.82	0.76
Cronbach's Coefficient Alpha (Overall)		0.88	
K-M-O Measure of Sampling Adequacy		0.91	
Bartlett's Test of Sphericity: Approx. Chi-Square = 10404.40; Degrees of Freedom = 171; Significance = 0.000			

Factor \ Cluster	Active	Competitive	Leisure
Relaxation	-0.465	-0.239	0.543
Experience	0.731	0.058	-0.657
Skill	-0.587	1.382	-0.350
Number of Cases	501	362	589
% Cases	34.51%	24.93%	40.56%

Function	Eigenvalue	% of Variance	Canonical Correlation
1	1.90*	59.9	0.81
2	1.27*	40.1	0.75

* First 2 canonical discriminant functions were used in the analysis.

Variable/Cluster	Active	Competitive	Leisure
Age (Years)	43.55	41.99	44.40
Percent Male	77.0	80.1	72.2
Total Days of Fishing in 2003	39.38	51.10	31.46
Fished at Least Once in Red River in 2003 (%)	48.1	51.7	47.2
Days of Fishing in Red River in 2003	8.61	12.42	7.49
Typical 2003 Red River Trip Expenditures	\$33.08	\$41.35	\$26.40

1, which comprised 34.5% of the Red River angler sample, was labeled *Active* anglers. The *Active* angler cluster showed a positive mean factor score for *Experience*, but negative mean factor scores for *Relaxation* and *Skill*. Cluster 2, named *Competitive* anglers, revealed positive mean factor scores for *Experience* and *Skill*, but a negative mean factor score for *Relaxation*. The *Competitive* angler cluster, containing 24.9% of the sample, was the smallest of the three clusters identified. Cluster 3, the largest group with 40.6% of the sample, was labeled *Leisure* anglers. The *Leisure* angler cluster showed a positive mean factor score for *Relaxation*, but negative mean factor scores for *Experience* and *Skill*.

Results of the cluster analysis were tested for accuracy using the multiple discriminant analysis. The null hypothesis of equal population covariance matrices was rejected significantly (the Box's M = 179.96; $F = 14.95$; $P = 0.000$), and the Wilk's Lambda scores were 0.15 ($\chi^2 = 2,729.40$; $P = 0.000$) and 0.44 ($\chi^2 = 1,187.94$; $P = 0.000$) for both discriminant functions, respectively, indicating that group means were significantly different. The canonical correlation results were both above 0.7, supporting that there were strong relationships between the discriminant score and the cluster membership (Table 4).

The Red River survey questions pertaining to the respondent's fishing activity, Red River fishing trip expenditures, income, age, and gender allowed the analysis of selected characteristics of the angler clusters (Table 5). The average age for each cluster was in the early- to mid-forties. Though statistically significant ($F = 4.58$, $P = 0.0104$), the differences in average ages were relatively minor, at most 2.41 years.

The overwhelming majority of each cluster (72 to 80 percent) was male. Nevertheless, there were statistically significant differences in gender composition ($\chi^2 = 8.36$; $P = 0.0153$). This implies that the *Leisure* angler cluster had a significantly larger percentage of female respondents (27.8 percent) than did the *Active* (23.0 percent) and *Competitive* (19.9 percent) angler clusters.

Angler clusters demonstrated significant differences ($\chi^2 = 23.263$; $P = 0.0256$) in respondent household income. In the *Competitive* angler cluster, 52.77 percent reported a household income of \$45,000 or less. Only 44.51 of the *Active* angler cluster and 40.07 percent of *Leisure* angler cluster had a household income below \$45,000.

Angling avidity varied significantly among clusters ($F = 2.62$, $P < 0.001$). The average number of days spent fishing among *Leisure* was lower than among *Active* and *Competitive* anglers. The average number of days of fishing in the Red River was also significantly lower ($F = 6.34$, $P = 0.0018$) in the *Leisure* angler cluster than in the *Active* or *Competitive* angler clusters.

The clusters also demonstrated significant differences for average fishing trip related expenditures ($F = 4.58$, $P = 0.0104$). The average expenditures in the *Leisure* angler cluster (\$26.40) was significantly lower than for *Active* (\$32.43) and *Competitive* (\$41.35) angler clusters.

CONCLUSIONS AND DISCUSSION

These motivational clusters group anglers in a manner distinct from the recreational specialization technique employed by Ditton et al. (1992) which created angler market segments based on individuals' responses to four questions pertaining to their orientation, experience, and commitment to fishing and their relationship to other anglers. Previous research (Finn and Loomis, 2000; Salz and Loomis, 2000) have detected differences among low, medium, and high specialization anglers in their responses to activity-related, motivation-related items, and perceptions of management practices. High motivation anglers were found to be more interested than low and medium anglers in qualitative experiences, like relaxing, experiencing the outdoors, escaping routine, and developing fishing skills.

This research suggests that the anglers' motivations – their reasons for fishing – may also be important in distinguishing different segments within the angling population. This study suggested that the nineteen statements describing fishing motivations of Red River anglers could be condensed into three attitudinal dimensions (*Relaxation, Experience, Skill*) using principal components analysis and performed a three-cluster solution, including *Active, Competitive, and Leisure* groups, using K-means cluster analysis.

Leisure anglers were the most common, comprising over 40 percent of the survey sample. They were more likely than their counterparts in the *Active* and *Competitive* angler clusters to view the social and experiential components of their fishing experience as very or extremely important. In contrast, they placed less importance on harvest rates, fish size, and other more traditional aspects of fisheries management. They were not as active as *Active* and *Competitive* anglers, fishing less frequently and spending less money during a typical fishing trip in the Red River, the survey target area.

Competitive anglers were the most active of the three clusters, with more days of fishing overall and more days of angling in the Red River than other anglers. Though a larger percentage reported a household income at the lower end of the income range, *Competitive* anglers typically spent more on a fishing trip than anglers in the other clusters. *Competitive* anglers also placed a higher importance on skill-oriented aspects of the fishing experience, such as winning a trophy, testing equipment, and development fishing skills.

Fisheries managers should be mindful of the diverse nature of recreational user groups if they wish to address the decline in recreational fishing in Louisiana and throughout the United States since 1991 (U.S. Fish and Wildlife Service, 2002). The customary objectives of fisheries managers, fish size and populations, are not the primary attractants for all anglers. Indeed, *Leisure* anglers, who comprised 40 percent of the sample (and possibly a larger portion of the public overall), place a relatively low priority on catching fish. To appeal to this segment, managers should work to enhance the perceived environmental quality of fishing sites and to provide facilities that enhance the convenience and relaxation of the angling experience.

At the same time, the traditional fisheries management goals are justified by their importance to the *Active* and *Competitive* angler clusters. Because their trip expenditures and participation rates are higher than those of *Leisure* anglers, they are likely to make a higher economic contribution to the communities in which their angling activity takes place. To retain these important angler groups, managers should continue to pursue the traditional fisheries management goals that enhance catch success.

These results illustrate the diversity of anglers' motivations and belie the concept of an "average" angler. Fisheries managers in Louisiana's Red River and other locations should be aware of this diversity when considering management options and striving to serve the angling public.

ACKNOWLEDGEMENTS

I would like to thank Dr. William Kelso of the Louisiana State University School of Renewable Natural Resources and Mr. Tim Morrison, Mr. David Lavergne, Mr. Herb Holloway, and Dr. Jack Isaacs of the Louisiana Department of Wildlife and Fisheries for providing the data necessary and research assistance to accomplish this study. I am also grateful to the reviewers who commented on an initial draft of the paper.

REFERENCES

- Anderson, D.K., R.B. Ditton, and C.O. Oh. (2002). *Characteristics, Participation Patterns, Management Preferences, Expenditures, and Economic Impacts of Sam Rayburn Reservoir Anglers*. College Station, Texas: Texas A&M University, Human Dimensions of Fisheries Laboratory Technical Document HD-622.
- Ditton, R.B., S.M. Holland, and D.K. Anderson. (2002). "Recreational Fishing as Tourism." *Fisheries*, vol. 27(3), p. 17-24.
- Ditton, R.B., D.K. Anderson, J. F. "Jack" Thigpen, B.L. Bohnsack, and S. G. Sutton. (2000). *1999 Pirates Cove Big Game Tournaments: Participants' Characteristics, Participation in Fishing, Attitudes, Expenditures, and Economic Impacts*. College Station, Texas: North Carolina Sea Grant Program and Texas Agricultural and Mechanical Experiment Station.
- Ditton, R.B., D.K. Loomis, and S. Choi. (1992). "Recreation Specialization: Re-conceptualization from a Social Worlds Perspective." *Journal of Leisure Research*. 16: 135-144.
- Finn, K.L., and D. K. Loomis. (2000). "Testing Recreation Specialization: Applications of a Specialization Index." *Proceedings of the 1999 Northeastern Recreation Research Symposium*: 232-241.

Kelso, W.E., D.A. Rutherford, R.C. Walley, J.D. Lang, and P.R. Tate. (2004). *The 2004 Louisiana Fishing Survey – The Red River*. Baton Rouge, Louisiana: Research Summary 161, School of Renewable Natural Resources, Louisiana Agricultural Experiment Station, Louisiana State University Agricultural Center.

Salz, R.J., and D.K. Loomis. (2000). “Development and Verification of a Specialization Index for Angler Segmentation.” *Proceedings of the 1999 Northeastern Recreation Research Symposium*: 227-231.

USDI, Fish and Wildlife Service, and USDC, Census Bureau. (1993). *1991 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*.

USDI, Fish and Wildlife Service, and USDC, Census Bureau. (1997). *1996 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*.

USDI, Fish and Wildlife Service, and USDC, Census Bureau. (2002). *2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*.

VOLATILITY DYNAMICS ACROSS INTERNATIONAL STOCK MARKETS

Rafiqul Bhuyan Rafiq, California State University, San Bernardino

Yoshi Fukasawa, Midwestern State University

A. Sobur Molla, University of Botswana

I. INTRODUCTION

Stock market volatility differs dramatically across international markets (Xing, 2004; Roll, 1992; Harvey, 1995; Bekaert and Harvey, 1997; and Aggarwal et al. 1999). The aim of this paper is to empirically examine those volatility characteristics in both developed and emerging markets. The unique features of the study include a large sample size with updated data set that reveals the world economy and volatility (synonymous with risk) testing that reports the risk return characteristics, leading to the venues for further research on the global diversification.

The rest of the paper is organized as follows: section II comprises the literature review of this study; the sample and methodology are described in section III. Section IV discusses the empirical findings of this study; and a summary of major findings and concluding remarks are in section V.

II. LITERATURE REVIEW

Many traditional asset-pricing models (e.g., Sharpe 1964; Merton, 1973) postulate a positive relationship between a stock portfolio's expected return and the conditional variance as a proxy for risk. More recent theoretical works (Whitelaw, 2000; Bekaert and Wu, 2000; and Wu, 2001) consistently assert that stock market volatility should be negatively correlated with stock returns. Earlier studies, for instance French et al. (1987), found a positive and significant relationship, and studies such as Baillie and DeGennaro (1990) and Theodossiou and Lee (1995) reported a positive but insignificant relationship between stock market volatility and stock returns. Consistent with the asymmetric volatility argument, many researchers (Nelson, 1991; Glosten et al., 1993; Bekaert and Wu, 2000; Wu, 2001; Brandt and Kang, 2003) recently report negative and often significant relationship between the volatility and return.

The financial literature that offers research on stock market volatility over time and linkages that exist among world markets is still unresolved. Researchers have empirically demonstrated (e.g., Harvey, 2001; Li, 2002) that the relationship between return and volatility depends on the specification of the conditional volatility. In particular, using a parametric GARCH-M model, Li (2002) finds that a positive but statistically insignificant relationship exists for all twelve major developed markets. By contrast, using a flexible semi-parametric GARCH-M model, they document that a negative relationship prevails in most cases and is significant in six out of the twelve markets. Malkie and Xu (1999) used a disaggregate approach to study the behavior of stock market volatility. While the volatility for the

stock market as a whole has been remarkably stable over time, the volatility of individual stocks appears to have increased. Yu (2002) evaluates the performance of nine alternative models for predicting stock market volatility. The data set used in the study is the New Zealand Stock Exchange (NZSE40) capital index. The competing models include both simple models such as the random walk and smoothing models and complex models such as ARCH type models and a stochastic volatility model. Four different measures are used to evaluate the forecasting accuracy. The main results are (i) the stochastic model provides the best performance among the alternatives; (ii) ARCH type models can perform well or badly depending on form chosen; the performance of the GARCH (3,2) model, the best model within the ARCH family, is sensitive to the choice of assessment measures; and (iii) the regression and exponentially weighted moving average models do not perform well according to any assessment measure, in contrast to the results found in various markets. Li (2002) examined the relationship between expected stock returns and volatility in the twelve largest international stock markets. Batra (2004) examined the time variation in volatility in the Indian stock market. Raju and Gosh (2004) used the International Organization of Securities Commission (IOSCO) clarification to categorize countries into emerging and developed markets. Shin (2005) examined the relationship between risk and return in a number of emerging stock markets.

The main contribution of this paper is to present more reliable evidence on the relationship between stock market volatility and returns in the emerging stock market by exploiting a recent advance in nonparametric modeling of conditional variance. From the literature review, three research questions arise: (i) Whether emerging markets earn more return than developed markets and the high return is compensated with the high volatility as a proxy of risk; (ii) whether emerging markets are more predictable than developed markets; and (iii) whether emerging markets are more volatile than developed markets. This paper attempts to investigate the three research questions, and in particular to explore the world market volatility in comparison between the developed and emerging markets which might be helpful for risk management through portfolio management and option pricing.

III. DATA AND METHODOLOGY

To investigate the issue of stock market volatility, we use the MSCI (Morgan Stanley Capital International, Inc.) country indexes of 50 developed and emerging markets. Monthly equity price indexes in US dollar terms for twenty-two developed markets and twenty-eight emerging markets are extracted from

the MSCI database. The sample period covers December 31, 1969 – February 28, 2006 for developed markets and December 31, 1987 – February 28, 2006 for emerging markets.

