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Finance Papers

Does AACSB Accreditation Provide Quality Assurance And Lead To Quality Improvement For Business Schools Whose Missions Are Primarily Teaching?

Richard F. Bieker, Delaware State University

Abstract

This study used content analysis to examine whether AACSB accreditation provides quality assurance and leads to quality improvement for business schools whose missions are primarily teaching. The findings do not indicate that graduates of AACSB accredited schools experience greater career success than graduates from non-accredited schools or that the learning outcomes of students enrolled at AACSB accredited schools exceed those of non-accredited schools. Because of the lack of generally accepted metrics for evaluating the quality of institutions whose missions are primarily teaching, there is no empirical evidence to determine whether AACSB accreditation enhances or retards quality improvement.

Introduction

One of the leading public policy issues in the U.S. during the last quarter of the twentieth century and the entire twenty-first century has been the quality and cost of higher education. During this time, some of the long held assumptions about the quality and value of higher education in the U.S. began to be subjected to increased levels of scrutiny. At the same time there began to be increasing concerns about the rising costs of higher education and the level of debt that students and their families were incurring to attend college. The issuance of the report entitled *A Test of Leadership: Charting the Future of U.S. Higher Education* by the commission appointed by Secretary of Education Margaret Spellings in 2006 (the Spellings Commission) concluded that higher education in the U.S. was found lacking on a number of fronts. The commission was critical of institutions of higher education with regard to cost and affordability, lack of transparency and accountability, lack of innovation, and lack of assurance of learning (U.S. Department of Education, 2006). Higher education came under further scrutiny with the release of *Academically Adrift* in 2011. In this book, Arum and Roksa (2011) reported the results of tracking the performance of 2,300 college students. They measured the changes in the students' critical thinking and analytical skills over the period, and found that 36 percent of the students showed no improvement in learning over their four-year period of matriculation and that those students who did show improvement showed only marginal improvement.

Business schools and programs have not been immune from this same type of scrutiny and criticism (Arum & Roksa, 2011; Pfeffer & Fong 2002; Porter & Mckibbin, 1998; Trank & Rhynes, 2003). One way in which a number of business schools have attempted to enhance the perceived quality and value of their programs is by pursuing specialized accreditation. Accreditation by AACSB International (AACSB) is regarded as the gold standard of achievement in business education around the world (AACSB, 2012a; Espiritu, 2007; McKee, Mills & Weatherbee, 2005). Espiritu (2007: 269) noted that "AACSB International articulates that it can help assure major stakeholders that accredited business schools manage resources to achieve a vibrant and relevant mission; advance business and management through faculty scholarship; provide excellent quality of teaching and current curricula; cultivate meaningful interaction between students and a qualified faculty and produce graduates who have achieved specified learning goals." McKee, Mills, and Weatherbee (2005) noted that AACSB accreditation is perceived by business school deans as a way to increase a school's legitimacy and therefore its perceived credibility in the market. Indeed, using data obtained from interviews with 20 business school leaders from the Americas, Europe and Asia and survey data from 234 AACSB-accredited and 71 in-process institutions worldwide, AACSB and Clarion Research (AACSB, 2012a) found that "99 percent reported that AACSB accreditation established credibility among other business schools, 97 percent stated that it enhanced their school's external image, 95 percent stated that it was an emblem that demonstrated the quality of their programs over others, and 95 percent responded that it indicated their quality was higher than non-AACSB-accredited schools."

Currently, only 643 business schools in only 43 countries and territories have been accredited by AACSB (AACSB International, 2012a). From its inception in 1916 until 1991 AACSB used a single standard to evaluate an institution's eligibility for accreditation. In order for an institution's business programs to earn accreditation, it had to satisfy a number of requirements, including the requirement that the program's faculty possessed terminal degrees in the disciplines in which they were teaching and that the faculty demonstrated significant levels of research productivity (McKenna, Cotton, & Van

Auken, 1995). As a result, up until 1991, the vast majority of accredited institutions were doctoral granting institutions that were engaged in high or very high levels of research activity. Of all of the institutions accredited from 1916 through 1990, over two-thirds were doctorate/research universities based on the 2005 Carnegie classification system. Only 2 percent of the institutions were baccalaureate colleges and only 30 percent were master's colleges or universities (AACSB, 2012c).

Beginning in 1991, AACSB began to evaluate an institution's eligibility for accreditation based on the school's mission. Each school would specify its own mission and there could be varying emphases on teaching and research among accredited schools. All institutions would be subjected to the same set of standards but the manner in which standards were applied was to depend on the mission of the school (McKenna, Cotton, & Van Auken, 1995). Given the more flexible standards and the perceived value of AACSB accreditation, it is understandable that both the number and diversity of institutions pursuing and earning AACSB accreditation increased significantly beginning in 1991. A total of 224 U.S. institutions were accredited after 1990. Of these, 13 percent were baccalaureate colleges and 67 percent were master's colleges or universities. Only 19 percent were doctorate/research universities. Compared to the institutions accredited before 1991, the missions of the schools accredited since 1991 tended to place a greater emphasis on teaching than on research and were generally smaller, more limited resource institutions (AACSB, 2012c). While AACSB does not provide information on the number of schools that are in the process of seeking accreditation, AACSB data indicate that, in addition to the accredited schools, 627 schools are members of AACSB but are not AACSB accredited (AACSB, 2012d). Presumably some of these institutions are either in the process of seeking accreditation or are considering the possibility.

Given the differences in the emphasis of research and teaching institutions, can the application of AACSB standards that evolved from standards established to evaluate doctoral/research universities create value for institutions whose missions are primarily teaching? In this paper I seek to identify the criteria that should be considered in assessing the benefits and costs of AACSB accreditation and then, using these criteria, seek to evaluate whether AACSB accreditation creates a positive net benefit for institutions whose missions are primarily teaching rather than research.

Methodology

The Conceptual Framework

Higher education is considered by economists to be a type of good for which there is asymmetric information. That is, the institutions which provide higher education (the suppliers) have more information about its quality than the students, their parents and the employers of the students (the demanders). Both the institutions and the students and parents have an incentive to pay for regulation to provide assurances of the quality of the higher education product. Higher education institutions favor this regulation so that they can then assure students and their parents of the quality of the education that they are providing. Students and parents are willing to pay for the regulation so that they have some assurance of the quality of the institution before they make the considerable resource commitment to it (Hall, 2012; Winston, 1999).

In the U.S., regulation of the higher education market took the form of self-regulation through a system of accreditation associations rather than through government regulation as was the case in other nations. Accreditation agencies began to be established beginning in the last quarter of the nineteenth century (Hall, 2012). During this period four regional accrediting agencies were established in New England, the middle states, the north central states and the southern states. These associations provided for institution-wide accreditation of institutions in their respective regions. In addition to the regional associations, specialized faith-related, career-related, and programmatic accrediting associations were established over time (Finnegan, 1991).

Both proponents and critics of accreditation agree that the criteria that should be used to evaluate the effectiveness of the accrediting associations include a consideration of the extent to which accreditation: (a) provides for quality assurance, (b) promotes quality improvement, (c) promotes and protects the autonomy of institutions of higher education, and (d) promotes efficiency (cost effectiveness) in institutions of higher education. The disagreements between the advocates and critics are on how effectively the accrediting associations are performing these functions (Brittingham, 2008; Eaton, 2003; Eaton, 2011; Gillen, Bennett, & Vedder, 2010; Hartle, 2012; Leaf & Burris, 2002; Murray, 2012; Neal, 2008; Sibolski, 2012). This paper focuses only on the quality assurance and quality improvement effects of accreditation. The effects of accreditation on autonomy and efficiency are considered elsewhere (Bieker, 2012).

Quality Assurance

Elizabeth Eaton (2003), President of the Council for Higher Education Accreditation, argues that accreditation associations serve as gatekeepers to insure a minimal threshold of quality during the initial accreditation of an institution. In addition, periodic peer reviews of accredited institutions insure that the institutions continue to sustain a high level of quality. The importance of this quality assurance function is affirmed to be an important function of accreditation by Barbara

Brittingham (2008), director and president of the Commission on Institutions of Higher Education at the New England Association of Schools and Colleges, and by Elizabeth Sibolski (2012), president of the Middle States Commission on Higher Education. Likewise, critics of accreditation (Gillen et al., 2010; Hartle, 2012; Leaf & Burris 2002 & Neal, 2008) agree that providing quality assurance is an important function of accreditation associations. Both sides agree that to provide quality assurance, the accrediting associations must specify appropriate measures of quality, certify quality when it exists, and inform the public with regard to the quality of the institutions.

There is, however, much disagreement on how effectively the accrediting associations are providing for quality assurance. Critics argue that accrediting associations focus too heavily on evaluating the inputs or resources of programs and institutions and not enough on outcomes or student learning (Gillen et al., 2010; Guskin, 1994). Neal (2008: 432) goes even further, noting that "the accrediting teams are composed of the personnel of institutions that will eventually be reviewed themselves. And these teams cannot reasonably be expected to be independent arbiters of quality." Possibly in response to this type of criticism both regional and specialized accrediting associations have begun to place more emphasis on student learning outcomes, although they still devote considerable effort to evaluating institutional inputs (Sampson & Betters-Reed, 2008).

Quality Improvement

Critics and defenders of accreditation also agree that an important function of accreditation is to insure that the quality of higher education improves over time (Brittingham, 2008; Eaton, 2003; Eaton, 2011; Gillen, Bennett, & Vedder, 2010; Hartle, 2012; Neal, 2008; Leaf & Burris, 2002; Sibolski, 2012). Both sides agree that to promote quality improvement among institutions of higher education, accrediting associations should assist these institutions in setting goals and developing strategies to achieve the goals, and provide constructive criticism from an outside perspective.

Defenders of accreditation argue that accreditation, by taking into account the specific mission of each institution and by focusing on targeted areas of quality, promote quality improvement over time in response to changing environments and public demands (Brittingham, 2008; Hatton, 2009; Smith & Finney, 2008). Hatton (2009) states that "it [accreditation] is uniquely suited to higher education as it developed in this country because it does not equate uniformity with quality — thereby encouraging innovation and adaptation to change."

Critics argue that the heavy emphasis that accreditation associations place on compliance with prescribed standards constrains resource allocation and undermines institutions' attempts at innovation (Leaf & Burris, 2002). And, sometimes the accreditors apply recipes for educational inputs that result in misallocated resources or even serve to undermine educational outcomes (Guskin, 1994).

Content Analysis Methodology

Based on the above criteria, the following specific research questions are examined:

(1) Does AACSB accreditation provide quality assurance for business schools whose missions are primarily teaching?

(2) Does AACSB accreditation lead to quality improvement for business schools whose missions are primarily teaching?

To evaluate these research questions, I use the technique of content analysis as proposed by Bowen (2009), Krippendorf (2004), and Schreier (2012). The search universe for the content analysis included all publications in the EBSCO Business Source Premier Data Base for the period January 1, 1990 through December 15, 2012, and the AACSB website which was accessed at various times between June 1, 2012 and December 15, 2012. In addition, some information was obtained via email from AACSB staff members over the period June 1, 2012 and December 15, 2012.

In the initial search of the EBSCO Business Source Premier database the search terms "AACSB" and "accreditation" with the Boolean operator "AND" were used. The optional search form was used. This resulted in an automatic search for the terms in all of the higher weighted fields (i.e. the author, the title of the article, the assigned subject terms, the abstract and the publication title). These search terms resulted in the identification of 185 documents over the period January 1, 1990-December 15, 2012. As suggested by Bowen (2009), Krippendorf (2004), and Schreier (2012), the use of narrower search terms was rejected so as to minimize the risk of sorting out relevant documents. However, to attempt to further reduce the risk that relevant documents would not be discovered, I used the following additional search terms: "AACSB AND assurance of learning," and "AACSB AND quality assurance." These additional search terms did not result in the discovery of documents that were not discovered by use of the broader search terms.

Each of the 185 documents identified by using the broader search terms was examined and categorized on the basis of the evaluative criterion, type of evidence, and whether the document affirmed, disaffirmed or was inconclusive with respect to the research questions. The results are summarized in Table 1. Except for purposes of framing both sides of the argument with respect to each criterion, only the documents that contained empirical evidence in the form of statistical analysis (including opinion surveys) or case studies were used to address the research questions.

The Findings

Does AACSB Accreditation Provide For Quality Assurance?

When AACSB shifted to a mission based approach to assessment in 1991, its more rigid standards evolved into a set of 21 standards that focus on student outcomes, resources, and educative processes (AACSB, 2012b). Generally, these standards mirror those of the regional accrediting associations. The major difference is that AACSB focuses on the business school while the regional accrediting associations focus on the entire institution (AACSB, 2012b; Middle States Commission on Higher Education, 2011). In addition, AACSB's requirements regarding faculty qualifications are much more specific than those of regional accrediting associations (AACSB, 2012b; Middle States Commission on Higher Education, 2011). Does AACSB accreditation enhance the student outcomes, resources, and the educative processes of business schools that focus on teaching? And does the AACSB brand provide an assurance of quality to students, their parents and employers?

Beginning in the late 1980's, colleges and universities began to be required to assess student outcomes as part of their accreditation requirements. In 1988 the American Council of Higher Education (AAHE) published regulations requiring accrediting agencies to include outcome assessments (Sampson & Betters-Reed, 2008). Accordingly, in 2002 AACSB established new standards that stressed "assurance of learning" (Sampson & Betters-Reed, 2008). This involved setting learning goals and required that assessment methods be established to determine the degree to which the goals were being achieved.

Presumably the most important metric of success for business schools whose missions are primarily teaching is the extent to which their students experience career success as a result of their education. Only seven documents in my content analysis provided empirical evidence related to the association between AACSB accreditation and student success after graduation and the results are mixed.

Hardin & Stocks (1995), using survey data from a sample of 186 recruiters for CPA firms and corporate controllers from North Carolina, Tennessee, Mississippi, and South Carolina found a positive relationship between graduating from an accounting program that was from an AACSB accredited school and being recruited for entry level accounting positions. However, graduating from an AACSB accredited accounting program was less important than other factors.

In a study of CEO's at large corporations, Jalbert, Jalbert, and Furumo (2011), using 6,305 observations covering the period 1997-2006 and multiple regression analysis, found that a high proportion of large firm CEOs earned their degrees from AACSB accredited schools. However, they found a negative relationship between having a degree from an AACSB accredited institution and firm performance as measured by one and three year returns, other things being equal. The content analysis revealed that there were three studies that attempted to determine whether there was an association between graduating from an AACSB accredited school and performance on the CPA exam. Lindsay & Campbell (2003) used multiple regression analysis with data on the CPA exam performance of 363 first-time candidates from 277 AACSB accredited and 86 non-accredited schools from two exam sittings in 1997 to examine the relationship between a school's accreditation status and the CPA exam performance of its students. They found that a school's AACSB accreditation status was not a significant determinant of success for any of the sections of the exam, other things equal.

Boone, Legoria, Seifert & Stammerjohn (2006), using multiple regression analysis with data of 43,711 graduates from 520 schools who sat for the CPA exam for the first time in either 1998 or 1999, found only weak evidence of an association between the CPA exam pass rates and AACSB accreditation. Rather, they found that academic aptitude and graduate school attendance were the most significant factors associated with performance on the CPA exam.

Barilla, Jackson, & Lowell (2008), using data for 360 first time sitters for the CPA exam between 1985 through 2003 did not find a statistically significant relationship between the odds of passing all parts of the CPA exam on the first try and graduating from an AACSB accredited business school. However, they did find that the odds of passing all parts of the CPA exam on the first try was positively associated with graduating from a business school that was AACSB accredited in accounting. Yet, the logit coefficient for the dummy variable AACSB accredited in accounting was only .07 as compared to a coefficient of .777 for the dummy variable graduate degree completed and .121 for the dummy variable accounting concentration required. Howell & Heshizer (2008), using multiple logistic regression analysis with data from an online survey of a sample of CPAs employed in public accounting firms located in several eastern, southern, and mid-western states, found that individuals who graduated from an AACSB accredited school were more likely to pass the CPA exam on one or two attempts than were graduates of a non-AACSB school. However, individuals' GPA's were more significant than accreditation status.

Kim, Rhim, Henderson and Bizal (1996) using survey data from 31 AACSB accredited and 28 non-accredited schools for the 1989-1990 academic year and a t test for differences between means, found that the mean salaries of accounting graduates were significantly different between graduates of AACSB accredited and non-accredited schools at national and

Table 1. Numerical Results of Content Analysis by Criterion Category and Type of Evidence

Criterion	*Type of Evidence*	*Number of Documents* *Confirmatory*	*Inconclusive*	*Disconfirmatory*	*Total*
Quality Assurance	Assertion: Not Substantiated	3	0	2	5
	Assertion Based on Anecdotal Evidence	0	0	1	1
	Assertion Based on Theory	0	1	2	3
	Assertion Based on Empirical Evidence	2	11	3	16
	Total				***25***
Quality Improvement	Assertion: Not Substantiated	4	0	1	5
	Assertion Based on Anecdotal Evidence	1	0	1	2
	Assertion Based on Theory	1	1	2	4
	Assertion Based on Empirical Evidence	0	0	1	1
	Total				***12***
Unrelated					148

regional CPA firms, but not at local CPA firms. They argued that these differences are due to the fact that there is asymmetrical information in the market for accountants (i.e. applicants have more information about the quality of their education than the CPA firms) and, as a result, national and regional CPA firms that are not familiar with specific schools use AACSB accreditation as a signal of quality when screening applicants.

Despite the importance of the metric "career success" for teaching institutions, the student outcomes that AACSB accredited schools (both research and teaching institutions) focused most heavily on in order to comply with AACSB's assurance of learning standards were the intermediate output student learning and "indirect" measures of outcome as measured by student and alumni satisfaction with the education that the institution provided. Despite this, there have been very few empirical studies that focused on how effectively AACSB accredited schools are implementing systems to evaluate what students are learning and how they are using the results to change curricula and educative processes.

An early study by Hindi & Miller (2000), using 1999 survey data from 164 chairs of accounting departments at institutions of higher education in the United States, found that the methods of assessment consisted primarily of indirect measures such as exit surveys for graduating seniors, student evaluations, and alumni surveys. Their findings indicate that accounting departments in schools accredited by AACSB considered planning to be the major purpose of assessment to a significantly greater extent than departments at schools accredited by other associations. On the other hand, for institutions accredited by the Association of Collegiate and Business Schools and Programs (ACBSP), assessment results were used to make instructional changes to a significantly greater degree than in AACSB accredited departments. Finally, they noted that, while employers are major stakeholders of business schools, employer surveys were used much less frequently in assessment than were student exit and alumni surveys and student evaluations of faculty.

A more recent study by Martell (2007), a facilitator of AACSB assessment of learning seminars, used survey data obtained from deans at 179 AACSB accredited and non-accredited schools in 2004 and 154 accredited schools in 2006 to evaluate assessment practices of those schools. Although 68 percent of the survey schools indicated that they had developed

learning goals for their undergraduate programs, only 31 percent of the schools had translated those goals into measureable student outcomes. Martell does not discuss differences between the AACSB accredited and non-accredited schools. Martell's 2006 survey results which included only AACSB accredited schools indicated that by 2006, 88 percent of the schools had developed learning goals and 64 percent had translated those goals into measurable student outcomes. However, only 44 percent had either internally developed or commercial data base software to store and analyze the data. Martell (2007: 193) notes that, in her role as a facilitator of AACSB assessment of learning seminars, she has observed that as late as 2007 "a surprising number of schools are still talking about intentions, not actions, in their maintenance reports. Other schools have gathered data on just one learning goal or have gathered data for only one of their degree programs."

Christensen, Judd and Nichols (2011: 84), in a survey of 174 individuals involved with the accounting program as leaders and/or instructors at AACSB accredited schools, found that "[AACSB] accreditation program goals typically represent a small subset of the goals specified by professional bodies such as the AICPA." Thus it would appear that satisfying AACSB standards would not necessarily provide an assurance of competence in the area of accounting. The authors also expressed concern that having to comply with the often times overlapping assurance of learning standards of AACSB, AICPA and regional accrediting associations may be so costly that limited resource institutions may not have the necessary resources to comply with the requirements of the multiple entities.

Walker & Terry (2008) used the results of regional and national SIFE competitions to evaluate student learning outcomes for the 2008 season. They obtained data on the performance of the top 235 SIFE teams at regional and national competitions and classified the teams by whether they were enrolled at an AACSB accredited school, an AACSB member school that was not accredited, or a school that was neither AACSB accredited nor an AACSB member school. They found that the performance was highest for programs that were not AACSB accredited or an AACSB member. It was the lowest for AACSB member schools that were accredited. However, the results of a paired t-test indicated that the differences were not statistically significant.

While the above four studies provide only a limited amount of statistical evidence, they neither confirm nor rebut the premise that AACSB accreditation improves student learning outcomes. And, since regional accrediting associations also require that institutions provide assurance of learning standards, it is uncertain whether the additional and often times overlapping AACSB accreditation requirements with respect to assurance of learning add a significant amount of value for business schools whose missions are primarily teaching.

Another factor that AACSB uses in its assessment of quality assurance is whether the institution has a sufficient level of resources to carry out its mission. Except for faculty resources, the standards for the required level of resources is quite general and do not differ significantly from those of regional accrediting associations (AACSB, 2012b; Middle States Commission on Higher Education, 2011).

Brink and Smith (2012: 10), using data obtained from the U.S. Department of Labor's National Center for Educational Statistics for the periods 2009-2010 and 2010-2011, compared the aggregate level of financial resources of institutions of AACSB accredited business programs with those of institutions with programs accredited by the Accreditation Council for Business Schools and Programs (ACBSP) and the International Assembly for Collegiate Business Education (IACBE). They found that "institutions with AACSB accredited business programs have the most assets and equipment, generate the most revenue overall …, expend the most on instruction, pay the highest professor salaries (at all ranks), and … have the most personnel (both total staff and instruction/research and public service staff) and students." However, they concede that the level of resources is not necessarily indicative of quality differences.

In assessing business schools, AACSB standards place a heavy emphasis on the necessity of faculty resources that are qualitatively and quantitatively sufficient (standards 9-12). AACSB places much greater emphasis on and provides more detailed and rigorous standards for faculty "intellectual contributions" than do the regional accrediting associations (AACSB, 2012b; Middle States Commission on Higher Education, 2011).

Does this emphasis on "intellectual contributions" add value for business schools whose missions are primarily teaching? The question of whether teaching and research are competitive or complementary activities has been the focus of much discussion for quite some time. Some empirical research indicates that teaching and research are complementary activities (Dyl, 1991; Feldman, 1987; Logue, 1991; Paul and Rubin, 1984). Others argue that the two activities are competitive (Hoyt and Sprangler, 1976). Finally, Hattie and Marsh (1996), after conducting a meta-analysis of 58 studies dealing with the relationship between research and teaching in universities, concluded that the relationship was zero.

In my content analysis I was not able to find any empirical evidence that dealt with the relationship between the level of faculty research activity and student learning outcomes for business schools as they go from being unaccredited to becoming AACSB accredited. Certainly, this is a very critical question for limited resource teaching institutions that are considering the possibility of becoming AACSB accredited. If the relationship between research and teaching is in fact negative or zero, then pursuing AACSB accreditation may be inimical to the teaching missions of such schools. However, as is discussed in the next section of the paper, there is no agreed upon set of metrics for measuring the quality and productivity of the teaching

component of business schools whose missions are primarily teaching. And, until such metrics are developed, it is not possible to answer this very important question.

Does AACSB Accreditation Lead to Quality Improvement?

The AACSB document entitled *Eligibility Procedures and Accreditation Standards for Business Accreditation* (AACSB International, 2012b: 7, 24, 28, 32, 57, 59) uses the term "continuous improvement" no less than 19 different times. In order to assess the degree to which member schools are engaged in efforts to improve quality, AACSB requires each school to submit an annual written report and to submit itself to an on-site review by a panel of deans from peer AACSB institutions every 5 years. AACSB assesses the degree to which an entity is engaged in the continuous improvement process by assessing improvements in: (a) the administrative structure, (b) faculty intellectual contributions, (c) the mission statement, (d) faculty development, (e) student engagement in the learning process, (f) instructional methods, and (g) the establishment and maintenance of learning goals (AACSB International, 2012b).

With regard to mandating that institutions engage in continuous improvement, AACSB does not differ from the regional accrediting associations. For example Standard 5 of the Middle States Commission on Higher Education requires that "the institution's administrative structure and services facilitate learning and research/scholarship, foster quality improvement, and support the institution's organization and governance" (Middle States Commission on Higher Education, 2011: 18). However, AACSB does require more frequent written reports and site visits by peer review teams than do regional accrediting associations.

Given that both AACSB and regional accrediting associations are placing increasing emphasis on continuous improvement, AACSB's member institutions are devoting increasing amounts of resources toward the development of methods for measuring and reporting changes in quality over time. Much of this effort is directed toward satisfying the reporting requirements of AACSB. A large number of the documents that I discovered in my content analysis were devoted to reporting the various methodologies that were being developed to measure and report quality improvement. (See for example Emiliani, 2005; Gardiner, Corbitt, & Adams, 2010; & Pineno, 2008).

Despite the heavy emphasis that AACSB places on continuous improvement, I found only one document that reported the results of an effort to measure quality improvement over time, and this was for a single AACSB accredited institution. Pritchard, Saccucci, & Potter, (2010) used the results of the Educational Testing Service's (ETS) Student Instructional Report (SIR) to assess the extent of continuous improvement in teaching over the period 2001-2007. The SIR instrument is designed to provide student evaluations of faculty performance. The study institution required all faculty members to administer the instrument in every class during each semester over the study period. The number of students completing the evaluation ranged from 2,052 in the fall semester of 2001 to 2,644 in the spring semester of 2007. The authors concluded that "the process intended to demonstrate continuous improvement in teaching; although well intended, it did not demonstrate long-term improvement" (Pritchard, Saccucci, & Potter, 2010: 282). The authors do not indicate what, if any, actions were taken to improve teaching performance as a result of the findings.

Despite the lack of empirical evidence on the issue of quality improvement, there has been some discussion about whether AACSB accreditation promotes or hinders quality improvement among member schools. Perhaps, the most serious criticism of AACSB's ability to promote quality improvement was made by Julian & Ofori-Dankwa (2006). They argued that AACSB regulation which focuses on "continuous improvement," formalized assessment processes, and the need for schools to diligently document and report their processes using hard data will be helpful to business schools in making meaningful improvements only if the environment in which they operate is characterized by gradual, continuous, and non-disruptive change. However, they maintain that such is not the nature of the current environment in which business schools operate today. Rather, the environment is one of discontinuity and increasing turbulence. Hence, they maintain that AACSB's focus on dealing with gradual and continuous change and its heavy emphasis on documentation and reporting actually hinder the ability of member schools to adapt to environmental changes and to meaningfully innovate. They point to changes that have recently taken place in computer and distance learning technology, the growth in for profit online degree programs, and corporate universities as evidence that current environmental changes are increasingly discontinuous and disruptive. And they note that these new technologies were initially adopted not by AACSB accredited schools but rather by non-traditional and non-AACSB accredited schools. Likewise, Cavico and Mujtaba (2010: 112-113) argue that there are risks associated with the programmatic elements of accreditation if it forces an institution to assimilate and become more traditional. They suggest that in pursuing the goal of acquiring the AACSB imprimatur, the institution might lose "its vibrancy or the values of innovation, creativity, and entrepreneurship." However, they provide no theoretical basis or significant empirical evidence to support their contention.

Romero (2008) disputes the claim by Julian & Ofori-Dankwa that AACSB inhibits innovation among member business schools. He argues that much of the criticism by Julian & Ofori-Dankwa about AACSB accreditation is not valid because business schools are part of larger universities which were bureaucratic in nature long before business schools existed. In

fact, he counters by arguing that by adopting mission based standards, AACSB encourages schools to pursue their own unique missions and develop their own strategies for "determining the appropriate mix of degree programs, faculty resources, student services, and other key functions" (Romero, 2008: 246). Romero argues further that the AACSB accreditation and peer review processes provide the member schools with valuable ideas for improvement.

Perhaps the lack of agreement and paucity of empirical evidence regarding the degree to which AACSB accreditation enhances or deters quality improvement is due to the lack of consensus on how to measure quality and quality improvement in higher education. Indeed, it was because of this lack of agreement that the National Research Council of the National Academies established a panel of recognized experts in higher education and/or productivity to consider the issue of how to measure quality and quality improvement in higher education in 2009 (Massy, Sullivan & Mackie, 2013). The panel was charged with "developing a conceptual framework for measuring higher education productivity at the institution, system, and sector levels and with describing the data needed for that framework" (Massy, et al., 2013: 16).

It is beyond the scope of this paper to delineate all of the panel's recommendations. However, until AACSB and its member schools settle on a set of metrics for denoting quality for the full range of AACSB accredited schools, including schools whose missions are primarily teaching, it will not be possible to determine whether or not AACSB enhances or impedes the process of quality improvement among the member schools. The need for developing metrics for schools whose missions are primarily teaching is especially urgent. The metrics for evaluating the quality and productivity of the research component of research institutions is relatively highly developed (see for example, Engemann & Wall, 2009; Graves, Marchand, & Thompson, 1982; Laband & Piette, 1994; & Scott & Mitias, 1996). However, the development of an agreed upon set of metrics for measuring the quality and productivity of the teaching component of institutions whose missions are primarily teaching is still in the embryonic stage.

Summary and Implications

The increased public concern over the quality and cost of higher education during the last quarter of the twentieth century and the entire twenty-first century has led higher education institutions to focus more closely on enhancing the quality and reducing the cost of higher education. One way many business schools have attempted to enhance their quality is by becoming AACSB accredited.

In this paper I sought to evaluate whether AACSB accreditation provides for quality assurance and leads to quality improvement for business schools whose missions are primarily teaching. To evaluate these research questions, I used the technique of content analysis. The search universe for the content analysis included all publications in the EBSCO Business Source Premier Data Base for the period January 1, 1990 through December 15, 2012, and the AACSB website which was accessed at various times between June 1, 2012 and December 15, 2012. In addition, some data were obtained via email from AACSB staff members over the period June 1, 2012 and December 15, 2012. In evaluating the results it is important to note that the amount of empirical evidence related to the research questions that was discovered is limited despite the fact that the search universe consisted of a large data base over a long time interval.

Arguably the most important metric of success for business schools whose missions are primarily teaching is the extent to which their students experience career success as a result of their education. It is not at all clear from my content analysis that graduates of AACSB accredited institutions experience greater career success than those of non-accredited schools, other things being equal. In addition, while the amount of empirical evidence about the issue is limited, there is no compelling evidence that demonstrates that AACSB accreditation is associated with improved student learning outcomes.

AACSB, as well as regional accrediting associations, are placing increasing emphasis on the need for member institutions to engage in efforts to improve the quality of their processes and output. As a result, AACSB's member institutions are devoting increasing amounts of resources to attempt to develop methods for measuring and reporting changes in quality over time. A large number of the documents that I discovered in my content analysis reported on various methodologies that were being developed to measure and report quality improvement. However, there is essentially no empirical evidence to determine whether AACSB accreditation enhances or retards quality and quality improvement for business schools whose missions are primarily teaching. This lack of evidence on quality and quality improvement is not unique to AACSB or to business schools. In fact, because of the dearth of metrics for evaluating quality and productivity in higher education, in 2009 the National Research Council of the National Academies established a panel of recognized experts in higher education and/or productivity to develop a conceptual framework for measuring quality and productivity in higher education. Until such a conceptual framework is developed, operationalized, and becomes widely accepted, it is not possible to determine whether or not AACSB accreditation would lead to quality improvement for business schools whose missions are primarily teaching. The findings, while limited, have a number of implications for limited resource teaching institutions and for AACSB. In addition, the limited findings of my content analysis point to the need for further research.

For limited resource teaching institutions considering AACSB accreditation, there are a number of questions that should be carefully considered. First, is the institution's mission congruent with AACSB standards? If so, exactly how will AACSB

accreditation serve to further the institution's mission? Will accreditation lead to enhanced learning outcomes for students and greater career success for its students after graduation?

The findings also have a number of implications for AACSB. Given the lack of any clearly articulated conceptual framework and measurement system for evaluating quality and quality improvement in higher education, particularly in the area of teaching, AACSB could provide a great service to its member institutions, especially those whose missions are primarily teaching, by spearheading efforts to develop a conceptual framework and measurement system that will assist member institutions in improving the manner in which they assess quality and use the assessment results to engage in quality improvement. Given the diversity of missions among AACSB accredited schools and given the recommendations of the National Research Council (see Massy, 2013) , it may be appropriate for AACSB to develop a system of measures that differ for schools with different missions but a more standardized set of measures that would be uniformly applied to institutions with similar missions. This would allow institutions to not only improve but also provide the basis that would allow them to address and respond to the rising public concern about the quality and cost of higher education.

While this analysis provided some evidence related to the research questions that were posed, there is a clear need for additional theoretical and empirical research related to the research questions. The findings indicate that there is a compelling need for research to develop a conceptual framework and measurement system that will allow business schools to better assess their quality and productivity. For limited resource institutions whose missions are primarily teaching this system should comport with the schools' teaching missions. Metrics should focus on student learning and the career success of graduates. To better assess the short run outcomes in the form of student learning, a single standardized instrument such as the Educational Testing Service's Business Subject Area (Educational Testing Service, 2012) might be developed and adopted. Institutions could use such an instrument to evaluate quality and quality improvement over time. In addition, if such a metric were widely adopted, it would be possible for an institution to compare its performance with that of peer institutions. Non-accredited schools could compare their results with similar accredited schools to help determine if becoming AACSB accredited would provide net benefits to their institutions. Statistical techniques such as propensity score matching as described by Dehejia and Wahba (2002) are well-suited for conducting such a comparative analysis. The challenge is to develop a valid instrument and succeed in having it gain widespread acceptance.

In addition, in order to provide a more comprehensive basis for institutions whose missions are primarily teaching to evaluate and monitor their quality over time, there is a need for research related to the development and implementation of systems that will allow these institutions to evaluate the long run career success of their graduates. Such methodologies are well-developed in the economics literature and have been used on a limited basis to examine a variety of issues in higher education (see for example Dale and Krueger, 2002 and Vetter, Coleman, Robe and Ruchi, 2008). These methodologies use earnings and other measures of career success of graduates as a measure of institutional quality and productivity. By controlling for student and other differences between institutions these types of methodologies would allow limited resource teaching institutions to assess the impact that AACSB accreditation would have on the career success of their graduates.

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Income Inequality and Contraception Use among Adolescents

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Abstract

This paper will examine the link between adolescent contraception use and income inequality. It has been argued that a high level of income inequality causes those in poverty to lower their future aspirations. This paper adds to the literature by accessing whether or not the level of income inequality experienced by an adolescent influences his or her decision to use contraception. If greater income inequality truly reduces an adolescent's future aspirations, that adolescent is less likely to use contraception. This research will be conducted using data from the National Longitudinal Survey of Youth 1997 (NLSY97).

Introduction

The role that income inequality plays in health outcomes has been investigated a great deal in various aspects of the social science literature. Several papers, including Deaton (2003), Lochner et al (2001), Wildman and Sutton (2003), and Waldmann (1992), discuss income inequality and health outcomes. One of those health outcomes is adolescent childbearing. Kearney and Levine (2011) found that – conditioned on living in poverty – teens living in areas where income inequality is greater have higher birth rates than teen living in areas where income inequality is less. This implies that living in an area where income inequality is high causes poor adolescents to lower their future aspirations. Kearney and Levine (2011) and other research examining teen birth rates as an outcome of "risky" behavior face some limitation. One limitation is that abortion rates may be underreported. The other limitation is that researchers can only study the behavior of females. This is problematic because males also make decisions regarding participation in "risky" behaviors and suffer similar economic losses when those decisions cause them to become parents while still in their teens.

To build on previous research and help overcome the two issues mentioned above, this paper will examine the link between income inequality and adolescent contraception use. There are many negative economic outcomes associated with early parenting such as lower levels of education for the parents (Card and Wise, 1978), and greater probability of foster care for the children (Goerge et al., 2008). These ills can be prevented in most cases with the use of contraception. By examining contraception use as oppose to teen birth rates, we are able to look more directly at the idea of planning. Our goal is to answer the question are poor teens in areas where income inequality is greater less like to plan for their future by opting not to use contraception? Using contraception use instead of birth rates means we do not have to consider the role abortion and miscarriages might play. It also means that we can examine planning by adolescent males as well as females.

Review of the Literature

Previous research has linked income inequality to individual choice theory. We use this foundation to establish a link between income inequality and adolescent contraception use. Much of the impact of income inequality has been link to education attainment, marriage decision and teen birthrates. Mayer (2001) examines the effects of changes in income inequality on mean educational attainment and on the disparity in educational attainment between rich and poor children. Although this article addresses the changes during the 1970 through 1990, Mayer's (2001) article provides five key results. First, inequality does not have much effect on graduation rates. Second, the growth in inequality is linked to college entrance rates. Third, the growth in inequality contributes to inequality in educational attainment between rich and poor children. Fourth, the effects of inequality is only due partly to the nonlinear relationship between parental income and families children outcomes. Lastly, increase in the level of per pupil expenditure at the elementary and secondary level and lower costs are positively associated with state inequality, and both raise educational expenditure. These findings suggest that there are significant peer and social effect due to area disparities income.

The works of Gould and Paserman (2002) examines the link between income inequality on marriage rates by providing a connection between wage inequality and marriage rates within cities. Their theory is based on the research that examines the effects of local level inequalities on observed outcomes marriage rates. To support this notion, Bergstrom and Schoeni (1996) argue that the income of males is positively associated with their age at which they decide to first marry. For women, Blau et al. (2000) suggest that they delay marriage when their own labor market prospects improve or when the male labor market deteriorates. Furthermore, Loughran (2002) provides evidence that age at first marriage is positively associated with

inequality. However, Gould and Paserman (2002) differ by focusing on establishing causality, looking at the decision to remarry. It is suggested by Gould and Paserman (2002) higher male inequality in a city lowers the marriage rate of women, especially for first and second husbands. The casual relationship suggests increasing male wage inequality explains about 25% of the marriage rate decline for women. If women decision to establish a family network is govern by the inequality rates in their area, then this family network may be extended to the decision to have children.

Further examination of the literature provides evidence that income inequality is a predictor of early, non-marital childbearing especially among women with household income at or below the poverty line (Kearney and Levine, 2012). The authors state that a young woman who views herself as having little to lose by having a baby while young and unmarried is less likely to delay childbearing. If feelings of economic hopelessness among the poor are heightened by greater disparities in income, then economically disadvantaged young women may perceive the opportunity costs of early childbearing to be very low. This could generate a causal link between income inequality and rates of early, non-marital childbearing. To the extent that income inequality leads to an increase of non-marital teen age births, this provides an avenue for further research to examine whether contraceptive decision theory is linked to income inequality.

Descriptive Statistics

We proceed by using data from the National Longitudinal Survey of Youth 1997 (NLSY97). This survey contains information on family income, family structure, residence, sexual history, and contraception use. We plan to examine the relationship between income inequality and contraception at the state and county level; however data is only available by region[1] at this time.