The linear time series model is inappropriate, in the sense that they provide very poor forecast intervals and it was contended that like conditional mean, variance (volatility) could as well evolve over time. Among the non-linear model for volatility testing ARCH and GARCH are the widely used methods. Volatility persistence is a subject that has been thoroughly investigated since the introduction of ARCH models by Engle (1982). The ARCH models provide a framework of analysis and development of time series models of volatility. ARCH (Engle, 1982) process allows the possibility that the error term is following some kind of AR process. Returns for the sample countries are calculated as natural log of returns (r_t):

$$r_t = \text{LN}(\text{Price}_t/\text{Price}_{t-1}) \dots\dots\dots(1)$$

Begin with a simple ARMA model of r_t :

$$r_t = b_0 + b_1 r_{t-1} + \varepsilon_t \dots\dots\dots(2)$$

Where ε_t = white noise process,
 $\varepsilon_t \approx IN(0,1)$

It follows that
 $\text{var}(\varepsilon_t) = \sigma_t^2$

Suppose that σ_t^2 depends on past values of ε_t^2 so, an ARCH (1) model:

$$\sigma_t^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \mu_t \dots\dots\dots(3)$$

More generally,

$$\varepsilon_t^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \alpha_2 \varepsilon_{t-2}^2 + \dots + \alpha_p \varepsilon_{t-p}^2 + v_t$$

The conditional variance is ε_t^2 or h_t is an ARCH (q) process:

$$h_t = \alpha_0 + \sum_{i=1}^q \alpha_i \varepsilon_{t-i}^2 \dots\dots\dots(4)$$

$H_0 =$ No ARCH process; $\alpha_1 = \alpha_2 = \alpha_3 = 0$. v_t is the white noise process with variance $\varepsilon_{t-1}^2=1$, α_0 and α_1 are constants with $\alpha_0 > 0$, and $0 < \alpha_1 < 1$. However, ARCH models themselves have a number of difficulties: *Firstly*, it is very difficult to decide the number of lags (q) of the squared residual in the model. *Secondly*, the number of lags of the squared error that are required to capture all of the dependence in the conditional variance might be varying in large amounts. This would result in a large conditional variance model that was not parsimonious. Engle (1982) circumvented this problem by specifying an arbitrary linearly declining lag length on an ARCH. *Thirdly*, other things being equal, the more parameters there are in the conditional variance equation, the more likely it is that one or more of them will have negative estimated values. Non-negativity constrains might be violated. To overcome these limitations GARCH model was introduced.

We can also think of errors as being ARMA process which generalizes the process to a GARCH model (Bollerslev, 1986):

$$\varepsilon_t^2 = h_t$$

$$\varepsilon_t = v_t \sqrt{h_t}$$

where $h_t = \alpha_0 + \sum_{i=1}^q \alpha_i \varepsilon_{t-i}^2 + \sum_{i=1}^p \beta_i h_{t-i} \dots\dots\dots(5)$

v_t is the white noise process

The conditional and unconditional means of ε_t are 0.

Table 1: Descriptive Statistics from Developed Markets

Country	N	Mean	Standard Deviation	Skewness	Kurtosis	Autocorrelation (SE)Q(1)	Box-Ljung Q(1) (prob)	Autocorrelation (SE)Q(16)	Box-Ljung Q(16) (prob)	Jarque-Bera
Australia	434	0.0043	0.07175	-1.660	12.176	-.034 (.048)	.498 .480	.062 (.047)	9.485 .892	1722.84
Austria	433	0.0076	0.05870	0.076	2.832	.096 (.048)	4.007 .045	-.020 (.047)	29.050 .024	0.93
Belgium	433	0.0067	0.05478	-0.210	2.722	.098 (.048)	4.201 .040	.068 (.047)	18.908 .273	4.58
Canada	433	0.0061	0.05583	-0.799	2.757	.048 (.048)	1.021 .312	.056 (.047)	20.916 .182	47.11
Denmark	433	0.0083	0.05353	-0.059	0.910	-.020 (.048)	.179 .672	.032 (.047)	32.885 .008	79.06
Finland	289	0.0129	0.08715	-0.365	1.953	.169 (.059)	8.384 .004	-.024 (.057)	25.606 .060	19.61
France	433	0.0065	0.06477	-0.362	1.583	.072 (.048)	2.291 .130	-.013 (.04)	13.214 .657	45.68
Germany	433	0.0063	0.06168	-0.523	1.885	-.006 (.048)	.015 .902	.032 (.047)	24.904 .072	42.13
Greece	217	0.0088	0.09764	0.875	3.296	.057 (.067)	.706 .401	.012 (.065)	28.038 .031	28.48
Hong Kong	434	0.0095	0.10541	-0.520	6.718	.084 (.048)	3.102 .078	.021 (.047)	23.141 .110	269.49
Ireland	217	0.0066	0.05708	-0.339	1.048	-.014 (.067)	.045 .832	-.063 (.065)	14.746 .543	38.61
Italy	433	0.0038	0.07255	-0.006	0.664	.045 (.048)	.888 .346	-.016 (.047)	25.169 .067	98.45
Japan	434	0.0080	0.06361	0.007	0.480	.097 (.048)	4.125 .042	-.084 (.047)	31.387 .012	114.83
Netherlands	433	0.0070	0.05290	-0.605	2.228	.001 (.048)	.000 .986	.039 (.047)	17.166 .375	37.25
New Zealand	290	0.0047	0.07666	-0.907	5.793	.027 (.058)	.218 .640	.021 (.057)	20.938 .181	133.88
Norway	433	0.0076	0.07596	-0.529	1.957	.106 (.048)	4.935 .026	-.072 (.047)	29.725 .019	39.85
Singapore	434	0.0075	0.08410	-0.440	6.100	.107 (.048)	4.963 .026	-.045 (.047)	19.325 .252	187.73
Spain	433	0.0038	0.06469	-0.426	2.364	.067 (.048)	1.937 .164	.110 (.047)	36.338 .003	20.29
Sweden	433	0.0091	0.06801	-0.374	0.874	.044 (.048)	.833 .361	-.033 (.047)	17.365 .362	91.58
Switzerland	433	0.0082	0.05317	-0.327	1.457	.058 (.048)	1.445 .229	.065 (.047)	24.756 .074	50.28
UK	433	0.0059	0.06330	0.448	5.966	.064 (.048)	1.804 .179	.064 (.047)	20.841 .185	173.54
USA	433	0.0058	0.0441	-0.576	2.523	.014 (.048)	.085 .770	.002 (.047)	11.681 .766	27.98

The key to ARCH and GARCH is that the conditional variance of the disturbances of y_t constitutes an ARMA process. Therefore, $H_0 =$ (No ARCH or GARCH) $\alpha_1, \alpha_2 = 0$
 $H_1 =$ (ARCH or GARCH) at least one $\alpha_t \neq 0$. ARCH and GARCH models have been applied to a wide range of time series analysis, but applications in finance have been particularly successful (Engle, 2001). This study employs GARCH type models including the recent update such as IGARCH and EGARCH. Nelson's (1991) EGARCH represents a more successful attempt to model excess conditional kurtosis in stock return indices based on a generalized exponential distribution. Nelson (1991) was the first investigator to model leverage effects, that is the down movements are more influential for predicting volatility than the upward movements.

Ding et al. (1993) show that stock market absolute returns exhibit a long-memory property in which the sample autocorrelation functions decay very slowly and remain significant even at high order lags. Evidence in favor of long-range dependence in measure of volatility has been largely documented. Despite the fact that many studies were done dealing with volatility in developed and emerging markets in last two decades, few

studies investigated the issue of volatility persistence using non-linear estimation models.

Engle and Bollerslev (1986), Chou (1988), Bollerslev et al. (1992) show that the persistence of shocks to volatility depends on the sum of the $\alpha + \beta$ parameters.

- < 1 imply a tendency for the volatility response to decay over time
- = 1 imply indefinite volatility persistence to shocks over time
- > 1 imply increasing volatility persistence over time/ covariance stationarity is violated

However, a significant impact of volatility on the stock prices can only take place if shocks to volatility persist over a long time (Poterba and Summers, 1986). In addition, Hasan et. al (2000) showed that significance of α parameter indicates the tendency of shock to persist.

Table 2: GARCH type models: Developed Markets

	AR(1)	GARCH(11)				EGARCH(11)				IGARCH(11)			
		α_0	α_1	β_1	$\sum\alpha_i + \sum\beta_i$	α_0	α_1	β_1	$\sum\alpha_i + \sum\beta_i$	α_0	α_1	β_1	$\sum\alpha_i + \sum\beta_i$
Australia	-0.0338 (-0.70)	0.0056 (4.89)	0.0198 (0.41)	0.2020 (1.32)	0.2218					-1.2E-005 (-1.637)	0.020 (0.405)	0.999 (17.042)	1.019
Austria	0.0965 (2.01)	0.0024 (7.07)	0.3137 (7.04)	0.1443 (0.98)	0.4580								
Belgium	0.0984 (2.05)	0.0028 (9.13)	0.0418 (0.87)	0.8948 (5.22)	0.9366	0.0024 (0.29)	0.1176 (2.26)	0.9234 (47.92)	1.041				
Canada	0.0486 (1.01)	0.0029 (9.05)	0.0527 (1.09)	0.7359 (3.67)	0.7886	0.0010 (0.31)	0.0045 (0.09)	0.9757 (1641.30)	0.9802				
Denmark	-0.0203 (-0.42)	0.0028 (11.97)	0.0196 (0.41)	0.9068 (4.30)	0.9264	0.0012 (0.47)	0.0902 (1.87)	0.9789 (1559.)	1.0691	0.0000 (0.21)	0.0744 (1.54)	0.9686 (3853)	1.043
Finland	0.1697 (2.92)	0.0068 (8.36)	0.0765 (1.30)	0.8654 (13.70)	0.9419					0.0033 (0.32)	0.0367 (0.57)	0.9266 (35.69)	0.9633
France	0.0727 (1.51)	0.0038 (10.09)	0.0986 (2.06)	0.8863 (8.67)	0.9849					-1.034E-06 (-0.04)	0.0483 (1.00)	0.9639 (1836.65)	1.0122
Germany	-0.0059 (-0.12)	0.0034 (9.49)	0.1081 (2.26)	0.2119 (0.42)	0.3200					-1.706E-06 (-0.04)	0.0463 (0.88)	0.9207 (44.58)	0.967
Greece	0.0573 (0.84)	0.0092 (6.28)	0.0281 (0.41)	0.8637 (8.22)	0.8918					-0.0003 (-0.20)	0.1004 (1.36)	0.8951 (27.46)	0.9955
Hong Kong	0.0843 (1.76)	0.0096 (6.34)	0.1237 (2.59)	0.6644 (5.70)	0.7881	-0.001 (-0.15)	0.0276 (0.54)	0.9305 (50.25)	0.9581				
Ireland	-0.0146 (0.21)	0.0031 (8.01)	0.0571 (0.84)	0.8546 (5.82)	0.9117					-0.0000 (-0.51)	0.0020 (0.03)	0.9470 (39.89)	0.949
Italy	0.0452 (0.94)	0.0045 (10.98)	0.1453 (3.05)	0.2082 (0.67)	0.3535	-0.0004 (-0.09)	0.0030 (0.06)	0.9660 (4984)	0.9691				
Japan	0.0972 (2.03)	0.0035 (11.68)	0.1276 (2.67)	0.8029 (7.46)	0.9305	0.0009 (0.38)	0.0384 (0.79)	0.9814 (1099)	1.0198	0.0000 (0.02)	0.1170 (2.43)	0.9766 (4211.9)	1.0936
Netherlands	0.0008 (0.02)	0.0026 (9.59)	0.0565 (1.17)	0.8578 (3.93)	0.9143					0.0011 (8.84)	0.7269 (4.34)	0.6152 (3.20)	1.3421
New Zealand	0.0273 (0.46)	0.0057 (5.95)	0.0234 (0.40)	0.9215 (4.12)	0.9449					-2.375E-05 (-0.75)	0.0249 (0.42)	0.9843 (26008)	1.0092
Norway	0.1068 (2.23)	0.0052 (9.78)	0.0808 (1.68)	0.5136 (1.31)	0.5944								
Singapore	0.1066 (2.23)	0.0063 (6.76)	0.0860 (1.79)	0.8434 (7.64)	0.9294	0.00403 (-0.21)	0.065 (1.16)	0.8413 (27.96)	0.9063				
Spain	0.0668 (1.39)	0.0038 (9.30)	0.0786 (1.64)	0.4718 (1.27)	0.5504								
Sweden	0.0438 (0.91)	0.0037 (10.30)	0.1904 (4.03)	0.7261 (6.52)	0.9165					-2.379E-06 (-0.06)	0.0923 (1.77)	0.9304 (46.98)	1.0227
Switzerland	0.0577 (1.20)	0.0025 (10.13)	0.0944 (1.97)	0.5108 (1.66)	0.6052								
UK	0.0644 (1.34)	0.0034 (6.49)	0.1341 (2.81)	0.7949 (10.14)	0.9290	-0.003005 (-0.87)	0.0356 (0.74)	0.9774 (47202.)	1.013				
USA	0.0141 (0.29)	0.0017 (8.63)	0.1291 (2.70)	0.5357 (2.29)	0.6648	-0.00294 (-0.40)	0.0514 (1.01)	0.9313 (50.34)	0.9827				