Table 1 shows the income distribution of each region. The poverty ratio is the ratio of the family's income to the poverty line (i.e. a poverty ratio of 100 means the household income was exactly equal to the poverty line). Of those surveyed, residences of the South have the greatest incidence of poverty and those in the Northeast had the smallest. To get a rough idea of inequality in the region, we divide the number of people in the region who earn an income at or below the poverty level by the total number of people in either the highest or lowest quintile. Using this measure, the South has the greatest income inequality and the Northeast has the least.

The age at which adolescents report first having sex is summarized in Table 2. When looking at the percentage of adolescents in each region who had sex before age 14, the largest percentage is in the South (the area with the highest income inequality) and the smallest percentage is in the Northeast (the area with the lowest income inequality). When the age is increased to 17, the South remains the region with the highest percent having already experienced sex; however the region with the lowest percentage is the West. When considering only those whose family poverty ratio is less than 200, the results are inconsistent. This is something that will have to be examined closely with regression analysis.

Table 3 shows the percentage of those surveyed who reported having sex by age 20. The South has the highest percentage of those reporting having sex. The lowest percentage is reported by the Midwest. However, when considering only those whose family's income is less than twice the poverty line, the South has the highest percentage and the Midwest has the second highest percentage of adolescents reporting having sex.

Finally, we summarize contraception use by adolescents. This will be our dependent variable in our regression analysis. Those in the Midwest report using contraception at a higher rate than any other region. This is true for the full population as well as those in poverty. The lowest rate of contraception use is reported in the South for the full population and the Northeast for those in poverty. The Northeast has the lowest inequality according to our measure and according to our hypothesis should have the highest rate of contraception use.

Our descriptive statistics show some support for our hypothesis that adolescents in area with more income inequality are planning less for their futures based on the decision to have sex and/or use contraception. Because the regions are so large, there is a great deal of noise in these numbers. We are working on gaining access to the geocodes for the NLSY97. With these geocodes, we will be able to conduct our analysis on a smaller area.

Methodology

The economic theory of choice can be extended to making the decision to use contraceptives during sexual activity (Donohue and Levitt, 1999: Akerlof et. al., 1996). Furthermore, the individual decides to maximize utility over childbearing and other consumption (Becker and Lewis, 1973). This theory is extended following the rational set forth by Hill, et. al. (2012). Assume that contraceptive cost associated with sexual activity is classified as either low or high. Low cost activity carries the highest probability or risk of unintended or intended pregnancy because no birth control is used. Call this the high risk strategy (H). Conversely, high cost activities carry with it the lowest probability of unintended pregnancy and has a positive birth control cost. Call this the low risk strategy (L). Choosing the low risk strategy has a cost of "*C*", due to lost

purchasing power by expenditures on contraception. The probability of conception (CN) is equal to P_H (the probability associated with using high risk strategy) and P_L (the probability associated with low risk strategy). Let the probability of CN given H and CN given L respectively be:

$$P_H = P(CN \mid H) \tag{1}$$

and

$$P_L = P(CN \mid L) \tag{2}$$

and

$$P(CN \mid H) > P(CN \mid L) \tag{3}$$

Let the utility of a newborn child be "*B*", if the net utility of *B* is positive (B>0) then an individual's utility increases with a newborn child. $B < 0$ corresponds to a case where an individual has greater utility without the baby at that given time. A child born to parents when $B< 0$ is deemed unwanted. This child that satisfies (B<0) is unlikely to be the beneficiary of parental human capital that is influenced by the disparities of income inequality as presented in this area. The expected utility from engaging in sexual activity can be modeled as follow:

$$EU_L = P(CN \mid L)B - C = P_L B - C \tag{4}$$

$$EU_H = P(CN \mid H)B = P_H B \tag{5}$$

The expected utility specified in (4) and (5) are based on the risk level taken at the time of the sexual act. It is assumed that the utility of sexual activity is the same regardless of the associated risk; therefore our interest is in what determines the equilibrium sexual activity strategy on unwanted newborns.

Setting equation (4) and (5) equal and solving for B yields the equilibrium condition:

$$P_H B = P_L B - C \Rightarrow B = \frac{C}{(P_L - P_H)} \tag{6}$$

It is plausible that the low risk strategy is adopted if and only if (Donohue and Levitt, 1999, 2001):

$$B \leq \frac{C}{(P_L - P_H)} \tag{7}$$

Since $P_H > P_L$, then $P_L - P_H < 0$, and the low risk strategy may be exercised if B<0. This establishes that for all individuals engaging in sexual activity for which children are unwanted, the low-risk strategy is the equilibrium choice. In other words, an individual will prefer to use contraception when a baby is not wanted. *As such, in a population where there is high-income inequality, there will be a causal and inverse relationship between contraceptive uses.* Some women adopt a high-risk strategy, even though $B < 0$. In this case, the pregnancy may be unwanted and they may opt to have an abortion.[2]

The previous methodology established above sets forth the testable econometric model

$$\text{ContraceptionUSE} = f(I, PR, Educ, Inc, Age, Age^2, Race \tag{8}$$

Where *I* is our measure of inequality, *PR* represents the Poverty Ratio, *Educ* represents the educational status, *Inc* represents income level, *Age* represents the age the respondent, Age^2 is the respondent's age squared and *Race* is an indicator for race and ethnicity. We will also control for state fixed affects.

Policy Implications

The goal of this paper is to help policy makers understand the root cause of adolescent parenting in the US. By examining the effect that income inequality has on planning, we may uncover a new tool to use in the fight against adolescent parenting. A reduction in adolescent parenting can improve educational attainment, particularly among the poor as well decrease the state's financial burden in caring for children whose parents do not have the means.

Notes

[1]The South region includes Alabama, Arkansas, Delaware, the District of Columbia, Florida, Georgia, Kentucky, Louisiana,Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. The Midwest consists of Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. The West region is Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. The Northeast is Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

[2]According to Donohue and Levitt (1999), if a woman chooses to abort a pregnancy it may cost her amount"*A*," which includes both emotional and monetary cost as well as the possibility of complication with future child bearing. A woman will choose to abort if and only if B<-A, or the utility of having the baby is more negative than the cost of an abortion. The negative value of "A" is expressed because it could be misleading with respect to cost being a positive number and the utility of a baby being less than zero. Because abortion as an option is costly, "no wanted baby will ever be aborted, and some unwanted babies will be born." (Donohue and Levitt, 1999). If $-A<[C/(P_L-P_H)$ then choosing the low level of pregnancy risk is more efficient means of preventing birth than abortion. In the above mentioned equation, the usage of contraception will be preferred as a precautionary choice. For all women the level of risk is identical to the level chosen when the abortion is illegal. If $-A<[C/(P_L-P_H)$ then the abortion becomes a more efficient method of birth control than precaution.

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Appendix

Table 1: Poverty Ratio

	Northeast	Midwest	South	West
0-100	474	635	1,561	613
101-200	290	387	985	444
201-300	276	368	604	312
301-400	223	288	431	223
401-500	137	209	268	146
over 500	303	359	499	314
% under 100	27.8	28.3	35.9	29.9
% under 200	44.9	45.5	58.6	51.5
% under 300	61.1	61.9	72.4	66.7
Inequality	61.0	63.9	75.8	66.1

This table shows the number of individuals in each income category. The ratio is created by dividing the household income by the poverty line. A family that earns exactly the poverty line for that year will have a poverty ratio of 100.

Table 2: Ever Had Sex (Full Population) / Ever Had Sex (Poor)

	Northeast	Midwest	South	West		Northeast	Midwest	South	West
YES	1,150	1,505	3,282	1,380	**YES**	544	746	2,012	738
NO	553	741	1,066	672	**NO**	220	273	530	318
Total	1,703	2,246	4,348	2,052	**Total**	764	1019	2542	1056
%YES	67.5	67.0	75.5	67.3	**%YES**	71.2	73.2	79.2	69.9

This table shows the number of adolescents who reported having sex in each region.

Table 3: Used Contraception (Full Population) / Used Contraception (Poor)

	Northeast	Midwest	South	West		Northeast	Midwest	South	West
YES	857	1096	2104	1026	**YES**	360	479	1186	494
NO	143	159	360	174	**NO**	73	84	233	99
Total	1000	1255	2464	1200	**Total**	433	563	1419	593
%YES	85.7	87.3	85.4	85.5	**%YES**	83.1	85.1	83.6	83.3

This table shows the number of adolescents who reported used contraception at last intercourse by region.

Table 4: Age First Had Sex (Full Population) / Age First Had Sex (Poor)

	Northeast	Midwest	South	West	Northeast	Midwest	South	West
less than 10	9	12	40	9	14	18	19	2
11 to 13	43	88	181	58	28	52	129	30
14 to 16	162	216	413	183	68	81	229	98
17 to 20	73	105	149	109	28	44	67	45
Total	287	421	783	359	138	195	444	175
% sex before 14	18.1	23.8	28.2	18.7	30.4	35.9	33.3	18.3
% sex before 17	74.6	75.1	81.0	69.6	79.7	77.4	84.9	74.3

This table shows the age adolescents report having sex for the first time by region.

Nicholas Oresme: Advice From The Past Speaks Loudly In The Present

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Abstract

Since the onslaught of the global financial crisis that began in the summer of 2008, central banks in the world's developed nations have been pumping copious quantities of money into their economies. In the U.S. via the Fed's multiple rounds of quantitative easing, commercial bank reserve balances have grown from about $21 billion in July of 2008 to almost $3 trillion 48 months later. In addition, by mid-2012 the Fed had purchased $849 billion of toxic mortgage notes and derivatives which have been placed on its balance sheet and plans to purchase $40 billion a month over the next 12-18 months. This has driven interest rates to historical lows which will stay there until 2015 per Fed announcements. In turn, banks hold almost $1.5 trillion in excess reserves which, when eventually loaned out, will likely generate rising inflation. This study looks back into history for a condemnation of this massive growth in the money supply. The monetary theories of a relatively obscure fourteenth century French medieval schoolman, Nicolas Oresme, will be analyzed and juxtaposed to those of the Monetarist school and to current events. It is shown that Oresme's prediction of the impact that the sovereign's clipping of coins, effectively increasing the money supply, would have on inflation in his time parallels that of the Monetarist's concern in the late 20th and early 21st centuries. Both foresaw a resulting round of inflation caused by the increase in M1, by either the King debasing coins in the 1300s or by the Fed monetizing government and private debt today. This now appears inevitable in the 21st century.

Introduction

Since the onslaught of the global financial crisis that began in the summer of 2008, central banks in the world's developed nations have been pumping copious quantities of money into their economies. This is especially true of the U.S. Federal Reserve Bank. Per data provided by the Fed's Statistical Release website (2012, May 14), on July 31, 2008 reserve funds in America's monetary system totaled $953.34 billion. Concurrent were commercial bank reserve balances on deposit with the Fed equaling $21.45 billion. By mid- 2012, four years into the crisis, the supply of reserve funds increased by more than three-fold to $2.908 trillion with bank reserves totaling $1.51 trillion. This latter figure registered a growth of 70 times in less than forty-eight months.

The massive growth in these accounts came as a result of unprecedented expansionary monetary policy implemented by the Fed in response to the striking slowdown in economic activity that ensued in tandem with unemployment of double digit levels not seen since the Great Depression. In particular, Treasury security purchases made by the Fed, the most common measure of easy money policies, rose almost 5.5 times from $479 billion in August, 2008 to $2.608 trillion in early summer 2012, mostly in securities bought and held outright by the Fed and by repurchase agreements. In addition, the Fed created a new reserve bank credit category as part of the TARP: mortgage backed securities. While not existing prior to the start of the crisis, by May 2012 the Fed had purchased about $849 billion of toxic mortgage notes and derivatives which were then placed on its balance sheet.

All this was done so as to mitigate the impact of the "Great Recession" on the U.S. economy. The consequences were felt quickly in the decline of interest rates to historical lows where they have remained for years. The Fed has announced that these miniscule levels will be maintained until at least the end of 2015 and longer if necessary; a recent paper in the *Economist* (2012, May 26) cites this as being an "unprecedented commitment". In theory cheap money should stimulate consumer and business borrowing and spending thus ameliorating the current state of slow real economic growth and an unemployment figure hovering not too far short of 10%. This policy has been portended by Chairman Bernanke and the Fed's Board of Governors on numerous occasions (for example see Bernanke 2009).

Many economists have become concerned with the potential impact that the $1.51 trillion reserve position held by commercial banks will eventually have on the rate of inflation in the U.S. (Westley 2012). Almost 90% of this is in the form of excess reserves due to the hesitation that financial institutions are displaying by a dearth of loaning activities. This of course has its roots in the sub-prime mortgage loans debacle which further spread into the derivative markets. It culminated in the collapse of Lehman Brothers, followed by the generous government support provided to the many major financial institutions deemed too big to fail such as AIG and Citi-Group and the increased banking capital requirements dictated by the Dodd-Frank Act (Chinn & Frieden 2011). This is reported to have doubled the administrative costs of complying with the securities laws previously passed by the Sarbanes-Oxley Act (*Economist*, 2012, May 19).

Inevitably banks will begin to loan again as the economy revives. The Bank for International Settlements (2012) argues in its recent annual report that the huge growth in bank excess reserves not only in the USA but in all OECD nations as well will, when converted into loans, render near impossible the ability of central banks to rein in inflation in the medium term future. Given the massive deluge of spending that this will produce, an economics 101 text would forecast rising, if not runaway, inflation likely in the double digit range not seen since the early 1980s. Increasing prices obviously cause the purchasing power of money to fall which would then decrease the real size of the national debt that has grown to over $15.8 trillion in 2012 pursuant to annual budget deficits throughout the Obama administration exceeding $1 trillion a year. While a boon to debtors such as the Federal government, this is a "bust" for creditors such as bond holders (Kollmann et al 2012; Bianchi 2012).

Should this have been allowed to happen? Certainly well-known economists such as Milton Friedman et al of the Monetarist school would shout a resounding no. However, the goal of this paper is to look further back into history for condemnation of this massive growth of the potential money supply. The monetary theories of a medieval Schoolman, Nicholas Oresme, found in a work published in the latter half of the fourteenth century first in French and then later in the lingua franca of the time, Latin, will be analyzed and juxtaposed to contemporary events. It will be shown that while more than 700 years old and when discussing the debasement of coinage during that time, the condemnation made by Oresme towards the sovereign clipping ducats parallels that of the Fed expanding the virtual supply of money in the form of bank reserves. As predicted by this author and by Friedman, these practices have in medieval Europe, and will in 21st century America, result in massive inflation.

Who Was Nicholas Oresme?

Nicholas Oresme was born circa 1320 in Normandy, France. By 1342 he had earned a Master of Arts degree at the University of Paris and was appointed to the faculty likely as a lecturer in philosophy. In 1356 Oresme became the Grand Master of the College of Navarre at the university, comparable to a present day dean, having completed his doctorate in theology. He held this position until 1362 (Burton 2007).

For the next twenty years Oresme served as an advisor to Charles V of France. This allowed him to view first-hand the functioning of medieval governments which provided the basis of his monetary theories. During this time he was also appointed canon and later ecclesiastical dean of the Cathedral in Rouen and Sainte-Chapelle in Paris which allowed for a mixture of Scholastic dogma with pragmatic economics in the development of his concepts. He was later elected bishop of Lisieux in 1377 where he died in 1382.

Oresme, the King, and Money

Oresme was the consummate Renaissance scholar of his time. He published at least sixteen works on a range of topics from astronomy and Aristotle to mathematics, physics and money (Clagett 1974). The focus of this paper is his comments on the state and its potential impact on money (coinage) in the late 14th century found in "De origine, natura, jure et mutationibus monetarum" (1864) published around 1370. The translation provided by Charles Johnson (1956) entitled "The De Moneta of Nicholas Oresme and English Mint Documents" is the work cited in this study.

Spiegel (1971) notes that the medieval Schoolmen's overriding concern with interest and usury emanating from the writings of St. Thomas Aquinas logically and inexorably drew them into an examination of money. According to Bell (1967), Oresme then synthesized the various comments on money made by his contemporaries into *De Moneta.* Johnson's (1956) introduction to this work indicates the focal point stressed by the author therein as an "economic tract provoked by the successive debasements of coinage by Philip VI and John II and the consequent derangement of trade and social relations" (p. x). Ferguson (1950) confirms this observation by categorizing Oresme's analysis as the "masterly arraignment" on all currency debasements, past and present, which anticipated an amazing amount of orthodox modern monetary theory *a la'* Milton Friedman.

Oresme (1956) begins his work with the following prescient statement: " Some men hold that any king or prince may, of his own authority, by right or prerogative, freely alter the money current in his realm, regulate it as he will, and take whatever gain or profit may result" (p. 1). However, he then sets the tone of the forthcoming criticism of this practice by further noting that "other men are of the contrary opinion". The goal of this treatise is then clearly enumerated by the following: "Perhaps my words will rouse them finally to settle the truth of the matter, so that experts may be all of one mind, and come to a conclusion that which shall be profitable both to princes and subjects, and indeed *to the state as a whole"* (all italics in this and in forthcoming quotations are mine). Thus Oresme establishes the goal of setting out a monetary policy that will provide benefit not only to the ruling monarch but to all of society as well.

Next is his reason as to why money exists, a statement that one sees in standard economics textbooks today. Noting the unlikelihood of a universal double coincidence of wants occurring in any society, barter gave rise to "many inconveniences" and men were "subtle enough to devise the use of money" in exchange. To wit: "For money does not directly relieve the necessities of life, but is an instrument artificially invented for the easier exchange of natural riches." pp. 4-5.

Paper money, while invented already by the Chinese prior to Oresme's time, was not the type of medium he discusses; Oresme refers of course to specie. He stresses that the best plan to consider was to use three natural materials in specie production: gold, silver, and what is referred to as "black" money, the latter being made out of a cheap material such as copper or even lead suitable for petty transactions. In addition, he lists a litany of advantages of using specie, such as ease of conveyance, scarcity and divisibility into fractional parts that are listed in current money and banking textbooks.

Oresme quickly turns to his unambiguous condemnation of money being debased. Pragmatically he admits that coinage should not be left in the hands of the private sector in that "specie should be made by one or more public persons deputed by the community to that duty, since ... money is essentially established and devised for the good of the community". However in Chapter VI, entitled "Who owns money", Oresme clarifies his position on who the ultimate monetary authority should be when stressing that the monarch is "not the lord or owner of the money current in his principality" but the persons "who possess such wealth". Thus money belongs to society and to those who have it and not the crown (p. 10)..

In Chapters VIII-XIII (see note 1) Oresme elaborates on the manner by which monarchs have and can alter the true value of money (specie) by changing the bimetallic ratio between gold and silver, by clandestinely varying the weight of a coin, or by changing the metal content contained therein. Regardless of how the prince does it, he points out that any form of debasement inexorably produces rising prices, which he describes as being scandalous in nature: "It is necessary, then, that if the proportion is to remain unchanged, and one coin changes its denomination [value], the others should be changed in proportion, so that if the first coin is called two pence, the second shall be two shillings, and the third two pounds. And if no other changes were made, *it would be necessary for goods to be bought or priced at proportionately higher rates*. But such a change would be to no purpose, and must not be made, because it would be scandalous and a false denomination. For that would be called a pound which is really not a pound, which is...improper" (p. 18). He concludes that this change in the value of money's purchasing power "should never be made; *least of all should the prince attempt to make it"*.

Kuhn (1970) supports this observation when stating that Oresme "unmasks" this specie devaluation as schemes contrived by kings and princes to exploit society in a "violent and deceitful" manner. In addition Lekachman (1959) notes how kings and "lesser rulers" in Oresme's time had "discovered the charm of debasing their coinage". Thus a prime goal of *De Moneta* was to find words strong enough to denounce this practice.

Oresme hones in on the problem seen during his time when he registers concern with the "definite alteration of the weight or quantity of money without any change in name or value". This is "plainly unlawful" due to the fact that the "prince's image on the coin guarantees its true value" to the possessor. Debasement, "which reduces the weight without altering the mark" is a "foul lie and ... [a] fraudulent" use of the monarch's authority. Oresme peppers *De Moneta* with references to classical writers which support his arguments. While the prince gains purchasing power in the form of senioriage, this is short lived because "as Cicero says 'Ill gotten goods never prosper' " (p.20). Strong words of denouncement are then clearly stressed in his following statement: "such change in proportion [of metallic content or weight] should be made by the community, for greater safety and to prevent fraud...But in no case should the mixture, or its proportion, be changed least of all by the prince...especially if he wishes to do it for the sake of profit and gain got from the change" (pp. 21 & 23).

In Chapter XV, entitled "That the profit accruing to the prince from alteration of the coinage is unjust", further hammers down Oresme's disdain of debasement to the point of redundancy when stating: "I am of the opinion that the main and final cause why the prince pretends to the power of altering the coinage is profit or gain which he can get from it". He also has a clear opinion on the attempt of the monarch to spin a justification of doing so to his subjects with the following warning: "And if he should tell the tyrant's *usual* lie, that he applies that profit to the public advantage, *he must not be believed*, because he might as well take my coat and say he needed it for public service" (p.24). In summary, the following metaphor consolidates Oresme's condemnation of the destruction of the purchasing power of money readily engaged by the sovereign by stating: "...it is monstrous and unnatural that an unfruitful thing should bear, that a thing specifically sterile, such as money, should bear fruit and multiply by itself" (p.25).

Before the observations in *De Moneta* are juxtaposed to the current state of monetary policy in the U.S. economy, it is important to point out that Oresme enumerates what today is called Gresham's Law, i.e., that bad money drives out good money (Lekachman 1959). In Chapter XVII, entitled "That profit from the change of money is worse than usury", the latter being a mortal sin by medieval canon law, Oresme parallels the clipping of coins to outright thievery. The king steals from his subjects "...by unnecessary change in the coinage, plainly takes the money of his subjects against their will, because he forbids the older money to pass current, though it is better, and anyone would prefer it to the bad; and then unnecessarily and without any possible advantage to his subjects, he will give them back worse money: " And this is done "only with a view to future debasement, and that he may give them less of the good money than the corresponding value of the old". Thus: "I

doubt whether it should not rather be termed robbery…" (p. 28). Oresme further states: "It is for that reason that copper money formerly went out of use" (p. 20).

In conclusion, in Chapter XX entitled "Of other disadvantages to the community as a whole" he categorically posits the ubiquitous and inexorable impact of debasing the value of money because "no tallage [sic] can be heavier, more general, or more severe" (p. 32). It is obvious that he is referring to the general increase in prices that will result from the debasement of money as noted previously.

De Moneta and Friedman versus the Fed

Oresme and Friedman share a mutual disdain for governmental ability and propensity to debase the purchasing power of a unit of money. In his seminal work entitled *A Monetary History of the United States* (1963) co-authored with Anna Schwartz, Friedman demonstrated how business cycles were basically caused by either too little or too much money being pumped into the economy by the monetary authorities. While this work stressed the government's policies that produced the economic downturns of the late 19th century recessions culminating the debacle of the early years of the Great Depression, he also proved that periods of inflation were rooted in excessive monetary growth. The cause and effect nexus is summarized by a statement made in a later 1970 publication that has become identified with its author in the literature: "Inflation always and everywhere is a monetary phenomenon in the sense that it is and can be produced only by a more rapid increase in the quantity of money than in output" (p. 102). And it happens due to the unbridled expansionary capacity of a central bank such as the U.S. Federal Reserve Bank or the Bank of England. This gives rise to what has become known in the textbooks as Friedman's rule, i.e., that the money supply should only be allowed to increase by an amount equal to the long run secular trend growth of real GDP. This would then preclude bouts of inflation from ever occurring. Thus control over an economy's monetary size and growth is not to be left in the hands of a Fed Board of Governors whom, according to Friedman, should and can be replaced by a computer.

While of course making reference to modern day forms of money, the above parallels Oresme's explanation of why prices rise as noted previously due to the debasing of the value of money seven centuries ago. In addition, as we have noted Oresme equally as well condemns the ability of his contemporary rulers to alter the purchasing power of money by this process. He states in Chapter XXIV entitled "Reply to the previous chapter and main conclusion" with the following creative juxtaposition: "So, just as the community cannot grant to the prince authority to misuse the wives of any of its citizens he will [sic], it cannot give him such a privilege over the coinage *as he can only misuse*, as exacting a profit from it…" (p. 40).

Conclusion

In conclusion, Friedman (1970) categorically states: "Only government can take perfectly good paper, cover it with perfectly good ink, and make the combination worthless (p. 106). Remove from the Fed discretionary monetary authority, which is the root of economic cycles over time. Oresme agree when stating that: "…to take or augment profit by alteration of the coinage is fraudulent, tyrannical and unjust, moreover it cannot be persisted in without the kingdom being, in many other respects also, changed to a tyranny…for this course can only be the advice of evil minded men…lest the prince should pretend such an emergency when there is none" (p. 39 et sequitur). Reinhart and Rogoff (2009) parrot Oresme's 14th century argument when noting that financial crises such the one which started in 2008 have periodically occurred since the creation of money and financial markets: "Many of the earliest crises were driven by currency debasements that occurred when the monarch of a country reduced the gold and silver content of the coin of the realm to finance budget shortfalls often prompted by wars" (p. xxvi).

The Fed has engaged in multiple rounds of "quantitative easing" (QE) since 2008, the euphemism for expanding M1 and M2 via the buying of Treasuries from the secondary market. Also the Fed has implemented what is called "operation twist", i.e., selling short term bonds and using the funds to purchase ones of a longer maturity thus lowering long term interest rates (Humpage 2012). Duncan (2012) points out that a third round of QE implemented by the Fed in September 2012 will without question have a short term wealth effect via rising stock prices as seen but will inevitably, and quickly, lead to rising rates of inflation. This is exactly what Oresme forecasted centuries ago via the process of coinage debasing which, according to Reinhart and Rogoff (2009), still plague countries today.

Perhaps Mr. Bernanke and the Board of Governors as well as the administrative councils that oversee the world's other central banks, when contemplating the state of monetary policy and its potential impact on inflation prospects both now and in the foreseeable future, should note Oresme's warning that concludes his work: "I say a thing which tends to bring a realm to ruin is disgraceful and harmful to the king and his heirs, my first premise; that it extends and changes to a tyranny, my second; *and it does so by alteration of the coinage*, my third" (p. 47). Shall we never learn?

Notes

1. The titles to the chapters are: VIII-On alterations of coinage in general; IX-Change of form; X-Change of ratio; XI-Change of name; XII-Change of weight; XIII-Change of material.

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The Impact of Outsourcing Medical Practices

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Abstract

Healthcare costs in the United States have risen faster than overall inflation. Becoming a healthcare practitioner is heavily regulated, and the American Medical Association exerts strong influence over these regulations. The advent of telemedicine is generating new innovations for the US healthcare industry, and creating cracks in the monopolistic system. We expect to find evidence that firms engaged in telemedicine are growing in size of firm and profitability.

Background

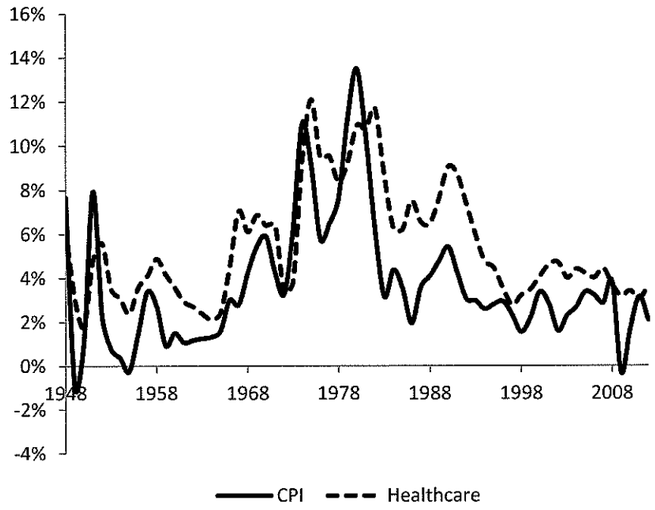
Technological innovations can have diametrically different economic outcomes, at least with regard to the price of a product or service. Innovations can be one of the two general types. The first kind of innovation results in a new product, for example, a new medicine is invented to treat an ailment. The second type of innovation provides a more cost effective way of producing an existing product or service, for example, electronic databases enable more efficient handling of patient records. Innovations of the first kind can give the impression that the costs are accelerating the overall costs in an industry. For example air bags increase the cost of an automobile, which may give the impression that the costs of cars are rising faster than the rate of inflation. When innovations of this nature are abundant, and costs increasing, the particular industry is often perceived as enjoying strong economic profits. This interpretation causes an increase in new entries into the market in an attempt by entrepreneurs seeking high returns. Another market consequence of the seemingly higher costs is an attempt to find substitutes for the products and services, and the mix of goods and services, in the consumers' baskets to lower the overall cost to the consumer. The consumer basket is a collection of items purchased by a typical consumer on average per year. The items in the basket are weighted by the amount of their use, for example, pharmaceuticals may be used on a daily basis whereas teeth whitening may be used only once or multiple times over many years. A change in the total cost of the basket from one year to the next reflects inflation as well as the increased demand for more medical services. In response to perceived increases in medical costs, consumers can pressure elected officials to reduce the increasing costs, directly or through subsidies. The healthcare industry is a good example where the creation of new innovations (cures, treatments, procedures, and medications, for example) created new goods and services at high prices over time. The increased level of new innovations led to the rate of increase in the cost of healthcare to outpaced inflation most years as indicated in Figure 1.

With the exception of the years 1948, 1951, 1973, 1974, 1979, 1980, 2008, and 2011, the increase in healthcare cost exceeded the inflation rate. These eight years overlap 5 years of recession (National Bureau of Economic Research 2013), three years of double-digit inflationary shocks such as the Arab Oil Embargo (Bureau of Labor Statistics 2013), and three years of unprecedented events such as revolution in the Middle East (1979, 1980, and 2011). The healthcare industry seems to lag behind the overall market during major negative and positive shocks.

History of the AMA

The first attempts at licensure of physicians occurred in the early 19th century as state legislatures responded to requests for physicians to only allow those with certain credentials to practice medicine. These early regulations generally failed to do much good because of the frontier mentality of the US at the time (people went to whom they wanted to go to), and the libertarianism of the Jacksonian era brought with it the end to many of these restrictions. In order to stop the "sectarian" physicians (homeopathic, botanical, etc.), the AMA was formed in 1847 by more mainstream physicians, and then proceeded to consolidate professional power. Their ability to win over the public stemmed from the advancements in science that demonstrated that diseases had causes and cures that could be known by science; hence, brining an awareness of the need for professional standards to the public (Conrad and Schneider, 2008). The AMA systematically sought the closure of many medical schools in the early 20th century (Blevins, 1995; Kessel, 1958). According to Kessel (1958), the AMA formed the Council on Medical Education in 1904, which sought to restrict access to the practice through regulation of medical schools. In 1910, the AMA published the Flexner report, which forced the closing of medical schools, reducing the number of medical schools form 162 in 1906 to 69 by 1944.

Figure 1.Healthcare Cost *versus* Inflation (Source: Bureau of Labor Statistics).



The healthcare industry is a combination of monopolistic competition in both the producers market and the consumers market. In the production market the industry resembles a cartel, in structure. The American Medical Association (AMA) provides base charges for different procedures for the medical practitioners. The AMA does not directly control the fees charged for medical service, but they do exert influence beyond that of just licensure. However, prices are influenced, in part, by the Resource-Based Relative Value Scale (RBRVS). The AMA has a large representation on the Relative Value Scale Update Committee (RUC) that makes annual recommendations on RBRVS. Moreover, the AMA provides the logistical support for the RUC (AMA, 2013). The RBRVS is based on a Harvard study that examines cost delivering physician services. According to Becker *et al.* (1990), RBRVS has the potential to establish a national fee schedule and to identify mispriced physician procedures. The system is based on the Current Procedural Terminology (CPT) developed by the AMA. When new codes are approved, the AMA reviews them and makes a recommendation to the Center for Medicare and Medicaid Studies (American College of Emergency Physicians, 2013; AMA, 2013). The process has its critics. According to Bodenhelmer, Berenson, and Rudolf (2007), this process is to blame for growing inequality in income between specialists and primary care physicians. One of the reasons they provide as evidence for this criticism is that the committee is made up mostly of specialists. Becker *et al.* (1990) acknowledge that the system cannot differentiate for quality of the physicians without incorporation of a quality index.

On the other hand, individual doctors with private practice are free to act as independent agents in a perfectly competitive market but this is becoming rare as doctors join larger medical groups. To complicate the market, there are few if any hospitals in many cities; thereby, creating a monopoly or monopolistic competition market. Many of the healthcare providers are either part of a large medical corporation or are affiliated with one in some way. Furthermore, there are hospitals and healthcare providers that are affiliated with the government to differing degrees and many have substantial contracts with state, local, or even the federal government. On the demand side, the situation is also complex in that Medicare and Medicaid have payment limits for all covered medical services. There are large medical insurance companies that negotiate different rates for their clients and act as third-party monopolistic entities within the health care market as well.

Microeconomic theories suggest that market imperfections on the side of the production would result in increased prices and revenues, thus creating an economic profit. The healthcare industry is an example of non-competitive market on the producers' side, and thus, a candidate for enjoying an above-the-average profit. The power of AMA in limiting the number of service providers, entry into the market, and establishing prices higher than what a perfectly competitive market would warrant, is essential to assure such higher profits. In this regard we are addressing the healthcare "product" produced by

medical professionals as the basis of discussion. In situations where the medical professionals are employees they enjoy higher than market salaries due to the limit on their numbers.

The same microeconomic theories demonstrate that in markets with monopsony or near-monopsony in the buyer's market, the prices would be lower compared to those of perfectly competitive markets (c.f., Perry, 1978). The higher-than-inflation increase in healthcare cost could signal that the producer side has outmaneuvered the consumer side of the market. Although in general this might be a reasonable conclusion, the fact that the healthcare services are changing due to the introduction of new products and services complicates the matters further. A more effective procedure would cost more than a less effective one. Therefore, the increase in healthcare is in part due to higher quality of the service, increasing number and choices of services, the method of indirect payment through monopolistic insurance companies as well as the monopolistic power of AMA.

Purpose of Study

The primary purpose of this study is to determine if the healthcare industry is in cost-saving innovation phase. The healthcare industry, like any other industry, experiences innovations in seemingly random pace. It is not possible to predict whether the next innovation will be in a product improvement area or cost-savings one. Whether the cost of healthcare would be higher or lower than inflation rate depends, in part, on which of the two types of innovations is dominating the innovation outcome.

The researchers do not expect to be able to separate and precisely determine the different forces that affect the healthcare cost. Instead, the focus will be on detecting whether the outcome signals the dominance of one or more force over the others. When innovations leading to new products and services are high, the healthcare cost will increase. Similarly, if the monopoly power of AMA exceeds the monopoly power of government and health insurance the cost will outpace inflation. However, in the presence of extensive improvements in cost-saving innovations, or an increase in the monopsony power, the overall cost increase would lose momentum. Therefore, the only gauge of the dominance of one set of forces over the others is the rate of growth in the health care costs. This is because there is no assurance that the opposing forces of monopsony and cost-saving innovations would necessarily offset the forces of increasing healthcare cost to the point that the rate of growth would be less than inflation, let alone negative.

The process of the appearance of a new product with high price that finally becomes less expensive and possibly vanishes from the market is called the product life cycle in marketing field. The product life cycle can take many different shapes depending on the nature of the product and the demand for the product. Fad products have a sharply increasing portion, a rapidly declining segment and a short life span. Some products, especially those relating to the taste buds, such as sodas and food items, enjoy a long and steady life span with little change in shape after the initial rise.

The Role of the Internet in Healthcare

The Internet, combined with the high-speed connectivity, has made it possible to transfer large volumes of digital data around the world quickly and at a low cost. The advances in the volume of data transmitted and speed of transmission has increased substantially since the inception. Now we can send books, images, and other large files with high accuracy. The everyday benefit of this capability is that people can share the pictures of loved ones whether they live nearby or on the other side of the world. The healthcare industry has begun to leverage this technology to transfer medical images, such as X-Rays and MRIs as well as lab results, which require the interpretation of a specialist to distant locations.

In the past the requirement was that a degreed and certified radiologist had to interpret the medical images, meaning that such a professional had to be on staff even if he or she was not fully occupied. This requirement increased the cost of the service, especially in the smaller communities. The inadequacy in obtaining the readings in smaller communities translated into an increased cost especially during the weekends, nights, holidays, and emergencies when a radiologist had to be present. To overcome this potential underutilization, some health facilities began sharing radiologist among smaller communities by using the data transfer ability of high-speed Internet connectivity. One radiologist could now be shared, both in skill and cost, among multiple sites. This innovation meant that the healthcare providers could theoretically access all radiologists in the country, and hence, the monopoly power of the radiologist in smaller communities was weakened. Nevertheless, due to the actions of AMA by changing the fees, licensing requirements, and restricting the number of medical professionals by limiting enrollments and residency requirements the cost-savings was not as substantial as it would have been without such restrictions. The next phase of innovation, leveraging this same technology, was to use non-American practitioners for the same services creating an innovative type of telemedicine. These persons outside the country do not enjoy the higher earnings that are made possible under the AMA umbrella. A single large source of less expensive radiologists is India where there is a large general population and thus any percentage of the population in a medical profession equates to a large number overall.

There is a misconception that India is suitable candidate to find this workforce because of the preponderance of English-speaking persons and lower wages than you would find in the United States. The majority, if not all, radiologists everywhere know sufficient English because English is the dominant scientific language. This is not the first service to be offshore outsourced to India by leveraging the ability to transfer data. The call center industry was the first notable service to move production from the United Kingdom and the United States to India to take advantage of the higher skills, lower wages, and English-speaking populations (Butler 2005; Granered 2005). The attraction of India stems from the availability of contacts and infrastructure for such services that have been established by the call-center sector of the service industry. This confounding problem could be the main shortcoming of this study. An attempt will be made to alleviate or reduce the problem.

The Economics of Factors of Production

Healthcare can be examined from consumer or producer perspectives. The interest here is on what is happening to the healthcare availability, which is a production and/or distribution issue. Therefore, the appropriate approach is a production approach. In the production theory it is necessary to address the factors of production. Under perfectly competitive market structure resources within a country are allocated in such a way that the marginal cost equals to marginal revenue from each factor. Therefore, at the equilibrium the marginal revenue product (MRP) equals the marginal cost (MC) of each factor. Previously in the history of the AMA section, it was demonstrated that the healthcare sector in the United States does not conform to the perfect competition market structure. Instead, it is a combination of monopolistic competition on the producer side and monopolistic competition on the consumer side plus a myriad of government regulations and interventions, most notably at the Medicare and Medicaid segment of the market. Therefore, in addition to the market the firms also face a downward sloping marginal revenue curve.

Theory

There are several theories that might play a role in explaining the changes that are occurring in the health care industry. These theories include industry life cycle, product life cycle, cost benefit analysis, and factor productivity. The first two theories play a prominent role in marketing and management, while the last two are employed in economics.

Industry Life Cycle

The idea behind this theory is that every industry has a birth and growth. Some industries die. There was a time when there was no Internet. Since its "birth" the Internet has been growing. Whether the Internet will eventually "die," as the horse-drawn carriages did, is uncertain. Some industries seem to be everlasting, such as the leather shoe. The life-span of an industry depends on how narrowly it is defined, the nature of its product, and whether it satisfies a basic need, among other factors.

In management science three stages are identified for every industry, growth, shakeout, and maturity. In stage one, a new product is commercialized and the rate of entry into the industry exceeds the rate of exit from it. In stage two, the rate of entry declines while the exit rate increases resulting in reduction in the number of existing firms. In stage three, the industry stabilizes and entry and exit are low and similar, provided the mature stage is stable. Sometimes in stage three new niche markets are created with substantial increase in entry such as specialization in radio in the forms of clock radios, car radios, portable radios, etc. of the mid-twentieth century. Chandha (2005) finds that technology proxies by foreign patent rights had a positive impact for Indian pharmaceutical exports for off-patent drugs.

Product Life Cycle

The product life cycle is assumed to have the same three stages as the industry life cycle. In the first stage there is little output, mostly non-uniform. This allows producer(s) to extract the majority of consumer surplus. As appealing as this might sound to a producer, it would be more profitable to increase the output, when technology permits and more efficient production methods such as assembly lines, product uniformity, and robotic production, becomes feasible in later mature phases of the cycle. By definition, a product life cycle cannot exceed the industry life cycle.

Basic economics provides a diagnostic of the medical cost problem in the United States. One, if not the main, reason for high cost of medical care is the American Medical Association's (AMA) monopoly power over the supply of medical care. While the medical care is provided by individual physicians and healthcare institutions (hospitals, for example), the AMA controls the number of physicians that are licensed to practice in the United States. AMA limits the supply of physicians

under the guise of protecting the public interest by excluding unqualified physicians. A reduction in supply causes an increase in the cost. If the market was flooded with physicians the cost of services would drop appreciably.

With the exception of a natural monopoly, a monopoly is constantly under attack by firms that are attracted into the market because of the monopoly profit. A natural monopoly is a firm that has substantially lower production cost, possibly due to the economy of scale and/or has a unique product without a close substitute. Since AMA is not a single producer its monopoly power is based on a cartel model. A cartel is an agreement among competing firms or entities to increase profit by either fixing the price or limiting the supply. A monopoly based on collusion by the AMA is enumerated: first, limiting the supply by collusion among producers of goods or services, second, demanding a specific price by providing a price guide, which is also practiced in automobile repair, plumbing, and other sectors. Third, requiring licensing issued by the cartel. Fourth, creating legal requirements or restriction such as the location, number, qualification, origin, periodic testing, of physicians, as examples. The greater the ability of the cartel to limit the supply the greater its power to maintain or increase prices, and thus, increase the profit. The greater is the monopoly profit of a cartel the greater is the incentives for the competition to attempt entry into the market to share the profit.

It is difficult to break up a well-established cartel. The AMA has been exerting its monopoly power since 1847 but it's achievement of economic monopoly began in 1904 with the founding of its Council on Medical Education (Kessel, 1958). However, the advent of the Internet has provided a new challenge to the monopoly power of the AMA. The Internet has increased access to information regarding the availability of alternatives and substitutes. One of the first examples of a crack in the monopoly power came through using the Internet to directly purchase prescription drug from Canada instead of local pharmacies. Another crack in the AMA monopoly is the case of Wilk versus AMA. A group of chiropractors filed suit against the AMA in 1976 claiming the AMA engaged in tactics to undermine the chiropractic profession. After 11 years, the courts ruled the AMA had violated part of the Sherman Anti-Trust Act (Winnick, 2005).

Interestingly, the first telemedicine program was established possibly as early as the 1950s (Sosa-iudicissa, Wooton, and Ferrer-Roca, 1998). Part of the reason telemedicine is not used as extensively could be due to the belief that telemedicine is useful in providing access to the remote areas where all medical expertise are not available due to shortage in demand. A somewhat dated source (Ferrer-Roca and Sosa-Iudicissa, 1998) provides a history of expansion of telemedicine through late 1990s for many countries. Their interpretation of telemedicine is broader than the one employed here. They include the use of telegraphy and radio while we are limiting the scope to the technology based on the Internet, which allows instantaneous communication with full access to complete audio and visual capabilities for both the patient and the healthcare provide. More recently, advances based on the Internet combined with faster and larger transportation capacity of files and images, has allowed the healthcare providers to increase their profitability by transferring laboratory works to overseas to be interpreted and analyzed by physicians and technicians abroad. These include, but not limited to blood work, x-rays, and other imaging processes. It is not difficult to notice that these are some of the medical care components that are opaque to the patients. The trends in using the Internet in telemedicine can be deciphered from data at http://www.internetworldstats.com/emarketing.htm.

Since the monopoly power of AMA is artificial and is maintained by a complex network of regulations, rules, quotas, tests, and licenses there is a great amount of incentive in the market for agents to enter into the medical sector to take advantage of the monopolistic profits. We are not referring to the normal process of joining a cartel, by virtue of membership, but rather deviating from its membership while charging the same prices as the cartel. For the case of the medical procedures that are offshore outsourced, the penetration comes in the source of moving the analysis to another country, where AMA does not have monopoly power, such as India, and hence medical services costs can be lower. There are other factors that contribute to the lower medical cost in India and elsewhere. Some of these include lower cost of living, lower per capita GDP, and until recently, immobility of the services and factors of production, namely, the physicians.

Improvements in computer and telecommunication technology have made it possible to send the procedures that are not transparent to the patients to other countries. These are test cases to measure the reaction and capabilities of the AMA in maintaining its cartel intact. If these are successful other procedures that can benefit from these technologies would follow. If the above argument is correct we should be able to see evidence of the process and its results. We predict that the procedures that are conducted without direct observation by patients are being sent overseas. These include interpretation of any all medical images from x-ray to MRI, any and all bodily fluids and extractions, such as blood, urine, tissue samples, readings of electrocardiograms, the monitoring of intensive care unit (ICU), and robotic surgery (http://www.nytimes.com/2003/11/16/business/who-s-reading-your-x-ray.html?pagewanted=all&src=pm)

The result is an increase in the profit of firms handling these procedures and hence the number or the sizes of these firms. Cost and revenue data will indicate that these firms are having higher profits, are increasing in numbers, and growing in size Another measure to consider is the decline in the number of firms that are still operating domestically. We predict a decline in their numbers, sizes, and profits. As the effectiveness of these operations improve other medical procedures that can benefit from computer and telecommunication technologies would follow.

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Bayesian Vector Autoregressive Model: Use of the USDA Forecasts as Informative Priors

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Abstract

Vector autoregressive (VAR) processes are the most commonly used multivariate time series models in economic impact analysis. Some econometricians are still skeptical about the applicability of the VAR in part due to the lack of its structural context. To respond to the criticism, this paper presents a process that a VAR model can be derived from a structural model that incorporates economic theory and statistical properties of economic data. This fine tune process is known as structural econometric time series analysis (SEMTSA). The paper also shows that researchers can greatly improve forecasting performance of the VAR model derived from the SEMTSA using informative priors: a Bayesian VAR.

Introduction

Commodity price forecasting is intended to provide important public information to both government agents in policy making and market participants in making informed production, marketing, processing, and retail decisions. Accurate price forecasts are essential inputs for these business decisions, because reliable price information renders rational decision making, assures efficient allocation of resources, and thus maximizes social welfare (Stein, 1981).

To facilitate these goals, the United State of Department of Agriculture (USDA) provides annual forecasts for most of the rice related economic variables, such as average farm price, world export price, supply, and demand among others. Not surprisingly, forecasting accuracy tests on the USDA forecasts have been the topic of many research publications over the years. A resulting consensus was that the USDA forecasts are consistently reliable benchmark numbers for most extension economists, researchers, more importantly rice producers. For example, the USDA price forecasts, by and large, provide adequate information for the end users, especially before the actual market price is revealed.

Generally, the SEMTSA approach can be summarized in four steps as follows: (1) A structural econometric model is developed, incorporating usual inputs from economic theory and knowledge of economic and institutional characteristics of the industry. (2) Based on this initial structural model, the implied properties of corresponding final equations (ARMA) and transfer functions are derived. Time series methods are then used to estimate the derived final equations and transfer functions. (3) The estimated ARMA and transfer functions are checked for consistency with the restrictions implied by the initial structural econometric model. (4) Inconsistencies between the implied and estimated ARMA and transfer functions should reappraise the initial structural econometric model until they are conformable. If they are conformable, then a VAR model can be obtained and used for forecasting purpose (Zellner and Palm, 1974).

The main purpose of this paper is to incorporate the forecasts of rice related variables provided by the USDA into a VAR model as informative prior and then to generate accurate forecasts for rice variables utilizing the resulting Bayesian VAR model. The rest of the paper is organized as follows. Data and descriptive statistics are briefly described in the following section. Methodology section presents derivation of VAR from the SEMTSA, the SEMTSA of U.S. rice market, estimation of Bayesian VAR model, and forecasting evaluation. Afterwards, empirical findings are reported. In the last section, the results are summarized and the paper is concluded.

Data and Descriptive Statistics

Data spanning the period from 1976 to 2012 are divided into two subsections: Supply and demand. The supply side contains supply (SUP, million cwt), beginning stocks, and imports as well. The demand side includes domestic consumption (USE, million cwt) and exports (QEX, million cwt) equations. To close the market model, the ending stocks (QES, million cwt) equation is specified. Lastly, the market price (FPR, dollars per cwt) equation closes the equilibrium model. The annual price series used are nominal. In addition, the U.S. population (POP) is employed as an exogenous variable in demand side; the implanted year of the farm bills (BIL, dummy variable) is included as a control variable for policy shift in the market price equation.

Total supply is the sum of the productions of the six major rice producing states, beginning stocks, and imports. Two data sources for the total supply are used: "The U.S. Rice Industry" (Setia et al., 1994) for the period of 1976 through 1999 and "Rice, Situation and Outlook Yearbook" (ERS/USDA) for the rest of years. Rough rice prices are obtained in the identical

manner. Domestic use is the sum of food and industrial consumption, seed and residual. Ending stocks are the quantity at the end of marketing year (the end of July). Exports are on a milled basis.

During the sample period, the average rough rice price was $8.61/cwt. This average price is much lower than what rice has commanded in the recent years, starting in 2007. The average price of the past 6 years was $14.18/cwt. These price swings are explained by a relatively high coefficient of 0.35. The variations of the other variables, such as exports and supply are moderate, compared to the ending stocks of rice. Interestingly, the U.S. domestic rice consumption year to year is much more volatile than the changes in the U.S. population, although rice is a major stable food in the U.S.

Table 1: Descriptive Statistics of Selected Rice Variables from 1976 to 2012

	Mean	Standard Dev.	Coefficient Variation
FPR (dollars/cwt)	8.61	3.04	0.35
QEX(million cwt)	84.52	15.93	0.19
SUP(million cwt)	212.52	38.89	0.18
QES (million cwt)	34.91	13.59	0.39
USE(million cwt)	93.18	27.92	0.30
BIL (dummy in year)	0.22	0.42	n.a.
POP(thousands)	258,335	29,848	0.12

Methodology

Derivation of VAR from the SEMTSA

A standard linear multiple time series process can be represented as follows:

$$H(L)\underset{m\times m}{\ }\underset{m\times 1}{Y_t} = F(L)\underset{m\times m}{\ }\underset{m\times 1}{E_t}, \quad t = 1, 2, \dots, T, \tag{1}$$

where $Y`_t = (y_{1t}, y_{2t}, \dots, y_{pt})$ is a vector of random variables, $E`_t = (e_{1t}, e_{2t}, \dots, e_{pt})$ is a vector of random errors, and $H(L)$ and $F(L)$ are each m x m matrices, assumed of full rank, whose elements are finite polynomials in the lag operator L, defined as $L_kY_t = Y_{t-k}$. Typical elements of $H(L)$ and $F(L)$ are given by $h_{ij} = \sum_{l=0}^{r_{ij}} h_{ijl}L^l$ and $f_{ij} = \sum_{l=0}^{q_{ij}} f_{ijl}L^l$. In addition, it is assumed that the error process has a zero mean, an identity covariance matrix and no serial correlation. In other words, $E[E_t] = 0$, for all t and $t`$, $E[E_tE`_t] = \delta_{tt`}I$, where $I$ is a unit matrix and $\delta_{tt`}$ is the Kronecker delta.

The model in Equation (1) is a vector autoregressive moving average (VARMA) process. If $H(L) = H_0$, a matrix of degree zero in L, then equation (1) is a moving average (MA) process; if $F(L) = F_0$, a matrix of degree zero in L, then it is a autoregressive (AR) process. In general, Equation (1) can be expressed as:

$$\sum_{k=0}^{r} H_k L^k Y_t = \sum_{k=0}^{q} F_k L^k E_t \tag{2}$$

where H_k and F_k are matrices with all elements not depending on lag operator, L, $r = \max_{i,j} r_{ij}$ and $q = \max_{i,j} q_{ij}$. Since $H(L)$ in Equation (1) is assumed to have full rank, (1) can be solved for Y_t as follows:

$$Y_t = H^{-1}(L)F(L)E_t, \tag{3}$$

or

$$Y_t = [H^a(L)/H(L)|]F(L)E_t, \tag{4}$$

where $H^a(L)$ is the adjoint matrix associated with $H(L)$ and $|H(L)|$ is the determinant which is a scalar, finite polynomial in L. If the process is to be invertible, the roots of $|H(L)| = 0$ have to lie outside the unit circle. Then, Equation (4) expresses Y_t as a finite MA process that can be equivalently expressed as the following system of finite order ARMA equations:

$$|H(L)|Y_t = H^a(L)F(L)E_t. \tag{5}$$

The i^{th} equation of in Equation (5) is given by:

$$|H(L)|y_{it} = a_i`E_t, \; I = 1, 2, \dots, m, \tag{6}$$

where $a_i`$ is the i^{th} row of $H^a(L)F(L)$. A special case for Equation (6) in a system is a vector autoregressive model (VAR).

The SEMTSA of U.S. Rice Market

As specified in the SEMTSA, the paper first builds an initial econometric structural model (i.e., Equation 1) by adopting No and Zapata (2001) economic model in which asset fixity (Johnson, 1997), Nerlovian adaptive expectations (Nerlove, 1956), and habitual demand (Pollack, 1977) are used to represent adjustments in supply, demand, and ending stocks in the recursive structure. More specifically, structural relationships among the market fundamentals can be presented in general functional forms: $SUP_t = f(QES_{t-1}, SUP_{t-1}, Disturbances)$; $USE_t = f(QEX_t, FPR_t, POP_t, Disturbances)$; $QES_t = f(SUP_{t-1}, QEX_t, Disturbances)$; $QEX_t = f(SUP_t, Disturbances)$; $FPR_t = f(SUP_{t-1}, QEX_{t-1}, BIL_t, Disturbances)$, where SUP = total supply, FPR = farm price (nominal), USE = domestic consumption, QES = ending stocks, QEX = exports, POP = the U.S. population, and BIL = the implementation year of the new farm bill.

The study specifies all the equations for endogenous variables above in a linear form not only because the linear equation is simpler and common specifications, but also because the linear relationship is considered to reasonably approximate

$$SUP_t = a_1 + \alpha_1(L)QES_t + v_{1t}, \tag{7}$$

$$USE_t = a_2 + \beta_1(L)QEX_t + \tau_1(L)FPR_t + \delta_1(L)POP_t + v_{2t}, \tag{8}$$

$$QES_t = a_3 + \eta_1(L)SUP_t + \beta_2(L)QEX_t + v_{3t}, \tag{9}$$

$$QEX_t = a_4 + \eta_2(L)SUP_t + v_{4t}, \tag{10}$$

$$FPR_t = a_5 + \eta_3(L)SUP_t + \beta_3(L)QEX_t + \rho_1(L)BIL_t + v_{5t}, \tag{11}$$

Using algebraic manipulation specified in Equations (4) – (6), Equations, (7) – (11) can be presented as in Equation (6):$|H(L)|y_{it} = a_i`E_t$, $I = 1, 2, \dots, 7$, which is a VAR model of five endogenous variables, along with the POP and BIL as exogenous variables in the system.

Estimation of Bayesian VAR Model

The estimation process within the Bayesian framework (Litterman, 1979) is to specify a relatively unrestricted VAR and to use symmetrical prior information on all the indicated variables to balance the tradeoff between over-simplification and over-parameterization in the VAR. This paper adopts the Bayesian VAR by allowing for the specification of an informative mean prior around a USDA forecast. Incorporating the intercept component, Equation (6) can be written as

$$Y_t = D_t + \sum_j A_j Y_{t-J} + \varepsilon_t \tag{12}$$

For instance, for a bivariate VAR with the lag length = 2 the first equation can be written as

$$y_{1,t} = d_1 + a_{1,1,1}y_{1,t-1} + a_{1,2,1}y_{2,t-1} + a_{1,1,2}y_{1,t-2} + a_{1,2,2}y_{2,t-2} + e_{1,t}, \tag{13}$$

where $a_{i,j,k}$ is the coefficient to be estimated in the k^{th} lagged j^{th} variable of the i^{th} equation in the VAR. The constant term, d_1 is assumed a diffuse prior distribution. Litterman suggested that the prior distribution (Litterman, 1974) for the coefficients, $a_{i,j,k}$ be: $a_{i,j,k} \sqcup N(1, \gamma^2)$, when i = j, k = 1. The coefficient is normally distributed with the population mean = 1 and variance = γ^2, indicating that all the variables are characterized by high persistence. Instead of using the flat prior, this paper employs a specification that the USDA forecasters have reliable information and strong priors about each dependent variable. Thus, the paper allows for an informative prior to be place on the first own lag in each equation. An informative prior mean for coefficient, $a_{i,j,k}$, i = j, k = 1 is set as the ratio of y_{t-1} to $\hat{y}_{t-1}$ where y_{t-1} is the actual value of the dependent variable and $\hat{y}_{t-1}$ is the USDA forecast for that variable. The prior distributions for the other coefficients, $a_{i,j,k}$ i = j, k >1 are $N(0, (\gamma/k)^2)$.

For $i \neq j$, $k > 1$, the mean of the prior distribution for $a_{i,j,k}$ is zero and the standard deviation is $\omega(rr_i/kr_j)$, where r_i and r_j is the standard error of a univariate autoregression on equation i and j, respectively, r/k is the standard deviation for the prior distribution for $a_{i,j,k}$, $i = j$, $k > 1$. Commonly, r is set as 0.2. ω is a weight parameter that allows the tightness on variable j in equation i relative to the variable i. A common choice is 0.5. As ω approaches zero, coefficients on all variables other than the own lags of the dependent variable and deterministic part in the VAR are forced to zero and approaches a set of univariate autoregressions.

Forecasting Evaluation

Using ex-post forecasting simulation, the study generates forecasts of rice prices, supply, ending stocks, exports, and domestic rice consumption from 2006 to 2012 based on the estimated final equation. Parametric evaluation techniques will be utilized to verify the performance of the forecasting models. The parametric validation methods are based on certain assumptions regarding the probability distribution of estimators and a number of classical statistical tests: mean absolute percentage error (MAPE) and root mean square error (RMSE) criterion.

$$\text{MAPE: } \sum_{t=1}^{n} \frac{|(e_t / y_t) * 100|}{n}, \tag{14}$$

$$\text{RMSE: } \sqrt{\frac{\sum_{t=1}^{n} e_t^2}{n}}, \tag{15}$$

where y_t is actual value and e_t is error terms which measure the difference between forecast and actual value. To make a forecasting comparison, the study chooses AR(1) model (or a naïve model) as a benchmark model. The naïve model is chosen because many earlier empirical works (Brandt and Bessler, 1984; Hauser and Andersen, 1987) have reported that the parsimonious ARMA model better performs for short-term forecasts.

Empirical Results

As specified in the SEMTA analysis, the paper estimates the initial structural model as follows:

Table 2: Estimated initial structural model

$SUP_t = 26.631 - 0.335QES_{t-1} + 0.920SUP_{t-1}$,	Adj. $R^2 = 0.78$
(1.378) (-1.497) (11.324)	D.W. = 0.78
$USE_t = -22.850 + 0.057QEX_{t-1} + 0.205SUP_t + 0.717USE_{t-1} - 0.155FPR_t$,	Adj. $R^2 = 0.95$
(-3.132) (0.598) (3.666) (8.983) (-0.426)	D.W. = 2.36
$QEX_t = 13.689 + 0.335SUP_t$,	Adj. $R^2 = 0.66$
(1.556) (8.390)	D.W. = 1.25
$QES_t = 44.146 + 0.287SUP_t - 0.824QEX_t$,	Adj. $R^2 = 0.27$
(3.890) (3.333) (-3.907)	D.W. = 0.78
$FPR_t = 6.402 + 0.031USE_t - 0.003ASUP_t$,	Adj. $R^2 = .009$
(1.791) (0.689) (-0.082)	D.W. = 0.46

Note that the numbers above in parenthesis are t-values.

Using this initial structural econometric model, Equations (5) – (6) (upon request, the detailed derived algebraic modes are available from the authors) were derived. Equation (6) dictates that a VAR model includes only one lagged dependent variable. This implied lag length was confirmed with lag length selection criteria, such as AIC and SBC.

As specified earlier, the paper estimates Bayesian VAR model below. Several observations are worth noting. Most of the parameters are insignificant. A lagged population variable has a marginal significant impact on supply variable, which is not observable in the structural model. Second, lagged farm price, ending stocks, and U.S. population significantly affects rice consumption variable. Third, rice exports are equally unaffected by all the other variables. Lagged farm price marginally affect rice ending stock variable. Lagged farm price positively affects current farm price.

Table 3: Estimated Bayesian VAR model

$SUP_t = -0.05SUP_{t-1} + 0.52USE_{t-1} + 0.21QEX_{t-1} + 0.32QES_{t-1} + 0.49FPR_{t-1} + 2.79\text{BIL}_{t-1} + 0.00\text{POP}_{t-1} - 38.44$
(-0.02) (0.20) (0.08) (0.13) (0.43) (0.42) (1.48) (-0.56)

$USE_t = 1.33SUP_{t-1} - 1.00USE_{t-1} - 1.47QEX_{t-1} - 1.56QES_{t-1} - 0.72FPR_{t-1} + 1.99\text{BIL}_{t-1} + 0.00\text{POP}_{t-1} - 82.97$
(1.43) (-1.05) (-1.57) (-1.70) (-1.66) (0.79) (3.67) (-3.22)

$QEX_t = -1.12SUP_{t-1} + 1.17USE_{t-1} + 1.40QEX_{t-1} + 1.02QES_{t-1} - 0.12FPR_{t-1} - 0.30\text{BIL}_{t-1} + 0.00\text{POP}_{t-1} + 3.82$
(-0.66) (0.67) (0.82) (0.62) (-0.15) (-0.07) (0.69) (0.08)

$QES_t = -0.34SUP_{t-1} + 0.41USE_{t-1} + 0.39QEX_{t-1} + 0.95QES_{t-1} + 1.34FPR_{t-1} + 1.25\text{BIL}_{t-1} - 0.00\text{POP}_{t-1} + 34.26$
(-0.20) (0.23) (0.23) (0.55) (1.62) (0.26) (-0.47) (0.26)

$FPR_t = 0.36SUP_{t-1} - 0.40USE_{t-1} - 0.29QEX_{t-1} - 0.34QES_{t-1} + 0.74FPR_{t-1} - 0.44\text{BIL}_{t-1} + 0.00\text{POP}_{t-1} - 7.78$
(1.30) (-1.41) (-1.04) (-1.25) (5.83) (-0.58) (0.56) (-1.02)

Note that the numbers above in parenthesis are t-values.

The estimated Bayesian VAR model above is used to generate forecasts of the five endogenous variables for the seven year period from 2006 to 2012. To compare and contrast the forecasting performance of the Bayesian VAR, the paper includes forecasts generated by Naïve model and VAR model. Table 4 shows that Bayesian VAR generates the smallest errors in forecasting rice supply. In fact, the Bayesian VAR model reduces the RMSE and MAPE of the Naïve model by 34.83% and 43.52%, respectively.

Table 4: Rice Supply (SUP) and Forecasts, RMSE, and MAPE

Year/Criteria	Actual	Naïve Model	VAR	Bayesian VAR
2006	258.2	274.65	274.31	258.84
2007	261.6	254.81	277.81	261.36
2008	252.44	297.94	275.25	269.13
2009	269.29	249.92	293.89	272.64
2010	297.94	266.24	274.51	269.13
2011	253.48	295.94	299.8	287.02
2012	247	250.98	260.09	258.28
RMSE	----	28.25	25.43	18.41
MAPE	----	9.03	8.88	5.1

In case of rice consumption, the VAR model generates less accurate forecasts than the simple AR(1) model, although differences in RMSE is minor between two models. Also, the naïve model is better model than the VAR model in terms of low MAPE. Using a USDA informative prior, the Bayesian VAR provides the most accurate forecasts for rice consumption in Table 5.

Table 5: Rice Domestic Consumption (USE) and Forecasts, RMSE, and MAPE

Year/Criteria	Actual	Naïve Model	VAR	Bayesian VAR
2006	128.1	120.88	119.79	119.4
2007	124.2	129.44	130.93	127.04
2008	127.6	125.15	129.07	125.69
2009	124.5	128.62	129.68	126.7
2010	137.83	125.31	126.02	125.69
2011	118	139.14	140.56	136.24
2012*	126	118.43	118.65	119.67
RMSE	----	10.44	10.99	9.35
MAPE	----	6.87	7.25	5.95

Asterisk * indicates an estimate from the USDA as of July, 2012.

In table 6, the rice exports forecasts generated by the naïve model fails to deliver better accuracy than the VAR model. Again, the Bayesian VAR model reduces the RMSE and MAPE of the VAR model by 18.57% and 14.51%, respectively.

Table 6: Rice Exports (QEX) and Forecasts, RMSE, and MAPE

Year/Criteria	Actual	Naïve Model	VAR	Bayesian VAR
2006	90.8	106.63	107.92	103.1
2007	105.26	88.72	96.05	97.6
2008	98	98.73	102.22	103.69
2009	108.3	93.99	106.09	106.06
2010	111.65	101.66	105.37	103.69
2011	101	104.95	110.77	107.23
2012*	92	97.24	100.86	99.63
RMSE	----	11.16	9.37	7.63
MAPE	----	9.38	8.41	7.19

Asterisk * indicates an estimate from the USDA as of July, 2012.

For ending stocks in Table 7, the Bayesian VAR model does not generate forecasts as accurate as the random walk model (Naïve model) does. Industry experts notice that ending stocks are most volatile among the rice variables. In fact, Table 1 indicates that the coefficient variation of ending stocks (QES) is highest among the variables included.

Table 7: Rice Ending Stocks (QES) and Forecasts, RMSE, and MAPE

Year/Criteria	Actual	Naïve Model	VAR	Bayesian VAR
2006	39.3	40.02	47.2	36.73
2007	29.4	37.76	50.92	36.29
2008	30.42	31.54	41.84	40.1
2009	36.5	32.12	60.35	40.3
2010	48.47	35.89	43.46	40.1
2011	34.5	43.42	49.05	43.98
2012*	29	34.83	40.73	39.1
RMSE	----	7.2	15.12	7.78
MAPE	----	16.85	41.31	21.68

Asterisk * indicates an estimate from the USDA as of July, 2012.

Often, the industry focus is on farm price. Table 8 shows that the Bayesian VAR model generates forecasts that closely follow the actual farm prices for the ex-post simulation period. The Bayesian VAR model greatly reduces forecast errors of the Naïve and VAR models. Implementing the Bayesian VAR improves the forecasting accuracy of the Naïve model by $1.18 on average. The Bayesian VAR reduces the MAPE of the VAR model as much as 50.44%.

Table 8: Rice Prices (FPR) and Forecasts, RMSE, and MAPE

Year/Criteria	Actual	Naïve Model	VAR	Bayesian VAR
2006	9.96	7.67	7.55	9.8
2007	12.8	8.98	6.82	9.6
2008	16.8	11.01	11.86	14.38
2009	14.4	15.5	13.19	13.92
2010	12.7	13.22	14.49	14.38
2011	14.1	12.7	12.98	13.36
2012*	14.3	13.16	13.54	13.65
RMSE	----	2.88	3.22	1.7
MAPE	----	16.71	19.43	9.63

Asterisk * indicates an estimate from the USDA as of July, 2012.

Summary and conclusions

Two types of outlook information are typically used by decision makers in the U.S. rice industry. The first is the forecasts of production, consumption, price, and other rice market variables. The second is information on how the rice market is impacted by internal or external shocks. This paper adopted a Bayesian VAR model to provide accurate forecasts for rice related variables. To present this objective, the paper adopts a process that a VAR model is derived from a structural model that incorporates economic theory and statistical properties of economic data. The paper incorporates USDA forecasts as an informative prior into the resulting VAR model – a Bayesian VAR model.

Several observations emerge from the empirical results. The Bayesian VAR model significantly reduces the RMSEs and MAPEs of the comparable models: Naïve and standard VAR models for all variables except ending stocks. A random walk model generates forecasts that are more accurate than the Bayesian VAR for the ending stocks, which exhibits a great volatility. To sum up, these empirical findings in favor of the Bayesian VAR stem from a common methodological approach, in which economic theory is combined with quasi qualitative information - a nature of USDA forecasts.

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Building a Business Confidence Index for Nigeria

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Abstract

Using the OECD methodology and integrating the key peculiar factors that impact domestic business outcomes into our framework, this research produced an initial framework for computing Business Confidence Index (BCI) for Nigeria. The framework is designed to become the basis for a continuous quarterly BCI computation for the country. The survey covered 14 sectors, and 844 top business executives. Aggregate BCI scores show that business expectation is currently less confident with a weighted score of 10.5%. Given that this is the first BCI computation in Nigeria, we cannot say which indicator mostly predicts economic behavior. Certainly, our BCI model will serve the interests of planners across all the sectors of the economy.

Introduction

There is a growing interest over forward looking short-term economic and business indicators across countries. These indicators are meant to monitor economic outcomes and in turn provide planners with the early signals of the turning points in economic activities. One of such indicators is the Business Confidence Index (BCI). The BCI is a computation derived from methodological surveys. It is a regular feature of the business research across the developed and, increasingly, developed world (Bram and Ludvigson 1998). For instance, all the OECD countries and most emerging markets currently produce one BCI or another over the past fifteen years. Nigeria has no equivalent study: in fact, decision-makers lack regular access to any proactive economic indicator to aid them in making crucial business decisions.

The creation of a business confidence index in Nigeria is essentially important for several reasons: Firstly, both the Gross Domestic Product (GDP) and other macroeconomic numbers published by the National Bureau of Statistics (NBS) and Central Bank of Nigeria (CBN) give hard numbers about the state's economic situation, but they are historical at the point computation and announcement. The macroeconomic numbers published by NBS and CBN in most cases give no hint to the future direction of the country or state of the economy. They are considered outdated even before they are published, and in many cases, collected 3 months after the relevant date. Indicators such as GDP, inflation numbers, money supply and other data as they are have not been helpful for two reasons. They are trailing indicators, which mean they state what has been done already and not what is going to be done. Second, because the data is released so late, it's not even helpful in gauging both present and future economic opportunities and cannot assist economic agents in taking proactive decisions.

Looking at the CBN Business Expectation (BE) reports, we find that they do not apply specifically to domestic realities or follow the global best practice OECD BCI framework. While it shows what is occurring on a nationwide level, they do little to isolate the causes and effects of changes in the Nigerian complex business structure. Again, the Business Expectation Surveys of CBN did not gain the trust of the Nigerian business community due to the inconsistency of the survey, report timelines and the potential of political interference with the real numbers (The Lagos Chamber of Commerce 2012).

This research has decided to remedy this situation by constructing a template for Nigeria BCI computation. The objective of this study is to produce an initial BCI that will form the basis for a continuous quarterly BCI survey and analysis for the country. The idea is to produce a tailor made estimate of the economic and business expectation from the context of top private sector managers in Nigeria. In the following literature review and conceptual framework, we will discuss the history, essence of this kind of survey and its link with economic development. We will also describe the process of creating BCI and the how the challenges we faced were overcome. On the final note, we will present the result of our BCI computation from the pilot survey, suggestions for robustness and sustainability of BCI computation in Nigeria.

Literature Review

Knowledge of the future and the ability to accurately forecast the magnitude of economic changes in GDP, employment and productivity has been an active pursuits in economic and business research (Blanchard and Cottarelli 2008). The use of expectations to forecast future changes in the economy goes back to the 1930's and the end of World War two. The Institute for Strategic Management (ISM), a research group based in San Antonio, Texas has been conducting production surveys on manufacturers since 1931. In 1930, trying to accommodate for the stock crash of 1929, the Hoover administration in the US attempted to find more information about manufacturers and began a manufacturer's survey. The Chief Executive Officer (CEO) Roundtable, the Bank of Canada, the Conference Board and other organizations around the world use confidence surveys to predict future inflation, GDP growth and future employment levels (The Conference Board 2003). Some Groups

like the Bureau of Economic Research, Marist University use regional results to compare national changes to those observed locally (Easaw, Garratt and Heravi,2005).

Sentiment indices are widely believed to have predictive content for the performance of the economy. Some empirical support for this belief is provided by research findings which indicate that sentiment measures contain information about future changes in the economy beyond what is contained in past values of other available indicators (Fuhrer, 1993; Carroll et al. 1994; Ludvigson, 2004). Potential explanations of the predictive content of sentiment indicators are that (i) they represent independent determinants of key macroeconomic variables, in line with the traditional Keynesian logic (Keynes, 1936); and (ii) that they reflect the overall state of the economy, without exerting a causal impact on it. Starting with consumer confidence, conventional wisdom holds that households, in allocating their disposable income and wealth, observe and take into account macroeconomic fluctuations. In particular, sentiments about optimism or pessimism are the result of the way future household income and GDP performance is perceived (Bram and Ludvigson, 1998; Carroll et al., 1994; Doms and Morin, 2004; Ludvigson, 2004; Easaw et al, 2005; Howrey, 2001). These authors establish that there are two links: first, that business cycle fluctuations influence consumer sentiment; and second that changes in consumer sentiment lead to changes in households' savings rates. In particular, the precautionary motive for saving depends on the prospects (sentiment) for short term economic growth. Therefore, at least on empirical grounds, the marginal propensity to consume rises during expansions and falls during contractions, since agents form sentiments based on the dynamics of national income, these sentiments are reflected in their consumption-savings decisions.

Although business sentiment indices have a similarly long history to that of consumer sentiment measures, most empirical work on the predictive content of sentiment indices focuses on the latter. However, recent empirical research suggests that business sentiment measures may outperform consumer sentiment induces in predicting business cycle fluctuations, thereby indicating that both types of confidence measures should be taken into account as predictors of future economic activity. Furthermore, recent research has also stressed that confidence might turn out to be important, to the extent that it is an independence factor affecting cyclical fluctuations along the lines of Keynes' (1936) 'animal spirits'. For instance, Matsusaka and Sbordone (1995) present evidence that consumer confidence is important in accounting for Gross National Product GNP variability.

As far as fiscal policy is concerned, conventional wisdom holds that counter-cyclical fiscal policy is appropriate, since governments may use their budget to stabilize the macroeconomy. During recessions, the government raises the rate of growth of spending to stimulate economic activity, while in expansions the growth rate of government consumption is contained. Empirical evidence seems to support this view. For instance, Gali and Perotti (2003) find evidence that fiscal policy is becoming increasingly counter-cyclical over time for countries in the emerging market, while similar results seem to hold for developed countries as well (see also Mackiewicz (2006). However, Gordon and Leeper (2005) suggest that during a recession, a countercyclical policy may change the expectations of economic agents, since it increases public indebtedness (raising future debt service payments). As economic agents foresee that taxes must rise in the future, they adjust their savings rates accordingly. In this context, the response to expected future policies may lead to recessions that are deeper and lengthier. Gordon and Leeper (2005) also highlight that this expectations channel may create business cycles that would simply not exist if a counter-cyclical policy was not adopted. Furthermore, research by Mertens and Ravn (2009) makes a clear distinction between the anticipated and the unanticipated effects of fiscal policy. They highlighting that the impact of anticipation could actually be to depress the economy until the fiscal changes are implemented. They also found that consumer sentiment data (Michigan Index of Consumer Sentiment) help to predict household expenditure. Higher confidence was correlated with less saving, consistent with precautionary motives and increases in expected future resources. This finding of excess sensitivity runs counter to the permanent income hypothesis.

Theoretical Perspective

In the General Theory, Keynes (1936) placed great emphasis on the role of business confidence in determining the level of investment. Investment is a forward looking phenomenon. Capital goods such as plant, equipment and vehicles have long life spans over which their returns accrue. As consumer confidence rises, people consume more of current income (y0). Thus, consumer confidence dynamics causes instability in the consumption function. Secondly, since y = c + s, variations in consumer confidence cause the average propensity to save (savings ratio) to vary. Thus, in upswings and booms, burgeoning consumer confidence will result in declining savings ratios.

Business and consumer confidence are likely to be highly correlated and to be mutually re-enforcing. Thus, if business optimism depends on current and expected market trends then high consumer confidence and associated high consumption will strengthen actual and expected demand which supports and sustains business optimism and confidence. As business confidence increases, investment demand will definitely surge. This will potentially increase Aggregate Demand (AD) and in extension causes earnings to increase across the economy which will in turn increase consumer confidence. Thus the investment amplifier and consumption amplifier work in the same direction. They feed off each other and can generate

unpredictable strong surges in AD during upswings which can result in unsustainable booms. In recessions, the combined effects of falling business and consumer confidence can turn a modest down downturn into a sharp recession. Confidence effects can cause output to stagnate and become unresponsive to fiscal injections.

Methodology

The Conference Board (2003) were concerned with methods of computing an index for future levels of economic activity. We already know that traditional economic indicators such as GDP and inflation give lagging figures. This is what is mostly avoided while creating the business confidence Index. The Conference Board shows that coincidence indicator holds a major influence on the timing and conduct of macroeconomic policy. The coincidence indicator, which is the most influential of all leading indicators, measures current economic activity. This indicator is thought to contain information on the future level of economic activity. By examining the coincidence index, with its future forecasting ability, we are able to build the background on the types of questions we want to ask as well as how each question will impact our aggregate BCI. The intuition behind such an indicator is that while there are many macroeconomic series that measure the levels of economic activity, there is no measure that summarizes the entire economy by itself. Interestingly, the coincident indicator combines a range of economic series together to give a holistic measure of overall economic activity.

The Organization of Economic Cooperation and Development (2009b) helped to create business confidence indicator by identifying the key factor for forecasting future economic development. The ISM model which is one of the globally recognised framework for BCI largely alluded to this as well.

Therefore, using the OECD methodology and integrating the key peculiar factors that impact domestic business outcomes in Nigeria as reported in the Lagos Chamber of Commerce and industry 2012 business environment survey, we covered 14 sectors, 37 subsectors and 844 (top business executives) respondents over the period of 15th November and 20th December 2012 in our pilot survey. It is crucial that the Nigerian BCI best reflects both the established global best practice and the domestic contexts which invariably effects business performance and business confidence. This applies to questionnaire design, data collection, the survey timelines and analysis.