Country	N	Mean	Standard Deviation	Skewness	Kurtosis	Autocorrelation (SE)Q(1)	Box-Ljung Q(1) (prob)	Autocorrelation (SE)Q(16)	Box-Ljung Q(16) (prob)	Jarque-Bera
Argentina	218	0.0142	0.15200	0.591	3.664	.025 .067	.140 .708	-.094 (.065)	9.457 (.893)	16.72
Brazil	218	0.0137	0.16847	-1.400	9.581	-.146 .067	4.697 .030	.054 (.065)	23.111 (.111)	464.57
Chile	218	0.0117	0.07176	-0.449	2.282	.143 .067	4.542 .033	.028 (.065)	13.646 (.625)	11.95
China	158	-0.0068	0.10896	0.267	1.542	.072 .079	.841 .359	-.022 (.075)	24.469 (.080)	15.84
Colombia	158	0.0111	0.09410	-0.246	0.681	.210 .079	7.118 .008	.109 (.075)	24.088 (.088)	36.97
Czech	134	0.0115	0.08503	-0.510	1.635	.016 .085	.036 .849	.039 (.080)	20.425 (.202)	16.21
Egypt	134	0.0157	0.08863	0.820	1.3505	.265 .085	9.612 .002	.099 (.080)	45.761 (.000)	30.99
Hungary	134	0.0160	0.10439	-0.716	4.484	-.014 .085	.026 .871	.020 (.080)	17.430 (.358)	23.68
India	158	0.0067	0.08268	-.129	-0.419	.063 .079	.645 .422	-.127 (.075)	22.797 (.119)	77.37
Indonesia	218	0.0050	0.14470	0.409	4.472	.165 .067	6.042 .014	-.052 (.065)	26.100 (.053)	25.75
Israel	158	0.0045	0.07588	-0.409	0.580	.054 .079	.477 .490	-.063 (.075)	20.543 (.197)	42.95
Jordan	218	0.0047	0.05066	-0.053	1.832	.143 .067	4.501 .034	.005 (.065)	33.565 (.006)	12.49
Korea	218	0.0053	0.11095	0.305	3.035	.041 .067	.376 .540	-.087 (.065)	18.929 (.272)	3.28
Malaysia	218	0.0038	0.09015	-0.210	3.900	.159 .067	5.591 .018	-.141 (.065)	40.387 (.001)	8.96
Mexico	218	0.0172	0.09707	-0.934	2.940	.077 .067	1.295 .255	-.050 (.065)	24.990 (.070)	31.64
Morocco	134	0.0080	0.05186	0.359	2.129	.111 .085	1.674 .196	-.010 (.080)	22.917 (.116)	7.11
Pakistan	158	0.0037	0.11405	-0.305	2.228	-.015 .079	.037 .847	-.032 (.075)	13.842 (.610)	6.29
Peru	218	0.0102	0.08928	-0.580	3.379	.002 .079	.001 .975	.020 (.075)	23.520 (.101)	9.63
Philippines	218	0.0026	0.09507	-0.027	1.849	.222 .067	10.891 .001	-.074 (.065)	21.486 (.161)	12.06
Poland	158	0.0144	0.13768	0.796	6.131	.065 .079	.689 .406	.005 (.075)	22.061 (.141)	81.11
Portugal	217	0.0016	0.06438	0.078	1.106	0.060 (0.067)	0.804 (0.370)	-.003 (.065)	17.396 (.360)	32.66
Russia	134	0.0174	0.18671	-1.082	4.730	.134 .085	2.443 .118	-.146 (.080)	20.648 (.192)	42.83
South Africa	158	0.0090	0.08044	-1.013	3.088	-.021 .079	.068 .795	-.045 (.075)	9.926 (.870)	27.07
Sri Lanka	158	0.0023	0.10142	0.332	1.980	.054 .079	.465 .495	.027 (.075)	22.713 (.122)	9.74
Taiwan	218	0.0041	0.11211	-0.036	1.272	.110 .067	2.698 .101	-.135 (.065)	22.096 (.140)	27.17
Thailand	218	0.0030	0.11830	-0.401	1.877	.032 .067	.224 .636	-.052 (.065)	38.837 (.001)	17.27
Turkey	218	0.0082	0.17210	0.010	0.792	.092 .067	1.851 .174	-.063 (.065)	26.863 (.043)	44.28
Venezuela	158	0.00020	0.14563	-0.784	3.929	-.180 .079	5.192 .023	.016 (.075)	14.762 (.542)	21.74
Emerging Market	218	0.0094	0.06762	-1.019	3.182	.145 .067	4.651 .031	-.099 (.065)	23.368 (.104)	38.01
The World	433	0.0059	0.04163	-0.622	1.736	.073 .048	2.351 .125	-0.003 (0.047)	15.996 (0.453)	56.68

Table 3: Descriptive Statistics-Emerging Stock Markets

IV. THE RESULTS

Table 1 shows that the mean US dollar returns for this study range for emerging markets from 1.74% (Russia) to -0.68% (China). Eleven countries have the mean return above 1% and seventeen countries have the mean return less than 1%, with the mean dollar return for the emerging market of 0.94%. In contrast to emerging markets, developed markets returns are lower, ranging from 1.29% (Finland) to 0.38% (Italy). However, Bekaert and Harvey (1997) reported that the mean US dollar returns range from 68% (Argentina) to -12% (Indonesia). Bekaert (1995) and Harvey (1993) showed that no developed market has an average arithmetic return that exceeds 25%. In the IFC emerging market sample, eight

countries (Argentina, Chile, Colombia, Philippines, Portugal, Taiwan, Turkey, and Venezuela) have returns above 25%. The standard deviation for the current study ranges from 18.67% (Russia) to 5.07% (Jordan) for the emerging markets. Fourteen emerging markets have standard deviation more than 10% and fourteen markets have less than 10% with the average standard deviation of 6.76%. As expected, developed markets have a lower standard deviation ranging from 10.54% (Hong Kong) to 5.32% (Switzerland). This is consistent with the findings of previous studies that mean returns are lower for the developed markets compared to emerging markets. Bekaert and Harvey (1997) reported standard deviation ranges from 104% (Argentina) to 18% (Jordan). The results from MSCI data provide contradictory results: reported volatility ranges

Table 4: GARCH type models: Emerging Markets

Name of the Country	AR(1)	GARCH(11)				EGARCH(11)				IGARCH(11)			
		α_0	α_1	β_1	$\sum\alpha_i + \sum\beta_i$	α_0	α_1	β_1	$\sum\alpha_i + \sum\beta_i$	α_0	α_1	β_1	$\sum\alpha_i + \sum\beta_i$
Argentina	0.0252 (0.37)	0.019403 (5.36)	0.1546 (2.30)	0.9176 (34.21)	1.0122	-0.007341 (-1.39)	0.0545 (0.80)	0.9860 (881.37)	1.0405	-0.000067 (-0.10)	0.0789 (0.97)	0.8132 (17.15)	0.8921
Brazil	-0.5754 (-10.30)	0.024443 (3.22)	0.4357 (7.10)	0.8935 (29.24)	1.3292	-0.00997 (-1.72)	0.0744 (0.99)	0.9117 (29.76)	0.9861	-0.0002524 (-2.06)	0.4019 (6.39)	0.9934 (5115.11)	1.3953
Chile	0.1436 (2.13)	0.0049122 (6.76)	0.0214 (0.31)	0.9929 (5012.18)	1.0143	-0.000988 (-0.40)	0.0084 (0.12)	0.9928 (8606.17)	1.0012	-3.344E-06 (-0.18)	0.2702 (4.07)	0.9883 (706.74)	1.2585
China	0.0723 (0.91)	0.008767 (5.03)	0.2498 (3.22)	0.8774 (23.08)	1.1272	-0.008128 (-0.96)	0.0799 (1.00)	0.9787 (108.54)	1.0586	-0.0000315 (-0.19)	0.1224 (1.40)	0.9086 (24.61)	1.031
Colombia	0.2111 (2.70)	0.009068 (7.99)	0.0780 (0.98)	0.9084 (27.56)	0.9864	0.000949 (0.14)	0.015 (0.18)	0.9848 (320.66)	0.9998				
Czech	0.0165 (0.19)	0.006790 (5.76)	0.0536 (0.62)	0.9596 (30.92)	1.0132	0.003584 (0.45)	0.0751 (0.85)	0.9783 (63.41)	1.0534	-1.650E-05 (-0.31)	0.0432 (0.49)	0.9822 (119.88)	1.0254
Egypt	0.2686 (3.18)	0.007197 (6.53)	0.0062 (0.07)	0.9759 (58.00)	0.9821					0.00008785 (3.14)	0.1524 (1.58)	0.9991 (121.69)	1.1515
Hungary	-0.0147 (-0.17)	0.011397 (4.85)	0.0561 (0.65)	1.001 (185.64)	1.0571					-1.016E-04 (-2.07)	0.0736 (0.86)	0.9997 (462.50)	1.0733
India	0.0634 (0.79)	0.007156 (10.54)	0.0572 (0.71)	0.9898 (233.88)	1.047					-1.220E-05 (-0.33)	0.0835 (1.03)	0.9657 (37.60)	1.0492
Indonesia	0.1653 (2.46)	0.017166 (5.14)	0.1520 (2.26)	0.9097 (33.08)	1.0617					-0.000091 (-0.33)	0.0478 (0.65)	0.9199 (32.80)	0.9677
Israel	0.0545 (0.68)	0.0046347 (6.36)	0.1856 (2.36)	0.9110 (28.04)	1.0966					-1.639E-05 (-0.30)	0.0993 (1.14)	0.9277 (28.24)	1.027
Jordan	0.1469 (2.15)	0.0024602 (7.38)	0.0166 (0.24)	0.9382 (34.61)	0.9548	0.006198 (1.92)	0.0540 (0.78)	0.9893 (6200.83)	1.0433	0.00002192 (0.81)	0.0758 (1.03)	0.9262 (30.69)	1.002
Korea	0.0418 (0.62)	0.008270 (4.66)	0.3256 (5.06)	0.8123 (20.51)	1.1379	0.000841 (0.24)	0.0428 (0.63)	0.9858 (630.98)	1.0286	-0.0000148 (-0.08)	0.1682 (2.16)	0.9836 (25.61)	1.0618
Malaysia	0.1593 (2.37)	0.007174 (5.53)	0.0894 (1.32)	0.8673 (25.94)	0.9567					-0.0000175 (-0.07)	0.2239 (2.94)	0.8075 (17.69)	1.0314
Mexico	0.0777 (1.15)	0.007837 (5.78)	0.1603 (2.39)	0.9958 (4951.05)	1.1561	-0.005595 (-1.32)	0.0105 (0.15)	0.9835 (449.67)	0.994	-9.54E-06 (-0.36)	0.1480 (2.18)	0.9902 (4554.76)	1.1382
Morocco	0.1119 (1.29)	0.0024895 (5.39)	0.0552 (0.63)	0.9685 (42.11)	1.0237	-0.003119 (-0.31)	0.0965 (1.07)	0.9755 (46.97)	1.072	0.00002157 (0.68)	0.0291 (0.33)	0.9666 (28.46)	0.9957
Pakistan	-0.0153 (-0.19)	0.009751 (4.80)	0.2447 (3.15)	0.9325 (32.96)	1.1772	0.005385 (1.92)	0.0712 (0.88)	0.9998 (7903.16)	1.071	-1.776E-05 (-0.34)	0.2394 (3.01)	0.9919 (966.06)	1.2313
Peru	0.0026 (0.03)	0.007947 (5.48)	0.0035 (0.04)	0.9805 (67.39)	0.984	-0.004408 (-0.60)	0.1008 (1.26)	0.9778 (43.68)	1.0786	-4.669E-05 (-0.92)	0.0223 (0.28)	0.9838 (111.06)	1.0061
Philippines	0.2220 (3.35)	0.007849 (7.35)	0.0816 (1.20)	0.9403 (40.25)	1.0219	-0.001528 (-0.78)	0.0468 (0.69)	0.9966 (70812.78)	1.0434	-1.211E-05 (-0.18)	0.0223 (0.31)	0.9453 (39.12)	0.9676
Poland	0.0654 (0.82)	0.016098 (3.99)	0.1400 (1.76)	0.9888 (1048.44)	1.1288	-0.010077 (-2.30)	0.0145 (0.18)	0.9904 (47.98)	1.0049	-2.769E-04 (-2.96)	0.0702 (0.87)	0.9930 (2668.44)	1.0632
Portugal	0.0607 (0.89)	0.0063 (7.90)	0.0645 (0.95)	0.9957 (139.23.08)	1.0602	0.000147 (0.03)	0.00842 (1.21)	0.9821 (998.32)	0.9905	-8.875E-06 (0.59)	0.2281 (3.42)	0.9867 (704.52)	1.2148
Russia	0.1357 (1.57)	0.0296 (3.93)	0.1285 (1.49)	0.9134 (25.58)	1.0419	-0.014927 (-1.71)	0.1064 (1.20)	0.9777 (57.64)	1.0841	-0.0003466 (-0.68)	0.0391 (0.42)	0.9382 (28.04)	0.9773
South Africa	-0.0207 (-0.26)	0.00602 (5.24)	0.0632 (0.79)	0.8819 (23.07)	0.9451	0.004263 (0.53)	0.1334 (1.67)	0.9811 (73.78)	1.1145				
Sri Lanka	0.0541 (0.68)	0.010183 (6.36)	0.0008 (0.01)	0.9892 (161.67)	0.99	0.001742 (0.31)	0.0813 (1.00)	0.9876 (375.70)	1.0689	0.00002563 (0.52)	0.0045 (0.06)	0.9871 (107.67)	0.9916
Taiwan	0.1118 (1.65)	0.010869 (7.36)	0.1206 (1.78)	0.9677 (77.82)	1.0883	-0.012946 (-8.21)	0.1332 (1.87)	0.9999 (92158.02)	1.1331	-9.488E-05 (-3.01)	0.0418 (0.61)	0.9883 (10873.00)	1.0301
Thailand	0.0320 (0.47)	0.011781 (6.45)	0.1531 (2.28)	0.8689 (26.19)	1.022	-0.00261 (-0.18)	0.0447 (0.60)	0.9001 (28.74)	0.9448	-0.0000207 (-0.07)	0.1516 (1.94)	0.8189 (18.20)	0.9705
Turkey	0.0918 (1.36)	0.029707 (8.98)	0.0161 (0.24)	0.9869 (1300.01)	1.003	-0.005094 (-0.60)	0.0443 (0.63)	0.9540 (43.49)	0.9983	1.983E-05 (-0.28)	0.0197 (0.29)	0.9892 (404.74)	1.0089
Venezuela	-0.1824 (-2.31)	0.019691 (5.18)	0.0339 (0.42)	0.9929 (30.10)	1.0268	-0.002871 (-0.48)	0.0918 (1.14)	0.9898 (229.23)	1.0816	-0.0000883 (-0.83)	0.0257 (0.32)	0.9890 (77.00)	1.0147
EM-Market	0.1460 (2.17)	0.0043610 (6.25)	0.0209 (0.31)	0.9837 (788.10)	1.0046	0.000224 (0.05)	0.0309 (0.45)	0.9841 (931.47)	1.015	-5.407E-07 (-0.03)	0.0149 (0.22)	0.9844 (762.06)	0.9993
The World	0.0740 (1.54)	0.0016252 (10.32)	0.0550 (1.14)	0.9832 (23117.33)	1.0382								

Note:

.AR(1): Coefficient of the lagged value of return equation

. α_0 : Intercept of the volatility equation . α_1 : Coefficient of the lagged squared residuals, . β_1 : Coefficient of the lagged conditional variance, $\sum\alpha_i + \sum\beta_i$ is the volatility persistence param

from 15% to 33%. There are 12 countries (Argentina, Brazil, Chile, Greece, Mexico, Nigeria, Philippines, Portugal, Taiwan, Turkey, Venezuela, and Zimbabwe) where volatility is higher than 33% and the volatility for Colombia, Indonesia, and Korea are higher than 30%. However, Harvey (1993) reported the volatility range from 15% for US to 33% for Hong Kong with an equally weighted average volatility of 23%.