In terms of questionnaire design, the OECD has identified production, employment, new orders, sales, prices, investment plans and limits to production as the key variables affecting business confidence and behaviour. The BCI survey designed in Turkey, which built upon OECD model, takes qualitative information on both the current situation as well as the next quarter expectations. The Turkish index asks 25 questions but only nine are used to calculate BCI. These nine were included in our questionnaire. We strongly believe that it is important that a Nigerian BCI model should take account of key local factors that impact domestic business environment. Consequently, issues such as security, infrastructure, regulation and power supply, amongst others, are included in the questionnaire. Overall, the Nigerian BCI takes 22 index calculating questions (comprising the OECD variables and domestic factors) and five control variables.

Ludvigson (2004) gave specific formulas for transforming survey answers into hard numbers, which can then be used to create the final business confidence index. Answers indicating improvement score 2, answers indicating no change score 1 and answers indicating a deterioration score 0. To calculate the index, the work done by Easaw, Garratt, and Heravi, (2005) as well as the OECD methodology illustrated how to turn qualitative responses into quantitative data. We calculated the diffusion index (using sector weighting) for each variable (Iv), all the scores from all of the responses in each sector are added to get a total score for each sector (TSs1, TSs2 … TSsn). Each sector's total score is then multiplied by its assigned weighting (ws1, ws2 … wsn) and divided by the number of responses, "n". The results are then added up and multiplied by 100%.

$$I_v = T_s \times 100\% \text{ where } T_s = (TS_{s1} \times w_{s1} + TS_{s2} \times w_{s2,} + \ldots + TS_{sn} \times w_{sn}), \quad (1)$$

Where I_v is the Index of variable, T_s is the total score for variable, T_{sn} is the total score for sector, ns_n is the number of respondents per sector and Ws_n is the sector weighting (sectoral GDP contribution in Nigeria).

In order to create the aggregate index, we took the simple mean of the index score for all the sectors,

$$I = \frac{\Sigma I_V}{N}, \quad (2)$$

where I is the index score for the survey, I_v is the index of variable, and N is the number of variables.

A minimum of 30 respondents from each sector was sampled in line with the Nigerian Bureau of Statistic (NBS) sectoral classification. At least the top 5 industry players (by turnover and employment) in each sector was included in our sample to enable us account for the opinions of the key industry leaders that collectively make up over 50% in their respective sectors. All the respondents are from private sector decision-makers: Director General, Managing Director, Chairman, Chief

Executive Officers, Chief Financial Officers, Chief Operating Officers, Presidents and Vice-Presidents of key departments and functions.

GDP contribution per sector as published by NBS was used to weigh the sample. This is appropriate for two reasons: It makes the index to reflect the dynamic contribution of each sector to the Nigerian economy. Again, sector contribution to GDP is readily available from NBS (as opposed to other OECD weighting indicators such employee numbers per sector)

We chose a variety of methods for data collection in order to achieve an unbiased and robust sample feedback possible. Robert (2003) found that response rates for the internet were comparable to response rates for mail in surveys. Because the Nigerian internet penetration and use remains very low, we complimented the online and email survey with other traditional survey methods such as paper and telephone calls. Overall, we pooled 12,000 business executives via email/online survey wizard and achieved 4.5%. In analysing the data, we utilized an automated self-built spreadsheet template containing main control, raw data entry; aggregate and sectoral index calculating sheets.

Data Analysis and Results

We achieved a total of 844 respondents in this BCI edition. Agriculture, oil & gas and distributive trade (retail and wholesale) contributed most to the economy in 2011. While ideally the sample would reflect the sectoral composition of the economy, gathering the responses per sector, this may not be absolutely feasible. GDP contribution weighting was used for each sector to balance the sample outcomes. The survey covered most sectors sufficiently, though solid mineral sector in particular is a concern. We secured the participation of top private players across all the sectors in a responsible fashion.

Table1: Sample Analysis

NBS Sectoral Classification	GDP Contribution	Achieved No of Respondents	% of Total Respondents
Agriculture	45%	64	8%
Oil & Gas	15%	103	12%
Distributive Trade	19%	73	9%
Telecoms / Postal	4%	33	4%
Solid Minerals	0.3%	4	0%
Manufacturing	3%	126	15%
Finance & Insurance	4%	159	19%
Building & Construction	2%	73	9%
Others	7%	195	23%
Hotel & Restaurant	0.1%	15	2%
Total	100%	844	100%

The aggregate BCI scores show that Business expectation in Nigeria is currently less confident with a weighted score of 10.5%. This is the mean of OECD index indicators score and the localised BCI indicators. Localised index score (all questions is 1% while OECD index score recorded 20%. Kindly note that, BCI indicators are designed so that the score fluctuates between -100% and 100%. For Instance, as investment optimism grows, the indicator would increase from 1% to 100% with a similar decline from -1% to -100% if business leaders become more pessimistic. We ensured that a Nigerian survey take account of the local context that impact businesses in our model. For result, Nigeria currently lags far behind the 50% minimum benchmark for high business confidence level.

Table 2: BCI Dash Board

Assessment	Aggregate Index Range
Significantly Less Confident	-100 to -50
Slightly Less Confident	-50 to -1
No Change	0
Slightly More Confident	1 to 50*
Significantly More Confident	51 to 100

*Nigeria's BCI score is currently confident insignificantly at 10.5%

Hotel, Telecoms/IT, Oil & Gas and the Finance sector posted positive but slightly less confidence level. Firms in the extractive, processing, manufacturing and trade sectors registered negative business expectation for Q1, 2013. The hotel and restaurant sector recorded the highest optimism of with 37% BCI score.

Table 3: Index Score by Sectors

Sectors	All questions (Weighted)	OECD Questions (Only)
Hotel & Restaurant	37%	57%
Telecoms / Postal	8%	17%
Oil & Gas	7%	22%
Finance & Insurance	7%	26%
Others	4%	23%
Distributive Trade	-1%	10%
Agriculture	-1%	24%
Building & Construction	-8%	1%
Manufacturing	-11%	3%
Solid Minerals	-15%	0%
Scores	1%	20%
Aggregate Index Score		10.5%

We discovered that BCI score fluctuate significantly in line with the size of firms in Nigeria. For instance, smaller companies (51-over 1,000 employees) tend to have exhibited a higher optimism relative to smaller firms. In the same vein, firms that reported sizable annual turnover (N100 million to over N1 billion) posted a positive but insignificant confidence level relative to smaller firms that exhibited pessimism all the way. There is evidence that newer firms (1-5years old) exhibited a surprising 10% rise in confidence relative to 6-20 years old companies with the average of -5% pessimism. New comer's syndrome, youthful exuberance, illusive political and funding connections may potentially explain the unique optimism found in newer entities. However, as firms grow older, it appears that confidence lost during its consolidation years (6-20 years old) tends to resurface though in a modest fashion. In all, first quarter 2013 doing business expectations for both small and large firms in Nigeria continue to lag behind the high confidence mark of 50%.

Table 4: Index Score by Size of Firm

Company Size – By No. of Employees	BCI Score	Company Size – By Turnover	BCI Score
None	-13%	0-N1 million	-22%
1-5	-10%	N1million – N10million	-11%
6-10	0%	N10 million – N50 million	-2%
11-50	-10%	N50 million – N100 million	-1%
51-100	1%	N100 million – N250 million	7%
101-250	0%	N250 million – N500 million	13
251-500	30%	N500 million – N1 billion	6%
501-1000	23%	Over N1 billion	6%
Over 1000	7%	Over 1000	7%

When asked to state three cities other than Lagos where they will like to site their new investments in 2013, 98.5% opted for cities mainly in the Nation's Capital and Southern part of the country. Abuja and Port Harcourt alone accounted for 50% of alternative business destinations in Nigeria in 2013. Sadly, no Northern city made it to the top 15 alternative investment destinations in 2013.

Table 5: Alternative Business/Investment Destinations

Ranking	*States/Cities*	*No of Responses*	*% of Total*
1st	FCT	392	27%
2nd	Rivers -PH	332	23%
3rd	Ogun - Industrial	123	8%
4th	Oyo - Ibadan	114	8%
5th	Delta	80	5%
6th	Anambra -Onitsha	39	3%
7th	Abia - Aba	35	2%
8th	Enugu	35	2%
9th	C/River -Calabar	33	2%
10th	A/Ibom - Uyo	32	2%
	Total	1,475	100%

Conclusion

Using the OECD methodology and integrating the key peculiar factors that impact domestic business outcomes in Nigeria we covered 14 sectors, 37 subsectors and 1,024 (top business executives) respondents over the period of 15th November and 20th December 2012. The aggregate BCI scores show that Business expectation in Nigeria is currently less confident with a weighted score of 10.5%. The BCI scores shows that business executives in the Hotel, telecoms/IT, oil & gas and finance sectors were positive about future expectations while business executives in the extractive, processing and trade sectors held negative expectations. We also discovered that BCI scores fluctuate significantly in line with the age, size and location of firms in Nigeria. For instance, newer companies (1-5years old) and bigger companies (250 - over 1,000 employees and over N500 million turnover per annum) tended to be more optimistic. When ask whether they will hire new employees in 2013, 85% of business leaders confirmed that they are considering to either keep their current work force size or slash it down. This suggests that the County's worrisome job market with an official unemployment figure of 23.9% is expected to remain sticky in months to come. The business executive (98.5%) who are planning to expand or open new plant/shop (other than in Lagos) in 2013 tend to be looking mainly at the FCT and the Southern cities (PH, Ogun, Ibadan and Aba topped the list). Sadly, no Northern state/city was mentioned among the top 15 alternative investment destinations in 2013.

Given that this is the first BCI survey and computation in Nigeria, it is difficult to say with any certainty which variables are better predictors of economic behaviour than the others at this stage. The effort so far has provided a model for BCI survey and computation for Nigeria. Hopefully, in the medium term, if our BCI model gain the interest financiers, we hope to employ a time series cross-sectional analysis on all the control variables (weighted aggregate, sectors, firms size, age and company location) to gauge seasonality and business confidence over different political regimes.

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Table 6: Questionnaire for Nigeria BCI

1	Which industry / sector do you operate in?	*Agriculture *Oil & Gas *Distributive Trade Telecoms / Postal services* Professional/Business Services* Manufacturing* Finance & Insurance *Building & Construction* Hotel & Tourism *Others (Specify)		
2	What is your level at your firm?	*Board member, Owner *Senior executive – i.e. CEO, COO, CFO, Director General *Senior management – Managing Director, Head of key business function (marketing, sales, IT) *Middle management *Junior employee		
3	What is your opinion of the general business climate for your industry compared with last month?	More optimistic	Same	Less Optimistic
4	Is it easier to access credit NOW compared to 3 months ago?	Easier	Same	Harder
5	What is the level of physical security for you and your firm now compared to three months ago?	Safer	Same	Less safe
6	What is the level of your productive capacity in relation to expected demand over the next 12 months?	More than adequate	Adequate	Less than adequate
7	What are your expectations for turnover over the next 3 months?	Higher	Same	Lower
8	What is the total amount of orders received over the past 3 months?	Above normal	Normal	Below normal
9	What is the level of employment at your firm now, compared to the last 3 months?	Higher	Same	Lower
10	What do you expect the level of employment at your firm to be in the next three months?	Higher	Same	Lower
11	How much deal/mandate do you expect your firm to close over the next 3 months?	More	Same	Less
12	What is your opinion about export prospects over the next three months, compared with last month?	More optimistic	Same	Less Optimistic
13	What do you expect your volume of output to be in the next three months?	Higher	Same	Lower
14	What is the impact of government regulatory and monitoring agencies on your company's operations over the last 3 months?	Positive	Neutral	Negative
15	How did your stocks of raw materials change in the last three months?	Higher	Same	Lower
16	How has the reliability of the public power supply changed over the past three months, compared to the previous three months?	Better	Same	Worse
17	How much investment expenditure do you expect to make over the next 12 months compared to the last 12 months?	More	Same	Less
18	What was the effect of inflation on your business in the past 3 months?	Positive	Same	Negative
19	How do you expect exchange rate movements to affect your business over the next 3 months?	Positive	Same	Negative
20	What is the current level of non-performing loans/trade credits at your firm compared to 3 months ago	Higher	Same	Lower
20	What is the current level of non-performing loans/trade credits at your firm compared to 3 months ago	Higher	Same	Lower
21	What is the cash requirement of your firm over the next 3 months, compared to the last three months?	Higher	Same	Lower
22	How much do you expect to sell to the Nigerian market in the next three months compared to the last three months?	More	Same	Less
23	What do you expect the impact of government regulatory and monitoring agencies on your company's operations to be over the next 3 months?	Positive	Neutral	Negative
24	What is the amount of monthly stocks of finished goods this month?	Above Normal	Normal	Below Normal
25	Other than Lagos, which other three cities in Nigeria do you think offer the best investments opportunities to your firm at this time?	➢ City 1 ➢ City 2 ➢ City 3		
26	How many people does your company employ?	None; 0-5; 6-10; 11-50; 51-100; 101-250; 251-1000; Over 1000		
27	What is your firm's annual turnover?	➢ 0-N1 million ➢ N1million – N10million ➢ N10 million – N50 million ➢ N50 million – N100 million ➢ N100 million – N250 million ➢ N250 million – N500 million ➢ N500 million – N1 billion ➢ Over N1 billion		

'Random' Regulation in Nebraska

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Abstract

"Random" often is a requirement specified in a USA State's statutes and in the State's administrative agency regulations. Sometimes the drafter's understanding of the word "random" is sophisticated and other times the understanding is naïve. Judicial interpretation of those statutes and those regulations both reflects variation in the drafter's apparent understanding as well as variation in the judge's own understanding. For example, when a State statute requires a State run lottery to be "random" is not the same statistical process required as when a licensing board of health professionals requires a "random" audit of compliance with continuing education requirements.

Introduction

Your author serves on the Nebraska Board of Optometry (NBoO) as its sole public member. From that experience your author was elected to the Board of Directors of the Association of Regulatory Boards of Optometry (ARBO).[i] Both bodies are interested in continuing competency of the O.D. (Doctor of Optometry).[ii] State boards (e.g., NBoO) specify objective criteria required of licensees for maintenance of licensure (e.g., quantities and types of continuing education). ARBO in turn facilitates those processes both in terms of quality of continuing education (e.g., Council on Optometric Practice Education [COPE][iii]) and in terms of record keeping of continuing education accomplishments (e.g., OE *Tracker*).[iv]

OE *Tracker* is a web facilitated database. All forms of continuing education (i.e., both COPE and non-COPE as well as both optometric and non-optometric [e.g., ophthalmologic]) relevant to optometry are recorded in OE *Tracker*. That data entry is done both by providers of continuing education as a service to their customers and individual optometrists tracking their own achievements. Access to the OE *Tracker* database exists both for individual licensees and licensing boards of ARBO's member jurisdictions.[v]

When record keeping switches from paper records to digital databases there are many new opportunities and many new challenges. These new opportunities and new challenges spring from how changes in technology in turn change fundamental assumptions underlying a regulatory structure. For example, if one is mindful of the limited financial resources of State governments as well as the potentially large number of licensees, it ought to be obvious that auditing of regulatory compliance in a paper world would counsel towards using smallest statistically relevant sample size. Digitization might so relax that cost constraint that 100% audits could become, first, feasible; and, second, with sufficient cost reductions, failure to do a 100% audit could become misfeasance.

Your author is motivated to write this manuscript as a result of the explicitly championed reluctance of the NBoO staff to engage in a 100% audit of continuing education achievements. Check your displeasure, since this reluctance is laudable. This reluctance springs from the staff's good faith reading of a legislative delegation of authority. To wit: Neb.Rev.Stat. 38-146 provides (in relevant part) in its subsection (3):

> "(3) Each credential holder shall be responsible for maintaining certificates or records of continuing competency activities.
>
> "The department or appropriate board *may biennially select, in a random manner*, a sample of the renewal applications *for audit* of continuing competency requirements. Each credential holder selected for audit shall be required to produce documentation of the continuing competency activities. The credential of any person who fails to comply with the conditions of the audit shall expire thirty days after notice and an opportunity for a hearing."[vi] *(emphasis added)*

While that reluctance is springing from a good faith reading and thus is laudable, it does not answer the question "Is that good faith reading the required reading?".[vii]

This manuscript will explore that Nebraska legislative authorization[viii] for a "random manner" audit.

Narrowing The Context of Exploration

The first narrowing is that this manuscript will be limited to jurisdictions of the USA. This narrowing excludes ARBO members from Canada (and soon Australia). Those jurisdictions will be reserved for future analysis. Since the USA, Canada, and Australia all share a common law heritage, and since "random" is a global concept, that extension is not likely to trigger too many fundamental changes in analysis.

Second, as you surely recall, in the USA we have a federal government and State governments; and, that within each government there are legislative, executive, and judicial branches. Additionally, both federal and State governments often resort to administrative agencies for implementation of legislative and/or executive desires. Those seven governmental elements engage in a dynamic and complex interplay. For simplicity, this paper will focus on one USA State's legislative action. Thus, there are two forms of statute of interest: a self-enacting legislative policy choice and a delegation of authority to an administrative agency. Nearly always, the latter type of statute will be the focus of this manuscript.

Third, random is likely to be a particularly constitutionally safe legislative requirement. Obviously, both forms of legislative action noted immediately above (i.e., self-enacting versus delegation of authority) and as discussed in endnote viii (i.e., may versus shall) are subjected to judicial review for constitutionality of the legislature's action. That judicial review is most acute when the question is equal protection of the laws. However, a stature requiring random it is unlikely to violate constitutional requirements of equal protection.[ix] Accordingly, rarely will judicial decisions come into play. Lack of judicial comment is especially likely when the administrative agency staff are laudably reluctant to push the envelope of their legislative delegation.

If two persons are legally recognized as materially different, then to treat both identically would be to deny both of them equal protection of the laws.[x] However, denial of equal protection far more frequently springs from differential treatment of legally similar persons. Random satisfies the constitutional requirement of equal protection when the persons are legally similar. Random violates the equal protection when the persons are recognized as legally dissimilar.[xi] Generically, all NB0O licensees are presumed to be legally similar; thus, random is constitutionally permissible. But, so too is a 100% audit since both a random audit and a 100% audit treat similarly situated persons similarly.

The fourth narrowing is that this manuscript will not delve into the rules and regulations adopted by the administrative agencies in reaction to their legislative delegations of authorities (e.g., delegated discretion; command). That too will be reserved for future research.

This manuscript will explore how the concept "random" is used in statute.[xii] Lastly, this manuscript will be limited to the USA State of Nebraska. Recall, your author's motivation is to explore whether a good faith reading by administrative staff is a required reading.

OE Tracker as Probable Cause

Note, this manuscript focuses on random audits. Thus, this manuscript will side-step a closely related question of what probable cause is required to initiate an investigation. Clearly, an adverse result of the legislatively authorized random audit is sufficient probable cause to trigger an investigation. However, what else is sufficient? If ARBO's OE *Tracker* were to report to the NBoO that a specific O.D. licensee did not have recorded (recall providers also record attendees) sufficient continuing education (CE) to maintain licensure, then (quite likely)[xiii] NBoO would have probable cause to initiate an investigation for unauthorized practice; both for failure to maintain continuing competency and for false reporting to the NBoO by the licensee of CE achievements.

Neb.Rev.Stat. 38-140, in total reads:

> "Every business credentialed under the Uniform Credentialing Act shall report to the department the name of every person without a credential that he or she has reason to believe is engaged in practicing any profession or operating any business for which a credential is required by the Uniform Credentialing Act. The department may, along with other law enforcement agencies, investigate such reports or other complaints of unauthorized practice or unauthorized operation of a business. The appropriate board may issue an order to cease and desist the unauthorized practice of such profession or unauthorized operation of such business as a measure to obtain compliance with the applicable credentialing requirements by the person or business prior to referral of the matter to the Attorney General for action. For businesses that do not have a board, the department may issue such cease and desist orders. Practice of such profession or operation of such business without a credential after receiving a cease and desist order is a Class III felony."[xiv]

The procedural stance of audit is far less hostile than the procedural stance of an investigation. Administrative best practices would recommend the initial regulatory engagement be at a lower level (e.g., audit) of hostility.

However, if the legislative authorization of 38-146 "may biennially select, in a random manner, … for audit"[xv] has a required reading that prohibits a NBoO initiated 100% audit using OE *Tracker* as the search engine for that audit, then that prohibition might be permissibly avoided by some person other than NBoO using an OE *Tracker* to generate a state-wide report which identifies those licensees who appear to be not in compliance; whereupon that report could be probable cause supporting initiation of an investigation.

Quite Likely Probable Cause

Immediately above the above quoted 38-140 statute is the text accompanying endnote xiii: the parenthetical "(quite likely)". Quite likely is used to modify the question of probable cause. That quite likely parenthetical is used because this manuscript does not address three important questions.

First, this manuscript does not address the question of what quantum of notification to the NBoO is necessary, either at a minimum to permit the NBoO or at the maximum to require, the NB0O to conclude that probable cause does exist. Second, nor does this manuscript address the question of whether NBoO members who are licensees themselves[xvi] are permitted to or are required to use their ARBO granted access to OE *Tracker* to discover which NBoO licensees appear to have not satisfied the continuing education (CE) requirements for continuing competency and sustained licensure. That is, with respect to second, does the legislative authorization of "may … random … audit" prohibit both [i] NBoO itself as well as [ii] NBoO members from using OE *Tracker* to do a 100% audit?[xvii] Third, as an extension of the first question immediately above, is NBoO by the legislative authorization of a "random … audit" prohibited from receiving from ARBO or some other third party (who is a stranger to NBoO) a gift of an OE *Tracker* state-wide report? That is, NB0O is prohibited from knowing the results of a 100% audit? How passive must the NBoO be, how active may the NBoO be, in coming into possession of a 100% audit using OE *Tracker*?

Your author's own off-the-cuff reactions to those three questions are as follows. [1st] The NBoO's receipt of a report that a specific licensee lacks sufficient CE based upon an OE *Tracker* report is sufficient probable cause to mandate an investigation by NBoO of unauthorized practice. [2nd] The NBoO has four members, three of whom statute requires to be an O.D. licensee. Those three licensee members of the NBoO almost certainly may use that ARBO granted state-wide report access to OE *Tracker*. And, in fact might very well have the duty to use it; but, statute 38-140 is drafted so poorly that breach of that duty might not be provable. [3rd] Since the statutory provision for a "random … audit" is phrased as a authorization rather than phrased as prohibition, NBoO may receive as legally admissible evidence an OE *Tracker* report from ARBO as a gift or from any other non-NBoO source.

Having narrowed the scope of this manuscript to Nebraska as well as having ducked the question of probable cause for an investigation, we are prepared to explore the Nebraska legislative authorization in 38-146 authorizing the NBoO so that it "may biennially select, in a random manner, … for audit".[xviii]

Inventory of "Random" in Nebraska Statutes

The federal government does not have the Police Power. In the USA only the USA States have the Police Power. The Police Power is the general and broad power of the USA States to regulate for the People's health, safety, morals, and general welfare. The federal government has the far narrow specific power to regulate Commerce as well as only the general welfare fragment of the Police Power.[xix]

The inventory of "random" in Nebraska statutes tracks the Police Power fragments of health, safety, morals, and general welfare. The inventory is presented immediately above in Table 1 and below (i.e., last page of manuscript) in Table 3. Table 1 displays the topics (e.g., hunting) and the random actions (e.g., drawing) addressed by the statutes, but without pairing topics and actions. Table 2 explains how to read the organization of statutes via section numbers (e.g. 38-146) of Nebraska statutes. Table 3 is more detailed than Table 1 as Table 3 shows, by statute number (e.g., 38-146), the topics (e.g., Public Health) paired with the random action (e.g., audit, biennially) and paired with the subtopic (e.g., continuing competency). The statute numbers in Table 3 are hyperlinks to the text of the statute.

Reading through the two columns of Table 1 ought to make clear that the topic inventory reflects more genuine policy variation than does the random action inventory, for several reasons.

First, the policy choices available the legislature are shaped by the interaction of the government's own power with the rights, privileges, and immunities of its citizens and the People. For example, the USA State's Police Power over health (e.g., food animals) is far stronger than is the State's Police Power over morals (e.g., gambling). Second, the topic inventory in some contexts activates expressly protected constitutional rights of the People (e.g., criminal; hunting[xx]) whereas other times the topic inventory impinges on mere privileges (e.g. pet animals); and least of all mere needs for general welfare (e.g., weights and measures). Lastly, the array of evils to be avoided as well as the array of benefits to be gained are sure to vary far more across the topics than across the governmental actions because at the core of each action is the same requirement (i.e., random). Accordingly, identical words used by the legislature to specify random governmental actions might have fundamentally different scopes of meaning when applied to constitutionally different topics.

A cursory review of the inventory of actions reveals many variation that reflect no more than word choice. For is there more difference than mere word choice between the legislative authorization to choose randomly versus the nearly identical in practice legislative authorization to select randomly? But, some word differences are genuinely different. For example, the legislative command to draw randomly when choosing or selecting is very different from a mere authorization to choose or to select randomly. The command to draw randomly connotes an increase in formality by specifying the technique of selection.

That is, what would pass muster as a random choice would not necessarily pass muster as random draw: even though sometimes a random choice could be far more random from a statistical sense than a random draw.

As noted earlier, the concept random ranges across a wide continuum from a hyper-technical statistically random used by the administrator of the PowerBall lottery to the least constraining random required of retail sellers of hand-packed agricultural products (i.e., dollar price stated with price per pound stated, and no declared weight).[xxi] At first blush, the legislature's use of the word "random" appears to range across the full continuum from the technical statistical view to the far more flexible vernacular view.

Table 1: Inventory of "Random" Topics and Actions

TOPIC INVENTORY	*ACTION INVENTORY*
Animals	Audit
Criminal	Basis
Education	Checks
Elections	Choose
Gambling	Drawing
Hunting	Inspection
Jury	Manner
Public Contracts	Monitoring
Public Health	Named
Public Safety	Numbers
Weights & Measures	Order
	Sample
	Screening
	Select
	Weights

Numbering System for Nebraska Statutes

Nearly all jurisdictions adopt legislation that is focused on one or more topics. Then, those individual legislative bills are organized into a code of similar topics; and, referred to as the statutes of the jurisdiction. The numbering systems for those codes vary widely across the many jurisdictions. This table explains Nebraska's code's numbering system for its books of statutes.

In Nebraska the Unicameral enacts Legislative Bills (e.g., Laws 1976, LB 877, section 15) and then the legislature's employee, the Revisor of Statutes, arranges the individual sections of those individual LBs into statutory sections (e.g., 38-146). The legislature provides guidance on the general structure of that organization.

In that exemplar section 38-146, first, note the number(s) to the left of the hyphen. This is the chapter (e.g., Chapter 38, Health Occupations and Professions). Second, note right of the hyphen the hundreds or thousands digits. These identify the article of the chapter (e.g., Article 1, Uniform Credentialing Act). Third, note right of the hyphen the tens and unit digits. Together these are the section number. Thus, 38-146 is section 46 of article 1 in chapter 38. Now for a couple of oddities, statute numbers with commas and/or periods. A comma will be used if the numbers of sections within an article exceeds 99 sections. For example the statute 49-14,122 refers to chapter 49 (i.e., Law), article 14 (i.e., Nebraska Accountability and Disclosure Act), section 122 (i.e., field audits).

A period will appear in a statutory section (e.g., 54-641.02) when the legislature adds legislation subsequent to the Revisor of Statute's initial codification. Since the codification seeks to group Legislative Bills addressing the same topic in numerically contiguous sets, when the legislature adds content or adds detail by inserting a new LB's section between two sections of a previously adopted LB, interleaving codification might make the most sense. Especially so when the LB itself uses a grouping of the sections of the new LB showing a sequencing interleaving the new section between existing statutory sections. For example, 56-641 was adopted as Laws 2003, LB 274, section 8; but that topic subsequently was amended by Laws 2012, LB 427, section 7; while at the same time Laws 2012, LB 427 also added new law in its 8th, 9th, and 10th sections which in turn became 56-641.o1; 56-641.02, and 56-641.03.

Random From the View of Statistics

At its core random means unpredictable.[xxii] This meaning is a bit odd; given the most formal use of the word random has an intensely predictable pattern known as the normal distribution.[xxiii] The normal curve is defined by the following formula,

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}},$$

or, if you prefer your formulas on a single line, f(x) = [1 / (σ √2π)] e^ -[(x - μ)^2 / (2σ^2)]. Where σ is the standard deviation of the observations under the normal curve and their variance is σ^2. The standard deviation is the magnitude of dispersion of the observations (i.e., x) around the mean (i.e., μ). Where π is the mathematical constant approximately equal to 3.14 and is the ratio of a circle's circumference to its diameter.

Where e is Euler's number, the mathematical constant approximately equal to 2.72. e is the base of the natural logarithm; and often used in exponential functions (as it is here). e is the limit of 1 / (1-n)^n. A normal distribution can exist with any size standard deviation. A special case normal distribution is the standard normal distribution. With the standard normal distribution, the standard deviation equals one; which in turn yields a variance of one: both of which simplify the formula considerably. That is, the standard normal curve approximately uses this formula: f(x) = 0.40^-[(x - μ)^2 / 2]. An additional simplification comes from the generic specification of a normal curve so that its mean equals zero. Whereupon the formula simplifies to: f(x) = 0.40^-[x^2 / 2].

All normal curves have several statistical advantages. For example, the three primary measures of central tendency of a normal curve all are equal. That is, the mean (i.e., μ = □ = ∑x/n), its median (i.e., 50th percentile), and its mode (i.e., most frequent observation) all are equal.

Let's look at the standard normal curve's most simplified formula of f(x) = 0.40^-[x^2 / 2]. Note that ^ indicates an exponent. Exponents generate changes in magnitude far faster than multiplication (e.g., 2*4 = 8 whereas 2^4 = 16). Note further this exponent is negative. A negative exponent, especially attached to a less than one coefficient, is going to generate small numbers very fast. Next, note the exponent itself contains an exponent. Thus, while normal curves do range from negative infinity to positive infinity, the probability of an observation away from the mean rapidly becomes vanishingly small. In common parlance it is said that a normal curve has thin tails.[xxiv] The tails are thin because the probabilities of outliers are decreasing at an increasing rate. The standard normal curve (i.e., σ = 1) has over 68% of its observations within ±1σ; has over 95% of its observations within ±2σ; and has well over 99% of its observations within ±3σ. Or, in common parlance the middle 68% is normal.

The (assumption of) normal curve is popular. One reason it is popular is it makes the math simple (read: predictable)[xxv]. Another, quite important, reason for the popularity of normal curves is the central limit theorem.

The central limit theorem posits that the mean of the means is normally distributed. That is, if there are many independent draws of samples from a population, each generating its own mean, then the mean of those means is normally distributed. If the mean of the sample means is normally distributed, then it is feasible to estimate the mean of the population. The central limit theorem permits extrapolation from an unknown and potentially non-normal distribution to a theorized normal distribution. That latter normal distribution then can be evaluated using the normal curve mathematics. Neat trick. With suspect garbage in it is feasible to get quality out (i.e., GIQO versus GIGO).

So, What is a Random Draw?

To use the central limit theorem it is necessary to have independent sample draws. Critically, the result of a sample draw cannot have a mean that is pre-determined. This raises a pair of questions that are opposite ends of a continuum. First, how small can the draw be and still be sufficient for a random, independent draw. Second, how large can the draw be and avoid pre-determination. The latter is easier to answer than the former. And, the latter is of greater importance to this paper.

Degrees of freedom gets at the concept of pre-determination. At its simplest,[xxvi] the degrees of freedom are n - 1. That is, if the population size is n, and if a draw is of n items, then the value of the last item drawn cannot vary, it is pre-determined. With a draw of sample size n from n having a pre-determined outcome, by definition, a draw of n cannot be random. This is why sophisticated individuals recoil at the suggestion of a 100% audit satisfying a legislative directive for a random audit.

However, also by definition, any draw smaller than n-1 avoids pre-determination. Thus, (while there might be other statistical reasons to not do a very large draw), any draw smaller than n-1 can qualify as a random draw and satisfy a hyper-technical definition of a legislative authorization for an audit that is "random". However, while using the largest feasible sample random audit (i.e., n-1) is constitutional, an n-1 random audit is constitutionally inferior to a 100% audit. Also, versus a 100% audit an n-1 random audit only saves money if the excluded licensee was in violation of the CE requirements for maintenance of licensure; which means n-1 only saves money when it fails its enforcement purpose.

Accordingly, an n-1 random audit is constitutionally inferior, routinely does not save money, and is a less effective enforcement tool when compared to a 100% audit. Administrators ought to prefer a 100% audit to an n-1 random audit. The how small question usually is of most interest because, generally, smaller costs less. As the size of the small draws increases

in size so too does the quality of the estimations based upon those larger draws.[xxvii] A draw of 100 from a population of 100,000 will not be as powerful for estimation as would a draw of 1,000 from that population of 100,000. However, while continual increases in the random sample size will generate improvements in the quality of estimation, the gains to be had are diminishing while the costs of larger sample sizes (routinely) continually increase. Hence, the usual focus on the smallest reliable random sample size.

A draw of the full population would not be random since the last draw's values would be pre-determined. But, with OE *Tracker* the cost of a 10% sample audit is the same as a 100% audit. Cost considerations favor a 100% audit. Going to the end of the continuum, the how large question usually costs so much more than the smallest reliable audit that large is a problem to be avoided rather than a goal that is sought. However, OE *Tracker*'s low cost ability to generate a 100% audit is challenging that standard set of assumptions.

Discussion of Table 2

Let's take a moment to examine Table 2, the last page of this manuscript. Let's look at the top of the table in the topic area Animals as well as look near the bottom of the table in the topic area Public Health, which is where we find the statute that is the focus of this manuscript (i.e., 38-146). We'll start with the Public Health statutes and end with the Animals statutes.

The Neb. Board of Optometry is concerned with the continuing competency of optometrists, as is the legislature. The legislature has directed (not merely authorized) the NBoO to specify continuing education (CE) requirements as a condition for the biennial renewal of licensure. The legislature has authorized a random audit, but has not required the NBoO or the DHHS to conduct an audit. Recall, the statute 38-146 used the word "may", thereby authorization a biennial random audit, but not mandating an audit.[xxviii] The audit authorized is biennially. The audit authorized is a random audit. That biennial constraint obviously is because the legislature specified all credentials as lasting two years.

If one takes the most restrictive view of the legislative authorization to biennially conduct a random audit, then both more frequent audits and non-random audits would be prohibited. However, generically, in the law an authorization is not read as a prohibition. Generically, if a power to act exists, then it is read more broadly than its narrowest feasible reading. And, importantly in this context, when seeking to read narrowly, that narrowing of the read is mindful of the purpose for the specification within the authorization.

For example, what would motivate the legislature, when it is authorizing an audit, to mention the limiting words of random and biennial? As discussed at endnotes ix through xi, one clear legislative motive for random would be to assure compliance with a constitutional requirement of equal protection of the laws. That motivation would be fully satisfied by a 100% audit. Also note, that, if fact, a 100% audit would be constitutionally superior as implied in endnote x.

Are there any other clear legislative motives for the limiting language on authorized audits being random and biennially? Cost. When 38-146 was adopted by the legislature audits were done (in so many ways) by hand, and were expensive. Both biennial and random served the needs of enforcement and continuing competency while avoiding the evil of "needless" expenditures. However, the cost of 100% audit using OE *Tracker* is less than a fractional audit done (in any way) by hand. Reading 38-146 narrowly defeats its clear purpose.

Now let's look at other statutes and their limiting language. In the topic area Animals we find two particularly noteworthy statutes. With respect to dog breeders statute 54-641.02 contains a limitation of a 5% sample. With respect to swine, statute 54-2242 contains a limitation of an area test whereas statute 54-2244 contains limitation language of two miles. In all three of these instances the legislature is demonstrating that it known how to and is inclined to in some circumstances to include a prohibition in an authorization. The existence of these statutory sections containing prohibitions only strengthens the argument that statute 38-146 simple authorization ought not be read as a prohibition.

Conclusion

The Nebraska Board of Optometry (NBoO) ought to pursue efficient operations in area of delegated authority to assure continuing competency of optometrists. NBoO ought to take advantage of ARBO's OE *Tracker*'s tremendous cost saving to dramatically increase the percentage of licensees whose continuing education (CE) is audited. In fact, NBoO ought to use OE *Tracker* to accomplish at 100% audit. At a minimum, NBoO ought to welcome a gift of a 100% audit. To do otherwise is to resist success as mindful stewards of their public trust.

NBoO ought to suggest to the legislature revisions of statute 38-146 and of statute 38-140 in order to clarify duties and responsibilities delegated[xxix] by the legislature to NBoO, the Neb. Brd. of Health, and the DHHS.

Table 2: Random topics paired by actions

TOPICS	ACTIONS	SUBTOPIC	STATUTE[xxx]
Animals			
	sample; 5%	dog breeder	54-641.02
	sample	swine area test	54-2242
	sample; two miles	swine circle test	54-2244
	sample	rabies	54-2281
	sample & sampling	rabies	54-2490
Criminal			
	named	sentencing	29-2521
	audit; annual	criminal history	81-1423
	monitoring	wiretap	86-290
	choose (judges for trial)	impeachment	Const. III-17
Education			
	selection	K12 consolidation employee allocation	79-857
	select; basis	K12 diversity	79-2110
Elections			
	selected	election judge	32-221
	selected	election judge	32-230
	(statute silent)[xxxi]	petition signatures	32-1409
	order (of candidates)	ballot	32-1411
	field investigation and audits	campaign finance	49-14,122
	manner	dialing	86-251
Gambling			
	selection	bingo (defined)	9-204
	drawing	bingo	9-255
	drawing	lottery	9-411
	drawing	raffle	9-415
	alternative of floating	lottery	9-426.01
	drawing	lottery (defined)	9-507
	drawing	raffle (defined)	9-509
	drawing; selection; numbers	lottery	9-607
Hunting			
	drawing	deer hunt	37-447
	drawing	sheep hunt	37-451
	drawing	lion hunt	37-472
Jury			
	selection; fair cross section	juror	25-1601.03
	select	jury pool	25-1629
	select	petit juror	25-1641
Public Contracts			
	checks	road construction	39-2122
	selected from pool	performance evaluation	81-11,104
Public Health			
	manner; biennial	continuing competency	38-146
	annual audit	immunization	71-1913.02
	screening	(efficacy) compliance	71-6729
Public Safety			
	onsite inspection	elevators	48-2504
Weights & Measures			
	weights	lots	89-195

NOTES

[i] www.ARBO.org

[ii] Not to be confused with a D.O. (Doctor of Osteopathic Medicine).

Depending upon context, the word "physician" might be used to describe an O.D. (i.e., optometrist), a D.O. (i.e., osteopath), and/or an M.D. (i.e., medical doctor).

The general medical education of a D.O. is closer to the general medical education of an M.D. than it is the specialized medical education of an O.D. The education of an O.D. is focused on the eye. The licensed scope of practice for a D.O. and an M.D. are identical, in most jurisdictions. The scope of practice of a licensed O.D. is limited to the eye related medicine. An average O.D. knows far more about the eye than does the average M.D. or D.O. There are, however, eye specialists among M.D.s and D.O.s: ophthalmologists.

http://en.wikipedia.org/wiki/Doctor_of_Optometry
http://en.wikipedia.org/wiki/D.O.
http://en.wikipedia.org/wiki/M.D.