Autocorrelation is the measure of persistence (or predictability) of the market returns based on past market returns. The coefficients of the first-order autocorrelation for the emerging market ranges from 0.2% in Peru and 26.5% in Egypt. On the contrary, the maximum first-order auto-correlation coefficient for the developed markets is 16.9% for Finland and 0.1% in Netherlands. Similarly, the highest autocorrelation at 16th lag is 14.6% (Russia) and lowest is for 0.3% for Portugal. Autocorrelation is less than 5% for thirteen countries and more than 10% for five countries. The autocorrelation coefficient for developed markets is lower than that of emerging markets. The highest autocorrelation at 16th lag is 11% in Spain and the lowest is 1.2% for Greece. Box-Ljung Q(1) statistics indicate significant serial autocorrelation at 10% level in eleven countries for emerging markets, therefore the presence of residual serial autocorrelation is rejected in these countries. However, for the developed market seven countries also have significant serial autocorrelation at 10% level. Besides, Box-Ljung Q(16) statistics indicate significant serial autocorrelation at 10% level for ten countries for emerging markets, therefore the presence of residual serial autocorrelation is rejected in these countries. Furthermore, Box-Ljung Q(16) statistics show that ten countries in the developed market also have significant serial autocorrelation at 10% level.

This study shows that only three countries out of twenty-two countries in the developed market have first-order autocorrelation coefficients that exceed 10% (Finland, Norway, and Singapore) whereas in the emerging market twelve out of twenty-eight countries have autocorrelation coefficients that exceed 10% (Brazil, Chile, Colombia, Egypt, Indonesia, Jordan, Malaysia, Morocco, Philippines, Russia, Taiwan, and Venezuela). Furthermore, three of the emerging markets have 1st order autocorrelation exceeding 20% (Colombia, Egypt, and Philippines). However, Bekaert and Harvey (1997) showed using MSCI data that five emerging markets with 1st order autocorrelation that exceeds 10%; and using IFC data they reported twelve countries with autocorrelation more than 10% and eight countries which have highest degree of autocorrelation that is above 20% (Colombia, Indonesia, Mexico, Pakistan, Philippines, Portugal, Turkey, and Venezuela). Therefore, these results strongly support the predictability of returns based on past returns. Hasan et al. (2000) also found serial autocorrelation in the Bangladesh stock market. Ten countries in the emerging market have positive skewness and eighteen countries have negative skewness in this study therefore the null hypothesis of skewness is rejected. Similarly, in the developed market eighteen countries have negative skewness and four countries have positive skewness. Seventeen countries have a thin tail and eleven countries have a fat tail distribution of the kurtosis or excess kurtosis. The null hypothesis of kurtosis is also rejected in all the cases. Similarly, sixteen countries in the

developed market have a thin tail and six countries have a fat tail distribution of the kurtosis or excess kurtosis. Overall, the non-normality of the return data is revealed by the coefficients of skewness and kurtosis.

GARCH and its family can provide additional confirmation of more return volatility in emerging markets compared to developed markets. A higher α_1 parameter value is shown in most of the emerging markets and is statistically significant in fourteen countries; but, a lower α_1 parameter value is shown and the parameter estimate is significant in sixteen developed countries. It is remarkable that the coefficients of α_1 in most of the emerging markets are at a higher level than those of the developed countries. The highly significant coefficient estimates are a clear indication of more market inefficiency in emerging markets. The estimates of conditional variance coefficients are highly significant in all the emerging countries but not highly significant in all the developed markets, indicating long time volatility persistence in the emerging markets compared to developed markets. These results are also confirmed by the integrated GARCH (IGARCH) model and the asymmetric GARCH (EGARCH) model (table 2 and 4). The estimate α_1 is statistically significant in nine countries in the emerging markets using the EGARCH model, and in thirteen countries using the IGARCH model; but in four countries and six countries, respectively, in developed markets. However, estimates of conditional variance coefficients are highly significant in all the countries, indicating long time volatility persistence in the emerging markets than developed markets (Table 2 and 4). Despite the significance of α_1 coefficients in fourteen countries in the emerging markets, the volatility persistence parameter $\sum \alpha_i + \sum \beta_i$ reports close to 1 or more than 1 in all the emerging countries; but volatility persistence parameter $\sum \alpha_i + \sum \beta_i$ in all developed countries in the GARCH model are less than 1, indicating time varying increasing volatility persists and the memory of shocks persist for a long time in emerging markets. These results are consistent with De Santis and Gerard (1997) and Aggarwal et. al (1999). Despite the volatility persistence parameter $\sum \alpha_i + \sum \beta_i$ using integrated GARCH and asymmetric GARCH (EGARCH) reports close to 1 or more than 1, time varying decaying volatility persists in the developed markets using GARCH(11). These results clearly support the more volatile nature of the emerging markets compared to the developed markets.

Overall, the major findings of the study can be summarized as follows:

- (1) As expected, returns in the emerging market (1.74% to -0.68%) are higher than those in the developed market (1.29% to -0.38%) and the standard deviations of the emerging market are also higher (18.67% to 5.07%) than those of the developed market (10.54% to 5.32%).
- (2) The predictability of the emerging market is also higher than that of the developed market. For example, the first order autocorrelation coefficient in the emerging market such as Egypt is 26.5%, whereas the maximum coefficient is 16.9% in the developed market such as Finland. Moreover, only three out of twenty-two countries in the developed

market have first-order autocorrelation coefficients that exceed 10%; whereas twelve out of twenty-eight countries in the emerging market have autocorrelation coefficients that exceed 10%.

- (3) Another major finding of the study is that the alpha coefficients, α , of the emerging market are higher than those of the developed market. The finding also indicates inefficiency in the emerging markets.
- (4) Volatility in emerging markets also shows long term persistence ($\sum \alpha_i + \sum \beta_i$ reports close to 1 or more than 1). There is an increasing tendency rather than decay over time in emerging markets. This finding is consistent with the results of the previous studies, if we consider volatility as a proxy of risk that must be compensated with higher returns. On the other hand all the developed markets volatility (sum of alpha and beta parameter) is less than 1, indicating volatility that decays over time.

V. CONCLUSION

This study investigates the time-varying risk return relationship within the GARCH framework and the persistence of shocks to volatility both in the developed and emerging markets. The non-normality of the emerging market return series data revealed by the coefficients of skewness and kurtosis suggests using non-linear models. However, using GARCH type models, it is found that emerging markets are more volatile and there is long term persistence of volatility in the emerging markets compared to the developed markets. The unique features of the study include a large sample size with updated data set that reveals the world economy and volatility (synonymous with risk) testing that reports the risk return characteristics which lead to venues for further research on the global diversification. An implication of these findings is that further research on the global diversification may be required. Further studies involving the issues of volatility forecasting are needed for risk management, such as hedging against risk using derivatives, including option pricing.

REFERENCES

- Aggarwal, R., C. Inclan, and R. Leal, (1999), "Volatility in Emerging Stock Markets", *Journal of Financial and Quantitative Analysis*, 34, pp. 33-55.
- Baillie and De Gennaro (1990), "Stock Return and volatility", *Journal of Financial and Quantitative Analysis* 25, pp.203-214.
- Batra, A. (2004), "Stock Return Volatility persistence in India: 1973-2003", Working paper, ICRIER, New Delhi, India.
- Bekaert, G., (1995), "Market Integration and Investment Barriers in Emerging Equity Markets", *World Bank Economic Review* 9, pp. 75-107.
- Bekaert, G. and C. Harvey, (1997), "Emerging Equity Market Volatility", *Journal of Financial Economics*, 43, pp. 29-78.
- Bekaert, G., C. Harvey, and T. V. Viskanta (1998), *Distributional Characteristics of Emerging Market Returns and Asset Allocation: Analyzing Returns that cannot be summarized by a normal distribution*, *Journal of Portfolio Management*, Winter, pp. 102-116.
- Bekaert, G and G. Wu, (2000), "Asymmetric Volatility and Risk in Equity Markets", *Review of Financial Studies*, 13, pp. 1-42.
- Bollerslev, T., (1986), "Generalized Autoregressive Conditional Heteroskedasticity", *Journal of Econometrics* 72, pp. 307-327.
- Bollerslev, T., R. Y. Chou, and K. F. Kroner, (1992), *ARCH Modeling in Finance: A Review of the Theory and Empirical Evidence*", *Journal of Econometrics* 52, pp. 5-59.
- Brandt M. W. and Q. Kang, (2003), "On the Relationship between the Conditional Mean and Volatility of Stock Returns: A latent VAR Approach", Working Paper, University of Pennsylvania.
- Campbell, J. Y., A. W. Lo, and A. C. Mackinlay, (1997), "The Econometrics of Financial Markets", Princeton.
- Chou, R. Y., (1988), "Volatility Persistence and Stock Valuations: Some Empirical Evidence using GARCH", *Journal of Applied Econometrics* 3, pp. 279-294.
- Claessens, S., Dasgupta, S., and Glen J., (1993); "Stock Price Behaviour in Emerging Stock Market," in Stijin Claessens and Sudarshan Gooptu, (eds.), *Portfolio Investment in Developing Countries*, World Bank Discussions Paper, 228, Washington, D.C.
- Cohen K., W. Ness, H. Okuda, R. Schwartz and D. Whitcomb, (1976), "The Determinants of Common Stock Returns Volatility: An international Comparison," *Journal of Finance*, 31, pp. 733-740.

- Ding, Z., C. W. J. Granger, and R. F. Engle, (1993), "A long Memory property of stock market returns and a new model", *Journal of Empirical Finance* 1, pp. 83-106.
- Engle, R. F., (1982), "Autoregressive Conditional Heteroskedasticity with Estimates of UK Inflation", *Econometrics* 50, pp. 987-1008.
- Engle, R. F., and t. Bollerslev, (1986), "Modeling the Persistence of Conditional Variances", *Econometric Reviews* 5, pp. 1-50, 81-87.
- Engle, R. F., and A. J. Patton, (2001), "What is a Good Volatility Model?", *Quantitative Finance* 1, pp. 237-245.
- French, K.R, W G Schwert and R F Stambugh, (1987), "Expected Stock Return and Volatility", *Journal of Financial Economics*, 19, pp. 3-29.
- Glosten L.R. R. Jagannathan and D. E. Runkle, (1993), "On the Relation between the Expected Value and Volatility of the Nominal Excess Returns on Stocks", *The Journal of Finance*, 48, pp. 1779-1801.
- Harvey, C. R., (1993), "Portfolio Enhancement using Emerging Markets and Conditioning Information", in Stijn Classens and Shan Gooptu, Eds., *Portfolio Investment in Developing Countries* (Washington: The World Bank Discussion Series, 1993, pp. 110-144).
- Harvey, C., (1995), "The Cross-section of Volatility and Auto-correlation in Emerging Markets", *Finanzmarkt und portfolio Management*, 9, pp. 12-34.
- Harvey, C.R. (2001), "The Specification of Conditional Expectations", *Journal of Empirical Finance*, 8(5), pp.573-637.
- Hasan, M. K., A. M. Islam, and S. A. Basher, (2000), "Market Efficiency, Time Varying Volatility and Equity Returns in Bangladesh Stock market", www.ssrn.com
- Li, K., (2002), "Long-memory versus Option-Implied Volatility Prediction", *Journal of Derivatives* 9(3), pp. 9-25.
- Malkiel, B. G. and Y. Xu (1999), "The Structure of Stock Market Volatility", Working paper, Princeton University Centre for Economic Policy studies.
- Merton, R. C., (1973), "An Intertemporal Capital Asset Pricing Model", *Econometrica* 42, pp. 867-887.
- Nelson, D. B (1991), "Conditional Heteroscedasticity in Asset Returns: A New Approach", *Econometrica*, 59, pp. 347-370.
- Poon, S. H., and C. Granger, (2003), "Forecasting Volatility in Financial Markets: a Review", *Journal of Financial Literature*", 41, pp. 478-539.
- Poterba, J. M., and L. H. Summers, (1986), "The Persistence of Volatility and Stock Market Fluctuations", *American Economic Review* 76, pp. 1141-1151.
- Raju, M. T. and A. Gosh, (2004), "Stock Market Volatility- An International Comparison", Working Paper Series, No 8, Security Exchange Board of India.
- Roll, R. (1992), "Industrial Structure and the Comparative Behaviour of International Stock Market Indices", *Journal of Finance*, 47, pp. 3-42.
- Sharpe, W. F., (1964), "Capital Asset Prices: A theory of Equilibrium under Conditions of risk", *Journal of Finance* 19(3), pp. 425-442.
- Shin, J., (2005), "Stock return and Volatility in Emerging Stock Markets", *International Journal of Business and Economics*, 4, pp.31-43.
- Theodossiou, P. and U. Lee (1995), "Relationship between Volatility and Expected Return Across International Stock Markets", *Journal of Business Finance and Accounting*, 22(2), pp.289-300.
- Whitelaw, R., (2000), "Stock Market Risk and Return: An Empirical Approach", *Review of Financial Studies* 13(3), pp. 521-547.
- Wu, G. (2001), "The Determinants of Asymmetric Volatility", *The Review of Financial Studies*, 14, pp.837-859.
- Xing, X., (2004), "Why Does Stock Market Volatility Differ across Countries? Evidence from Thirty Seven International Markets", *International Journal of Business*, 9(1), pp.83-102.
- Yu, J. (2002), "Forecasting Volatility in New Zealand Stock Market", *Applied Financial Economics*, 12, pp.192-202.

A SUMMARY AND ANALYSIS OF THE FASB'S PROPOSED 'OWNERSHIP APPROACH' FOR DISTINGUISHING BETWEEN FINANCIAL INSTRUMENTS TO BE CLASSIFIED AS LIABILITIES VERSUS EQUITY

Konrad E. Gunderson, Missouri Western State University

INTRODUCTION

In 1979 the Securities and Exchange Commission (SEC, 1979) ruled that redeemable shares could no longer be classified as permanent equity which resulted in these hybrid securities being reported in an area of the balance sheet between liabilities and equity, commonly known as the mezzanine section of the balance sheet. This has created a problem for the Financial Accounting Standards Board (FASB) because only assets, liabilities and owner equity are recognized elements of financial statements in the FASB conceptual framework (FASB, 1985). Some commentators have proposed adding additional categories to the balance sheet, for example the American Accounting Association Financial Accounting Standards Committee (2001) has called for additional categories of capital elements on the balance sheet as a way to solve the problem. The FASB however remains committed to a dichotomous classification system.

In a recent Preliminary Views document (FASB, 2007) the FASB has indicated its preference for a set of principles called the "Ownership Approach" for distinguishing between financial instruments to be classified as liabilities versus equity. The Ownership Approach represents the most practical of those under consideration. The other approaches include the "Ownership-Settlement Approach" and the "Reassessed Expected Outcomes Approach." All three approaches include classification based on fundamental characteristics of equity, and all would change the classification of a variety of financial instruments from their current GAAP classification.