Lastly, terms of art vary from jurisdiction to jurisdiction. "Optometrist" is a professional moniker with different meanings in different nations. Also, what in the USA is known by the moniker optometrist might in another nation be known by the moniker optician. In the USA, a optometrist makes a diagnosis and orders a corrective prescription whereas the optician does the fitting of the eyewear to fill that prescription. See, the World Council on Optometry's website http://www.worldoptometry.org/.

[iii] https://www.arbo.org/index.php?action=cope

[iv] https://www.arbo.org/oetracker.html

[v] All USA States and most other USA jurisdictions that license optometrists are members are ARBO. Most Canadian provinces (that regulate optometry) are members of ARBO. Australia recently shifted from provincial licensure to national licensure, and Australia's national optometry board has applied to join ARBO.

[vi] http://nebraskalegislature.gov/laws/statutes.php?statute=38-146

[vii] Nor does it answer whose good faith reading is to be controlling where there are multiple good faith readings. For example, in Nebraska there are at least four loci within the executive branch will the duty to engage in a good faith reading of the legislation.

FIRST, the authority of NBoO is limited to optometry. The members of the NB0O are appointed by the Neb. Board of Health. SECOND, the Neb. Brd. of Health has authority over all credentialing boards. The Governor appoints the members of Neb. Brd. of Health. THIRD, the Neb. Department of Health and Human Services (DHHS), whose chief executive is appointed by the Governor, both directly assists the Neb. Brd. of Health and the NBoO as well as engages in a myriad of activities both close and remote to those boards' duties. FOURTH, the Neb. Attorney General provides legal assistance to the NBoO, to the Neb. Brd. of Health, and to the DHHS. So as to preserve its discretion in the event of litigation, the AGs office is reluctant to comment officially unless a proffered reading clearly is erroneous.

Note that this statutory section applies to all licensees of all credentialing boards; but that the language quoted above is a legislative delegation to the "appropriate" board or the DHHS. The NBoO might be that appropriate board for the purposes of optometry, while not necessarily excluding the Neb. Brd. of Health or the DHHS from claiming jurisdiction. This sets up a contest of wills between the NBoO, the Neb. Brd. of Health, and the DHHS when persons of good will are inclined to read a given legislative pronouncement in different manners.

[viii] Note that the verb in this statute is "*may*". Thus, at its core, this is an authorization, not a command. In the law when a delegated authority is given as a duty, that is as a command, the verb used is "*shall*". This will be discussed more at a later position in this manuscript. The legislative use of the word "may" connotes delegated discretion whereas the legislative use of the word "shall" connotes no discretion.

Can a legislature use the word "may" in such a way that it ought to be read as the phrase "*shall not do otherwise*"? Rarely, yes; and, that oddity will require a clear sentence structure for that odd purpose or a clear context for legislative action that is constitutionally or intentionally limited to that rare and narrow reading.

Interpretation of legislation, first and foremost, is done within the four corners of the legislation. There is no constitutional constraint on the legislature limiting the legislature's authority to delegate. The legislature is free to delegate broadly or to delegate narrowly. Thus, when the legislature authorizes the NBoO to conduct biennial random audits that, alone, does not equate with either a constitutional or a legislative prohibition on other forms of audits by the NBoO. Constitutionally, the legislature would have been free to authorize the NBoO to do audits more frequent and/or less frequently than biennially. As discussed in endnotes ix through xi, random does address a constitution limitation, but that constitutional limitation on the legislature can be satisfied (even better) by a 100% audit.

Accordingly, since the sentence structure containing the authorization "may" does not clearly require the rare and narrow reading "shall not do otherwise", the best reading of 38-146 is a 100% audit is permissible.

The DHHS and/or the Neb. Brd. of Health have duties far broader than NBoO that are activated by 38-146. Accordingly, DHHS and/or the Neb. Brd. of Health might be rightfully motivated by concerns external to the plain language of 38-146. However, both DHHS and the Neb. Brd. of Health ought to notice that a permissive reading that empowers the NBoO to take advantage of the cost savings and sweep of OE *Tracker* in no way requires either DHHS or the Neb. Brd. of Health to fashion similar solutions for their own audits. The essence of "may" is that all three of those delegates of legislative authority are free to choose the solution that fits best the context of each of those three, separate and distinct, delegatees.

[ix] For example, see USA *Constitution's* Fourteenth Amendment's first section, which ends with an equal protection clause. To wit, XIV, sec. 1: "All persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States and of the State wherein they reside. *No State shall* make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any State deprive any person of life, liberty, or property, without due process of law; nor *deny to any person within its jurisdiction the equal protection of the laws.*" (*emphasis added*)

Most USA State constitutions have a similar equal protection of the laws requirement. Nebraska's *Constitution* recognizes this right in Article I, section 3. To wit: "No person shall be deprived of life, liberty, or property, without due process of law, nor be denied equal protection of the laws.".

[x] Equal protection is but one of many constitutional constraints on legislative action. It is entirely feasible that with two persons who are materially different that legislation which violates the duty to provide equal protection of the laws would otherwise be constitutionally authorized and thus permissible as applied to one of those two persons.

[xi] Note how equal protection of the laws mimics price discrimination as seen by economics. In economics to be price discrimination the ratios of price to marginal cost must be unequal.

In economics $Pa \neq Pb$ is not necessarily price discrimination: and most frequently is not price discrimination. That is, in economics price discrimination exists when $Pa/MCa \neq Pb/MCb$. Thus, $Pa \neq Pb$ will be price discrimination in two contexts: [1] when $MCa = MCb$; and [2] when the difference between Pa and Pb is not equal to the difference between MCa and MCb. In fact, in economics it is more likely that there is price discrimination when $Pa = Pb$ because their marginal costs (i.e., MCa and MCb) are likely to be different. That is, if $Pa = Pb$, then routinely that is price discrimination since routinely $MCa \neq MCb$.

And, so too is it with the law of equal protection.

[xii] The Nebraska *Constitution* contains one use of the word "random". In Article III, section 17, the *Constitution* addresses impeachment procedures. The Legislature impeaches (i.e., similar to a criminal indictment) and then refers the case to the Nebraska Supreme Court which then exercises original (i.e., trial) jurisdiction. However, if a member of the Supreme Court is the subject of the impeachment, then Art. III, sec. 17 provides, in relevant part, "A notice of an impeachment of the Chief Justice or any Judge of the Supreme Court shall be served by the Clerk of the Legislature, upon the clerk of the judicial district within which the Capitol is located, and he or she thereupon shall choose, at random, seven Judges of the District Court in the State to meet within thirty days at the Capitol, to sit as a Court to try such impeachment, which Court shall organize by electing one of its number to preside.".
http://nebraskalegislature.gov/laws/articles.php?article=III-17

Since there only is one constitutional use of random, and since that use is very similar to several statutory uses, that one constitutional use will be included in the inventory of statutory uses without further comment beyond this endnote; and as inventoried in Table 3.

[xiii] See text below on next page for a discussion of quite likely.

[xiv] http://nebraskalegislature.gov/laws/statutes.php?statute=38-140

[xv] http://nebraskalegislature.gov/laws/statutes.php?statute=38-146

[xvi] A well crafted uniform act seamlessly encompasses all that is to be regulated. Some might see Nebraska's Uniform Credentialing Act as well crafted while others might not. This author does not.

For example, read carefully the terms of 38-140. Does 38-140, first, impose a duty on optometrists to report unauthorized practice of optometry; second, grant the NBoO the authority to receive complaint; third, grant the NBoO the power investigate unauthorized practice of optometry; and fourth, criminally sanction unauthorized practice of optometry? Clearly, the focus of 38-140 is that set of four powers. That was not the question. The question was far narrower. Does NBoO get all four? If 38-140 does not accomplish that delegation, then no other section does so. Failure to create those powers would be surprising. That all said, a careful reading of 38-140 does that surprising thing.

Note how the first sentence of 38-140 uses the word "business". Then note that subsequent sentences in 38-140 shift between [A] business, [B] person, and [C] business or person. The plain meaning of the statute is you mean what you write.

If the legislature, in one section, writes "business" in some sentences and writes "person" in other sentences, and writes "person or business" in still other sentences, then the plain meaning is that the legislature intended three different meanings. However, if a narrow plain meaning reading is given to that first sentence of 38-140 (i.e., uses definition of "business" provided in statute 38-105 [discussed below in this endnote]), then the subsequent sentences of 38-140 almost are nonsensical. However, if a broad reading is given to that first sentence of 38-140, then relaxing some ordinary rules of construction permits 38-140 to take on its "clearly" intended meaning (e.g., NBoO may address unauthorized practice of optometry).

The text above quotes statute 38-140 authorizing investigations and defining unauthorized practice following a cease and desist order as a felony. In doing so the statute creates some reporting duties. For example, note how 38-140 uses the words "business" and "person".

Neb.Rev.Stat. 38-105 in total states "For purposes of the Uniform Credentialing Act, unless the context otherwise requires, the definitions found in sections 38-106 to 38-120 apply."
http://nebraskalegislature.gov/laws/statutes.php?statute=38-105

Neb.Rev.Stat. 38-109 defines "business" for the purposes of the Uniform Credentialing Act. To wit: "Business means a person engaged in providing services listed in subsection (3) of section 38-121.".
http://nebraskalegislature.gov/laws/statutes.php?statute=38-109

At section 38-121 the reader find three subsections. Subsection (1)of 38-121 prohibits an individual from practicing any of long list of medial arts (e.g., optometry is subsection (1)(dd)) without a license. Subsection (2) prohibits individuals from holding themselves out for various mental health service without having been credentialed. Subsection (3) prohibits businesses from providing various body services (e.g., tattoo) without having been credentialed.

The Uniform Credentialing Act does not define either "person" or "individual". That is not particularly odd, since there is general statute for that purpose in Chapter 49, Law.

Neb.Rev.Stat. 49-801 provides a long list of definitions for ordinary words frequently used in statutes. At subsection (16) "person" is defined as "(16) Person shall include bodies politic and corporate, societies, communities, the public generally, individuals, partnerships, limited liability companies, joint-stock companies, and associations;". 49-801 does not define "business" or "individual".
http://nebraskalegislature.gov/laws/statutes.php?statute=49-801

In the Uniform Credentialing Act's definition section the word "business" is defined while incorporating by reference a section (i.e., subsection (3) of 38-121) that makes a critical distinction between individuals and businesses. To your author's eyes a better reading of 38-121 would focus on section 38-105 and its "unless the context otherwise requires" clause. If, as your author suspects, the context of the investigative power in 38-140 imposes a reporting duty on all licensees, both in their individual capacity and in the capacity of any business form that they choose to assume.

[xvii] Note how that may is a delegation of power without a duty to exercise that power (i.e., recall endnote viii and its treatment of the difference between legislation using "may" versus using "shall"). However, the delegated power is circumscribed by the "random … audit".

Let's accept for the sake of argument that a 10o% audit implicitly is prohibited because the authorization only granted a "random … audit". Which raises the question addressed below, how close to 100% may the NBoO without violating either the letter or the spirit of the statute? This question will be expressly address later in this manuscript.

This author suggests, because the definition of the word "person" at 49-801(16) does not include the word "business", and because the Uniform Credentialing Act does distinguish its regulations by the categories "person" and "business"; and because 38-109 defines the word "business", that the Uniform Credentialing Act be globally reviewed for selective replacement of the single words "person" or "business" with the phrase "person or business". This substitution is very important in 38-140 as that is a criminal statute which triggers a host of increased constitutional concerns.

[xviii] http://nebraskalegislature.gov/laws/statutes.php?statute=38-146

[xix] The Police Power is an inherent power of a sovereign government. The USA States have all powers of any sovereign government except those the States have given to the federal government, or the States took from the States, or the People of a State took from that State.

The federal government only has those powers expressly granted to it. See, USA *Constitution* Amendment IX (i.e., "The enumeration in the Constitution, of certain rights, shall not be construed to deny or disparage others retained by the people.") and Amendment X (i.e., "The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people."). Most of the federal powers are granted in USA *Constitution* Art. I, sec. 8. The Commerce Clause is clause 3 (i.e., "The Congress shall have Power ... To regulate Commerce with foreign Nations, and among the several States, and with the Indian Tribes;") and the Necessary and Proper Clause is clause 19 (i.e., "The Congress shall have Power ... To make all Laws which shall be necessary and proper for

carrying into Execution the foregoing Powers, and all other Powers vested by this Constitution in the Government of the United States, or in any Department or Officer thereof.") of section 8.

In clause 1 of section 8, among a litany of general powers Congress is granted the general welfare fragment of the Police Power (i.e., "The Congress shall have Power To ... provide for the ... general Welfare of the United States;").

[xx] In the November 2012 elections the People of Nebraska chose to make the right to hunt a State constitutional right.

"The citizens of Nebraska have the right to hunt, to fish, and to harvest wildlife, including by the use of traditional methods, subject only to laws, rules, and regulations regarding participation and that promote wildlife conservation and management and that preserve the future of hunting, fishing, and harvesting of wildlife. Public hunting, fishing, and harvesting of wildlife shall be a preferred means of managing and controlling wildlife. This section shall not be construed to modify any provision of law relating to trespass or property rights. This section shall not be construed to modify any provision of law relating to Article XV, section 4, Article XV, section 5, Article XV, section 6, or Article XV, section 7, of this constitution."
http://nebraskalegislature.gov/laws/articles.php?article=XV-25

NOTE: sections 4, 5, 6, and 7 of Art. XV are the core of Nebraska water law.

This manuscript will leave unaddressed the impact on the legislature's previously enacted regulatory structure addressing a topic that is not a constitutional right, but which subsequently The People make that topic an expressly protected constitutional right (e.g., 37-447 given subsequent adoption of Neb. *Const.* XV-25).

[xxi] See, Neb. Rev. Stat. §89-195 "In addition to the declarations required by section 89-194, any package sold at retail being one of a lot containing random weights of the same commodity shall bear on the outside of the package a plain and conspicuous declaration of the price per pound and the total selling price."

[xxii] http://en.wikipedia.org/wiki/Randomness
Or, as Merriam-Webster succinctly defines it, "a haphazard course".
http://www.merriam-webster.com/dictionary/random

[xxiii] http://en.wikipedia.org/wiki/Normal_distribution

[xxiv] The Black Swan effect exists when reality has fatter tails than the normal curve (especially the standard normal curve). Positive Black Swans often generate very different consequences than negative Black Swans.

[xxv] Recall the definition of "random" at endnote xxii.

[xxvi] We could push much harder on the concept of degrees of freedom than is done in this paragraph. However, that would not change the fundamental analysis. For example, in multiple regression statistical analysis it is necessary to reduce the size of the draw so as to account for the multiple variables. If, for example, a regression is in the form $Y = a + b_iX_i \ldots + b_kX_k + \varepsilon$; where k equals 10, then the degrees of freedom would be reduced to n - k - 1 (e.g., n - 11) so as to avoid pre-determination. Conceptually, however, there is no real difference between n-1 and n-k-1.

[xxvii] There are very many considerations beyond sample size that influence the selection of the "best" sample size. Roughly, however, the smallest sample size that will permit useful estimation is a sample that permits use of the student's t distribution to approximate the normal curve's distribution. Very roughly, a minimum number of observations in the draw would permit 30 or more degrees of freedom (i.e., n - k -1 > 30). Assuming a population of N = 400 optometrists and assuming 5 metrics of CE, then the smallest n random sample draw yielding enough degrees of freedom to use of the student's t would be a 9% draw (i.e., [30 + 5 + 1] / 400).

[xxviii] See endnote viii.

[xxix] For example, see endnote xvi regarding 38-140.

[xxx] You might have noted that web links to copies of the Nebraska statutes follow a pattern that will allow you to generate the link for any statutory section. To wit, as described in Table 2: http://nebraskalegislature.gov/laws/statutes.php?statute=STATUTE-NUMBER.

[xxxi] See, *State ex rel. Bellino v. Moore*, 254 Neb. 385, 576 N.W.2d 793 (1998). Court ruled county officer's findings of valid signatures cannot be rebutted by random sampling.

Can We Really Teach to the Middle? A Quantile Regression Approach

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Abstract

It has come to our attention for the past 10 years or so that two modes in many of Economics courses have become a norm. The dwindling middle makes us at a quandary as to which mode we shall teach to. In this paper, we have shown that the OLS tends to underestimate the learning using GPA as an explanatory variable when it is compared to the median regression even in the case of a large sample.

Introduction

Learning is most effective if grade distribution, hence mastery of the knowledge, has a single mode in the middle. Sometimes more challenging topics are offered as bonus to high achievers while additional tutorial services are extended to low achievers. Such a paradigm is becoming the norm in pedagogy of economic education especially at state university level. For the past several years, those who teach Intermediate Microeconomics have noticed the presence of two modes in grade distribution: one to the left and another to the right of the grade spectrum. Classical regression analysis -- regression towards the mean or $\bar{y}_i = \hat{\beta}_0 + \hat{\beta}_1\bar{x}_1 + \hat{\beta}_2\bar{x}_2 + ...$-- dictates that the regression line must pass through means of both dependent and explanatory variables. Well known in the literature, the least square technique is heavily influenced by outliers. For instance, using Engel's data (1857) of 235 European working-class households, Koenker and Hallock (2001) found the least square model provides a rather poor fit of the conditional mean for the low income households in the sample. That is, the least square line appears to the right of the median regression line due to the two points of unusually high income and low food expenditure. The lower value of the least square slope (marginal propensity to consume) indeed underestimates the conditional mean response for the poor families even in the large sample.

As compared to the ordinary least square technique, quantile regressions in which median regression corresponds to the 50^{th} percentile are more robust to outliners or distributions with thick tails especially in small or medium samples. In a large sample, regressions through different quantiles provide a complete picture of conditional responses to difference sets (quantiles) of x's (Koenker and Hallock, 2001, p.154). It is to be noted that least square regression, while most popular, is not necessarily the correct formulation. For instance, in climatology, it is found that the full spread of global temperature shrinks at the 0.95 and 0.05 quantiles while the central spread (0.25-0.75 quantile) is rather constant (Marzban). In a similar vein, at the upper quantile (0.95), increasing precipitation doesn't lead to increasing steam flow as fast as the middle portion of the distribution. Little wonder that one may want to know the lowest (0.10) or highest (0.90) level of a river given the amount of snowpack. This translates into the knowledge of conditional means at different quantiles for irrigation or flood prevention. In terms of economic education, what the quantile regression can offer that the ordinary least square fails to provide is as interesting as it is challenging when two tails manifest themselves in the grade distribution.

Literature Review

A significant body of research has developed in economic education that attempts to determine factors influencing academic performance in a wide variety of courses. The vast majority of work concentrates on student performance in the Principles of Macroeconomics and the Principles of Microeconomics courses offered by all universities. The prevalence of studies devoted to the beginning courses in economics is primarily a result of the availability of large data sets due to greater demand for these courses. Spector and Mazzeo (1980) present a study of grades in introductory economics close to the approach of our analysis by utilizing a probit model to determine factors influencing final grades. Anderson, Benjamin, and Fuss (1994), Borg and Shapiro (1996), Becker and Watts (1999), Okpala, Okpala, and Ellis (2000), Ziegert (2000), Marburger (2001), Cohn, Cohn, Balch, and Bradley (2001), Walstad (2001), and Grimes (2002) are a few important examples of studies that discuss evaluation of students and faculty in a principles of economics environment. An equally significant amount of literature has been devoted to teaching methods and techniques in principles of macroeconomics and principles of microeconomics courses. Examples of this growing area of analysis include Sowey (1983), Becker and Watts

(1996), Chizmar and Ostrosky (1998), Raehsler (1999), Vachris (1999), Parks (1999), Oxoby (2001), Becker and Watts (2001a, 2001b), Colander (2003), and Jensen and Owen (2003).

To somewhat of a lesser extent, work has recently been done to determine factors relevant to grades earned by students in Intermediate Macroeconomic Theory as well as in Econometrics. Froyen (1996), Salemi (1996), Smith (1997), Findlay (1999), Gartner (2001), Borg and Stranahan (2002), Walsh (2002), and Weerapana (2003) represent a good cross section of papers dealing with teaching Intermediate Macroeconomics and related upper-level economics courses. Becker (1987), Murray (1999), Spinelli (2001), Kennedy (2001), Matthews (2001), Elder and Kennedy (2001) present a similar body of study for statistics and econometric courses. In contrast, relatively little attention has been given to studying academic performance in Intermediate Microeconomic Theory. Two articles published by Peter von Allmen (one co-authored with George Brower) are notable exceptions. Von Allmen and Brower (1998) utilized a survey to all economics department chairs to determine how calculus was used in Intermediate Microeconomics and its importance in course content. Interestingly, they were able to obtain a relatively high proportion of responses from economics departments across a wide variety of academic environments. Their survey results indicate that the use of calculus in Intermediate Microeconomics varies widely across universities and is influenced by school enrollment and the general belief as to whether it helps in the understanding of marginal analysis. They also find that there is a substantial mismatch between what students are taught in an undergraduate calculus course and what economists believe students need to know by the time they take Intermediate Microeconomics. The authors also provide an interesting comparison of theoretical versus applied calculus as it pertains to material taught in microeconomics.

Of greatest relevance to the current analysis is the work by Von Allmen (1996) in which the impact of quantitative prerequisites on student grades in Intermediate Microeconomics is studied. In his analysis Von Allmen utilizes an ordered probit model to show that there is a strong link between performance in calculus courses and student performance in intermediate microeconomics. This provocative article has generated some related literature within and outside the economics discipline that merits some attention. Outside the field two articles of note utilize an empirical methodology similar to that presented in the Von Allmen (1996) paper and to that employed in our work. Brahmasrene and Whitten (2001) identify various factors leading to a successful performance on the Certified Public Accountant (CPA) examination. They find that undergraduate grade point average, student age, private accounting experience by the student, and gender are each significant determinants of predicted success on the CPA examination. In a similar fashion, Didia and Haswat (2001) identify significant factors that determine academic performance in an introductory finance course. They find that undergraduate grade point average and prior academic performance in economics, accounting, and mathematics courses represent the most important positive factors that will influence a student's grade in a beginning finance course. Interestingly, hours of study were found to have a negative impact on the final grade in introductory finance. This troubling result may be the result of unreliable reporting of study hours by students, multicollinearity between independent variables, or the existence of outliers and is not an issue addressed in the paper.

Rather than extend the work of Von Allmen (1996) across other courses and fields, our work will concentrate on Intermediate Microeconomics to see whether any similarities and differences Clarion University and Moravian College (the sample of students used in the Von Allmen study) are both similar in that each program requires business students to take Intermediate Microeconomics. This, of course, ensures a stable and large sample size. The academic environments are different, however, with respect to the total enrollment of students for each school and admission requirements. Moravian College is a private and selective liberal-arts institution while Clarion University is a public institution with more inclusive admission standards. As a consequence, students at the two institutions are likely to be very different from each other. Both campuses primarily enroll students from the state of Pennsylvania and have similar average class sizes. Therefore, students between the two schools do share some geographic characteristics and experience similar classroom environments. Our work represents an important refinement of the Von Allmen study with respect to statistical analysis and sample size. Results appear to be significantly different and we proceed by doing a statistical analysis on the marginal probabilities; something not done in Von Allmen (1996). In addition to collecting a larger sample size, we also provide results on the threshold variables in our ordered probit model. Therefore, even though both papers utilize a similar empirical model, our work represents a noticeable improvement in data and statistical presentation.

Data

Data for this study came from Clarion University, a public university in western Pennsylvania. Enrollment at Clarion University is approximately 6,000 and the school is part of the Pennsylvania State System of Higher Education; a collection of fourteen universities that collectively make up the largest higher education provider in the state of Pennsylvania (106,000 students across all campuses). The College of Business Administration has a current enrollment of approximately 900 students and offers seven various academic majors leading to a Bachelor of Business Administration degree. These include accounting, management, industrial relations, economics, international business, finance, real estate, and marketing. The

college is accredited by the Association to Advance Collegiate Schools of Business (AACSB) and has enjoyed this status since 1998. Intermediate Microeconomics is a current requirement of all business majors at Clarion University and helps the college uphold an acceptable level of rigor and analytic ability required of all students per AACSB accreditation guidelines. Regarded by many students as a difficult, abstract, and quantitative-oriented course, Intermediate Microeconomics tends to be an overwhelming challenge for many students who are not adequately prepared for quantitative study and is uniformly disliked by a stable subset of business majors. Even though this last observation is anecdotal in nature, it is clear that any analysis of factors leading to academic success or failure in this course is an important endeavor.

The sample of 224 students was collected from computerized student transcript records of Clarion University business majors with at least a junior standing as of April 2004. Only those students who received final grades in Intermediate Microeconomics during the 2003-2004 academic year were included in the sample. All students in the sample completed both principles of economics courses (macroeconomics and microeconomics) in addition to the business statistics two course sequence required of all business majors. These prerequisites are similar to those observed by Von Allmen (1996) and are indicative of most business college programs. Data for each student is collected that measures the cumulative grade point average (GPA). The final numerical grade in Intermediate Microeconomics is recorded for each student. Normally, two different instructors taught Intermediate Microeconomics during the sample period. Each instructor (both are tenured and professors) used a different textbook and rather different grading rubrics and philosophy. We use the data from the instructor who has taught ECON 310 for a long time and who keeps numerical score. A dummy variable is also included to account for two different groups of academic majors of students in the sample. The value of the dummy variable is 1 for students majoring in accounting, economics, or finance and a value of 0 otherwise (primarily marketing and management majors). Given that a significant number of students in the College of Business Administration choose a double major in economics and finance along with a smaller group of students selecting to double major in accounting and economics, this appears to be a natural grouping to consider. There is also some support in the literature (Didia and Haswat, 2001) that suggests a strong grade linkage between accounting, economics, and finance courses. As such, there is some historical and theoretical support for developing the dummy for academic major in this fashion. Gender was included as an explanatory variable in the Von Allmen study and was included in the initial model in the current analysis. Since it was found to be statistically insignificant, it has not been included in the discussion.

Quantile Regression on Student Learning

Intermediate Microeconomics (ECON 310) is a required course for all business major after students successfully completed Principles of Microeconomics (ECON 212). Most students take ECON 310 in their junior year, some their senior year. Thus, grade point average GPA, not SAT, may be relevant. Major, gender and letter grade on ECON 212 are included in the following regression.

$$Score = \hat{\beta}_0 + \hat{\beta}_1 GPA_i + \hat{\beta}_2 Major_i + \hat{\beta}_3 Gender_i + \hat{\beta}_4 D_1 + \hat{\beta}_5 D_2 + \hat{\beta}_6 D_3 + \varepsilon_i \quad (1)$$

where, GPA is grade point average on a 4.0 scale, major is a dummy variable: Major =1 indicates the student is an accounting or economics or finance major; major = 0 indicates the student is a marketing or management major. Gender is equal to 1 for males and 0 for females. $D_1 = 1$ if a student earned a C in ECON 212, $D_2 = 1$ if a student earned a B in ECON 212, $D_3 = 1$ if a student earned an A in ECON 212.

Ordinary least square results shown in the left half of Table 1 indicates (i) GPA being a proxy for effort is indeed an excellent predictor for students' performance in ECON 310, (ii) major is statistically insignificant (p value $\approx$ 0.66), (iii) gender is significant (p value $\approx$ 0.001) indicating female students have disadvantage in quantitative analysis used in ECON 310, (iv) a student who obtained an A ($D_3 = 1$) versus that who earned a D is expected to perform better with a p value of 14.1% (marginally significant), indicating the advantage in score of ECON 310 from retained knowledge from the previous course (ECON 212). However, the large Jarque-Bera statistic suggests that the least square residuals are far from being normally distributed and as such the statistical inferences may be suspect.

To overcome the non-normal assumption, median regression, which minimize a sum of symmetrically weighted absolute residuals offers a good alternative to the OLS. The least absolute deviation (LAD) estimator sets out to minimize

$$\sum_{i=1}^{n} |y_i - y_i' \beta|$$

The derived asymptotic variance-covariance matrix for the coefficients of the quantile regression is

$$\Psi = (x'x)^{-1}x'Dx(x'x)^{-1}$$

where the diagonal matrix D carries the weights $d_i=[q/f(0)]^2$ for positive errors or $d_i=[1-q/f(0)]^2$ for zero or negative errors in which q = quantile (0.5 for median) and $f(0)$ is the true density of errors evaluated around zero (Greene, 2003). For a small sample, nonparametric kernel density estimation is preferred. In other cases, however, bootstrap standard error approach appears to be a good choice for estimates approach the true population values via a large number of replications as is done by many statistical software packages (TSP). The results of median regression are reported in the right half of Table 1. An examination indicates that (i) both GPA and GENDER remain to be significant indicators with p values of 0.000 and 0.001 and (ii) D_2 (those obtain a B in ECON 212) becomes significant with a p value of 3.8% versus the reference group (those who obtained a D in ECON 212). The significant coefficient on D_2 signifies an important yet often-ignored phenomenon: the pedagogy in ECON 310 has been shifted toward a lower target such that those who obtained a B gain significant amount of knowledge while some A students in ECON 212 might have lost interest. The estimated coefficient on GPA (22.50) differs from that of the OLS (20.35) indicating OLS in heavily influenced by a handful of outliers: those who have high GPA's but low scores on ECON 310. The presence of the outliers implies the OLS estimates are biased downward even in the large sample of 224 observations. Mean absolute value (MAV) of errors and adjusted squared R^2_A are reported to indicate the median regression has minimum MAV (symmetrical weights) while OLS has the smallest R^2_A.

Table 1: Least Square and Median Regression Estimates

	Least Squares			Median Regression Est		
Variable	$\hat{\beta}_i$	**t-statistic**	**p-value**	$\hat{\beta}_i$	**t-statistic**	**p-value**
Constant	- 4.26* (7.43)	- 0.574	0.567	- 9.62 (5.59)	- 1.722	0.086
GPA	20.35 (2.54)	8.02	0.000	22.50 (1.91)	11.778	0.000
Major	-1.2 (1.607)	- 0.746	0.456	- 0.53 (1.21)	- 0.441	0.66
Gender	3.65 (1.6)	2.29	0.023	4.18 (1.2)	3.481	0.001
D_1	2.85 (2.87)	0.99	0.322	1.526 (2.16)	0.708	0.480
D_2	2.58 (1.95)	1.33	0.186	3.06 (1.47)	2.088	0.038
D_3	4.782 (3.24)	1.48	0.141	1.88 (2.44)	0.771	0.442
$\overline{R}_A = 0.409$				Mean of Absolute		
Jarque-Bera statistic = 18.603 [0.000]				Value of Error = 8.755		

numbers in parentheses are standard errors of the estimate; p value of the Jarque-Bera statistic is in the bracket; n =224.

Discussion of Results

Generally speaking, the median regression and the OLS do not differ significantly for large sample (e.g., 20.35 vs. 22.5 for the coefficient of GPA). Nonetheless, OLS or median regression gives only a partial description of predicted y's for a given set of x's via means of y and x's or median of y and x's. To provide a grand summary of a regression analysis, Koenker and Hallock (2001) suggest running a complete set of quantile regressions in order to explore a comprehensive set of strategies for policy analysis. As such we report the estimates of quantile regression from q = 0.025 through q = 0.975 with an increment of 0.025 in Table 2.

Table 2: Summary of Estimates of Quantile Regression

Quantile	**GPA** $\hat{\beta}_1$	**Gender** $\hat{\beta}_3$	R^2_A	**Mean of Absolute Value of Error Term**
0.025	21.1433 (0.542)	-6.03446 (0.782)	0.316702	25.4063
0.05	19.6696 (0.384)	-4.63572 (0.744)	0.310219	23.7321
0.075	20.3160 (0.177)	1.94357 (0.837)	0.377654	19.5569
0.10	23.4279 (0.025)	3.34402 (0.608)	0.404222	15.8278
0.125	23.4542 (0.006)	3.32196 (0.536)	0.402979	14.7618
0.15	24.2857 (0.000)	2.39000 (0.575)	0.383964	13.0393
0.175	24.3902 (0.000)	3.58536 (0.334)	0.386582	12.4423
0.20	23.9774 (0.000)	3.74612 (0.245)	0.391357	11.7205
0.225	21.7628 (0.000)	3.50925 (0.222)	0.402440	11.2580
0.25	21.7628 (0.000)	3.83134 (0.137)	0.400454	10.7948
0.275	19.9430 (0.000)	4.66667 (0.043)	0.403065	10.3084
0.30	18.9573 (0.000)	4.43602 (0.039)	0.403991	10.1864
0.325	20.0000 (0.000)	3.32000 (0.088)	0.406605	9.79687
0.35	20.3252 (0.000)	2.04472 (0.251)	0.404055	9.50120
0.375	22.4215 (0.000)	2.46189 (0.137)	0.404513	9.31748
0.40	23.2558 (0.000)	2.60465 (0.090)	0.402234	9.09925
0.425	24.0334 (0.000)	2.79206 (0.053)	0.399310	8.99317
0.45	23.9583 (0.000)	3.29375 (0.015)	0.404574	8.83910
0.475	22.5825 (0.000)	3.62478 (0.005)	0.403674	8.76548
0.50	22.4972 (0.000)	4.17885 (0.001)	0.403726	8.75463
0.525	22.4252 (0.000)	4.57807 (0.000)	0.400789	8.77416
0.55	22.1130 (0.000)	4.61179 (0.001)	0.400261	8.79642
0.575	21.8239 (0.000)	4.44037 (0.002)	0.401962	8.82057
0.60	22.4467 (0.000)	4.74075 (0.002)	0.397771	8.88877
0.625	21.6920 (0.000)	4.78742 (0.003)	0.399137	8.98848
0.65	22.0000 (0.000)	3.97600 (0.021)	0.404921	9.17178
0.675	22.9008 (0.000)	4.29770 (0.020)	0.406029	9.27890
0.68	23.2558 (0.000)	4.53488 (0.016)	0.405768	9.30336
0.70	20.7336 (0.000)	4.65391 (0.024)	0.400661	9.74326
0.725	18.5567 (0.000)	5.39587 (0.021)	0.398643	10.4387
0.75	19.5072 (0.000)	6.42402 (0.012)	0.390092	10.6280
0.775	20.2532 (0.000)	5.78987 (0.042)	0.401900	11.0946
0.80	20.2945 (0.000)	5.98448 (0.058)	0.397748	11.4575
0.825	17.8174 (0.004)	6.78842 (0.075)	0.380530	12.7643
0.85	17.0455 (0.016)	5.80114 (0.189)	0.386356	13.4857
0.875	18.3486 (0.024)	5.48624 (0.282)	0.397296	14.0332
0.90	17.3348 (0.072)	4.68039 (0.438)	0.393603	14.6332
0.925	17.7282 (0.144)	4.69731 (0.537)	0.388908	15.7757
0.95	17.4419 (0.280)	3.51163 (0.729)	0.390063	16.9246
0.975	13.6646 (0.602)	4.38137 (0.790)	0.364737	19.1825

Note only the coefficients on GPA and GENDER are reported as they remain statistically significant (p value in parenthesis) in most cases. As inspection of Table 2 reveals that the impacts on learning are most effective in the regression line goes through 17.5% quantitle of all the variables that is, if the LAD regression passes through 17.5th percentile of all x's and y, the estimated coefficient on GPA has the greatest value in our model: 24.3902. Similarly, the learning in ECON310 is significant with the estimated coefficient of 24.0334 if the framework of the pedagogy is focused on the quantile of 42.5%. At the other side of the quantile spectrum, the LAD estimator produces the greatest estimate with the coefficient of 23.2558 at the 68% quantile.

The presence of multiple modes as shown in Figure 1A indicates the traditional paradigm of teaching to the middle, be it mean or median, is no longer the most efficient way in teaching ECON310 at a state university where admission standard is loose. As many of us have witnessed, there exist two distinct groups in most Economics classes: a group of students with

letter grades A or B and another with low C or D or E. The dwindling "middle" renders the traditional OLS or median regression inappropriate for analysis even for a large sample. Which group should we cater to if the middle mode is not there? Just as lecturing Cournot-Betrand equivalence is not a suitable strategy for the majority of the students, spending as inordinate amount of time on demand and supply is boring to say the least.

To Whom Shall We Teach?

To select an appropriate pedagogy, both the size of the coefficient on GPA and MAV of error need to be considered. For prediction purpose, one needs to identify the smallest MAV on one hand. For teaching effectiveness, however, one needs to find the greatest $\hat{\beta}_i$ value (effectiveness index) with a statistical significance. The least squares model gives the largest adjusted r square by definition with the effectiveness index of 20.35 (Table 1). The median regression fits best based on MAV (8.75463) with the effectiveness index of 22.50, better than that of the least squares model. In the presence of significant outliers, the MAV criterion seems that there are 3 quantiles where higher effectiveness indexes lie: at 0.175 quantile with effectiveness index of 24.3902; at 0.425 quantile with efficiency index of 24.0334 and at 0.68 quantile with effectiveness index of 23.2558. Of the 3 groups, we ought to eliminate the quantile regression at 17.5% for the MAV is way greater than that of the median regression (12.4423 > 8.75463). On the other hand, the quantile regression at 68% may be desirable as well when compared to the 42.5% quantile despite its slightly larger MAV (9.30336 > 8.99317) and smaller effectiveness coefficient (23.2558 < 24.0334).

How about teach to the lowest or highest quantiles? A perusal of Table 2 indicates the model has lowest predictive power : MAV of 25.4063 and 23.7321 for 0.025 and 0.05 quantiles with low effectiveness index values of 21.1433 and 19.6696 respectively. Teaching to the highest groups of 0.95 and 0.975 quantiles produces lowest effectiveness index values (17.4419 and 13.6646) with relatively low explanatory power (MAV of 16.9246 and 19.1825) . In either case, one should avoid teaching to the extreme groups at state university level.

In the case of GENDER, the estimated coefficients reach its greatest value around the 82.5% quantile with the p value of 7.5% (Figure 1B). It reflects that other things being constant, the learning is the greatest at the 82.5% quantile (female = 0 and male = 1), which corresponds more to male students. However, MAV is far greater (12.7643) and the magnitude of learning is too small (17.8174). Such a gender-based criterion is clearly inappropriate and as such, we should be discarded.

Figure 1A: Response of GPA to Score

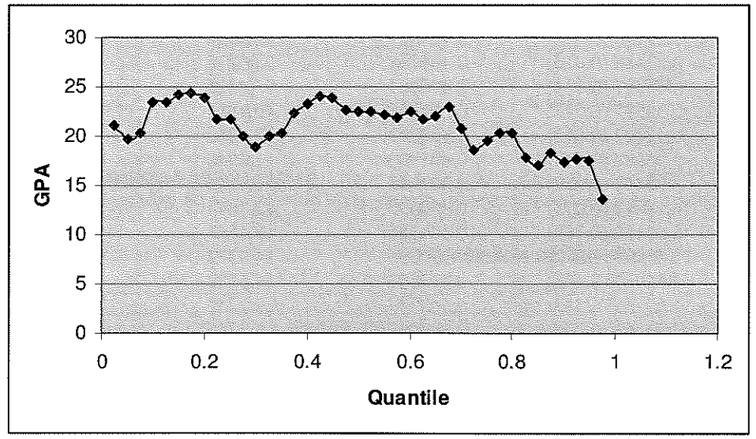
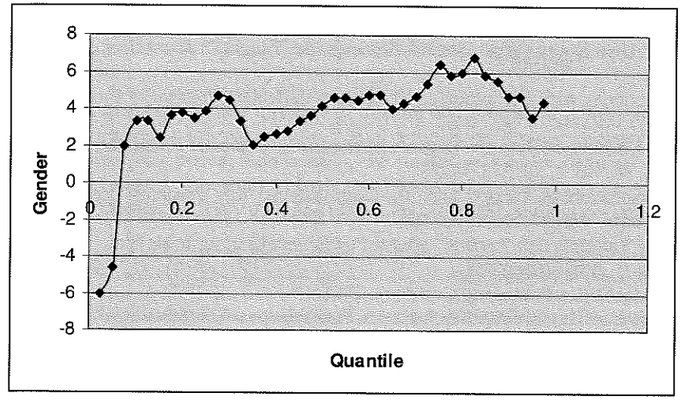


Figure 1B: Response of Gender to Score



Concluding Remarks

It has come to our attention for the past 10 years or so that two mods in many of Economics courses have become a norm. The dwindling middle makes us at a quandary as to which mode we shall teach to. In this paper, we have shown that the OLS tends to underestimate the learning using GPA as an explanatory variable when it is compared to the median regression even in the case of a large sample (n = 224). The learning is most effective at quantiles of 17.5%, 42.5%, and 68%. To balance between teaching effectiveness (the sizes of estimated coefficients) and the predictive power (MAV's), we recommend that the pedagogy be focused at around 42.5% quantile of student characteristics pertaining to GPA and ECON310 scores (corresponding to a C). The second best quantile group is at 68% with slightly less effectiveness index and slightly less predictive power. Until admission requirements toughen in the future, teaching to below the median may well offer an effective pedagogy. At the same time, optional but more challenging topics are given to high achievers as a "bonus" so that they could become more interested in upper level economics courses.

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Disaster Response, Mitigation and Growth

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Abstract

This paper explores the question of disaster and mitigation policy on economic growth in the U.S. over the last forty years. Of particular interest is how federal policies on disaster mitigation to states have impacted the level of disaster damages over this period. Additionally, the impact of disaster damages on overall U.S. economic growth and corporate profits is evaluated. The analysis finds that FEMA mitigation grants do reduce the level of economic costs associated with disasters. Disasters had only a limited impact on U.S. GDP, and did not appear to impact reported after tax corporate profits.

Introduction

Over the last thirty years, advances in hazard forecasting methods and modeling combined with broad changes in the news cycle and within the political atmosphere have led to a broad range of early warnings and local, state, and national emergency proclamations and announcements. As a result cities and regions that once would have had from just a few hours to one or two days to prepare for weather related disasters such as severe to extreme flooding, tropical storms and hurricanes, or extreme winter weather, may now have as much as three or four days to implement emergency preparation and evacuation plans. This paper explores the question of disaster and mitigation policy on regional economic growth in the U.S. over the last forty years. Of particular interest is how federal government spending policies to states have impacted the level of disaster damages over this period.

September 11th and Hurricane Katrina have raised the visibility of disaster studies in the research community over the last decade. These events also prompted changes to federal policies underlying disaster planning and post disaster response. But even before these events, disasters such as Hurricane Hugo, Hurricane Andrew, and the Northridge Earthquake between 1989 and 1994 raised the level of visibility of disasters to the public and the political sphere.

Natural hazard events in and of themselves, even powerful events such as a Category 4 or 5 hurricane or a powerful earthquake are not necessarily a disaster. It is the interaction between the hazard event and human-built environment that ultimately determines whether a disaster occurred or not. Thus disasters are the result of a particular hazard agent interacting with a complex set of economic, political, institutional, social and geographic factors. Super Storm Sandy in October of 2012 which impacted New York, New Jersey and Connecticut is a good example of this situation. This particular storm impacted a densely populated area of nearly 50 million people that devastated a region of well-established urban and suburban communities with an aging power grid, transportation infrastructure and communications system. Additionally, a large number of communities and individuals in the region had limited experience with this type of event.

The rest of this paper is organized as follows. Section 2 provides an overview of the current literature on disaster policies, mitigation policy and their economic impacts. The next section presents the model used for the analysis and the data and data sources. Section 4 presents the results of the analysis. The conclusions of the analysis are presented in Section 5.

Review of the Literature

Disasters and the public response to natural disasters are part of the greater economic, social, institutional and political setting. Growth and population movement into hazardous zones in the United States from flood zones to earthquake zones and regions vulnerable to tornadoes and wildfires has accelerated over the last sixty years. More than one third of the U.S. population lives in a coastal zone, areas that are susceptible to floods, storm surge, tropical storms, and hurricanes.

Hallegate (2012) notes that global trend towards urbanization. Disasters in particular are an ever increasing function of the pace and level of urbanization. As urban areas grow a greater level of capital and populations become vulnerable to damage and risk. Overall, Hallegate (2012) suggests that in growing communities, the annual average level of losses associated with disaster impact will grow more quickly at low levels of development than for areas at higher levels of development. Lall and Deichmann (2009) also address the issue of urbanization and disasters. Rising urbanization increases the level of population at risk from disaster. They suggest that government should provide better information on hazard risk and adopt hazard management policies.

Cacallo, Galiani, Noy and Pantano (2009) using a comparative case study methodology find that large disasters have a negative impact in both the short run and the long run on output. Ding and Schoengold (2007) in their study evaluating the adoption of mitigation technologies and activities by farm households given varying climatic conditions find that the level

and severity of drought or flood hazard increases the adoption of mitigation activities. Kellenberg and Mobarak (2011) also note the growing importance of mitigation policies in their recent survey of disaster.

Studies by Kunreuther (2006; 1997), Kunreuther and Pauly (2006), and Burrus, Dumas and Graham (2008) focus on the purchase of insurance and investment in mitigation activities by households in at-risk communities. Kunreuther (2006) delineates what is termed the natural disaster syndrome, the situation where the inhabitants of hazard or disaster prone areas fail to voluntarily undertake the necessary steps to mitigate the potential damages associated with the known hazard. One solution to this problem is for government (at all relevant levels) to adopt well-enforced building codes. Kunreuther and Pauly (2006) suggest that a more rules-based set of policies to ensure that at-risk populations and communities have insurance coverage and taken steps to mitigate potential disaster damages (ex-ante) and limited ex post disaster aid would increase economic efficiency. They also suggest that low income households should be subsidized as necessary to increase the level of ex ante insurance coverage within a community to better align household and government interests given the risks associated with potential hazard risks.

Using household survey data, Burrus, Dumas and Graham (2008) find that increasing household expectations of disaster risk does lead to greater household expenditures on mitigation and insurance. These findings though are tempered as they do find that mitigation expenditures do cap out. Naoi, Seko and Ishino (2012) in their analysis of the East Japan earthquake and tsunami of 2012, also using survey data, find that post-disaster households are more likely to invest in mitigation. They also find though that the level and amount of mitigation actions taken by households is highly dependent upon household income and wealth levels. Cutter and Emerich (2006) find that there is uneven social vulnerability to hazards within communities that requires differential responses both pre-disaster mitigation policy and post-disaster response and recovery activities.

Godschalk et al (2009) and Healy and Malhotra (2009) both find that there are substantial savings possible from mitigation investments. The level of savings found range from anywhere between 4 dollars in savings for every 1 dollar investment in mitigation (Godschalk et al, 2009), to 15 dollars (Healy and Malhotra, 2009). Healy and Malhotra also find that voters are more likely to reward the incumbent presidential party for disaster relief, but not for preparedness spending.

Burby (2006) addresses the safe development paradox – the situation that has arisen as a result of federal policies that make hazardous areas safer for habitation but also increases the potential for catastrophic property damage and economic loss. He also identifies a local government paradox in which local government pays too little attention to policies to limit vulnerability. Burby concludes that local government should pay greater attention to mitigation policy and the federal government should modify policies to better address the issue as well. Resiliency planning and te relationship between federal and local government policy is also addressed by Berke and Campanella (2006). They suggest that there needs to be greater focus on planning for resiliency in the post-disaster period and that barriers impeding post-disaster resiliency planning need to be addressed between federal and state entities.

Lave and Apt (2006) using a benefit-cost framework find that mitigation policies should focus upon providing protections and reducing damages from small to medium events. For less frequent and more powerful events, policy should focus upon warnings and evacuation. At issue is that the public does not necessarily fully understand the nature of the risks and underestimates the costs that they may face. If residents were required to pay more actuarially fair insurance premiums and bore more of the costs associated with the risks that they face, they would be more likely to incorporate the hazard risk into their planning.

As the literature above shows, disaster damages, mitigation policy and government responses to the disaster situation are quite complex. Interaction between federal, state, and local governments not only affects the level of response that residents of hazardous zones may take, they also influence patterns of habitation and investment and mitigation decisions.

Model & Data

Disaster policy in the U.S. has led to a wide range of both intended and unintended outcomes. Zoning and building regulations in many parts of the country have reduced the costs and impacts and the level of injury and death that would otherwise have occurred from a wide range of hazards on households and individuals – for low level and moderate events. Combined with modern technologies that increase warning times to households for events such as larger and more powerful hurricanes and other weather events, even the level of death and injury from these events have been reduced to very low levels. On the other hand, these same policies and others such as engineered flood control undertaken by the Army Corps of Engineers and large scale urban and suburbanization have led to an even larger portion of the population living in hazardous areas. Thus we have more capital and population vulnerable to disaster risk even though the level of damage and impact from ordinary events has been falling.

Federal policy has tried to address the level of vulnerability within communities and does provide for a range of federal grants in aid to communities that may help to reduce disaster damages. Following Healy and Malhotra (2009) these programs are analyzed using an empirical model with an autoregressive structure as follows:

$$DD_i = f(FG_t, FG_{t-1}, DD_{i-1}, DDec_t, FI_t, FI_{t-1}, GDP_t, PCI_t), \quad (1)$$

where, *DD* is disaster damages at time periods *'t'* and *'t-1'*, *FG* is federal grants in aid to states at time periods *'t'* and *'t-1'*, *DDec* is the number of disaster declarations in period *'t'*, *FI* is the number of flood insurance policies in place in time period *'t'* and *'t-1'*, *GDP* is real gross domestic product in time period *'t'*, and *PCI* is real per capita income in time period *'t'*. Several variants of this same analysis are conducted. Equation 2 evaluates the impact of mitigation expenditures on deaths associated with disasters:

$$DDeath_t = f(FG_t, FG_{t-1}, DD_{i-1}, DDec_t, FI_t, FI_{t-1}, GDP_t, PCI_t), \quad (2)$$

additionally, the impact of disasters on both GDP and corporate profits is evaluated using a similar structure,

$$GDP_t = f(FG_t, FG_{t-1}, DD_t, DD_{i-1}, DDec_t, FI_t, FI_{t-1}, GDP_{t-1}, PCI_t), \quad (3)$$

and

$$CP_t = f(FG_t, FG_{t-1}, DD_t, DD_{i-1}, DDec_t, FI_t, FI_{t-1}, GDP_t, PCI_t). \quad (4)$$

Data for the analysis was collected from several sources. Disaster damages and the number of deaths annually from natural disasters was collected from the OFDA/Cred International Disaster Database. Federal grants in aid to states were collected from the U.S. Statistical Abstract (various years). Data on Flood Insurance policies in force and disaster mitigation grants was collected from FEMA as was data on the number of disaster declarations annually. Real GDP, real per capita income, and corporate profits after taxes was collected from the St. Louis Federal Reserve FRED database. All dollar values are reported in 2005 dollars. Data that was collected as nominal values such as corporate profits after taxes, disaster damages, and mitigation grant awards were converted into 2005 dollars using the GDP price deflator.

Results of the analysis

Table 1: Variable Names and Definitions

Variable	Variable Definition	Source
RDISCOS2	Real Disaster costs (2005)	OFDA/Cred Disaster Database, 1970-2012
RCORPROF	Corporate Profits after taxes, (2005)	FRED, 1970-2011
RDPIPC	Real disposable personal income (2005)	FRED, 1970-2011
RGDP2	Real Gross Domestic Product (2005)	FRED, 1970-2011
RHAZMIT	Hazard mitigation grants, real (2005)	FEMA, 1989-2012
GRANTS2	Federal grants in aid to states (2005)	U.S. Statistical Abstract, 1970-2011
TDEATH	Total deaths from disasters	OFDA/Cred Disaster Database, 1970-2012
FLPOL	Number of Flood Insurance Policies	FEMA, 1978-2011
DISDEC	Number of Disaster Declarations (annual)	FEMA, 1970-2012

Variables used in the analysis and summary statistics are shown in Tables 1 and 2. Data on GDP, real disposable per capita income, Federal Grants in Aid to States, corporate profits after taxes, disaster costs, deaths arising from disasters, and disaster declarations were available for the entire period under analysis (1970-2011). Information on hazard mitigation grants was available starting from 1989, and data on flood insurance was available from 1978 through 2011.

Table 2: Summary statistics

	Mean	Median	Maximum	Minimum	Std. Dev.	Obs
RDISCOS2	16,857,932,819	8,329,581,270	159,071,465,003	115,440,928	27,335,382,358.36	41
RCORPROF	545,299,073	407,449,939	1,307,300,345	190,237,489	338,002,245.34	42
RDPIPC	24,029	23,500	33,229	15,150	5,635.78	42
RGDP2	8,511,345,238	8,017,650,000	13,299,100,000	4,266,300,000	2,989,181,395.26	42
RHAZMIT	634,061,347	402,333,743	2,687,298,212	85,696,578	657,088,020.68	23
GRANTS2	274,700,000,000	233,800,000,000	532,700,000,000	123,700,000,000	109,542,968,515.65	42
TDEATH	369.0930233	242	1973	27	386.06	43
FLPOL	3486705.647	3258513.5	5700235	1446354	1435711.99	34
DISDEC	74.34883721	53	242	16	50.92	43

The analysis was conducted using vector autoregression (VAR) methodologies. The results of the analysis are presented in Tables 3 and 4. FEMA post-disaster hazard mitigation grants (RHAZMIT) are awarded to communities following an event with the aim of reducing future vulnerability. The variable GRANTS2 represents total federal assistance to states from a host of government programs. The number of observations for RHAZMIT is limited, thus the analysis was conducted on a truncated set of variables. These results are reported in Table 3.

Table 3: VAR Results – Hazard Mitigation Grants

	RDISCOST	RHAZMIT	RGDP2
RDISCOST(-1)	0.44979549	2.723841237	2.588215049
	0.343384122	6.781332168	2.130209145
	[1.30989]	[0.40167]	[1.21501]
RDISCOST(-2)	0.175411199	9.444939072***	-1.380537679
	0.364017459	7.188810282	2.2582096
	[0.48188]	[1.31384]	[-0.61134]
RHAZMIT(-1)	-0.035566663**	-0.508557859	-0.143921972
	0.017142655	0.338542263	0.106345746
	[-2.07475]	[-1.50220]	[-1.35334]
RHAZMIT(-2)	-0.033948582*	-0.826877438**	0.13264925
	0.019094192	0.37708226	0.118452254
	[-1.77795]	[-2.19283]	[1.11985]
RGDP2(-1)	0.002663032	0.27612307	1.393016479***
	0.037943278	0.749324022	0.235383969
	[0.07018]	[0.36850]	[5.91806]
RGDP2(-2)	0.005540436	-0.09992248	-0.418509717*
	0.037712742	0.744771275	0.233953822
	[0.14691]	[-0.13417]	[-1.78886]
C	-30785701.94	-727606876.4	400669686.4
	43827792.14	865534536.8	271888994.7
	[-0.70242]	[-0.84064]	[1.47365]
R-squared	0.419951236	0.413303978	0.992027467
Adj. R-squared	0.171358908	0.161862826	0.988610667

Overall, hazard mitigation grants do appear to reduce the costs of disasters. The overall strength of the analysis though appears to be quite weak. This result is consistent with other studies such as Healy and Malhotra (2009). The analysis from this VAR also indicates that disasters do not appear to have a strong effect on U.S. GDP. The results of VAR's including disaster deaths as a variable did not appear to show any strong positive or negative relationships and are thus not reported here.

There is some discussion in the literature on how disaster may affect firm profitability. In terms of profitability, while a disaster itself may negatively impact a firm's capital and disrupt normal trade activities, some firms such as those supplying pre-disaster supplies and materials and others involved in the post-disaster recovery efforts may also experience positive impacts. The results of the VAR analysis do not find a strong relationship between corporate profits and natural disasters (Table 4).

Table 4: VAR Results – After Tax Corporate Profits

	RCORPROF	RDISCOST	RGDP2
RCORPROF(-1)	1.252552852**	0.134672648**	0.692694712**
	0.155602692	0.0518565	0.325157222
	[8.04969]	[2.59703]	[2.13034]
RCORPROF(-2)	-0.601686062**	-0.129344561**	-1.226310838**
	0.159250796	0.053072275	0.332780531
	[-3.77823]	[-2.43714]	[-3.68504]
RDISCOST(-1)	0.796765737	-0.106272301	-0.761231977
	0.512311625	0.170734113	1.070558757
	[1.55524]	[-0.62244]	[-0.71106]
RDISCOST(-2)	-0.014887352	-0.371572683**	1.17985302
	0.533307108	0.177731114	1.114432247
	[-0.02792]	[-2.09065]	[1.05870]
RGDP2(-1)	-0.213449752**	0.011230789	1.189464452**
	0.069215727	0.023066987	0.144637559
	[-3.08383]	[0.48688]	[8.22376]
RGDP2(-2)	0.248290924**	-0.006507996	-0.145023195
	0.070964207	0.02364969	0.148291294
	[3.49882]	[-0.27518]	[-0.97796]
C	-53927859.23	-22169540.98	63019346.03
	43545549.29	14512086.71	90995532.59
	[-1.23842]	[-1.52766]	[0.69255]
R-squared	0.963850846	0.407090812	0.997921418
Adj. R-squared	0.956621015	0.288508974	0.997505701

Conclusions

Overall, it appears that natural disasters have limited impacts on U.S. GDP, and real corporate profits after taxes. Mitigation expenditures do appear to reduce the overall costs of disaster damages, though they did not have noticeable effects on the number of deaths associated with natural disasters in the U.S. While this work is still preliminary in nature, it does support the existing literature in the field.

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Figure 1: Plots of all variables over period under analysis

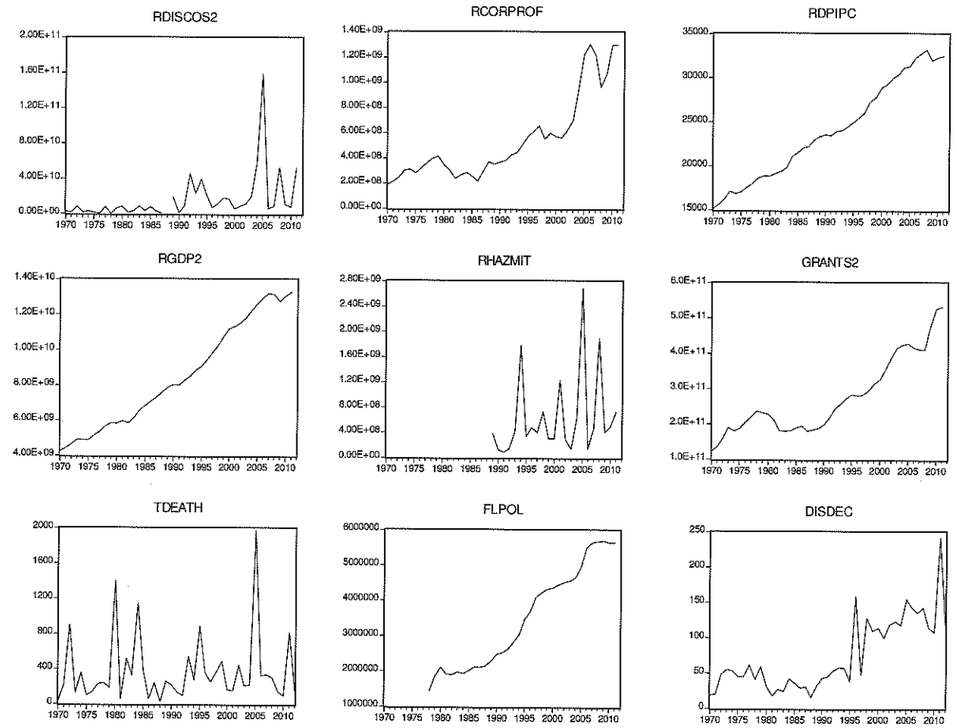


Figure 2: Impulse response functions, VAR – disaster costs, hazard mitigation, and GDP

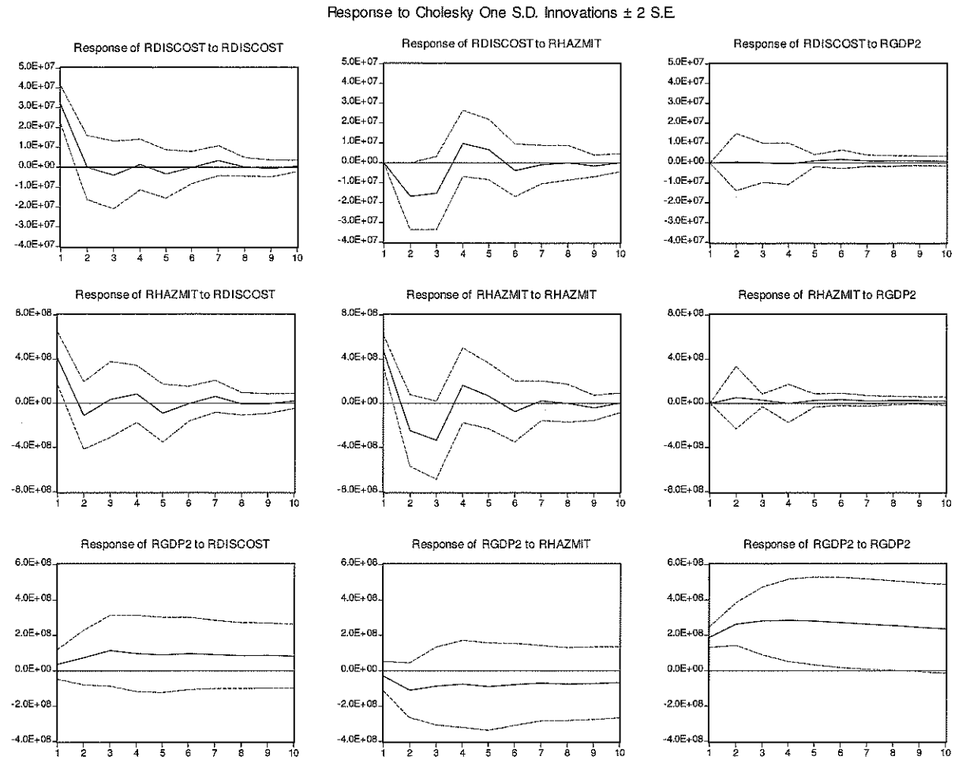
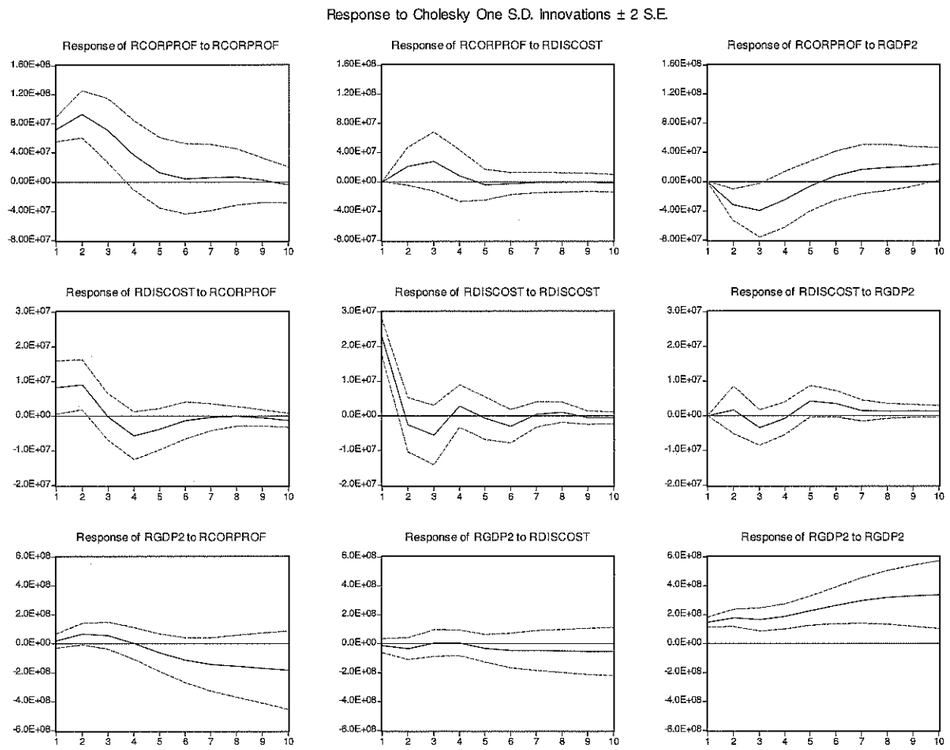


Figure 3: Impulse response functions, VAR – corporate profits, disaster costs, and GDP



Price Discrimination: A Classroom Exercise

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Abstract

Price discrimination is a topic frequently found in an introductory microeconomics class. Students often find the concept confusing, as they try to understand charging multiple prices for the same good in a given market. They tend to lose sight of the firm's goal, profit maximization, in an analysis where there is more than one price, and where the price paid is determined by the buyer's characteristics. The following analysis provides a numerical example that clearly demonstrates the profitable application of price discrimination.

Introduction

This paper provides a price discrimination classroom exercise, which was designed for a microeconomics class, could also be used in a marketing or management class during the discussion of how price should be used to place the product. The exercise incorporates the assumptions of non-competitive markets, the law of demand and price elasticity of demand.

Price discrimination is charging more than one price for the same good or service in the same market. The effective implementation of price discrimination depends on an understanding of elasticity of demand, which integrates yet another topic from microeconomics into the discussions in other business classes. The law of demand states that price and quantity vary inversely (other things held constant). Elasticity of demand is a measure of quantity responsiveness to price changes. The formula for elasticity of demand is:

$$E_D = -[\%\Delta Q/\%\Delta P]$$

(Since price and quantity vary inversely, the relationship between price and quantity changes would always be negative. The minus sign is inserted into the elasticity formula by convention, which makes it possible to refer to elasticities as a positive number.) A percentage quantity response greater than the percentage price change (E_D>1) is referred to as elastic demand. If the percentage change in quantity is less than the percentage change in price (E_D<1), demand is said to be inelastic. Price discrimination increases the price charged to customers who are not very price sensitive (demand is inelastic) and lowers the price to customers who respond more to changes in price (demand is elastic).

The principle determinant of elasticity is the number of effective substitutes. The more options available, the more consumers respond to price increase by buying other substitute goods. Effective advertising either persuades consumers that a specific product is a good substitute for a competitive product, or strives to convince consumers that their product is so unique that no substitute should be considered. (A review of elasticity at this point in the course should prove helpful when the topic shifts to advertising strategy.)

This classroom exercise uses a numerical example to illustrate the effect that price discrimination has on revenues and profits. However, the mathematics required is simple arithmetic (not calculus), which should calm even those students with serious math phobias. Finally, the example is not graphical, so the results do not depend on how a curve is drawn. Too often, a graph meticulously derived by the professor on the board (or screen) in the front of the classroom does not get reproduced in a student's notes with the tangencies and/or intersections in the right places. Thus, the conclusions the student should infer from the discussions are not supported by the graph they have in their notes. This confusion leads to frustration, which is not conducive to learning.

Requirements for Price Discrimination

Price discrimination as a pricing strategy is not an option for all firms. Several factors need to align before charging more than one price is possible. However, where it is possible, it is highly profitable. The first requirement is that the firm has some degree of control over their price. Perfect competitors selling homogeneous products, such as an agricultural commodity (i.e. wheat), take the price from the market and do not even set one price, so price discrimination is not an option for them. In addition, the consumers must have different elasticities of demand for the product, as the price charged the consumer will depend on their elasticity of demand. The firm must be able to segment their customer base along these elasticities. If the elasticity of demand depends on the buyer's age, then the seller must be able to look at a buyer and determine which age category they are in. Finally, resale of the product cannot be possible or feasible. If a customer who can buy at the lower price could resell the product, then you would lose the high priced end of your market to these resellers.

Students are familiar with businesses that engage in price discrimination. They include airlines (different prices for coach seats on the same flight) and movie theaters (children pay less, but sit in the same sized seat).

Class Example

As you are discussing pricing strategy, assume a firm produces a fixed output of 500 units each period and originally sells them for $600 per unit, making total revenue equal to $300,000 per period. For example, if the firm is an airline, these numbers could represent seats on a single flight. Output is obviously fixed by the number of seats on the plane. Costs are assumed to be some fixed fraction of sales. If the average total cost is 80% of sales, then the profit on $300,000 in sales equals $60,000. If we assume the firm meets the requirements for price discrimination, it is straight-forward to show how engaging in price discrimination can raise revenues and profits.

Assume the two groups of identifiable customers have elasticities of 4.0 (elastic demand) and 0.2 (inelastic demand). (For the airline, these groups could be business travelers and leisure/vacation travelers. Business travelers have fewer scheduling options when they need to travel when compared to vacation travelers.) For simplicity's sake, assume the market is evenly divided between the two groups, with 250 seats purchased by each group. A final simplifying assumption is that output will be held constant as we change the pricing structure. This is an easy assumption to make, as there are a fixed number of seats available on a given aircraft. Fixing the output will keep costs constant, so any change in revenue translates directly into a change in profit.

The exercise begins by increasing the price to the inelastic customers by some amount, say 50%, or to $900. Since the elasticity for this group is 0.2, a 50% increase in the price will result in a 10% decrease in the quantity they wish to buy (0.2 = %ΔQ/%ΔP = 10%/50%). The decrease in sales by 10% equates to 25 units (10% x 250), so sales in this portion of the market fall to 225. Total revenues, however rise from $150,000 ($600 x 250) to $202,500 (225 x $900).

To maintain output at the previous level, the unsold 25 units will be sold in the elastic market. The price needs to decline to increase the quantity demanded from 250 to 275. Since elasticity of demand is 4.0 in this market, a 10% increase in quantity requires a 2.5% decrease in price (4.0 = %ΔQ/%ΔP = 10%/2.5%). This makes the new price $585 (($600 x (1 – 2.5%). The new total revenue in the elastic market $160,875 ($585 x 275). Summing both markets, total revenue has risen from $300,000 to $362,875, a 21% increase in sales revenue. Since costs remained constant at $240,000, profits have more than doubled, rising from $60,000 to $122,875.

Common Mistakes

The most common mistakes (aside from not using the correct formula for elasticity and/or careless math errors) students seem to make in this example surround changing the price or quantity the appropriate percentage but in the wrong direction. They may correctly calculate that a 50% price change requires a 10% quantity change in the inelastic market, but fail to realize that if price increases, quantity will decrease (the law of demand). Their thinking seems to be that if price goes up, then selling more at this higher price will greatly increase revenues. While they cannot be faulted for the math, their reasoning does ignore the inverse relationship between price and quantity demanded.

Another common mistake is to confuse which market gets the higher price. This is where the mathematical aspect of the exercise is most enlightening. If price is lowered by 50% in the inelastic market, quantity will increase by 10%. The new total revenue is now $82,500 ($300 x 275), which is lower than the original $150,000. If the quantity in the elastic market must decline by 10% to accommodate the expansion in the inelastic market, price must increase by 2.5%. This will produce total revenue of $138,375 ($615 x 225), which is also less than the original $150,000. Some students will realize that this implementation of price discrimination is inconsistent with maximizing profits. However, many will fail to compare the original (pre-price discrimination) revenues with those after the price changes. This mistake will remind the student to evaluate whether their answer is reasonable, and not just to copy the number in the calculator's display.

Conclusion

This price discrimination numerical exercise highlights a common topic from microeconomics. The exercise also reinforces the law of demand and the profit maximization motivation of the firm. Using specific numbers, while maintaining a constant output, clearly demonstrates that effective price discrimination increases profits. This example can also be used in marketing and strategic management, demonstrating how the business disciplines are integrated.

MBA Curriculum: The Role of an Introductory "Toolkit" Course

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Abstract

Revising curriculum at any level in higher education is a challenging task. Revising the curriculum for a "generalist" Masters of Business Administration program during the first year of a new business school administrative team's tenure could be seen as ambitious…or insanity. Such was the case during the 2011-12 academic year at Samford University's Brock School of Business. The following pages describe the changes that were implemented in the school's MBA program, focusing specifically on the introduction of a new course to the curriculum: BUSA 505 Managerial Communications and Analysis, or, as it has come to be known, "The 'Toolkit' Course."

Background

For several years the Brock School of Business (BSOB) faculty working on the Graduate Education Process Committee (GEPC) examined the strategic positioning of the BSOB's Masters of Business Administration (MBA) program. The result of the committee's work was a set of recommendations for ways to improve the MBA program. The committee's proposals were of great value to the school; but, following a Dean transition between the 2009-10 (Dean), 2010-11 (Acting Dean), and 2011-12 (New Dean) academic years there was uncertainty over the implementation of the committee's proposals.

With the work of GEPC as a foundation, new School administration began to work with the incoming (new) chair of GEPC on ways to improve the MBA program. One area that had been highlighted for discussion was how the Brock School would handle students who needed coursework and skills to get them "up to speed" before they entered the core courses in the program.

Previously, the School offered six "Foundations" level courses (Accounting, Statistics, Economics, Finance, Management, and Marketing). These courses were designed for students who either did not have an undergraduate degree in a Business discipline or had not performed well enough in a given subject area as an undergraduate Business major to exempt out of the course. With more students coming to the School with undergraduate Business degrees, enrollment trends in these Foundations courses were on a downward trajectory. Additionally, scheduling these courses pulled valuable course loads and course preparations from full time faculty. The decision was made to attempt to reduce the number of "Foundations" courses offered and required in the MBA program as well as provide for creative ways for students to exempt out of any remaining "Foundations" classes.

A thorough but informal discussion with each department chair and faculty teaching in the MBA Core revealed that the Foundations of Statistics was a course that could be a good candidate for alternative delivery, streamlining into an existing course, or elimination. The decision was made to incorporate the statistical material into a new combined "Foundations of Economics and Statistics" course.

Discussions with faculty in the Department of Entrepreneurship, Management, and Marketing resulted in both the Foundations of Management and Foundations of Marketing courses being removed from the curriculum. The plan was for key concepts from these classes to be disseminated and taught in a new course in the MBA Curriculum: BUSA 505 Managerial Communications and Analysis.

With the total number of "Foundations" courses reduced from six to three, GEPC began to look at new ways to get students into the MBA core more quickly. The School faculty voted to allow students to exempt out of any of the three remaining "Foundations" courses (Accounting, Finance, and Economics/Statistics) if they held a regionally accredited undergraduate degree that included Accounting, Finance, and Economics courses, provided that the student made at least a C- in any given course. Additionally, students without the equivalent courses could choose a self-study route that led to them

taking the final exam of the respective Foundations course. Scoring a 70 on that final exam would allow the student to exempt a given course and move into the core curriculum.

As a result of adding Managerial Communications and Analysis (BUSA 505), the MBA increased from 30 to 33 hours. The faculty also decided that a course that had been an MBA elective, Managing Corporate Integrity, should now be in the MBA Core to better match with the University's Christian mission. This change increased the required hours for an MBA from 30 to 36 hours. There were some concerns that an increase in credit hours (and thus cost) would damage the demand for the Brock School MBA. GEPC and the faculty argued that a better MBA would be the result and that the market would recognize the improved quality of the MBA as compared to the competition.

With the structural framework in place for the new MBA program, it was time to begin work on creating a new and inventive course, Managerial Communications and Analysis. This course would be taken in each student's first semester in the MBA program and would provide a set of skills that would be needed for success as students matriculated through the Brock School's MBA program.

Managerial Communications and Analysis – the Toolkit Course

In the Brock School's standard Fall and Spring semester students attend class for a total of 30 hours of "seat time." Classes meet two hours a night for one night a week over a 15 week semester. The next challenge was to determine how to divide up and allocate those 30 hours of seat time given the desire to have multiple skills and concepts taught to the students.

In the early course development process, School administration worked closely with GEPC and the faculty at large to develop a desired set of skills that should be included in the Toolkit Course. No longer having foundational courses in Management and Marketing made concepts from those disciplines a priority for the toolkit course. Additionally faculty requested that time be spent on oral and written communication as well as case analysis and Excel. After negotiating time allotments for each topic, School administration sent out an email soliciting faculty participation and involvement in the delivery of the respective "modules" within the course. Faculty were offered compensation in line with hourly rates for training and consulting rather than have any portion of this class count as part of their teaching load.

The final schedule included 4 hours of written communications, 2 hours of oral communications / presentation skills, 4 hours of case analysis, 4 hours of Excel, and 6 hours each of management and marketing.

The course syllabus includes grading elements for two content related exams (one in Management and one in Marketing), class participation (based on peer evaluation), student use of Excel in their case analysis project, and the final written case analysis and presentation of their analysis. The students were divided into teams to work on their case analyses and each team member was instructed to evaluate the participation of his or her teammates. The students analyzed a case (Brauna Technologies Case) that was written explicitly for this course by an experienced healthcare consultant. The case analysis, which is used as the basis of the "final exam" for the course, combines elements of management and marketing along with Excel. Additionally, students must present the case and turn in a written case analysis. This project is a multipart assessment of how well the students have grasped the skills and concepts of the class.

Samford also offers a "JanTerm," which is a three week winter inter-session. Only a limited number of MBA courses have been offered in this semester; however, the Toolkit course seemed well suited for this session, and offering the course allowed students to begin taking a full slate of core or elective classes in the following Spring semester. Plans were also in place to offer the course during the Summer for newly admitted MBA students.

The following sections will discuss each of the modules offered in the Toolkit course.

Case analysis

A significant number of the core courses in the BSOB MBA program employ case analysis as either a primary or a secondary learning tool. Depending on the course, students may be expected to analyze cases or mini-cases as part of class discussions, individual or team writing assignments, individual or team presentations, and/or exam questions. Because cases form such an important part of both the learning experience and the grading process, two separate two-hour class meetings were devoted to the topic of introducing students to how the case method might be used in our program.

In our first iteration of the course, we actually chose to begin the first session regarding case analyses with a discussion of two things that the students should not expect to learn from the session. First, some students enter MBA programs thinking of their classes as the fifth and sixth year of college, or, worse yet, the "17th and 18th grades." So, we thought it was quite important to make sure that the students knew that this particular session was not going to be devoted to providing them with a checklist they could follow, which would give them a guaranteed "A" on a case analysis.

Second, many incoming MBA students would have no way of knowing that the term "case analysis" does not mean the same thing to every professor. Purists would describe a case analysis as presenting students with a situation and telling them,

in essence, "Go to it." On the other extreme, some cases are actually designed as directed problems. And, there are various shades in between those two extremes. So, in addition to explaining to the students that there was no checklist for earning a guaranteed "A" on a case analysis, we thought that it was critical to make clear from the start that there also is no single template for what a case analysis ought to look like.

With those key points established, the next step was to make the students aware of three key learning objectives of the ensuing discussion: how studying cases can benefit their education, questions they should ask themselves when they read a case, and how to approach the preparation of a case analysis.