The Ownership Approach is stated in the form of a set of principles, and is consistent with the FASB's overall effort to move toward principles-based standards and away from rules-oriented standards. The Ownership Approach provides classification and measurement guidelines that will produce consistent results, be practical from an implementation standpoint, and be capable of dealing with a broad range of financial instruments currently in existence as well as others to be created in the future.

The Ownership Approach, also referred to as a "narrow equity view," represents a fundamental change in how liabilities and equity are defined on the balance sheet. Historically, liabilities have been narrowly defined, and equity was a broad category including financial instruments not meeting the definition of a liability. Under the new approach, equity has a specific definition and anything not meeting that definition becomes a

liability. Thus, we have gone from a narrow liability view to a narrow equity view for classification of financial instruments.

The income statement will also be impacted since net income is the amount available to equity after deducting interest on liabilities; financing expense would therefore be broadened to encompass all amounts representing compensation to investment instruments classified as liabilities. For example, if preferred stock were re-classified as a liability, then dividends on preferred would be reported in the income statement as financing expense.

EQUITY CLASSIFICATION UNDER THE OWNERSHIP APPROACH

Two principles for determining equity classification were considered under the Ownership Approach: (1) whether an instrument is a perpetual instrument, and (2) what kind of return characteristics an instrument conveys.

The first principle states that equity instruments should represent investments in the firm which carry no settlement obligation for the issuer. Equity should be a permanent investment, and any instrument that must, or may be redeemed, regardless of whether it is issued in the form of shares or a traditional debt instrument, is fundamentally different from equity. Perpetual instruments include common stock and standard preferred stock, i.e. non-redeemable preferred stock.

The second principle encompasses what are referred to as direct ownership instruments, which represent claims to net assets that are "not limited nor guaranteed." This principle relates to the basic nature of equity as bearing risk, but also having return potential to compensate for risk. As a residual claim, equity reaps all amounts available after fixed claims are satisfied, so return is, in principle, not limited. However if income or assets are insufficient to satisfy fixed claims, equity receives nothing; therefore payments are not guaranteed, either in periodic distributions or in liquidation. The direct ownership criteria specifically requires that an instrument not have priority over any other in liquidation proceedings of the firm.

The direct ownership principle allows instruments that convey the essential return characteristics of common stock to be classified as equity, even if they are not perpetual instruments. Shares redeemable at fair value that have a redemption value equivalent to or closely tied to the common stock price, although not perpetual because they may be redeemed, are exposed to

the same risks and market fluctuations as the common. In general, shares redeemable at fair value and having no priority in liquidation are classified as equity. Redeemable preferred shares would not be equity because of the liquidation preference granted to preferred shares.

The Ownership Approach also includes a “linking principle” which requires that financial instruments be combined if accounting for them separately would result in different accounting than for the combined instrument. This ensures that instruments are accounted for similarly regardless of whether they are issued individually or in combination. For example, a share of stock redeemable for a fixed amount is a compound financial instrument consisting of a share and a put option. It is not a perpetual instrument because the firm may have to redeem it, nor is it a direct ownership instrument because the put guarantees a minimum value, so it is not exposed to the same risk that a direct ownership interest is. The redeemable share would be accounted for as a liability in its entirety under the Ownership Approach. If instead a share and a written put option were issued separately, absent the linking principle, the proceeds from issuing the share would be accounted for as equity and only the proceeds from the put would be a liability. To avoid this opportunity for accounting arbitrage, the linking principle requires the put and the share to be combined and accounted for as a single instrument, puttable stock, and classified as a liability.

The Ownership Approach does not require separation of convertible debt into liability and equity components as had been discussed previously in the liability and equity discussion memorandum (FASB, 1990) and the exposure draft preceding FASB Statement No. 150 (FASB, 2000). An instrument such as a convertible bond is analyzed at issuance to determine if it is an equity instrument and, if not, it is accounted for as a liability in its entirety. A convertible bond is not a perpetual instrument since the issuing firm may have to pay cash to settle if it is not converted. A convertible bond is not a direct ownership instrument; while the conversion element provides unlimited upside potential, the bond conveys guaranteed payment of interest and principal, thereby limiting the downside risk.

To summarize, the Ownership Approach contains two classification concepts for equity, a perpetual (lack of settlement) concept and a direct ownership (return characteristics) concept. Initially the FASB contemplated each principle alone as being sufficient for equity classification, which would have retained equity classification for standard (non-redeemable) preferred stock. However after further deliberation it was decided that instruments with a liquidation priority could not receive equity classification. Thus, in its final decision the FASB discarded the perpetual criteria and limited equity classification to “basic ownership instruments” which possess the essential return characteristics of common ownership and have no liquidation preference. This makes the Ownership Approach truly a “narrow equity” approach. Table 1 below summarizes classification for some of the financial instruments discussed.

ALTERNATIVES TO THE OWNERSHIP APPROACH

The Ownership Approach is the simplest to implement of the three considered by the FASB. It provides classification criteria resulting in most instruments being classified entirely as equity, or entirely as liabilities. In most cases it does not require the proceeds from issuing financial instruments to be allocated between liabilities and equity.

The Ownership-Settlement Approach is similar to the Ownership Approach, but also includes an indirect ownership instrument concept. This principle allows equity classification for instruments which may eventually result in the issuance of direct ownership instruments. Examples of indirect ownership instruments include physically settled written call options and convertible debt (convertible debt is separated into liability and equity components under the Ownership-Settlement Approach).

The Reassessed Expected Outcomes Approach would provide perhaps the most useful financial statement information by separating instruments into components, and re-measuring those components at each balance sheet date. Separation is an issue that has been considered by the FASB for some time, typically in the context of convertible debt. Proceeds from issuing a convertible bond can be split between liabilities and equity based on relative fair values of straight bonds and equity call options at the time a convertible is issued. Under the Reassessed Expected Outcomes Approach a number of instruments would be separated including convertible debt, convertible preferred shares, callable shares, and redeemable shares. The FASB ultimately rejected the Reassessed Expected Outcomes Approach because of its cost and complexity.

In contrast to Reassessed Expected Outcomes, the Ownership Approach is the most practical. It does not require separation of convertible debt into components, instead classifying it entirely as a liability. This does reduce the quality of information provided by classifying as a liability an instrument (i.e. convertible debt) which is not entirely a liability in its potential outcomes. As with any ruling, the FASB must balance the usefulness of information provided with the cost of providing it. At this point the FASB believes the Ownership Approach provides a satisfactory tradeoff among these factors.

Table 1

Classification of Financial Instruments Under the Ownership Approach			
Instrument ²	Ownership Approach ¹	Current GAAP	Current GAAP Guidance
Common shares	Equity	Equity	FASB concepts ³
Preferred shares	Liability	Equity	FASB concepts ³
Common shares redeemable (puttable) at a fixed amount	Liability	Equity ⁴	EITF D-98
Common shares redeemable (puttable) at fair value	Equity	Equity ⁴	EITF D-98
Convertible debt	Liability	Liability	APB 14 (1969)

¹ Source: FASB (2007a), Summary of Principles for the Ownership Approach
² Redeemable shares are assumed settled with assets (i.e. cash payment)
³ Conceptual Framework, Elements of Financial Statements, FASB (1985)
⁴ For registered companies, classification is in temporary equity per ASR268 (SEC, 1979); EITF D-98 (FASB, 1998) acknowledges ASR268 and enumerates additional conditions under which classification under permanent equity is inappropriate.

THE SIGNIFICANCE OF THE OWNERSHIP APPROACH

The narrow equity view reflected by the Ownership Approach represents a fundamental change in the way financial instruments are classified in that traditionally the liability category was limited to instruments with specific legal or contractual remedies if issuers failed to make scheduled payments. Historically, we had a “narrow liability” classification scheme, and equity was a default category which included a variety of instruments issued in the form of shares.

The narrow liability scheme allowed opportunities for firms to obtain equity classification for borrowing transactions, a prime example being issuance of mandatorily redeemable shares with guaranteed dividend payments (re-classified as liabilities under FASB Statement No. 150; FASB, 2003). The change to a narrow equity classification system would reduce these opportunities. A narrow definition of equity will make it difficult for financial instruments to qualify as equity, causing most instruments to default to the liability category. This should reduce the incentive for firms to devote resources to structuring transactions solely for the purpose of achieving a preferred accounting treatment.

Research by Engel et al. (1999) indicates that firms are willing to pay significantly to shift securities from the liability to equity category. In a study of 44 instances (during 1993-1996) where firms issued trust preferred stock to retire debt, firms paid an average of \$10 million in direct issuance costs for each transaction (trust preferred stocks are arrangements in which a parent company issues redeemable shares through a special purpose trust; for illustrations, see Engel et al, 1999, Frischmann and Warfield, 1999, or Frischmann, Kimmel, and Warfield, 1999). Trust preferred and debt are close substitutes from a tax standpoint, but the stock is classified as equity for financial reporting. The study ruled out regulatory issues (commercial banks were excluded) and instances of financial distress (firms were generally large and financially stable) as explanations for the observed transactions.

However, a narrow equity approach also has the potential to reduce the usefulness of the liability category as a solvency indicator. When liabilities were limited to legal debts with the ability to threaten the firm with bankruptcy, total liabilities on the balance sheet and related solvency ratios were useful in evaluating a firm’s financial solvency. The liability category will lose this perspective under the new approach. With an expanded liability category, financial instruments with varying impacts on a firm’s solvency will be included in the total. Financial statement users will have to examine the composition of liabilities, using additional disclosures in footnotes, to determine the extent to which specific arrangements impact a firm’s solvency. Research by Hopkins (1996) indicates that financial statement users focus on balance sheet classifications to infer characteristics of the items within them. Thus, there is potential for confusion if the liability category is changed significantly.

FINANCIAL STATEMENT IMPACT

The Ownership Approach would move a variety of financial instruments currently classified as equity, into the liability category. Principal among these would be redeemable shares not addressed by FASB Statement No. 150. FASB 150 required mandatorily redeemable shares to be classified as liabilities, and any related dividends, and/or carrying value accretions, to be classified as financing (interest) expense in the income statement (carrying value accretions are in accordance with APB Opinion No. 21, Interest on Receivables and Payables; AICPA, 1971). The Ownership Approach would result in conditionally redeemable shares (i.e. redeemable at the option of the holder) being re-classified as liabilities. In addition, as discussed above, the FASB is currently favoring a version of the Ownership Approach that would classify standard (non-redeemable) preferred stock as a liability.

These moves have the potential to significantly alter the balance sheets of some companies, in some cases to an extent where debt covenant violations and other contracting concerns come into play. The following testimony from a representative of the construction industry (Richard Forrestel, 2003, on behalf of the Associated General Contractors of America “AGC”) reflected concerns businesses had over the issuance of FASB 150:

“[AGC’s Tax and Fiscal Affairs Committee] spent the last few months trying to understand why the Financial Accounting Standards Board would inflict Financial Accounting Standard 150 on the industry. This FASB standard has hit our industry and my committee like an earthquake. It has the potential to undermine the fiscal stature of tens of thousands of construction companies, like mine...I will briefly touch upon the ramifications of such an accounting bombshell. Cold Spring builds only public works projects, all of which require surety bonds. First, wiping out our equity would make us unable to obtain bonds. Second, we would be in violation of loan covenants. Third, many states like Pennsylvania have prequalification requirements in order to bid on public works projects. FAS 150 would have rendered us unqualified to bid on most projects in Pennsylvania, because the state requires the contractor to show net worth in order to bid. Finally -- and this is strictly a psychological reason -- this change would have dramatically altered the way our balance sheet looked.”

<u>SIC Codes</u>	<u>Description</u>	<u>Number of Firms</u>	<u>Preferred Stock (millions)</u>
1000	Agriculture, Mining, and Construction	36	\$ 4,383.390
2000-3000	Manufacturing	207	12,148.019
4000	Transportation, Communication, and Utilities	161	21,023.876
5000	Retail and Wholesale	39	2,135.127
6000	Finance, Insurance, and Real Estate	203	55,778.203
7000-8000	Services	106	4,807.260
9000	Public Administration and Other	29	568.169
	Totals	781	\$ 100,844.044

To provide perspective on the scope of the potential impact of reclassifications under the Ownership Approach, the Compustat North American annual data base was screened to identify active companies having preferred stock outstanding as of fiscal-year-end 2006. A total of 781 companies, representing 7.9% of all 9,888 active companies, had preferred stock reported as part of total stockholders' equity in 2006. Of the 781 companies, 524 had non-redeemable preferred stock outstanding, 223 had redeemable preferred shares, and 34 had both. Table 2 provides a breakdown of the 781 companies and total amount of preferred stock outstanding by industry using primary SIC codes reported on Compustat. Table 2 reveals that a significant proportion of the total preferred stock is issued by firms in the 4000's (\$21.0 billion, 20.8%) and by firms in the 6000's (\$55.8 billion, 55.3%), reflecting significant use of preferred stock financing by utilities and financial institutions.

Illustration 1 depicts the aggregate capital structure for the 781 firms based on mean values for total assets, total liabilities, and total stockholders' equity. Panel A displays the figures and percentages under current practice, i.e. with redeemable and non-redeemable preferred stock included in stockholder equity. Panel A reveals that the average firm is highly leveraged with total assets of \$24.6 billion, total liabilities of \$22.0 billion, and a leverage ratio of 89.5%. Figures in Panel B reflect the effects of shifting redeemable and non-redeemable preferred stock into liabilities. As shown, the change does not dramatically affect the totals or percentages, with average total liabilities increasing by \$129 million (up to \$22.155 billion from \$22.026 billion) and the leverage ratio increasing by one-half percentage point from 89.5% to 90.0%. Nevertheless, for individual firms close to contractual limits on their leverage ratios, small increases may be material. In addition, there are firms which would literally have their equity "wiped out" as suggested by the above quote by Richard Forrestel. Further examination of the data shows that 72 firms have preferred stock outstanding which exceeds their overall positive total stockholders' equity balance (for example, due to an existing accumulated deficit). For these firms, Forrestel's comment would hold true if the Ownership Approach were implemented: re-classification of

their preferred stock from equity to liabilities would move them from a positive net worth position to one with overall negative stockholders' equity.