It occurred to us that even with a "sample case analysis" coming during the second two-hour session (see "Purinex Inc." in Case Studies in Finance: Managing for Corporate Value Creation, Sixth Edition; by Robert F. Bruner, Kenneth M. Eades, and Michael J. Schill; McGraw-Hill/Irwin, 2010), it would be a bit odd to use a lecture-only format in an entire two-hour session regarding something as participatory as case analysis. Further, it also seemed to us that it would be useful to utilize student input as a means of creating student buy-in to the ideas that we wished to present.

Thus, after the introductory comments outlined above, the instructor distributed a handout in which students were asked what skills they expected to develop and/or improve as a result of performing case analyses as part of their graduate education. Students were told up front that the instructor for this session, along with the course coordinator, would evaluate their written answers, and that the best two or three answers would receive a modest amount of extra credit.

After the students had written their comments and handed them in, the instructor then opened up the floor for discussion, in a manner similar to what an instructor might do in asking open-ended questions to set the stage for discussion of a particular case. After allowing a reasonable amount of time for this discussion, the instructor then went through his prepared comments regarding the topic, integrating earlier student comments where possible.

The instructor followed a similar pattern for the topic of what questions a student should ask in reading a case, and again for the topic of what a good "plan of attack" would be for actually writing up a case analysis. For each of these questions, the forms on which students were to provide their initial written reactions made clear that they were being asked how to approach cases in general, regardless of the particulars of a given case.

The aforementioned discussions combined were designed to take all of the first two-hour class session, and a modest portion of the second. At the time of the first session (i.e., one week prior to the second session), the students were also provided with an example of the type of case that they might be requested to analyze in a future course. Students were also provided with a set of questions designed to prompt their thinking on various issues in the case. Most of the second session was spent discussing the assigned case, simulating as closely as possible the way an instructor might conduct such a discussion in a core class.

There was one thing that we tried to stress at the time the case was distributed, but which in hindsight we should have stressed more. In order to make sure that the students' attention is where it should be on this "trial case," we believe that it is important to stress that we have no expectation regarding the ability of the students to carry out an actual graded analysis of the case in question. Clearly, many of the students in this course will not have been exposed to any of the material that someone in a core course would be familiar with by the time a case analysis of this nature was conducted.

Rather, the key is to put the students in a position of fighting their way through a case. Indeed, during the actual case discussion the following week, the instructor pointed out that many case analyses will end up sending the students scurrying for various forms of reference materials, and that this is perfectly normal. However, in future iterations of the course we think that we should pay more attention to stressing this idea before the fact, as well as after.

Written and Presentation Skills

Early in the semester students were provided guidance on writing and research styles for academic writing. The Brock School collectively has a preferred citation format (APA), and that was the style that was taught and emphasized. Students engaged in writing activities and exercises and were informed about the importance of attribution and citation of sources in academic writing.

The presentation skills section of the class focused on effective public speaking, for both monologues (speeches) and group presentations. You Tube video examples were presented of both good and poor public speaking. Points of emphasis included enunciation, clarity, pacing, pauses and transitions, and voice inflection. The final speech of Dr. Martin Luther King, "I Have Been to the Mountain Top," was used to highlight passion, pacing, pausing and voice inflection. Then Presidential candidate Bill Clinton's 1992 campaign debate moment was used to illustrate body language, personalization of message, and empathetic connection with the audience. The videos were shown in class and discussed. Students responded very positively to the King video, stating that his passion and personal conviction motivated them to buy into the message and desires to join his efforts to fight for equal rights. Reaction to the Clinton video was decidedly mixed; some students felt that his decision to leave the podium and walk out to the edge of the stage to address the person who raised the question was very effective in personalizing the message, while others stated that his (now known) propensity for less than full truthfulness

made him unbelievable. The instructor learned that using political figures as classroom examples proved polarizing and detracted from the public speaking discussion. Thus, a take-away from this portion of the class was to change future examples to non-political figures.

Next, the class focused on the use of visual aids in presentations, primarily PowerPoint slides. Again, You Tube videos were shown on how to use Power Point effectively and to illustrate some of the more egregious mistakes oft-repeated. Points of emphasis included font size and readability, color schemes and contrasts between text and backgrounds, avoiding too much information on single slides, readability and effectiveness of graphs, minimization or avoidance of animation, and pictures and use of clip art. Students were cautioned against reading slide content to the audience, and class members shared their ideas for avoiding this mistake. The general consensus that emerged from class discussion was that less is more, both in individual slide content and regarding the total number of slides comprising the presentation. A take-away from this portion of the class was the use of roadside billboards to highlight effective and ineffective slides. The average motorist has less than 3 seconds to digest a billboard message, and this analogy was used effectively for Power Point slides as well.

Finally, the class concluded with a short discussion on the logistics of group presentations, particularly regarding case studies. Emphasis was noted on effecting smooth transitions from one presenter to another, avoiding redundancy, and discussing where and how many presenters should be standing during the presentation. There was some debate on whether non-presenting members of the group should be standing or sitting, with a consensus that they should be standing off to the side to avoid distracting up and down movements as speakers transitioned.

Marketing Concepts

The three-week marketing component of the course aimed to familiarize students with the fundamentals of marketing. The marketing component was structured with the assumption that the students may not have had any formal business training or work experience.

Emphasis was placed on key marketing principles and an overview of the marketing function in the context of organizational strategy. Major topics covered included market planning, management of the marketing mix, segmentation, marketing research, market positioning, and branding.

The marketing component incorporated four chapters of textbook material from a popular marketing management textbook appropriate for graduate and executive education. In addition, the students were expected to read assigned articles from the popular press (including the school-provided *Wall Street Journal*), which were discussed in class meetings. An in-class test was administered at the end of the component to assess the students' understanding of the marketing content covered.

There were several challenges associated with the marketing component of the course. First, it was difficult to provide a thorough overview of a major functional area of business in only 6 class hours. Second, there was vast variability with respect to the previous business education and work experience of the students enrolled in the course. Further, it was difficult to position the marketing material in the context of the other course topics and instructors; it was difficult to know exactly what content they had presented, and how the marketing material could best be presented in the context of the full course content. Finally, given the uncertainty just noted, it was challenging to present the marketing material in a manner that would best inform the business strategy case to be completed at the completion of the course.

In the second iteration of the course, care will be taken to more fully understand the entire course content, and to more thoroughly address the key marketing issues relevant to the assigned business strategy case.

Management Concepts

In advance of the Management section the students were provided several outside readings. These were primarily focused on organizational structure concepts, especially that of the matrix organization. The students were to have read the following four articles in preparation for class discussion. First: Biege, S., Jaegger, A. & Bushak, D. (2012). New service development in manufacturing companies: Insights from the German manufacturing sector. *Journal of Applied Management & Entrepreneurship*, 17, 4-19. Second: Fontaine, C. (2007). *Organizational structures: A central factor for organizational effectiveness & employee satisfaction*. 1-22. Third: Galbraith, J. (1971). *Matrix organization designs. Business Decisions*, 29-40. Fourth: Sy, T. & D'Annunzio, L. (2005). Challenges and strategies of matrix organizations: Top-level and mid-level managers' perspectives. *Human Resource Planning Journal*, 28, 39-48.

In lieu of a textbook, the instructor provided an electronic copy of a PowerPoint presentation leading the class through the historical management periods and the significant leaders within each. Also, each lesson stressed competitive advantage, value chain, and the four functions of management (planning, organizing, leading, and controlling).

Following the organizational structure lecture (Theories X, Y, Z, Matrix and Generational Differences to Motivation, etc.), the instructor conducted one in-class assignment consisting of four mini-case studies divided among the group. The students were asked to use sticky notes to develop an organizational structure based on the assigned case. They developed an organizational chart with titles and functions. They arranged their structure on the class wall/board. The issues mirrored many of those found in the Brauna case. Each group had to explain their departmentation structure and whether or not their structure was a matrix (why or why not). This was very practical in helping them to understand how to work together and how to quickly evaluate a case, and it also set them up for the coming Brauna case.

From a pedagogical perspective the lectures were designed to focus the class on many of the salient points within the Brauna case; however, the instructor specifically tried not to give leading answers. In a more consultative approach, the instructor stressed the need to consider all the aspects of the case and look for clues that would fit within the context of the lectures and the case.

Each class session was primarily lecture based with a conversational tone. The instructor engaged the students with real life examples, current events, and hypothetical discussion starters. Several of the class members engaged, while many others were unable to grasp the direction due to some language barriers and lack of work experience. Those with the most work experience seemed to excel in this part of the class. This module of the course used an in-class, open-note, multiple choice test at the end of the third session for assessment purposes.

Much like the marketing module, time became a central roadblock to the effective introduction and application of the salient management topics. In an attempt to secure more "in class" time, the instructor plans to use a take home test in order to reserve the time for more instruction.

There were also concerns that the management portion of the course was placed too late in the semester and that students would have benefitted from getting both conceptual / topics based modules (management and marketing) earlier in the semester and more of the "tools" later in the semester. The instructor plans to sharpen the lectures and discussion points more toward the key concepts of the Brauna case, while requiring more out-of-class reading of the students.

As with the marketing module, current events are viewed as a must for effective discussion going forward and will be a part of ongoing class participation for each session.

Excel Skills

One of the key challenges of this skill module was to recognize that MBA students come to our MBA program with differing levels of knowledge and experience with respect to using Microsoft Excel. This acknowledgement reassured students that there would be reasonable expectations for all students. This tactic may have resulted in some students finding the material covered to be too elementary; however, the module was built to provide even the "power-users" with a few tips or some new ways to do things using Excel. A unique feature of Excel is the fact that there are different ways to accomplish the same task, so encouraging students to share with the class if they had a "better way" turned out to be a nice class participation technique.

The six major learning objectives for the Excel module of the Toolkit course were as follows. First, students were to understand common uses for Excel. Second, students were to become familiar with basic Excel features. Third, students were to be introduced to keyboard shortcuts for efficient usage. Fourth, students were to be introduced to some Excel functions that they would be using in subsequent MBA coursework. Fifth, the students were to learn how to import data into Excel. Sixth and finally, students were to be introduced to Excel macros.

The Excel Toolkit component of the course was taught in a computer lab classroom using PowerPoint. Students were provided with an electronic copy of the PowerPoint presentation along with an Excel workbook for use during two two-hour class sessions. The Excel workbook consisted of 17 worksheets with datasets used to illustrate a particular Excel feature. Also included on each Excel sheet was an embedded Power Point slide with applicable guidance for each Excel topic. During discussion of a specific Excel feature, students were encouraged to practice the Excel feature being illustrated.

The first several topics were very basic and included topics such as entering data, worksheet navigation, selecting cells/rows/columns, copy and paste, insert, auto fill, formulas, cell references, renaming/moving sheets, freezing panes, format painter, printing, and worksheet protection. Again, students had the opportunity to practice various commands and procedures during class time.

Next, more programming oriented topics such as VLookup, AutoSum Tool, Date and Time functions, text functions, If Statements, error trapping, freezing panes, filtering, sorting, and charts were covered. Students were given a problem and then the instructor demonstrated how the problem could be solved using Excel as a tool.

Next, basic functions were briefly covered. These functions included: sum, count, large, min, max, and subtotal. Similarly, time value of money functions such as FV, PV, PMT, IRR, and NPV were demonstrated. It was important to keep in mind that the purpose of the class was not to teach students about the underlying principles of the functions, but merely to show them the proper syntax and the availability of some Excel features.

The finance faculty requested the Time Value of Money topic coverage. Due to time constraints the instructor was not able to explain the meaning of present value or future value. Likewise, the difference between annual compounding and more frequent compounding was not discussed. The difference in how interest rates are entered using the Texas Instrument BAII Plus Professional calculator (required in BSOB finance classes) and how interest rates are entered using time value of money functions in Excel were illustrated. It proved to be a challenge to stay on task by introducing the Excel topics and leaving the subject matter for subsequent MBA coursework.

The next objective of the module was to introduce students to more powerful Excel features such as "What if Analysis" including Data Tables, Goal Seek, Solver, and Scenario Manager. Short pre-constructed examples with business applications were used. For example, the worksheet demonstrating Goal Seek contained a contribution approach income statement. Students used goal seek to determine the number of units that must be sold to break even. Various ways of importing data and how to record macros as a means to speed up one's work where repetitive actions are often required were briefly demonstrated.

The remaining time was used to practice Excel skills within the context of a very large dataset. The Fatality Analysis Reporting System (FARS) provided by the National Highway Traffic Safety Administration data set was used for this purpose. This database contains extensive details about every traffic fatality in the U.S. The FARS database provides a very large dataset that students can use to practice their worksheet navigation skills. Students quickly realize that the common mouse usage of pointing and clicking is not always the most efficient way to select ranges of data. Finally, the use of this database is very practical for this first MBA course since it contains data that is familiar to students and does not require explanation of business concepts to practice data manipulation skills. Having this practice time allotted to the end of the class allows for some flexibility in terms of classroom time management.

After the Excel Toolkit component, students should at least understand the basics of using Excel, appreciate the capabilities of Excel, and have confidence in their ability to use Excel in their MBA coursework as well as on the job.

Final Thoughts

The Brock School of Business has attempted to strengthen and improve its MBA curriculum in the past academic year. One specific course, Managerial Communications and Analysis, serves as a "Toolkit" course for entering MBA students to gain skills and concepts that will prepare them for success during their MBA program of study. This unique pedagogical approach offers both opportunities and challenges to administration, faculty, and students. Two iterations of the class (Fall 2012: 32 students; January 2013: 8 students) have produced mixed results, with the students in the smaller class providing much more favorable feedback than the students in the larger class. School administration plans to review all aspects of the course during the Summer of 2013 and make any necessary changes in time for the Fall 2013 semester.

Are Small Businesses that use Commercial Finance Instruments to Fund Their Operating Activities Different From Those That Do Not?

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Abstract

This paper uses logistic regression to examine the distinctive reasons why some small businesses choose to fund at least a portion of their activities using commercial finance companies (CFC) while others do not. Using the 2003 Survey of Small Business Finances (SSBF) for businesses with 500 or fewer employees conducted by the Federal Reserve Board of Governors', Office of Research (2007), we have segmented the database of 4,240 respondents into the 1,269 that employed CFC financing any time over the period 2003 - 2005 from the remaining 2,878 who did not. The results indicate certain statistically significant differences between them.

Introduction and Overview

This paper focuses on the specific characteristics of those small businesses that use commercial company financing instruments to fund their operations versus those that don't. Based on our research, it appears that this paper is the first to do so.

The source of our data is the 2003 Survey of Small Business Finances (SSBF) for businesses with 500 or fewer employees conducted by the Federal Reserve Board of Governors', Office of Research. The SSBF is the only source of such data and includes 4,240 respondents, representing 6.3 million small businesses. Over 1,500 variables were surveyed for each respondent covering a comprehensive set of their characteristics, sources and uses of financial services, organization forms, detailed financial statements, financial decisions, and success or lack thereof.

Using logistic regressions, we have uncovered a number of results that suggest that small business users of this form of finance are somewhat different from those that do not use it. In addition, our results indicate that certain of the hypotheses put forth by various authors respecting the reasons for and characteristics of commercial finance company users are not borne out by our tests of these data. As well, others are! This paper is necessarily a preliminary edition to a more complete final version of a paper which we hope to submit to a refereed journal when completed.

Over the past 25 years, there have been a large number of papers that have examined the differential benefits that various forms of finance can offer to small businesses, among them commercial finance company funding. Among the most widely quoted of these are Berger and Udell (1998, 2005, 2006), Bitler, et. al., (2001), Carey, et. al., (2002), Carter, et. al. (2005), Klapper (2006), Udell (2009) and Vos, et. al. (2007). Some have studied the users of one component of commercial finance, viz., factoring. These include Asselbergh (2002), Soufani (2000, 2002a,b), and Summers and Wilson (2000). Finally, there are a couple of professional writings that survey the whole industry -- Sherman and Fisher (2001) and Udell (2004). Several of these, along with the implied data collected by the Commercial Finance Association (CFA), the industry's primary trade association representative, present a number of hypotheses regarding reasons why small businesses use commercial finance companies to fund certain of their activities. However, no one to our knowledge has actually explored this important question in depth. This is important because CFC's represent one of the largest sources of non-bank lending to small businesses. Sherman - CFA, (2004a, 2004b) has estimated that approximately 5.92 percent of the industry's total volume of asset-based and factoring outstandings (the two largest components of CFC funding) of $465,375 billion were lent to small business borrowers in 2004, the mid-year of the SSBF survey. This amounts to about $27.6 billion in that year.

It is from this background of research by those noted above as well as many others and Sherman's long involvement with the CFA and its members that the hypotheses that we explore herein has evolved. One of the biggest influences upon our work is that by Cole (2008). The approaches and methodology in this paper as well as his direct suggestions to us provided an important guide to our work herein.

What Makes Commercial Finance Companies Unique?

While the general topic of commercial finance is well known and widespread, that of commercial finance companies and their products is not. The primary reason for this is that while there are substantial data on the activities of many types of

commercial finance institutions, especially that of commercial banks, thrifts, and federal savings banks, there are far less for a number of others, including commercial finance companies and their industry. The primary reason for this is that CFCs are unregulated by federal agencies. Thus, the only public data produced regarding them is that collected by the industry's principal trade association, the Commercial Finance Association (see cfc.com) and the ABF Journal (see, for example, ABF [2013], Sherman and Fisher [2001] and Udell [2004].

They are highly unique in three ways. First, CFCs are unregulated non-bank lenders. They are unregulated because 1) they are not publicly traded and, thus, are not subject to SEC oversight, 2) they raise no funds through depository arrangements and, therefore, are not monitored by either state or federal regulatory agencies such as the Federal Reserve or FDIC, and 3) they have no access to protective central bank liquidity and, consequently, do not come under the scrutiny and protection of the Federal Reserve Banking system. Being both private and unregulated, their transactions, financial statements, etc. are not published. As a result, data regarding their activities are almost completely unavailable. Second, being unregulated creates a critical difference in the way they acquire funds to lend. They have no depositors and, thus, no responsibility to protect the funds they utilize in their lending transactions. They obtain their funding through commercial paper issuance, medium-term notes from banks and other private providers, and through the reinvestment of their profits. Finally, these attributes allow CFCs to offer lendable funds quickly, with much less paperwork, and to businesses generally considered to be too risky for more traditional, regulated financial institutions to provide funds.

These features, have led CFCs to be included in the recently created literature of *shadow banking*, see for example Pozsar, et. al., (2010). Pozsar defines them as financial intermediaries that carry out a number of financial transformations -- in our case, credit and liquidity -- without central bank liquidity or public sector guarantees. Among these institutions are finance companies and limited-purpose finance companies. In combination, these two components comprise a substantial portion of the lending activities of CFCs. Asset-based lenders by far make up the lion's share of finance company activity. In 2005, they accounted for $2.9 trillion of the industry's $3.7 trillion in loan turnover (Sherman, 2007). Sherman estimated that small businesses (defined differently in that paper than herein) constituted 5.92 percent of that total. Factors comprised the largest portion, approximately $600 million, of the limited-purpose component of CFC funding activities.

Why Is The Topic Covered In This Paper Important?

Because of the lack of data and information available regarding CFCs and, at the same time, their very large lending profile, these financial institutions have become part of the focus of the shadow banking literature. This literature questions their role, due to their large size and lack of regulation, hypothesized significant involvement in the 2007 - 2009 Great Recession. See, for example, Noeth and Sengupta (2011) and Adrian and Shin (2009). At the same time and in a related context, they have come under focus because little is known about those who borrow from them, under what terms and conditions, and what characteristics these customers possess, including their size, type of enterprise, and location. There is also very little written about them in the finance and accounting literature or in the textbooks respecting these associated fields because of the paucity of available data and information. As a result, the public, academics, and government authorities have the collective feeling that they are lenders of last resort, charge very high interest rates for the funds they provide, and require fast paybacks of these amounts under horrific penalties if they do not do so. It is also felt that they prey on helpless small businesses. It is the feelings of these authors that these allegations are false. Part of the reason for this paper is to begin the exploration of these assertions.

Annual reports published by the Commercial Finance Association have never included client company size data. The exception is the 2003 Asset-Based and Factoring Surveys that included some data on client/customer company employment in that year. Previous to that data the only information that was supplied was that which indicated the relative size and amounts of lending by CFCs in defined funding-size categories (See Sherman - Commercial Finance Association, 2003a and 2003b). Those funding-size categories did permit some inferences to be made as to the underlying size of CFC borrowers. In this respect these groupings strongly implied that the overall size of both asset-based borrowers and factoring client/customers were large. As pointed out earlier, Sherman (2007) estimated that small users of ABL funding accounted for only 5.92 percent of the total. However, with the release of Survey of Small Business Finances by the Federal Reserve, it became possible to examine various characteristics and financial aspects of businesses with 500 or fewer employees. The latter is based on that defined by the Small Business Administration as being "small companies".
It is the combination of these implied aspects of CFC borrowers and the subsequent availability of the SSBF survey results that have made it possible for this paper to be developed. As such and based on our extensive literature search, it is the first paper we know of that examines the type of small businesses that make use of CFC financial instruments, under what circumstances they do so, and how these differ, if at all, from small businesses that do not use this type of funding. Below, we present the results we have uncovered to date respecting this investigation.

Data

In this study, we use data from the 2003 Survey of Small Business Finances (SSBF), a cross-sectional data file containing a wide variety of business and business owner characteristics on 4,240 businesses with fewer than five-hundred (500) employees. The survey was primarily sponsored and designed by the U.S. Federal Reserve Board of Governors (the Fed), with some additional input by the U.S. Small Business Administration. (The sampling frame for the 2003 SSBF data was the Dun and Bradstreet Corporation's Dun's Market Identifier (DMI) file.) These data were collected for the reference year 2003 (between 2004 and 2005) which implies that some responses might be subject to recall bias or some other form of measurement/response error. Potential analytical issues owing to these matters, however, were ameliorated by the data collection, processing, and imputation techniques resulting from the Fed's collaboration with the National Opinion Research Center (NORC) in developing the final version of the 2003 SSBF. To download the 2003 SSBF micro-data and/or to download or view all related technical documentation, go to:

www.federalreserve.gov/pubs/oss/oss3/ssbf03/ssbf03home.html.

The 2003 SSBF is a very complex data set in a couple of respects. *First*, it is a multiple-imputation data set, which means that valid questions for which there were missing data were imputed in more than one way. In the case of the 2003 SSBF, the result is five (5) observations for each business–for a total of 21,200 observations–corresponding to five "*implicats*." Variables *with responses* have the *same* values across implicats (because no imputation was necessary). Variables with imputed values–and there are relatively few, again, thanks to NORC–have slightly different values, which means that data analyses don't yield dramatically different results across implicats. (For the record, our data analyses made use of the first implicat, which was chosen for no particular reason.) *Second*, the 2003 SSBF has data has a truly daunting number of variables and an also daunting (albeit, in a different way) number of possible responses to many questions.

Methodology

At the core of our research methodology was the creation of a variable that, in effect, establishes a binary partition of businesses in the data. The 2003 SSBF included a set of questions regarding their sources of financing–from twenty-one (21) possible sources–allowing for ranking of these sources from first/primary source through their twentieth (20^{th}). Businesses that cited either commercial finance companies (CFCs) *or* factoring as at least one of their first 20 sources were assigned into one group (variable FINTYPE=1), with an unweighted and weighted count/population of businesses of 1,269 and 1,608,920, respectively. Those that do not cite CFCs or factoring as any of their sources of financing were assigned to the alternative group (variable FINTYPE=0), with an unweighted and weighted count/population of businesses of 2,872 and 4,469,129, respectively. FINTYPE becomes the dependent variable in a logit regression model.

Using descriptive statistics, we examined *several* variables that should, a priori, distinguish between our two, mutually exclusive types of businesses. Without manipulating the data so as to "tease out" results consistent with our a priori hypotheses, we evaluated *many* logit regression model specifications, with special attention to the resiliency and/or robustness of parameter estimates. Logit parameter estimates for the model we chose to present in this forum, their corresponding odds ratios (which are the respective anti-logarithms of the parameter estimates), and significance levels are reported in Table 1(a). Mean values of dependent variables–as well as statistical comparisons of mean values between our two categories of businesses are reported in Table 1(b). The p-values reported in Table 1(b) were calculated using Chi-squared statistics (from two by two contingency tables) for dummy variables and using t-tests for continuous variables. The dichotomous, dependent variable is FINTYPE, where FINTYPE=1 businesses are businesses that cite either CFCs or factoring as a source of financing and FINTYPE=0 businesses are businesses that do not cite either CFCs or factoring as any of their sources of financing. Dependent variables are as follows:

FRSTOWNF	a dummy variable that equals one (1) for businesses whose first owner is female;
FRSTOWNB	a dummy variable that equals one (1) for businesses whose first owner is black;
COLLPLUS	a dummy variable that equals one (1) for businesses whose first owner has a bachelor's degree or higher education;
CF_AGE	business age in years;
SOLEPROP	a dummy variable that equals one (1) for businesses legally organized as sole proprietorships;
INDDIV3	a dummy variable that equals one (1) for businesses in the manufacturing industry division;
INDDIV6	a dummy variable that equals one (1) for businesses in the wholesale trade industry division;
INDDIV8	a dummy variable that equals one (1) for businesses in the services industry division;
A_TOTEMP	total number of businesses' respective employees;
CURRASST	total current assets in dollars;

DBSCORE3 a dummy variable that equals one (1) for businesses with a Dun and Bradstreet credit score of three (3);
DBSCORE4 a dummy variable that equals one (1) for businesses with a Dun and Bradstreet credit score of four (4);
DBSCORE5 a dummy variable that equals one (1) for businesses with a Dun and Bradstreet credit score of five (5);
DBSCORE6 a dummy variable that equals one (1) for businesses with a Dun and Bradstreet credit score of three (3);
FBANKRUP a dummy variable that equals one (1) for businesses that filed for bankruptcy in the last seven (7) years;
FDELNQNT a dummy variable that equals one (1) for businesses with who were delinquent of at least one financial obligation by at least sixty (60) days in the last three years;
FJUDGE a dummy variable that equals one (1) for businesses with judgments against them within the last three years;
NOAPPLY a dummy variable that equals one (1) for businesses that didn't apply for a conventional business loan within the last three (3) years for fear of being rejected.

Results/Findings

What follows is a summary of our empirical findings presented in Tables 1(a), which contains logit parameter estimates or coefficients for out model, and Tables 1(b), which contains mean values of the dependent variables for all businesses, as well as by FINTYPE. With regard to what we expected to find, are results are somewhat mixed. Recall that the dichotomous dependent variable is FINTYPE, where FINTYPE=1 businesses are businesses that cite either CFCs or factoring as a source of financing and FINTYPE=0 businesses are businesses that never cited either CFCs or factoring as any of their sources of financing.

Table 1 (a) Logit Coefficients and Odds Ratios

Variable	Coefficient	Odds Ratio*	p-value
INTERCEPT	-0.6344		0.0002
FRSTOWNF	-0.2415	0.7850	0.0371
FRSTOWNB	0.4436	1.5580	0.1055
COLLPLUS	-0.3569	0.7000	0.0004
CF_FAGE	-0.0046	0.9950	0.3096
SOLEPROP	-0.3100	0.7330	0.0050
INDDIV3	-0.4479	0.6390	0.0175
INDDIV6	-0.4484	0.6390	0.0036
INDDIV8	-0.1993	0.8190	0.0994
A_TOTEMP	0.0101	1.0100	<.0001
CURRASST	0.0000	1.0000	0.6134
DBSCORE3	-0.3252	0.7220	0.0381
DBSCORE4	-0.0090	0.9910	0.9505
DBSCORE5	0.0249	1.0250	0.8727
DBSCORE6	0.1781	1.1950	0.3439
FBANKRUP	-0.7820	0.4570	0.1947
FDELNQNT	0.1678	1.1830	0.2111
FJUDGE	0.5370	1.7110	0.0933
NOAPPLY	0.6117	1.8440	<.0001

-2 Log L for Intercept only = 6,991,063.5;
-2 Log L for Intercept and Coefficients = 6,675,194.3
*** Odds ratios are the respective anti-logarithms of the logit parameter estimates or coefficients.**

Table 1 (b) Mean Values for Regressors

	FIRMTYPE = 0		FIRMTYPE = 1			All Firms	
Variable	No. Obs.	Weighted Mean	No. Obs.	Weighted Mean	p-value*	No. Obs.	Weighted Mean
FRSTOWNF	2,816	0.2683	1,247	0.2208	0.0225	4,063	0.2557
FRSTOWNB	2,816	0.0322	1,247	0.0530	0.0407	4,063	0.0377
COLLPLUS	2,816	0.5250	1,247	0.4401	0.0003	4,063	0.5025
CF_FAGE	2,878	14.4777	1,269	14.1370	0.3857	4,147	14.3875
SOLEPROP	2,878	0.4334	1,269	0.3399	0.0002	4,147	0.4087
INDDIV3	2,878	0.0734	1,269	0.0683	0.6362	4,147	0.0721
INDDIV6	2,878	0.1945	1,269	0.1620	0.0797	4,147	0.1859
INDDIV8	2,878	0.4628	1,269	0.4249	0.1104	4,147	0.4528
A_TOTEMP	2,878	7.5139	1,269	12.5119	<0.0001	4,147	8.8369
CURRASST	2,878	247,119	1,269	450,932	0.0046	4,147	301,070
DBSCORE3	2,878	0.2349	1,269	0.1728	0.0014	4,147	0.2185
DBSCORE4	2,878	0.2496	1,269	0.2504	0.9697	4,147	0.2499
DBSCORE5	2,878	0.1806	1,269	0.1769	0.8294	4,147	0.1796
DBSCORE6	2,878	0.1037	1,269	0.1220	0.1982	4,147	0.1085
FBANKRUP	2,878	0.0098	1,269	0.0065	0.4565	4,147	0.0089
FDELNQNT	2,878	0.1471	1,269	0.2045	0.0011	4,147	0.1623
FJUDGE	2,878	0.0185	1,269	0.0459	0.0011	4,147	0.0257
NOAPPLY	2,878	0.1529	1,269	0.2596	<0.0001	4,147	0.1811

p-values for dummy variables were calculated using Chi-squared tests and for continuous variables, using t-tests.

Owner Characteristics

Although the 2003 SSBF contains data on a fairly wide variety of (primary) owner characteristics beyond just the ubiquitous race, ethnicity, and gender, most of these characteristics proved of no explanatory value in statistically distinguishing between FINTYPE=1 and FINTYPE=0 businesses. *Mean values* for all three owner characteristics that *were* specified in our logit model–viz., FRSTOWNF, FRSTOWNB, and COLLPLUS–were statistically significantly different–each with p-values of less than .05 between FINTYPE=1 and FINTYPE=0 businesses. Specifically, the average proportion of FINTYPE=1 businesses was lower than FINTYPE=0 businesses if the primary owner was a woman or had at least a four-year college degree. By contrast, the average proportion of businesses with a primary owner who was black was higher for FINTYPE=1 businesses compared to FINTYPE=0 businesses. The logit parameter estimates are consistent with the descriptive statistics (means) for all three of these three variables, although only the estimates for FRSTOWNF and COLLPLUS were statistically significant, with p-values of 0.0371 and 0.0004, respectively.

Dun and Bradstreet Credit Scores

The higher a business' Dun and Bradstreet (D&B) score is, the higher the business' credit rating is, at least according to D&B's criteria. The results we obtained for the dummy variables corresponding to the D&B scores are a bit curious, although quite consistent across a wide variety of model specifications that were estimated. For whatever reason, only one credit score–namely, D&B credit score number three (3)–was significant (at any remotely reasonable level of confidence), and negative. Specifically, compared to FINTYPE=0 businesses, FINTYPE=1 businesses were, according to the odds ratio, about an estimated 72 percent as likely, other things equal, to have this D&B score. The findings from the comparison of mean values for these dummy variables between our two groups of business were not at all statistically significant for scores 4 through 6, and these findings were mirrored in the statistical insignificance of the logit parameter estimates for the dummy variables for these same credit scores dummy variables. In light of the p-values for differences the D&B scores in Table 1(b), it should not be surprising that our logit parameter estimates for the D&B score dummy variables were quite robust.

Legal Form of Organization

As evidenced from both Tables 1(a) and 1(b), FINTYPE=1 businesses are highly statistically less likely to be organized as sole proprietorships than FINTYPE=0 businesses. The odds ratio for this sole proprietorship dummy variable indicate that FINTYPE=1 businesses were about an estimated 73 percent as likely to be sole proprietorships as were FINTYPE=0 businesses.

Industry Division

None of the differences (between FINTYPE=0 and FINTYPE=1 business) in *mean values* of the three industry divisions that we included as dependent dummy variables in our logit model were statistically significant with a p-value of less than 0.08. However, the *estimated coefficients* for the dummy variables were negative, and statistically significant for manufacturing and wholesale trade, with p-values of 0.0175 and 0.0036, respectively. Specifically, and coincidentally, FINTYPE=1 businesses were *both* about an estimated 64 percent as likely to be located in these industry divisions as were FINTYPE=0 businesses.

Proxies for Businesses' Credit Worthiness

Three variables on negative aspects of businesses' credit history–viz., FBANKRUP, FDELNQNT, FJUDGE–and one variable related to one aspect of businesses' perception of their own credit worthiness–NOAPPLY– were specified as independent variables in our logit model. Of the first three of the aforementioned variables, the *mean values* were statistically significantly higher–with p-values of 0.0011 each–FDELQNT and FJUDGE. However, the most statistically significant of the logit *parameter estimates* for these three variables was the estimate for FJUDGE, with a p-value of 0.0933.

One of our strongest and more interesting findings–both in terms of magnitude and statistical significance is for NOAPPLY. Recall that this dummy variable equals one (1) for businesses that didn't apply for a conventional business loan within the last three (3) years for fear of being rejected. Both the means values and logit parameter estimate for this variable indicate that FINTYPE=1 businesses are considerably more likely to have claimed to have not applied for a conventional business loan within the last three (3) years for fear of being rejected. But, then, this would be consistent with businesses that cited either CFCs or factoring as one of their sources of financing. This is an issue that we plan to pursue using additional, related variables, as a matter of follow-up/clarification.

Conclusions

The 2003 Survey of Small Business Finances is one of a few, if not the only, sources of business micro-data (data where the unit of analysis or observation is an individual business) that contains fairly comprehensive information on businesses' sources of financing–among many other things, of course. As such, the 2003 SSBF provided us with an opportunity to contrast the business and owner characteristics of businesses that cited CFCs or factoring as at least one of their sources of financing with businesses that did not.

As a general proposition, we would have expected businesses with negative credit worthiness characteristics, inter alia, to be more likely to avail themselves of either CFCs or factoring as a source of financing. This was not so obvious in our findings regarding D&B credit ratings. As for our four proxy variables for credit worthiness, our results were more supportive of this notion, especially as evidenced by the mean values as reported in Table 1(b). What was consistent with our expectations is our finding that businesses that did not apply for conventional business loans for fear of being turned down were, other things equal much more likely to opt for either CFCs or factoring as sources of financing. We are in the process of doing follow-up research using other variables in the 2003 SSBF to shed more light on this finding.

Our findings for other business characteristics are mixed. Our finding that, other things equal, sole proprietorships are less likely to avail themselves of either factoring or CFCs as sources of financing (than businesses with other legal forms of organization) makes sense. After all, sole proprietorships are typically much smaller and simpler than their counterparts, and thus less likely to choose more sophisticated sources of financing. As for our findings for industry division, our results are mixed with regard to the stylized facts regarding the sources of financing at the focus of this paper. We are in the process of using 2-digit SIC code dummy variable that may yield empirical results more consistent with conventional wisdom.

A couple of owner characteristics–viz., gender and educational status apparently do affect the choice of financing. However, our interpretation of the nature of these findings would be speculative, at this point.

In closing, many of the patterns in mean values of variables presented in Table 1(b) that were consistent with our a-priori expectations became less statistically significant in our logit (multivariate) results presented in Table 1(a). But, of course, that's why multivariate analysis is such an important part of virtually all empirical research.

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The Positive Causal Relationship Between the Growth of Commercial Banking and Economic Development in Eastern Europe

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Abstract

It is generally held in the literature that financial deepening promotes economic development. One channel is through the banking system's growth-enhancing role as an efficient allocators of funds (Schumpeter, 1911). If the assertion is correct, then policy priority should be placed upon maintaining the integrity of this channel.

This study attempts to determine the causal relationship between commercial banking and economic development through proxies that include leverage and credit availability. Sixteen Eastern European nations spanning a period from 2000 to 2011are observed. The results indicate support for the Finance-Led Growth Theory in general and a strong relationship specific to the commercial banking channel of credit availability.

Introduction

This paper is divided into seven sections. The first section is the Literature Review and develops the background theory behind the hypothesis that the development of Finance-Led theory. Section Two develops the basis for the hypothesis that the development of Commercial Banking lead to economic development. A model is presented and the justification of its parameters in Section Three. Section Four discusses the Methodology. Testing the model utilizing Goodness of Fit, Shapiro-Wilk, Shapiro-Francia tests for normal data, and KS Test for Skewedness and Kurtosis are contained in Section Five. Section Six expands the testing of the hypothesis to include times series and panel data over a period of 12 years from a Fixed Effect, Random Effect, Hausman Effect perspective. The final Section, Seven, discusses the conclusions of the study: its determinations, its drawbacks, and recommendations for additional research.

Literature Review

At least as far back as the 19th century, Bagehot (1873) emphasized the importance of the banking system in economic growth. Finance spurred innovation and future growth through identification and funding of productive investments. Schumpeter (1911) argued that entrepreneurs require debt, as a result, financial services are paramount in promoting economic growth as production requires credit. Keynes (1930) also placed a premium on the importance of the role of the banking sector in economic growth by illustrating that bank credit "is the pavement along which production travels, and the bankers if they knew their duty, would provide the transport facilities to just the extent that is required in order that the productive powers of the community can be employed at their full capacity."

Goldsmith's (1969) research focused on the relationship between financial development and the efficiency of investment. He argued that the positive correlation between financial development and growth is mainly due to the efficient use of the capital stock. McKinnon (1973) and Shaw (1973) went steps further by altering Goldsmith's channel and incorporating the role of savings, which they believed led to a higher level of investment. Both claimed that financial liberalization (deregulation) promotes domestic savings and investment. They proposed that poor public policies lead to financial depression just as good policies lead to growth. Examples include policies that impose credit rationing, high reserve requirement and/or interest rate ceiling

Greenwood & Smith (1996) examined the role that banks played in allocating funds for highest and best use and supporting economic activity. Khan (2008) findings suggest that in the long and short run, financial development and investment exerted a positive impact on economic growth.

Theory

The endogenous growth theory holds that long term economic growth is the result of internal and not external forces. Economic growth results from investment in human capital, innovation and knowledge. Additionally, the theory claims positive externalities and the spillover effect of a knowledge based economy will lead to further development (Romer, 1994).

For example, subsidies on research and development or education increase the growth rate in some endogenous growth models by increasing the incentive to innovation

One of the subsequent theories that grew out of the Endogenous Growth Theory was the Finance Led Theory. It states that financial development promotes economic growth by enhancing either efficiency of capital accumulation or technological innovation or both (Kim, 2007). The degree of financial development (depth) has an impact on the growth of technology. Levin (2005) and others have concluded that the greater a nation's financial development the greater the economic growth.