CONCLUSIONS AND FUTURE DIRECTIONS IN THE LIABILITY AND EQUITY PROJECT

As with any new accounting standard, the Ownership Approach involves tradeoffs. The Ownership Approach includes a narrow definition of equity which is simple to implement and provides consistent classification of financial instruments as either liabilities or equity. This should reduce the incentive for firms to game the rules to obtain equity classification. Preparers also benefit from simpler rules which are less costly to implement.

However, classifying a wide variety of financial instruments as liabilities reduces the representative faithfulness of the liability category. This will likely impose at least some cost on those doing financial solvency analysis since they will no longer be able to take the total liability figure and use it as they have in the past, but will have to examine specific liability items and additional footnote information before proceeding with their analysis. Finally, the adoption of new rules will change the composition of companies' balance sheets, in some cases imposing costs on individual companies from a contracting standpoint.

Any ruling ultimately released by the FASB can be expected to converge with similar international accounting standards as the FASB has committed to cooperate with the International Accounting Standards Board (IASB) in the area of accounting for financial instruments. In terms of opening up the liability category to a broader array of financial instruments, International Accounting Standards (IAS) are generally ahead of U.S. GAAP. For example, International Accounting Standards No. 32 and No. 39 (IAS, 1995, 1998) already classify puttable stocks (not just those mandatorily redeemable) as liabilities. In this regard, a move by the FASB to include conditionally redeemable shares in the liability category brings U.S. GAAP closer to international convergence. On the other hand, international standards currently provide for separation of convertible debt into liability and equity components, a practice which is at odds with the Ownership Approach in its current form. This and other differences will have to be worked out in future deliberations between the FASB and the IASB.

Illustration 1		
Capital Structure – Means Values for 781 Compustat Firms (dollar figures in millions)		
Panel A – Preferred Stock in Stockholders' Equity (current practice)		
Total Assets	\$ 24,610	
Total Liabilities	\$ 22,026	89.5%
Total Stockholders' Equity	2,584	10.5%
	\$ 24,610	100.0%
Panel B – Preferred Stock in Liabilities (Ownership Approach)		
Total Assets	\$ 24,610	
Total Liabilities	\$ 22,155	90.0%
Total Stockholders' Equity	2,455	10.0%
	\$ 24,610	100.0%

REFERENCES

- American Accounting Association Financial Accounting Standards Committee. 2001. Evaluation of the FASB's Proposed Accounting for Financial Instruments with Characteristics of Liabilities, Equity, or Both. *Accounting Horizons* (December 2001): 387-400.
- American Institute of Certified Public Accountants (AICPA). 1971. APB Opinion No. 21, Interest on Receivables and Payables. New York, NY: AICPA.
- American Institute of Certified Public Accountants (AICPA). 1969. APB Opinion No. 14, Accounting for Convertible Debt and Debt Issued With Stock Purchase Warrants. New York, NY: AICPA.
- Engel, E., Erickson, M., and E. Maydew. 1999. Debt-Equity Hybrid Securities. *Journal of Accounting Research*, Vol. 37, pp. 249-274.
- Financial Accounting Standards Board (FASB). 2007. Preliminary Views: Financial Instruments with Characteristics of Equity. Norwalk, CT: FASB.
- Financial Accounting Standards Board (FASB). 2007a. Summary of Principles for the Ownership Approach. <http://www.fasb.org/project/liabeq.shtml>.
- Financial Accounting Standards Board (FASB). 2003. Statement of Financial Accounting Standards No. 150, Accounting for Certain Financial Instruments with Characteristics of both Liabilities and Equity. Norwalk, CT: FASB.
- Financial Accounting Standards Board (FASB). 2000. Exposure Draft, Proposed Statement of Financial Accounting Standards, Accounting for Financial Instruments with Characteristics of Liabilities, Equity, or Both. Norwalk, CT: FASB.
- Financial Accounting Standards Board (FASB). 1998. EITF Topic No. D-98, Classification of Redeemable Securities. Norwalk, CT: FASB.
- Financial Accounting Standards Board (FASB). 1990. Discussion Memorandum, An Analysis of Issued Related to Distinguishing Between Liability and Equity Instruments and Accounting for Instruments with Characteristics of Both. Norwalk, CT: FASB.
- Financial Accounting Standards Board (FASB). 1985. Statement of Financial Accounting Concepts No. 6, Elements of Financial Statements. Stamford, CT: FASB.
- Forrestel, R. 2003. The Financial Accounting Standards Board and Small Business Growth. Testimony on behalf of The Associated General Contractors of America presented to the US Senate Committee on Banking. http://www.agc.org/content/public/PDF/Press_Releases/2003/11-12-03Testimony.pdf
- Frischmann, P., P. Kimmel, and T. Warfield. 1999. Innovations in Preferred Stock: Current Developments and Implications for Financial Reporting. *Accounting Horizons*, Vol. 13, No. 3: 201-218.
- Frischmann, P., and T. Warfield. 1999. Multiple Motivations and Effects: The Case of Trust Preferred Stock. *Issues in Accounting Education*, Vol. 14, No. 2: 269-284.
- Hopkins, P. 1996. The Effect of Financial Statement Classification of Hybrid Financial Instruments on Financial Analysts' Stock Price Judgments. *Journal of Accounting Research*, Vol. 34: 33-50.
- International Accounting Standards Board (IAS). 1998. IAS No. 39, Financial Instruments: Recognition and Measurement. London: IAS.
- International Accounting Standards Board (IAS). 1995. IAS No. 32, Financial Instruments: Presentation. London: IAS.
- Securities and Exchange Commission (SEC). 1979. ASR No. 268, Presentation in Financial Statements of Redeemable Preferred Stocks. Washington, DC: SEC.

DISAGGREGATED BUSINESS FIXED INVESTMENT: THE RESPONSE OF STRUCTURES AND EQUIPMENT TO MACROECONOMIC FLUCTUATIONS AND POLICIES*

LtCol Jeffrey S. Smith, United States Air Force Academy

M.H. Tuttle, Sam Houston State University

*The views expressed in this paper are those of the authors and do not necessarily reflect the official policy or position of the U.S. Air Force, the Department of Defense, or the U.S. Government

1. INTRODUCTION

From 2001 through the end of 2003, the Federal Reserve reduced the target for the Federal Funds rate thirteen times, from a level of 6.5 percent on 16 May 2000 to one percent on 25 Jun 2003. It remained at one percent until 30 Jun 2004, when the Fed instituted a series of quarter point increases to its current level of 4.25 percent. Starting in the third quarter of 2000, the U.S. economy looked increasingly anemic, with annualized GDP growth rates ranging from 1.4 percent at its lowest point to 3.4 percent at the highest. Only 4 of 11 quarters recorded GDP growth rates above 2 percent, and 3 of 11 quarters exhibited negative GDP growth. This mediocre showing was attributed in no small measure to the lackluster performance of business fixed investment (BFI), more specifically, businesses' continued reluctance to invest in equipment. In fact, Federal Reserve Governor Ben Bernanke delivered a speech entitled "Will Business Investment Bounce Back?" to the Forecasters Club in New York, addressing this very issue (2003).

Why juxtapose interest rate cuts with lackluster BFI spending? Mishkin (1995), in his symposium on transmission mechanisms, uses the typical Keynesian macroeconomic theory of investment to illustrate how the interest rate channel works. A tightening money supply eventually causes higher interest rates, causing investment and output to fall. Likewise, we expect investment and output to rise in response to a corresponding reduction in interest rates. Surprisingly, empirical research discovered a divergence from theory, in that aggregate investment illustrates one trend, while the disaggregated components of investment revealed strikingly different trends. In particular, research focused on subdividing private investment into residential fixed investment (RFI) and business fixed investment (BFI) and then estimating the effects of monetary policy on each component. Existing evidence shows that RFI exhibits strong responsiveness to interest rates, typically leading the economy both into and out of recessions (see Garrison (1991), Bernanke and Gertler (1995), Shbikat (2001), and Stock and Watson (2002)). Conversely, BFI responds with a lag to interest rates, but it exhibits a much stronger reaction to changes in output.

Given the noted difference in BFI behavior (compared to RFI), disaggregating business fixed investment warrants closer attention. If BFI and RFI respond differently, as empirical evidence would seem to indicate, then it also seems plausible that the two major components of BFI may also respond to different stimuli. Business fixed investment can be subdivided into two major subcategories, equipment and structures. A better understanding of the relationship between equipment

and structures may yield further clues regarding possible changes in BFI responsiveness. Additionally, a more thorough understanding of these interactions, and their interactions with other policy instruments, may provide insight into the business cycle, giving us an indication as to which actions may enhance policy-makers effectiveness. The rest of the paper is as follows. Section 2 contains the theoretical background regarding investment. Section 3 is a review of the recent literature. Section 4 is devoted to our empirical results. Section 5 concludes.

2. BACKGROUND

Much of the research regarding investment begins with a Jorgensonian approach for modeling investment decisions. Chirinko (1993) describes Jorgenson's approach (an implicit model) as a typical neoclassical model, where the firm maximizes discounted profits over an infinite horizon. He develops a simple benchmark model and then derives the neoclassical model of investment in equation (1), which states that total investment is the sum of net and replacement investment, where C_t is a factor in net investment, and is defined as the user cost of capital given in equation (2). In equation (2), p_t^I is the purchase price of new capital, r_t is the real financial cost of capital net of taxes, δ is depreciation, and m_t , z_t , and t_t are all tax-related variables. From this model, it is easy to see that, if fixed investment is an important determinant in the national income equation, central bank officials can affect investment decisions by targeting r_t , the real financial cost of capital

$$I_t = \delta K_{t-1} + \sum_{j=0}^J \alpha \beta_j \Delta(Y_{t-j} C_{t-j}^{-\sigma}) + u_t = I_t^r + I_t^n \quad (1)$$

$$C_t = p_t^I (r_t + \delta) \frac{(1 - m_t - z_t)}{(1 - t_t)} \quad (2)$$

Chirinko then develops a benchmark explicit model as a comparison for other explicit and implicit model results. This model is derived from first principals, and results in equation (3), where Λ_t is the shadow price of capital and p_t^I is the price of investment, both at time t .¹ Chirinko reports the results of empirical tests for both the implicit and explicit models and finds the literature overwhelmingly supports the conclusion that output is the dominant variable, while user cost has a much more modest effect when determining investment.

$$\frac{I_t}{K_t} = \left(\frac{1}{\alpha} \right) (E_t \{ \Lambda_t \} - p_t^I) + u_t \quad (3)$$

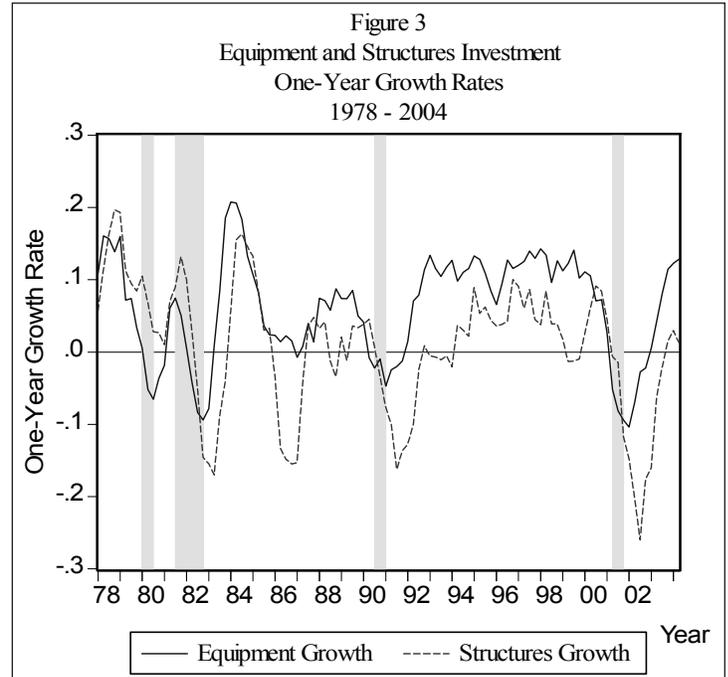
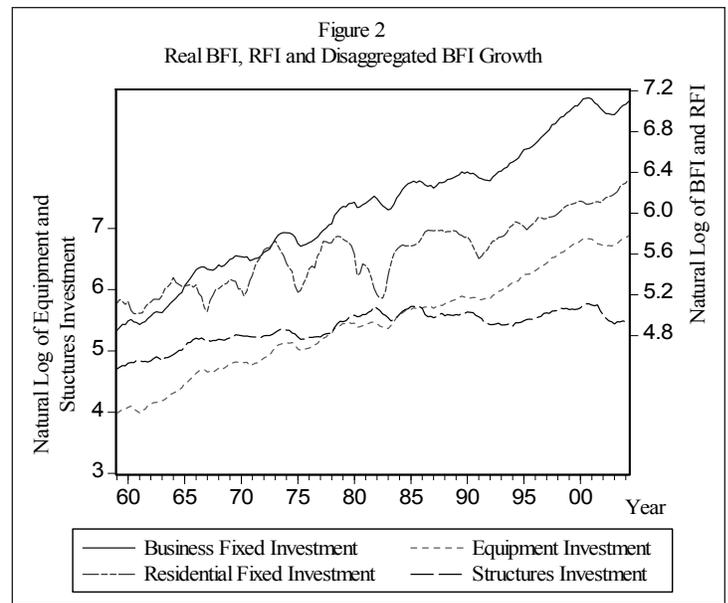
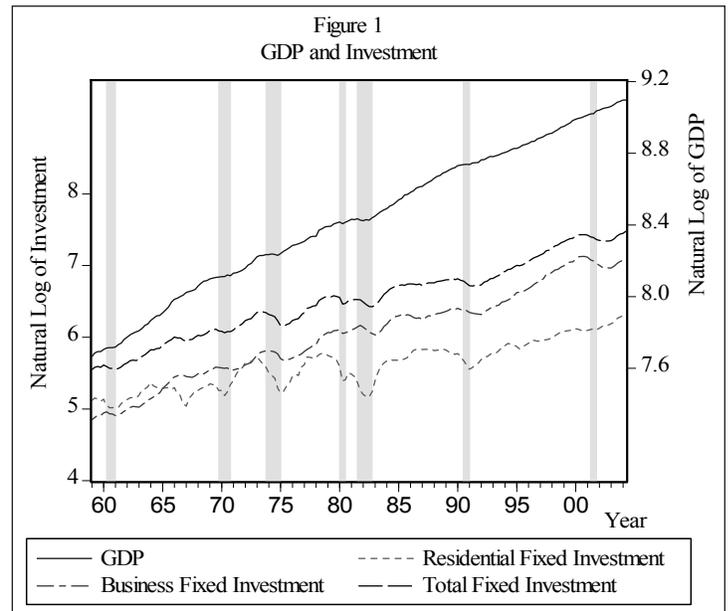
So what intuitively explains investment? Using the accelerator model as the premise, we would expect the Federal Reserve, in

response to a downturn in RFI, to reduce the federal funds rate target. This reduction works through the system, lowering the credit costs of mortgages, thereby stimulating both RFI demand and output. Increasing output is accompanied by an increase in consumption, which decreases business inventories, signaling firms that investment is required to meet the increased demand for goods. Thus, businesses invest to maximize profits and BFI responds pro-cyclically to GDP. A different perspective based on the Jorgensonian neoclassical model of investment models investment as a function of expected output and user costs of capital. Assuming higher expected output and falling user costs of capital, investment in new capital becomes cheaper than investment in existing capital. With the price of capital goods becoming inexpensive relative to other goods, firms invest in more capital (McCarthy 2001). These basic models are the foundation for many different variations of investment models, but they represent two “schools of thought” regarding investment. So, what does recent research show us?

3. RECENT LITERATURE

When the changes in BFI are examined, its evolution in the nineties looks much different than it did in earlier time periods. Figure 1 contains a graph of real GDP, real total fixed investment (TFI), real BFI, and real RFI from 1960 through 2004, with the beginning and ending of each NBER-declared recession highlighted by vertical lines. Notice that in Figure 1, TFI and BFI trend upward roughly parallel to the growth in real GDP, while RFI tends to exhibit larger fluctuations (see Stock and Watson (2002) for a discussion of volatility and the business cycle). Figure 2 plots the real growth of BFI, RFI and BFI’s disaggregated components, and Figure 3 presents the one-year growth rates of equipment and structures investment from 1978 - 2004. From Figure 2, equipment spending growth rapidly accelerates during the 1990s as compared to a steady, or slightly declining, level of structures investment. Interestingly, Figure 3 shows that, over the 1978-2002 period, equipment investment appears to “lead” structures investment. More precisely, equipment investment growth begins to fall prior to a recession, while declines in structures growth follow. Furthermore, equipment investment growth appears to reach its trough and then rise before structures investment reaches its trough. Following is a discussion of the research that attempts to explain the growth in equipment spending exhibited in Figure 3.

According to Kliesen (2003), this large run-up in business investment is a direct result of Tobin's Q. Throughout the nineties, the U.S. stock market experienced unprecedented growth in equity prices. While researching the underlying reason for this explosive BFI growth, Kliesen concludes that large share price increases made the cost of acquiring new capital much less expensive as compared to their over-inflated share prices. In contrast, McCarthy (2001) fails to find supporting evidence for this theory, while concluding that business investment would have grown at the same rate had the stock market not reached its stratospheric levels. McCarthy doesn't, however, offer any other tangible explanation for the growth. Tevlin and Whelan (2003) use a disaggregated approach to business equipment to explain the investment run-up in the nineties. Breaking down



equipment investment into computing and non-computing equipment, they conclude that the shift from heavy machinery-type capital goods to information technology (IT) type goods explains the outsized growth rate. IT goods depreciate more rapidly than typical capital equipment and they experience rapidly declining prices, so businesses increase their investment in these goods to continue to increase productivity and try to remain competitive. Within the context of the neoclassical model, we see final demand present and the user cost of capital declining, which are the two primary factors that determine business investment. If we believe the neoclassical model, a dramatic increase in equipment spending in the nineties should not have been a surprise to anyone.

So what do studies conclude about business fixed investment versus residential investment? Garrison (1991) reports that residential construction is highly sensitive to interest rates and confirms the conclusion that business investment is not nearly as responsive as residential investment. This result seems counterintuitive. Bernanke and Gertler (1995) use the credit channel to explain this apparent disparity between the way residential investment and business investment responds to monetary policy. Using vector autoregression (VAR) analysis, Bernanke and Gertler confirm results reported in Garrison and identify the credit channel as an "enhancement mechanism" rather than a truly separate transmission mechanism channel. In their work, this enhancement mechanism operates through either the balance sheet or the bank-lending channel. These two channels affect the "external finance premium", which is a wedge between what external borrowing costs versus the opportunity cost of using internally generated funds (Bernanke and Gertler, 1995).² Shbikat (2001) uses disaggregated measures of both investment and money and arrives at the same conclusion; interest rate innovations strongly affect residential investment but have a negligible affect on business investment.³

More important for policymakers, Garrison (1991) finds that personal consumption and residential fixed investment lead economic recoveries, while business fixed investment initially lags the recovery but eventually extends a recovery which may otherwise start to fade.⁴ Coulson and Kim (2000), using VAR analysis, estimate the effects of non-residential investment, residential investment, consumption and a government expenditure shock on GDP. They find that residential investment has a much greater impact than non-residential investment with two different variable order specifications.⁵ To summarize the findings, RFI responds strongly to interest rate shocks, while leading the economy out of recession. BFI response to interest rate shocks is muted at best, but BFI, while lagging growth in RFI, typically plays the role of extending the ongoing economic expansionary period. With much of the groundwork laid, we turn our attention to the next step, which is to identify any linkages between structures, equipment and monetary policy instruments.

4. EMPIRICAL RESEARCH

For our research, we disaggregate business fixed investment into its two subcomponents, equipment and structures investment, and we do so given the curious nature of the results in previous

research. This paper investigates any linkage between these two subcomponents of business fixed investment and monetary policy instruments. Investments in physical plants are both purchases of long-lived assets and investments of large magnitude. Structures investment can possibly respond to changes in interest rates, if firms rely upon externally provided funding (borrowing) when building new plants, distribution centers, etc. One-third of nominal BFI, on average, is purchases of structures. Therefore, any interest rate effects on structures may possibly be muted by equipment investment's response to real output. This is one goal of this research.

The response of equipment investment (or even structures) depends upon the source of funding. If most equipment is purchased using internally generated funds (reinvestments from operations), then the equipment investment's response to interest rate changes may be muted. So, if firms use cash to purchase equipment for operations, we would expect equipment spending to respond positively to both shocks to structures investment and shocks to M2 and GDP. Additionally, if there is a positive, and large, response of equipment to structures, it may help to explain why business investment appears non-responsive to interest rate shocks. In fact, the timing of any interest rate shocks and the length of time required to bring a plant on-line may cause this relationship to appear to be pro-cyclical when, in fact, it is simply responding to the lag associated with construction of new plants, expansions of existing plants, etc.

Data

The data used in this research are collected from the Bureau of Economic Analysis (BEA) and the Federal Reserve Bank of St. Louis's FRED II database. The BEA series include GDP, equipment investment, structures investment, and the appropriate deflators. FRED II provides M2 and the ten-year treasury rate. These latter two series are converted to quarterly frequency, and real M2 and real ten-year treasury rate are derived using the GDP deflator. The data span the period 1959:1 through 2004:2. Real equipment investment and structures investment is deducted from real GDP in this investigation.

Methods

The empirical investigation here employs vector autoregressive (VAR) methodology. It has been shown in previous research that the variables used in this study move together in the long run, i.e. they are cointegrated. This paper uses the Johansen test (1995) to estimate the long run relationship between the variables. Using the cointegration relationship, a Vector Error-Correction Model (VECM) is employed to investigate the dynamic relationship between the included variables. From this VECM, Granger-Causality tests are conducted to determine if any of the variables aid in forecasting structures or equipment investment.

Following Enders (2004), the VECM used takes the form of equation (4). In equation (4), y is a vector of endogenous variables. These variables include real equipment investment (EQP), real structures investment (STRC), real GDP, real M2,

and the real ten-year treasury rate (10T). In equation (4), $\boldsymbol{\varepsilon}$ is an $(n \times 1)$ vector of disturbance terms, and \mathbf{k} represents the lag length. Pre-testing for the presence of a unit root confirms that all variables included are non-stationary in levels, but are stationary in first-differences.⁶

$$\Delta y_t = \Pi_0 + \Pi_1 y_{t-1} + \sum_{i=1}^k \Pi_i \Delta y_{t-i} + \boldsymbol{\varepsilon}_t \quad (4)$$

Cointegration Results

The lag length chosen in the test VAR is three.⁷ The results are given in Table 1.⁸ The Johansen test suggests one long run relationship between the variables. Inferences concerning the parameter estimates are not valid without first considering the nature of adjustment of all included variables. This question is addressed later in the *Dynamic Adjustment section*. The focus here now turns to examine whether any potential breaks occurred in the long run relationship during the sample period.

It is well known that modeling long-run relationships in the presence of structural breaks may lead to model misspecification and misinterpretation. Gregory and Hansen (1996a, 1996b) structural breaks tests were conducted to reject the possibility of a break in the long-run relationship, giving us confidence in our cointegration results. The break tests were conducted for a level break, i.e. a break in the constant, a break in all variables, and a combined break in the constant and a single slope coefficient (six possible breaks in total). In all, the three test statistics are calculated for each of the six possible breaks, resulting in eighteen tests. In every test, results failed to reject the null of no cointegration in the presence of a structural break. Therefore the tests failed to find any break in the long run relationship between the variables used in this research.⁹ The long run results found and presented in Table 1 are now used to analyze the dynamic adjustment of equipment and structures investment.

Dynamic Adjustment of Structures and Equipment Investment

Using the cointegration results from Table 1, this research now turns to examining the dynamic adjustment of structures investment and equipment investment. Innovation accounting [impulse response functions (IRFs)], Forecast Error-Variance Decompositions (FEVDs), and Granger-Causality tests are employed. The IRFs display the direction of change in a variable due to shocks in another variable. The FEVDs provide the percentage of changes in a variable attributable to shocks in other variables. Granger-Causality tests denote whether a variable provides information explaining the future values of another variable. IRFs, FEVDs, and Granger-Causality tests are provided here to examine the relationship between structures investment and equipment investment.

Figure 4 gives the response of equipment and structures investment to real GDP shocks.¹⁰ Both components respond positively to shocks in GDP.¹¹ Further, the duration of the response is similar between the two components of BFI. A

positive shock to GDP impacts equipment and structures investment for roughly twelve quarters. Thus, the IRF results support findings in the previous literature: both components of BFI respond to GDP shocks. In addition, the two subcomponents of BFI respond similarly to real M2 shocks. In Figure 5, M2 shocks appear to have a significant and sustained impact on equipment and structures investment. There is some support that businesses use internally generated funds to make equipment investments. We see this as some evidence that, given the short economic life designated by the general depreciation system (GDS) to most machinery, businesses prefer to have cash in advance of major equipment purchases.

Number of Cointegrating Equations	Eigenvalue Test Statistic	Critical Value (5% level)
None	38.95	33.88
At least one	15.06	27.58
At least two	13.68	21.13
At least three	9.39	14.26
At least four	1.02	3.84

Equipment Investment	Structures Investment	GDP	M2	Ten-Year Treasury Rate
1.000	-0.207 (0.123)	-3.181 (0.277)	1.240 (0.332)	0.034 (0.007)

Standard errors in parenthesis.

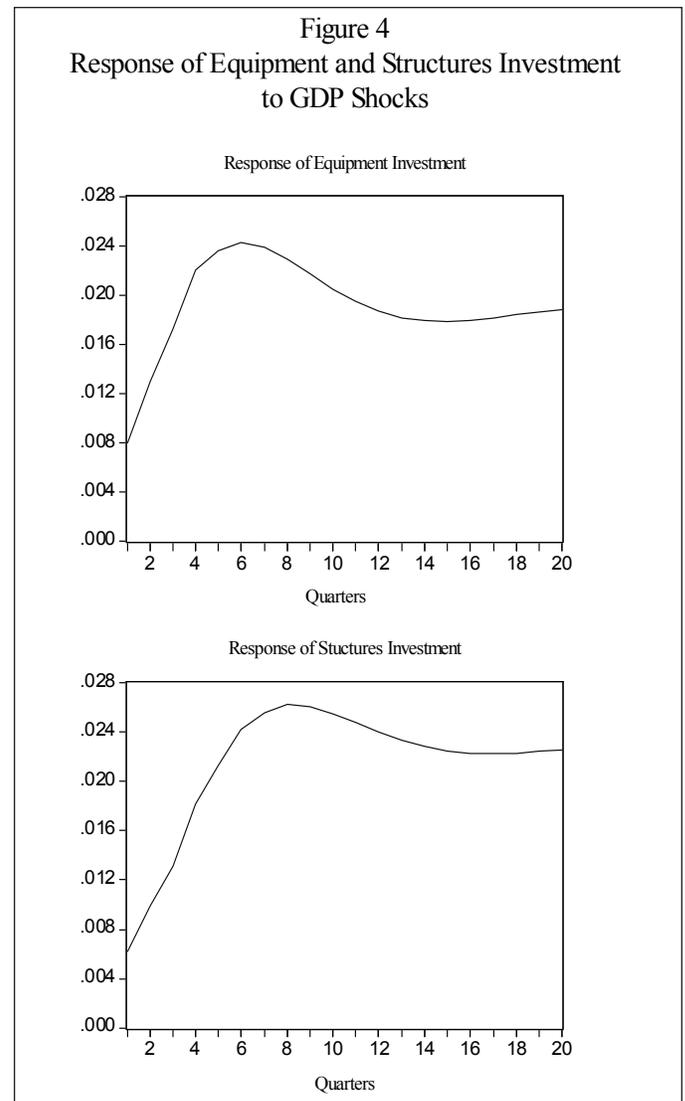
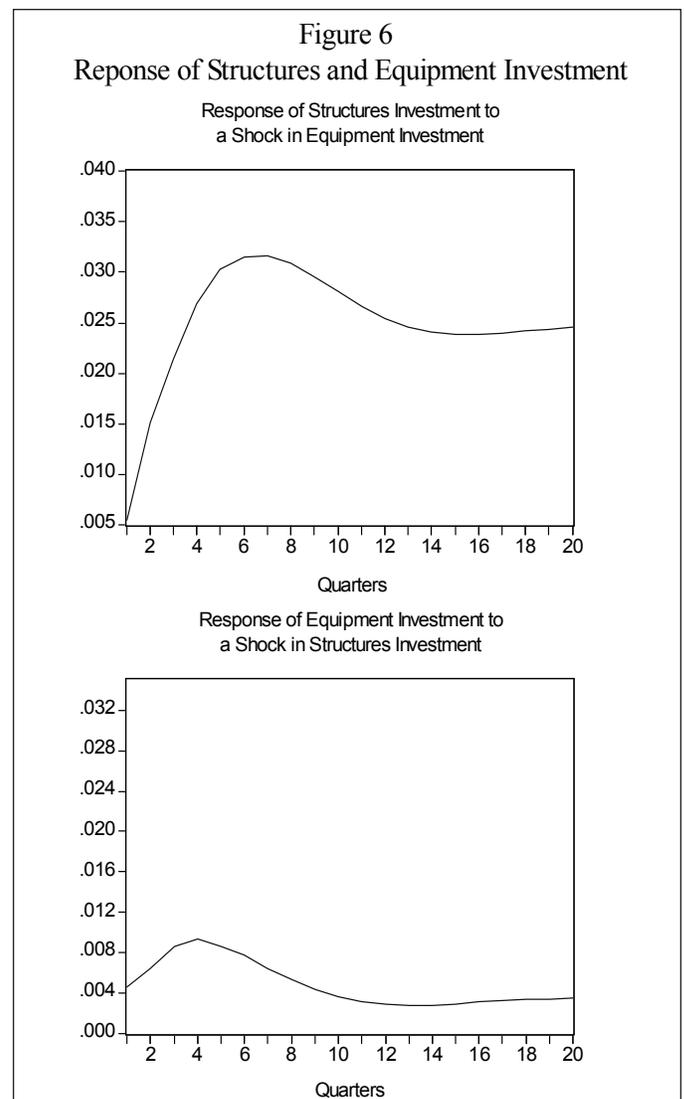
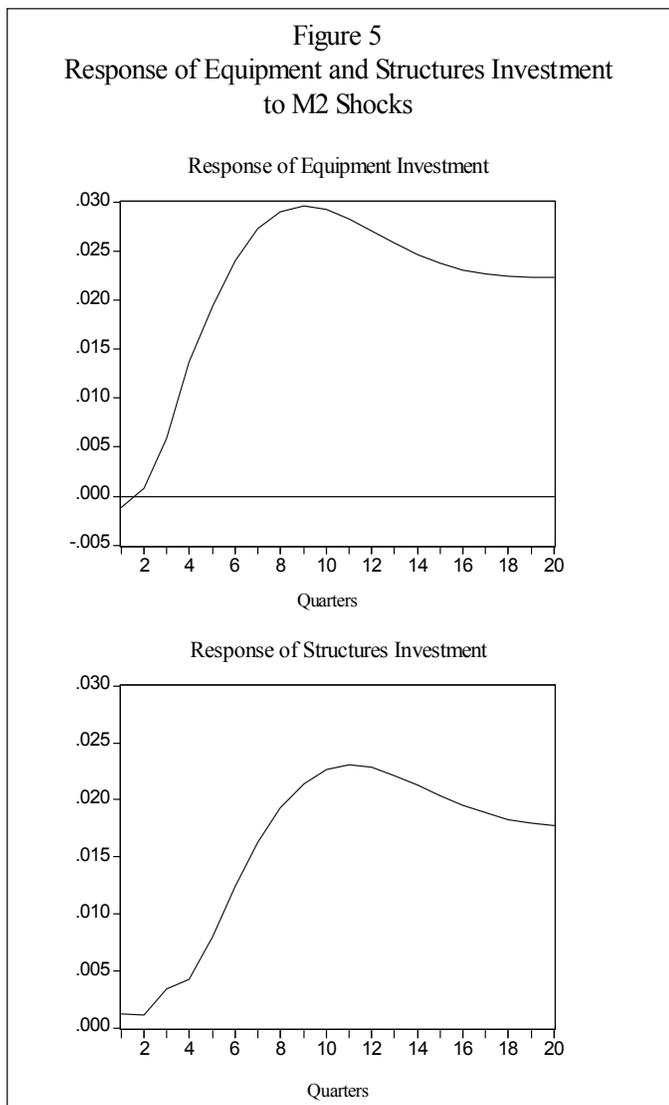


Figure 6 shows the response of structures investment to a positive shock in equipment investment and the response of equipment investment to a positive shock in structures investment respectively. Structures investment appears to be positively impacted by a shock to equipment investment with a long-lasting response. This response is almost identical to the response of structures investment to shocks in GDP, thus leading us to consider the possibility that an equipment shock in some way proxies a GDP shock (real business cycle approach). Of more interest to this paper is the reverse situation, where we consider the impact of structures investment shocks on equipment investment. Here we see the initial response is positive, but not significantly large or long-lasting. Intuitively, we expected the opposite; we expected a nonexistent response early after a shock to structures, with a significantly positive response coincident with the end of construction, somewhere in the range of 4 - 8 quarters after the structures shock. It may be the case that, in times of economic uncertainty, businesses postpone large plant expenditures but try to boost productivity by investing in new equipment, therefore giving the appearance that structures investment responds to equipment investment. Alternatively, it could be that there is no statistical link between construction of plants and increased equipment spending

Two notable patterns emerge from the IRFs. The GDP and M2 shocks create long-lasting variations in equipment investment and structures investment. Therefore GDP and monetary shocks appear to be a primary contributor to investment growth, which supports findings in the previous literature. Structures investment shocks account for negligible changes in equipment investment. We do not find this to be problematic, in that the cash in advance considerations appear to play a much larger, and theoretically rich, role.

The FEVD results in Table 2 support the conclusions from the IRFs. GDP shocks have significant impacts on equipment and structures investment, explaining just over twenty-five percent of the variation in equipment investment and nearly twenty percent of the variation in structure investment. The effect of a GDP shock on equipment peaks at four quarters, but its effect on structures peaks at a longer horizon (at twelve quarters). Monetary shocks have an apparently larger effect on equipment, which is larger than the effect of GDP shocks. Forty-two percent of the variation in equipment investment is explained by M2 shocks at a twelve quarter horizon. Finally, as noted in the IRFs, equipment investment shocks have some impact on structures investment, with these shocks explaining fourteen percent of the variation in structures investment



after eight quarters. Alternatively, structures investment has a negligible effect on equipment investment.

The final analysis here examines the pattern of Granger-Causality. Specifically, this section tests block-exogeneity (or causality) of an included variable. The null hypothesis is that the included variable provides no short run information regarding the changes in either equipment investment or structures investment, and the p-value of the test is presented in Panel A of Table 3. Further, this section also tests the weak exogeneity of each of the five variables, and the null hypothesis is that the variable is weakly exogenous. If a variable is weakly exogenous, the variables included in the long run (cointegration) relationship have no effect on the weakly exogenous variable in the long run. Panel B of Table 3 presents the results of the weak exogeneity tests.

Most of the dynamic adjustment in equipment investment appears to be from the effect that changes in the five variables have in the long run, except for M2. Structures investment, GDP, and the interest rate measure fail to Granger-Cause equipment investment in the short run, but the test rejects weak exogeneity. Therefore, most of the changes in equipment investment are due to the long run impact from the included variables. Structures investment, however, is Granger-Caused by all variables, but GDP. Further, tests narrowly fail to reject its weak exogeneity.

5. CONCLUSION

The evidence presented here suggests that the disaggregated components of business fixed investment behave differently than the aggregate measure. Equipment investment responds primarily to shocks in real GDP and real M2 over a twelve quarter horizon. The other component, structures investment, responds to shocks in equipment investment, real GDP, and real M2 over the same period. By examining the IRFs, we see that real monetary shocks have a larger impact on equipment investment. In addition, the pattern of Granger-Causality differs. Equipment investment is Granger-Caused by M2 and is endogenous. Conversely, structures investment is Granger-Caused by all variables but GDP and only marginally fails to reject the null of weak exogeneity.

We conclude by noting that BFI's importance in determining long run and short run output prospects for the U.S. cannot be ignored. The results contained here suggest that disaggregating equipment and structures investment leads to a richer understanding of the behavior of BFI. It is this difference in behavior that enables policymakers to make better-informed choices when deciding upon policy objectives and choices.

Panel A: Response of Equipment Investment to shocks in:					
Quarters	Equipment Investment	Structures Investment	GDP	M2	10-year Treasury
2	76.5	2.3	20.6	0.2	0.4
4	63.8	2.3	25.9	7.6	0.4
8	41.7	1.0	24.8	31.1	1.4
12	32.0	1.5	22.1	42.0	2.6
Panel B: Response of Structures Investment to shocks in:					
Quarters	Equipment Investment	Structures Investment	GDP	M2	10-year Treasury
1	4.5	85.3	8.1	0.2	1.9
4	11.6	73.0	12.2	0.7	2.5
8	14.2	59.6	18.3	6.5	1.4
12	12.2	54.2	19.9	12.7	1.0

FEVD analysis utilizes a Choleski decomposition with order M2, 10-year treasury, GDP, Structures Investment, and Equipment Investment.

Panel A: Block-Exogeneity Tests					
	Equipment Investment?	Structures Investment?			
Does Equipment Investment Granger-Cause	—	0.000			
Does Structures Investment Granger-Cause	0.983	—			
Does GDP Granger-Cause	0.565	0.750			
Does M2 Granger-Cause	0.000	0.820			
Does the 10-year Treasury Granger-Cause	0.139	0.520			
Panel B: Weak Exogeneity Tests					
Null Hypothesis: Variable is Weakly Exogenous (p-value)	Equipment Investment	Structures Investment	GDP	M2	10-year Treasury
	0.000	0.758	0.153	0.040	0.115

REFERENCES

- Bernanke, B.S., and Gertler, M. (Mon 1995). Inside the Black Box: The Credit Channel of Monetary Policy Transmission. *The Journal of Economic Perspectives* 9(4): 27-48.
- Bernanke, B.S. (24 Apr 2003). Will Business Investment Bounce Back? Speech given to the Forecasters Club, New York, New York. available online at <http://www.federalreserve.gov/boarddocs/speeches/2003/>
- Chirinko, R.S. (1993). Business Fixed Investment Spending: Modeling Strategies, Empirical Results, and Policy Implications. *Journal of Economic Literature* 31(4): 1875-1911.
- Coulson, N.E., and Kim, M. (2000). Residential Investment, Non-residential Investment and GDP. *Real Estate Economics* 28(2): 233-247.
- Enders, W. (2004). *Applied Econometric Time Series*. New York: John Wiley & Sons, Inc.
- Garrison, C.B. (1991). The Role of Business Investment, Residential Investment, and Tax Incentives in the Economic Expansion in the 1980s. *Applied Economics Journal* 19(4): 11-18.
- Gregory, A., and Hansen, B. (1996a). Residual-Based Tests for Cointegration in Models with Regime Shifts. *Journal of Econometrics* 70(1): 99-126.
- Gregory, A. and Hansen, B. (1996b). Tests for Cointegration in Models with Regime and Trend Shifts. *Oxford Bulletin of Economics and Statistics* 58(3): 555-560.
- Johansen, S. (1995). *Likelihood-based Inference in Cointegrated Vector Autoregressive Models*. Oxford: Oxford University Press.
- Kliesen, K.L. (2003). Was Y2K Behind the Business Investment Boom and Bust? *Federal Reserve Review*, January/February 2003, 31-42.
- McCarthy, J. (1995) Equipment Expenditures since 1995: The Boom and the Bust. *Current Issues in Economics and Finance, FRBNY*. 7(9): 1-6.
- Mishkin, F.S. (1995). Symposium on the Monetary Transmission Mechanism. *The Journal of Economic Perspectives* 9(4): 3-10.
- Shbikat, G.H., (2001). The liquidity effect and the transmission mechanism of money. *Applied Economic Letters* 8: 779-785.
- Stock, J., and Watson, M. (2002). Has the Business Cycle Changed and Why? NBER Macroeconomics Annual Conference.

- Tevlin, S., and Whelan, K. (2003). Explaining the Investment Boom of the 1990s. *Journal of Money, Credit, and Banking* 35(1): 1-22.

ENDNOTES

- ¹ See Chirinko (1993) for more exposition on the derivation of this equation.
- ² Bernanke and Gertler associate principal-agent type issues, such as contract enforcement costs and asymmetric information regarding the borrowers' credit worthiness, etc. with this external finance premium.
- ³ Shbikat finds that residential investment explains 53% of the variation in non-residential investment at the 16- quarter horizon. This supports Garrison's finding of BFI's long lag length.
- ⁴ Garrison (1991), regarding the recession in the Eighties, actually said that BFI retarded what was already a recovery in the housing and personal consumption expenditure sectors. Thus, had BFI merely reverted to zero, the initial recovery as recorded by aggregate GDP would have occurred sooner.
- ⁵ It is well known that variable ordering can affect VAR results. The authors use two different specifications, 1. C causes RI causes NI, and 2. NI causes RI causes C, where C is consumption, RI is residential investment and NI is non-residential investment.
- ⁶ See Appendix Table 1 for results of the unit root tests.
- ⁷ The Akaike Information Criteria (AIC) and Schwartz Criteria (SC) both suggest a lag length of two, but some instability in the estimates remained. Since the Johansen test requires white noise residuals, one additional lag was added.
- ⁸ Results are robust when using a real ten year treasury rate.
- ⁹ Results of the various tests are provided in Appendix Table 2.
- ¹⁰ Generalized IRFs are presented.
- ¹¹ Recall that the GDP measure excludes equipment and structures investment.

Midwestern Business and Economic Review

Manuscript Submission Guidelines

The *Midwestern Business and Economic Review* invites submission of original manuscripts and research by individuals in the public and private sector in the areas of economics and business administration. Of particular interest are topics dealing with issues relevant to Texas and the Southwestern United States. Each manuscript submitted is anonymously reviewed by members of the Editorial Review Board and *ad hoc* reviewers as needed. To meet the interest of a broad spectrum of the academic and business community, readability and expository clarity are considered essential in the review process.

All manuscripts submitted for review must meet the following guidelines

- The manuscript should be doubled spaced, 12 point Times New Roman, with 1” margins, and should not exceed fifteen pages, excluding tables, figures, and references
- The first page should include the title of the article and an abstract 50-75 words in length
- Endnotes are preferred over footnotes
- References should follow the *American Psychological Association* guidelines
- All tables and figures should be included on separate pages

A cover letter should be included with the submission containing the following:

- Title of the manuscript
- Name, degree, rank, and affiliation of each author
- Contact information for each author (mailing address, telephone number, and email address)

Four copies of each manuscript must be accompanied by a PC compatible electronic copy of the manuscript formatted in Microsoft® Word or rich-text (RTF) formats.

All manuscripts should be submitted to:

Editor, *Midwestern Business and Economic Review*
Bureau of Business and Government Research
Midwestern State University
3410 Taft Boulevard
Wichita Falls, Texas 76308-2099

Bureau of Business and Government Research
Midwestern State University
3410 Taft Boulevard
Wichita Falls, TX 76308-2099

ADDRESS SERVICE REQUESTED

Non-Profit Organization
U.S. POSTAGE
PAID
Permit No. 781
Wichita Falls, TX