Financial development is usually defined as a process that marks improvement in quantity, quality, and efficiency of financial intermediary services. This process involves the interaction of many activities and institutions (e.g. liquidity providers – stock and bond markets, risk transfer - insurance companies, capital providers – commercial and investment banking, and regulatory oversight – government, agency, and self regulating organization.) It is assumed that the greater the interaction, the greater the sophistication, or financial depth. More specifically, financial depth means that: a) savers are able to invest in a broader range of investment and risk- sharing instruments, and b) borrowers are able to tap into a broader range of financing and risk management instruments. Through this process, technology (an endogenous variable) positively affects economic growth.

Financial development most likely flows through channels like markets, insurance companies, commercial and investment banks and regulation. Each channel has different proxies that can be utilized to test the hypothesis (Calderón, Ce'sar and Liu, Lin, 2002). Subsequent theories have been developed regarding which channels may have a greater or lesser influence on economic development. These theories include: a) the financial sector's role in funding innovative activities; b) the growth rate of the economy is determined by both levels of human capital and financial development, c) unfettered financial liberalization leads to financial crisis, and d) financial depth has an effect on the rate of technological innovation. The literature addresses in part the most likely channels: stock markets, commercial banking, financial liberalization (laws), and investment banking, insurance.

The banking sector provides liquidity and enables more investments in illiquid/productive assets thus enhancing the efficiency of capital accumulation and economic growth (Diamond and Dybvig, 1983) and (Bencievenga and Smith, 1991). An alternative channel enhancing capital accumulation efficiency is through a reduction of agency costs allowing a larger share of savings to be directed into investments (Roubini and Sala-i-Martin, 1995). To test these influences an appropriate proxy must be identified. Currently, finding an appropriate quantitative measure is difficult. Perhaps latter studies can create a set of metrics that will captures more precise aspects of financial development.

This study will use similar proxies to those proposed in the literature that capture various aspects of financial development. Beck et al., (1999) hold that liquidity is the most commonly used indicator of financial development and measures the overall size of the financial sector without distinguishing between the financial sectors or between the uses of liabilities. Alternatively, De Gregorio and Guidotti (1995) suggests that the growth in private credit represents the role of financial intermediaries in channeling funds to private market participants.
Kim (2007) also focused on private credit as a proxy for financial development channeling,

Model and Data

The literature reveals potential holes and oversights in the research. It is determined that research in at least three channels is deficient in testing: Commercial Banking, Private Equity, and Financial liberalization. The relationships between the different types of monetary aggregates like M1, M2 and M3 on GDP were the first financial sector indicators investigated (Jung, 1986; Liu et al., 1997; Darrat, 1999). This study seeks to expand upon Greenwood and Smith's thesis and further test the causal relationship between the growth of commercial banking and economic growth.

The regression model can be stated as the relationship between the GDP (***gdp***) and leverage (***lvg***), and credit availability (***ca***). It is demonstrated in the model:

$$gdp_t = \beta_0 + \beta_1 lvg + \beta_2 ca + u.$$

Using the model, the paper examines the causal impact of the depth of commercial banking and economic development in Eastern Europe. Using panel data from 2000 to 2011 this study investigates the cause and strength of the linkage between leverage and economic growth. The sixteen countries chosen in Eastern Europe include: Albania, Armenia, Belarus, Bosnia, Bulgaria, Croatia, Czech Rep., Greece, Hungary, Latvia, Macedonia, Moldova, Romania, Romania, Serbia, Slovak Rep., and Slovenia. Azerbaijan and Kosovo were omitted due to a lack of data. The great majority (except for Greece) of the countries were under Soviet domination for more than a generation.

Dependent /Outcome Variable

Gross Domestic Product (*gdp*) at purchaser's prices is the sum of gross value added by all resident producers in the economy

plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current U.S. dollars. Dollar figures for GDP are converted from domestic currencies using single year official exchange rates. For a few countries where the official exchange rate does not reflect the rate effectively applied to actual foreign exchange transactions, an alternative conversion factor is used (World Bank, 2012).

Independent/Explanatory Variables

As mentioned earlier, the various measures of commercial bank development used in this analysis will include: 1) Bank Capital to Assets (***lvg***), and 2) Credit Availability (***ca***).

Bank Capital to Assets Ratio (***lvg***):

Bank capital to assets is the ratio of bank capital and reserves to total assets. Capital and reserves include funds contributed by owners, retained earnings, general and special reserves, provisions, and valuation adjustments. Capital includes tier 1 capital (paid-up shares and common stock), which is a common feature in all countries' banking systems, and total regulatory capital, which includes several specified types of subordinated debt instruments that need not be repaid if the funds are required to maintain minimum capital levels (these comprise tier 2 and tier 3 capital). Total assets include all nonfinancial and financial assets (World Bank, 2012).

Credit Availability (***ca***):

The domestic credit provided by banking sector. Domestic credit provided by the banking sector includes all credit to various sectors on a gross basis, with the exception of credit to the central government, which is net. The banking sector includes monetary authorities and deposit money banks, as well as other banking institutions where data are available (including institutions that do not accept transferable deposits but do incur such liabilities as time and savings deposits). Examples of other banking institutions are savings and mortgage loan institutions and building and loan associations (World Bank, 2012).

Methodology

Regression analysis has been the most often used method to examine the finance to growth relationship (Choong and Chan 2010). Following the lead of De Gregorio and Guidotti (1995), Bek et al. (1999), and Kim (2007) this study will use the proxies of banking leverage, and credit availability (explanatory/independent variables) with GDP (outcome/dependent variable). An ordinary least squares regression was conducted to obtain parameter estimates from data for the years 2000 to 2012 for each of 16 countries available from the World Bank's databank (http://databank.worldbank.org).

A model can be stated as the relationship between the GDP and the proxies:

$$gdp_t = \beta_0 + \beta_1 lvg + \beta_2 ca + u.$$

The null hypotheses can be written as:

$$H_0: B_{lvg} = B_{ca} = 0;$$

Table 1: Regression Results

	Coef	Std.Err.	T	P
B_0	1.55e+10	1.73e+10	.90	0.371
Lvg	-2.32e+09	8.91e+08	-2.60	0.010
Ca	1.37e+09	1.73e+08	7.88	0.000

We can write the estimate with the standard errors in parentheses:

$$gdp = \underset{(1.73e+10)}{1.55e+10} - \underset{(8.91e+08)}{2.32e+09 lvg} + \underset{(1.73e+08)}{1.37e+09 ca}$$

$$n = 192 \quad R^2 = 0.4028$$

The significance of the independent variables are:

lvg with a P < .01 is significant

ca with a P < .000 is highly significant

There is an inverse relationship between gdp and lvg.

Model Testing

Goodness of Fit

The goodness of fit of the regression model is high given values for F (2,189) = 63.74 with $p < .0000$ and a coefficient of determination (R^2) of 40.28%. This indicates a significant amount of variation is accounted for by the explanatory variables.

Table 1: Goodness of fit

Source	*SS*	*Df*	*MS*	Obs	192
				F	63.74
Model	3.75e+23	2	1.87e+23	**Prob F**	.0000
Resid	5.57e+23	189	2.94e+21	**R2**	.4028
				Adj R2	.3965
Total	9.32e+23	191	4.88e+21	**Root MSe**	5.4e+10

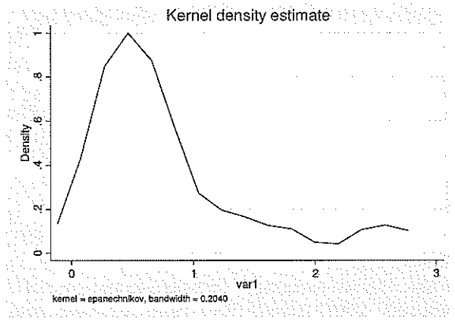
Significance of Independent Variables

lvg with a P of .010 is significant

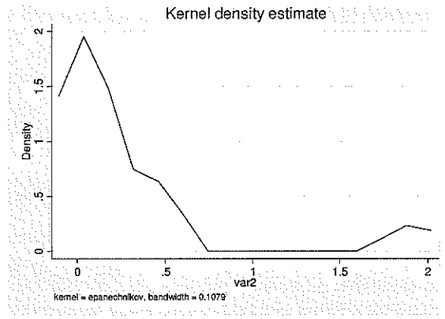
ca with a P of .000 is highly significant

Normality, Skewedness, Kurtosis and Heteroskedasticity

Kernel density estimations (Parzen, 1962) were performed for each variable using 2011 data and the results are shown in Graphs 1 and 2 illustrating possible non-normality of some of these data distributions.



Graph 1
16 Countries reporting *lvg/gdp*



Graph 2
16 Countries reporting *ca/gdp*

The ***lvg/gdp*** and ***ca/gdp*** plots appear to have something approaching normal distributions. Both are skewed positively. The graphics warrant further assessment of data normality and possible use of nonparametric statistical methods for analysis of relationships between variables.

Normality tests are used to determine whether a data set is normally distributed or not. In descriptive statistics terms, one measures a goodness of fit of a normal model to the data – if the fit is poor then the data are not well modeled in that respect by a normal distribution, without making a judgment on any underlying variable. Tests of normality are conducted against each set of data to determine whether parametric or nonparametric statistical techniques can be applied to assess hypothesized relationships. We test the following hypotheses:

H_0: variables ***lvg,*** and ***ca*** are normally distributed

Table 3: *Shapiro-Wilk*

	Obs	*W*	*V*	*Z*	*P>z*
lvg	192	.9191	11.64	5.63	.0000
Ca	192	.9567	6.22	4.190	.0000

Table 4: *Shapiro-Francia*

	Obs	*W*	*V*	*Z*	*P>z*
Lvg	192	.9224	12.19	5.15	.0000
Ca	192	.9571	6.74	3.935	.0000

Table 5: *KS Test*

	Obs	*Skw*	*Kurt*	*Chi2*	*P>z*
lvg	192	.0000	.9228	14.80	.0006
Ca	192	.000	.0403	18.03	.0001

The results of the three tests indicate that the data is normally distributed

Breusch-Pagan test for heteroskedasticity results in a Chi 2 with 2 degrees of freedom to be 76.99 providing us with a Prob > chi2 = .0000. Thus we can reject the null hypothesis and conclude the model is heteroskedastic.

Collinearity

Another important assumption for regression models is to determine there is no multi-collinearity and that the independent variables are not a linear function of another variable. When this is present, it will inflate standard errors since they get compounded when reporting. The most efficient way to test independent variables for multi-collinearity is to examine the Variance Inflation Factors (VIF). The 1/VIF tells us what proportion of an x variable's variance is independent of all the other x variables (Wooldridge, 2009).

Table 6: Test for Multi-Collinearity

Variable	VIF	1/VIF
Lvg	1.40	.7118
Ca	1.40	.7115
Mean	1.40	

The high proportionality found in ***lvg*** and ***ca*** indicate little problem with collinearity.

Misspecification

We approach our model with the assumption that it is correctly specified. But as has been observed with strong evidence for multi-collinearity, this model might be either a) misspecified or, b) contain endogeneity between regressors.

A regression specification error test (RESET) is conducted to assess the presence of general functional form misspecification, a possible cause of bias in estimators (Wooldridge, 2009). If there was missing variables in the model that were correlated with the regressor and that omitted variable is a determinant of the dependant variable, the regressor's coefficient is inconsistent. The null hypothesis is H_0: the model is correctly specified. Ramsey's omitted-variable regression specification error test (RESET) yields a value of F (3,186) = 14.76 with p = .0000. The high degree of significance of these results implies that we should reject the null hypothesis and that the model is correctly specified. As indicated above, future models should include ***lvg*** and *ca.*

Expanded Study to include Panel Data

It was the recommendation of a previous paper that the study be expanded to include time series aspects utilizing Panel Data Analysis. In as much as more observation mean more information and may mean better estimations, the structure to give us this is sixteen countries for twelve time periods yielding us 192 observations. There are sixteen panels which

includes data that is set up with time variant variables for the years 2000 to 2011. Four tests are administered: Simple Regression (one variable and four variable summaries), Fixed Effect, Random Effect, and Hausman test.

The analysis indicates that it is "strongly balanced" which refers to the fact that all countries have data for all years. Ideally, one would want to have a balanced dataset.

Simple Regression, One Variable at a time Summary

	Coef	*t*	*P*	*F*	*P*	R^2
lvg	-6.08e+09	-7.04	.0000	49.53	.0000	.2068
ca	1.61e+08	10.83	.0000	117.20	.0000	.315

Based upon the test run, both ***lvg*** and ***ca*** are highly significant,

Simple Regression, Four Variables Summary

	Coef	*t*	*P*	*F*	*P*	R^2
				63.74	.0000	.4028
lvg	-2.32e+09	-2.60	.0000			
ca	1..37e+09	7.88	.0000			
cons	1.55e+10	.90	.978			

Based upon the test run, both ***lvg*** and ***ca*** are highly significant.

Fixed Effect

The fixed-effects (FE) method is used whenever you are only interested in analyzing the impact of variables that vary over time. FE explored the relationship between predictor and outcome variables within the country. Each country has its own individual characteristics that may or may not influence the independent/predictor variables. It is assumed that something within the country may bias the variables and need a control for this.

	Coef	*T*	*P*		*F*	*P*	R^2
					35.42	.0000	.3701
lvg	3.82e+08	.42	.067				
ca	1.14e+09	8.38	.0000				
cons	-5.18e+09	-.38	..703				
Rho				.7862			
F U=0					38.55	.0000	

The Fixed-effect model omits all time-invariant factors. We then can compare the coefficient of the variables to see whether ***lvg*** and ***ca*** improve growth in ***gdp***. *"The key insight is that if the unobserved variable does not change over time, then any changes in the dependent variable must be due to influences other than these fixed characteristics"* (Stock and Watson, 2003). In the case of time-series cross-sectional data the interpretation of the beta coefficients would be *"...for a given country, as X varies across time by one unit, Y increases or decreases by β units"* (Bartels and Brandom, 2008).

Since the probability of the F is .0000 then we determine that the model is ok. The test indicates that only ***ca*** is significant. The Rho is the intra-class correlation, and tells you the average correlation of variables within the countries The Rho is .7862 indicating how much of the variance is due to the differences across the panels.

Random Effect

If one has reason to believe that differences across countries have some influence on the dependent/predictor variable then the random effects model is appropriate. The rationale behind random effects model is that, unlike the fixed effects model,

the variation across countries is assumed to be random and uncorrelated with the predictor or independent variables included in the model: "...the crucial distinction between fixed and random effects is whether the unobserved individual effect embodies elements that are correlated with the regressors in the model, not whether these effects are stochastic or not" (Green, 2008). The random effects assumption is that the individual specific effects are uncorrelated with the independent variables.

	Coef	*Z*	*P*		*Chi2*	*P*	R^2
					79.22	.0000	.3809
lvg	2.40e+07	.03	.978				
ca	1.17e+09	8.76	.000				
cons	-2.33e+09	-.13	.899				
Rho		0		.7788			
F U=0					50.12	.0000	

Since the probability of the F is .0000 then we determine that the model is ok. The test indicates that only ***ca*** is very significant. The Rho is .00 indicating how much of the variance is due to the differences across the panels.

Hausman Effect Model

To decide between fixed or random effects, you can run a Hausman test where the null hypothesis is that the preferred model is random effects vs. the alternative the fixed effects (Green, 2008). It basically tests whether the unique errors are correlated with the regressors.

	Fixed Coef	*Rndm Coef*	*Diff*	*Chi2*	*P*
lvg	3.82e+08	2.40e+07	3.58e+08		
ca	1.14e+09	1.17e+09	-2.76e+07		
				2.05	.3583

Since the Prob > chi2 (.3583) then we cannot conclude that the fixed effect model is useful and we have to depend upon the random effect model. As indicated above, the test indicates that only **ca** is highly significant.

Conclusion

The random effect, confirmed by the Hausman test, indicates that of the two proxies for explanatory/predictor variables – ***lvg*** and ***ca***, only ***ca*** is significant enough to be used in creating an estimate. Domestic credit provided by the banking sector includes all credit to the numerous business sectors. The banking sector includes monetary authorities, commercial and retail banks, as well as other banking institutions like savings and mortgage loan institutions and building and loan associations.

It is logical and rational that the growth in the number of domestic banking enterprises would fuel economic development. Though not a complete picture of capital formation, the increase in the number of financial institutions should reflect successful first stage growth in businesses.

The study indicates support for the Finance-Led Growth Theory in general and a very strong relationship between the expansion of commercial banking and economic development. We can conclude that the financial sector efficiently distributes funds among various economic activities that foster innovation and technology.

Future research pertaining to the Finance Led Theory might include: a) the search for more descriptive proxies centered around small business loans and new business formation, b) the gathering of data from sources that go deeper than twelve years, c) increased the number of panels, d) pool data to review cultural/political factors that retard or enhance the growth of commercial banking, and e) review the effects of externalities in causing the creation of new debt products.

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Global Equity Market Driven Currency Trading Strategy

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Abstract

This paper analyzes the impact of global equity markets on currency prices. A simple currency trading rule based on global returns is tested. Preliminary results indicate that global equity markets returns provide information useful in implementing a daily currency trading strategy.

Introduction

The increased globalization of financial markets during the last decade has led investors and traders to become more involved in international markets for a variety of reasons including the expectation of higher return, risk minimization, increase exposure to new markets, and diversification. At the same time, multinational corporations are listing their stocks overseas where they operate resulting in increased correlation among equity markets around the world. For example, if the European markets reacts in a certain way, American markets follow, and then Asia follows America. The stock markets are open for 8 hours on average. However, they are not open at the same time. According to Eastern Time (ignoring DST), Asia opens at 8 PM (Japan, Australia, China, and Hong Kong) and closes at 2 AM. Europe (Germany, France, and Switzerland) starts at 3 AM and closes at 11 AM. America (United States and Canada) opens at 9.30 AM and closes at 4 PM. Foreign exchange markets runs for 24 hours a day 5 days a week. Information in one market can lead to expectations of another market when it opens. This information in equity markets provides information about currency prices that can be used to implement simple daily currency trading strategies.

Literature Review

The relationship between equity and currency markets has received considerable attention in the literature. Merton's (1973) intertemporal capital asset pricing model (ICAPM) predicts that investors want to hedge their exposure to stock market volatility because increasing volatility indicates lower quality investment opportunities. Foreign exchange volatility should forecast equity returns as increased foreign exchange volatility implies poorer investment opportunities. Gua, Neely, and Higbee (2008) found that Japanese yen volatility is priced independently of equity market volatility and caries a negative risk premium. Dornbusch and Fischer (1980) suggested that fluctuations in exchange rates influence the competitiveness of the firm in the market, as the variation in the exchange rate affect the value of the earnings and the cost of financing, which is borrowed in terms of foreign currencies to finance their operations and therefore the stock prices of the firm. According to Mao and Kao (1990), if an economy is export oriented the stock prices in such economy is inversely affected by exchange rate appreciation. All of these studies use exchange rate information to predict stock returns. We extend this literature by investigating whether equity market returns can predict currency movements.

Tauchen and Pitts (1983) developed a speculative trading model in which linkages between two markets are driven by a common information effect or a spillover effect. Common information can drive an innovation in each market. As markets open throughout the day this common information predicts market movements. A spillover effect occurs when a position in one market is used to offset a position in another market. Treepongkaruna and Gray (2009) found a volatility spillover effect from one market to another as the information is priced with a lag as different markets open and close throughout the day. Both of these effects describe how movements in one market predict movements in another.

Zia and Rahman (2011) found that the stock market index and currency exchange rate determine each other and there is a dynamic relationship between the two. Li and Huang (2009), Bahmani-Oskooee & Sohrabian's (1992) and Chien-Chung Nieth & Cheng-Few Lee's (2001) supported the idea for the short run.

We hypothesize that equity market returns provide information on short term exchange range movements and that this information can be used to create a simple currency trading strategy. Exchange rates have been shown to impact the market value of companies. Mehrara and Oryoie (2012) argued that efficiency of foreign exchange markets have fallen after the financial crisis of 2008 for reasons such as governments' interventions in the foreign exchange market causing speculators to encounter with economic losses, and consequently many of the speculators left the foreign exchange market, and this sharp reduction in speculative activity lead to a great reduction in the efficiency of the market. As a result, they rejected Efficient Market Hypothesis after the crisis.

We will investigate currency and equity markets from 2010 through 2012 to identify market inefficiencies. Market fundamentals and equity market returns will be used to create a daily currency trading strategy to take advantage of any market inefficiencies. Longworth (1981) also concluded that the markets are not efficient. Moreover, Beillie and Bollerslev (1991) found high volatility during the opening hours of principal foreign exchange markets and the reason is said to be the junction of the afternoon London session with the New York morning session.

Here's a scenario. European Union agrees to bail out Greece and everybody is optimistic, so the European Markets surges by 2% and closes. When the U.S. markets open, it starts with positive 1% (after pre-market trading) and ends up increasing by approximately 2%. Then, Asia follows. This is an ideal situation which may not always happen but the correlation is always there.

There are certain issues that might affect the correlation inversely. For example, economic data such as GDP growth or political instability. Going back to the example above, this might lead to U.S. markets going south. In such case, Asia and Europe would follow America. Treepongkaruna and Gray (2009) stated that macroeconomic news, such as the US Federal Reserve's decision to change interest rates or monetary policy, can have a significant impact on the US dollar-denominated rates of a number of currencies. This correlation causes currency prices to move in a certain anticipated way. Research conducted previously, Frank and Young (1972), Jorion (1990, 1991), Bodnar and Gentry (1993), and Bartov and Bodnar (1994), concluded that there are no correlations between equity and foreign exchange markets but their research were done years ago and used different set of data and different methods. Franck and Young (1972), Solnik (1987), Chow et al. (1997) had similar statements.

Few authors such as Aggarwal (1981), Giovannini and Jorion (1987), and Roll (1992) found the correlation to exist. Moreover, Burt, Kaen and Booth (1977) argued realized foreign exchange volatility forecasts stock returns in both US and international markets. Because there is a lag in impact between the equity markets in different regions around the world, currency prices tend to react after such lag has passed.

Data

Majority of returns data were collected from Bloomberg terminal with Excel for Bloomberg and the rest from Yahoo Finance. Monthly from 2001 to 2012, daily data are dated from 2008 to 2012 and intraday for Dec 2012 only. Data that were not in the form of percentage returns were used to calculate percentage returns.

Economic data are collected from various websites. Monthly CPI and Unemployment Rate data are collected from U.S. Department of Labor, Bureau of Labor Statistics website. Monthly Federal Funds Rate data are collected from Board of Governors of the Federal Reserve System website.

Table 1: List of Data Collected

Stock Market Returns			
S&P/ASX	Nikkei 225	Shanghai Composite	Hang Seng Index
FTSE100	EuroStoxx50	DAX	CAC40
SMI	S&P/TSX	Dow Jones	S&P500
Nasdaq			
Metal Returns			
Gold (XAU/USD)	Silver (XAG/USD)		
Currency Returns			
Dollar Index	EUR/USD	GBP/USD	AUD/USD
USD/JPY	USD/CHF	USD/CAD	
Volatility Index Returns			
VIX			
Energy Index Returns			
S&P500 Energy			
Economic Data			
CPI	Unemployment		

Methodology

We used European stock market indexes (FTSE100 and EuroSTOXX50) and American stock market indexes (DOWJONES and S&P500) as control variables to generate trading signals for EURUSD (E/U). We used intraday data (30 minutes interval) from 8/15/2012 till 2/20/2013 from Bloomberg to back-test the trading strategy. Signals are generated anytime between 3:00 AM and 4:00 PM Eastern Time while European and American markets are open.

The theory is whenever markets go up or down by a certain percentage, EURUSD follows with a lag. For example, if at 6:00 AM EuroSTOXX50 has fallen by 2% from previous day close, we would sell EURUSD. Trades would be close right before the American markets close.

Results

The following table lists the trades based on 2.0% increase or decrease in index and the returns on those trades (excluding commissions).

Table 2: Result Based on 2%

Date/Time	Signal	E/U Trade	Price	Close	Return
9/6/2012 9:30 AM	STOXX50 = +2.77%	Long	1.2579	1.2631	52 Pips
9/14/2012 5:00 AM	STOXX50 = +2.10%	Long	1.3033	1.3128	95 Pips
9/26/2012 6:00 AM	STOXX50 = -2.01%	Short	1.2864	1.2869	-5 Pips
9/28/2012 11:30 AM	STOXX50 = -2.07%	Short	1.2856	1.2847	9 Pips
10/16/2012 9:30 AM	STOXX50 = +2.30%	Long	1.3016	1.3049	33 Pips
10/23/2012 10:00 AM	STOXX50 = -2.27%	Short	1.3012	1.2974	38 Pips
11/7/2012 10:30 AM	DOWJONES = -2.26%	Short	1.2762	1.2762	0 Pips
11/19/2012 9:30 AM	STOXX50 = +2.25%	Long	1.2772	1.2808	36 Pips
1/2/2013 4:30 AM	STOXX50 = +2.24%	Long	1.3272	1.3172	-100 Pips
2/4/2013 10:30 AM	STOXX50 = -2.64%	Short	1.3571	1.3529	42 Pips
				Total Pips	**200**
				Total Trades	10
				Positive Trades	7
				Negative Trades	2

The following table lists the trades based on 1.5% increase or decrease in index and the returns on those trades (excluding commissions).

Table 3: Result Based on 1.5%

Date/Time	Signal	Trade	Price	Close	Return
8/22/2012 11:30 AM	STOXX50 = -1.51%	Short	1.2471	1.2517	-38 Pips
8/31/2012 11:30 AM	STOXX50 = +1.54%	Long	1.2578	1.2582	4 Pips
9/4/2012 10:00 AM	FTSE100 = -1.62%	Short	1.2572	1.2562	10 Pips
9/6/2012 8:00 AM	STOXX50 = 1.63%	Long	1.2622	1.2631	9 Pips
9/14/2012 3:00 AM	STOXX50 = +1.66%	Long	1.3032	1.3128	98 Pips
9/26/2012 3:30 AM	STOXX50 = -1.70%	Short	1.2875	1.2869	6 Pips
9/28/2012 11:00 AM	STOXX50 = -1.79%	Short	1.2842	1.2847	-5 Pips
10/1/2012 10:00 AM	FTSE100 = 1.56%	Long	1.2890	1.2889	-1 Pips
10/5/2012 9:00 AM	STOXX50 = +1.59%	Long	1.3012	1.3036	24 Pips
10/16/2012 7:30 AM	STOXX50 = +1.77%	Long	1.3006	1.3049	43 Pips
10/19/2012 1:30 PM	S&P500 = -1.65%	Short	1.3031	1.3028	3 Pips
10/23/2012 8:00 AM	STOXX50 = -1.55%	Short	1.3038	1.2974	66 Pips
11/7/2012 9:30 AM	STOXX50 = -1.62%	Short	1.2815	1.2762	53 Pips
11/19/2012 8:00 AM	STOXX50 = +1.62%	Long	1.2766	1.2808	42 Pips
1/2/2013 3:30 AM	STOXX50 = +1.76%	Long	1.3267	1.3172	-95 Pips
2/4/2013 8:00 AM	STOXX50 = -1.70%	Short	1.3592	1.3529	63 Pips
2/6/2013 8:30 AM	STOXX50 = -1.67%	Short	1.3544	1.3512	32 Pips
2/19/2013 9:30 AM	STOXX50 = +1.70%	Long	1.3337	1.3382	45 Pips
				Total Pips	**359**
				Total Trades	18
				Positive Trades	14
				Negative Trades	4

The following table lists the trades based on 1.0% increase or decrease in index and the returns on those trades (excluding commissions). Due to table size limitation, we are showing every tenth trade below.

Table 4: Result Based on 1%

Date/Time	Signal	Trade	Price	Close	Return
9/6/2012 3:30 AM	STOXX50 = +1.11%	Long	1.2615	1.2631	16 Pips
9/26/2012 3:00 AM	STOXX50 = -1.27%	Short	1.2872	1.2869	3 Pips
10/19/2012 10:00 AM	STOXX50 = -1.10%	Short	1.3047	1.3028	19 Pips
11/9/2012 7:30 AM	STOXX50 = -1.16%	Short	1.2744	1.2710	34 Pips
12/18/2012 12:30 PM	S&P500 = 1.09%	Long	1.3179	1.3227	48 Pips
2/5/2013 6:00 AM	STOXX50 = 1.01%	Long	1.3514	1.3592	78 Pips
				Total Pips	**1367**
				Total Trades	66
				Positive Trades	47
				Negative Trades	17

Even though returns generated on these trades may seem low; however, foreign exchange trades are leveraged trades with leverage of up to 50 times on major currency pairs in the United States. If we had a $1,000 account, we would be able to trade $50,000 worth of contracts.

Based on 2% change as indicator, if we had traded on a $1,000 account and went long or short $10,000 worth of contracts every time, we would be losing or gaining $1 for every pip movement. As a result, 200 pips would earn us $200, which is 20% return in approximately 6 months. The following table illustrates trading results of a $1,000 account on the basis of %2 change in underlying indices. These are based on the assumption that we did not alter trade size and there are no trading costs such as commission.

Table 5: Trading Results on a $1,000 Account Based on 2% change

Opening Balance	Margin	Trade Size	Δ Price	Profit	Closing Balance
$1,000	$50,000	$10,000	0.0052	$52	$1,052
1,052	52,600	10,000	0.0095	95	1,147
1,147	57,350	10,000	-0.0005	-5	1,142
1,142	57,100	10,000	0.0009	9	1,151
1,151	57,550	10,000	0.0033	33	1,184
1,184	59,200	10,000	0.0038	38	1,222
1,222	61,100	10,000	0.0000	0	1,222
1,222	61,100	10,000	0.0036	36	1,258
1,258	62,900	10,000	-0.0100	-100	1,158
1,158	57,900	10,000	0.0042	42	1,200
			Total	$200	
			ROI	20%	

A 1.5% change as signal would generate approximately 36% over the same period.

Table 6: Trading Results on a $1,000 Account Based on 1.5% change

Opening Balance	Margin	Trade Size	Δ Price	Profit	Closing Balance
$1,000	$50,000	$10,000	-0.0038	-$38	$962
962	48,100	10,000	0.0004	4	966
966	48,300	10,000	0.0010	10	976
976	48,800	10,000	0.0009	9	985
985	49,250	10,000	0.0098	98	1,083
1,083	54,150	10,000	0.0006	6	1,089
1,089	54,450	10,000	-0.0005	-5	1,084
1,084	54,200	10,000	-0.0001	-1	1,083
1,083	54,150	10,000	0.0024	24	1,107
1,107	55,350	10,000	0.0043	43	1,150
1,150	57,500	10,000	0.0003	3	1,153
1,153	57,650	10,000	0.0066	66	1,219
1,219	60,950	10,000	0.0053	53	1,272
1,272	63,600	10,000	0.0042	42	1,314
1,314	65,700	10,000	-0.0095	-95	1,219
1,219	60,950	10,000	0.0063	63	1,282
1,282	64,100	10,000	0.0032	32	1,314
1,314	65,700	10,000	0.0045	45	1,361
			Total	$361	
			ROI	36.1%	

Using 1%, the trading system would generate 140%.

Table 7: Trading Results on a $1,000 Account Based on 1% change

Opening Balance	Margin	Trade Size	Δ Price	Profit	Closing Balance
943	47,150	10,000	0.0016	16	959
1,141	57,050	10,000	0.0003	3	1,144
1,525	76,250	10,000	0.0019	19	1,544
1,790	89,500	10,000	0.0034	34	1,824
1,935	96,750	10,000	0.0048	48	1,983
2,058	102,900	10,000	0.0078	78	2,136
			Total	$1367	
			ROI	136.7%	

We had access to 6 months intraday in Bloomberg, from August 16, 2012 till February 20, 2013, and this strategy worked during that period.

Conclusion

The following tables provide summary statistics of returns such as mean, standard deviation, total number of trades, positive and negative trades.

Table 8: Summary Statistics of Trading Results

	2% as Indicator	1.5% as Indicator	1% as Indicator
Mean Returns (Per Trade)	1.93%	1.78%	1.36%
Standard Deviation	4.42%	3.74%	3.11%
Total Trades	10	18	66
Positive Trades	7	14	47
Neutral Trades	2	4	17

The table above illustrates that this strategy works. There are other dependent and independent variables that we have not tested based on this strategy. Different variables require different trading methods and each methods need to be tailored to turn it into a winning strategy. There could be times where the method we tested may not work and would require changes in

the system. We can conclude that the relationship exists between equity and currency markets, and there's a lag in impact of one on the other which can be used to generate good returns on investments.

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Does Principal-Agent Or Principal-Principal Conflicts Impact The Performance Of Islamic Banking?

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Abstract

Firms in developing economies suffer an agency conflict called principal-principal (PP) conflict, distinct from the traditional principal-agent (PA) conflicts usual in developed economies. In the Islamic banks, little is known, and PP is usually ignored in mainstream research. Using five years of panel data from 37 banks across ten countries, this paper investigates the existence of conflicts and their impact to the banks' performances. Results show that PA is the main concern, with inconclusive results for PP conflicts. This cross-country study helps to establish the existence of agency conflicts in Islamic banking and increases knowledge of principal-principal conflicts.

Introduction

Does principal-agent (PA) and principal-principal (PP) conflicts impact the performance of Islamic banking? This is the central question this paper will address. The well-researched issue within PA is conflicts between shareholders and managers, where managers are not maximising company's wealth according to the shareholders objectives. While the majority of research considers the conventional banking environment, very little is known about the context of shareholder conflicts within the scope of corporate governance within Islamic banking. This is even though it is suggested that with the exception of shariah governance compliance, the corporate governance in an Islamic financial institutions is similar in all aspects with the conventional financial institutions (Grais & Pellegrini, 2007).

Islamic bank is a business where lending will not be its regular business. Entitlement to profit is linked with the liability of risk of lost that comes with the capital itself. Profit is earned by sharing the risk and reward of ownership through the pricing of goods, services or benefits. (Ayub, 2007). The early discussion on the banking theory highlights that both *mudarabah* and *musharakah contracts* constitute the foundation of the Islamic banking system. In addition, both contracts are potentially be able to distribute the wealth fairly. Nevertheless, similar to other conventional bank when the operation of Islamic banks create multiple relationships between agent and principal. By having, funds and skill, Islamic bank can act as agent and principal at the same time. Nevertheless, according to the Ismile (2010) this multiple relationship might also create the principal–agent problem. This problem arises under conditions of incomplete and asymmetric information when, for example, a principal hires an agent, the problem may arise that the two may not have the same interests, while the principal is, presumably, hiring the agent to pursue the interests of the former.

However, PP conflicts have been argued by Young, Peng, Alhstrom, & Bruton (2003) as the major and prevalent concern in emerging markets. Broadly, PP refers to conflicts between controlling shareholders and minority shareholders in a company which may results lowering the shareholders' overall wealth. minority shareholders in a company (Dharwadkar, George, & Brandes, 2000). Developed market views finds that increasing ownership concentration and aligning ownership and control are mechanisms for mitigating agency conflict between shareholders and managers (Anderson & Reeb, 2004). Although this concentrated ownership mitigates principal-agent (PA) agency conflict in large companies in developed markets, this concentrated ownership may worsen agency conflict in emerging market firms ((Lin & Chuang, 2011). In emerging markets, concentrated ownership, weak institutional protection for minority shareholders and a lack of information disclosure all enhance window-dressing, tunneling and expropriation of minority shareholders from majority shareholders (Lin & Chuang, 2011).

Ideally, PA and PP problems suffered in the corporate world should not exist in an Islamic environment. This is due to the fact that in an Islamic economic system, men and women are trusted to manage these resources under their care with full knowledge that all resources in the world belong to the Almighty God, and, as such have associated consequences. Human beings are required to follow two main aspects being 'religious beliefs and means of sustenance/material resources" (Ayub, 2007, p. 25).

As such, Muslims, according to the Creator's laws, must abide by His rules so all individuals including Government and the public can earn their resources within a just and equitable manner (Ayub, 2007, p. 33). It is universally believed that good will be endowed with goodness, and thus generate a sustainable long term growth for corporations, responsibilities lie with those individuals or groups to work for a just distribution of wealth in society.

"Believe in Allah and His Messenger and spend out of that in which He has made you successors. For those who have believed among you and spent, there will be a great reward." (Al Quran, :7)

This paper aims to shed some light on the question of whether the existence of PA and PP conflicts are being reflected in practice in an Islamic corporation. Islamic banking was chosen as a framework in which to conduct this study as the practice of Islamic finance is implemented here and the assumption that all other aspects, especially in the corporate governance of Islamic practices, should be embodied within these corporations.

When banks are different from the conventional setting, agency and governance mould into a more intricate situation than in a conventional model Safieddine (2009). This research builds that the author's attempt to explore these issues in an empirical manner. A unique area of agency theory in the Islamic banking context is the fact that agents/large shareholders must make decisions based on the objectives of maximising wealth, but they must also comply with the strict requirement of placing all supplied funds in Sharia (Islamically compliant) based investments.

Two key aspects which make the Islamic context distinct from the conventional duties of agents/principals of firms are maximising value of shareholders' investments, and also to adhering to the objectives in a Sharia-compliant manner[xxxii] (Archer, Ahmad, & Al-Deehani, 1998). Islamic banking or Islamic finance refers to as "a state of affairs wherein the financial institutions and the clients have to fulfil the relevant principles of Islamic jurisprudence - some conditions have been put in place to ensure that contracts do not contain the elements of Riba[xxxiii], Gharar[xxxiv] and Qimār[xxxv] – the main prohibitions as discussed in Islamic law" (Ayub, 2007, p. 96).

Literature Review and Hypothesis Development

Principal-Agent vs. Principal-Principal Conflicts

In the conventional finance and economics discipline, Berle and Means (1932) link the concept of a corporation being widely held and that ownership becomes more dispersed across a large number of small public companies. This dispersion of ownership gives rise to increased control for the management team, referred to by Jensen and Meckling (1976) as the divergence of interest or principal-agent (PA) conflicts.

The agency problem occurs in companies where managers take direct or indirect financial benefits at the expense of maximising the shareholders' wealth. Examples include on-the-job consumption of company assets for own benefits, redirecting corporate assets to personal accounts and non-profitable investment decisions. These researchers further suggests that large shareholders[xxxvi] are a good internal mechanism to reduce PA agency costs as they have higher incentives and more resources to efficiently monitor the company's performance (Jensen & Meckling, 1976; Schleifer & Vishny, 1986).

Ang, Cole, & Lin (2000) prove their hypothesise that in companies with dispersed ownership and having less monitoring system from the owners may cause serious implications to PA conflicts. They measure these conflicts by the ratio of operating expenses to the annual sales of companies that capture the excessive expenses incurred by the agents/managers.

Dharwadkar et al. (2000) stress that the traditional agency solutions to mitigate the principal-agent (PA) conflicts in developed economies are not necessarily effective in emerging economies due to that there being occurrences of other unique conflict. The two different situations associated with different types of ownership and control may give rise to the PA and principal-principal (PP) conflicts (Dharwadkar et al., 2000; Young, Peng, Ahlstrom, Bruton, & Jiang, 2008).

In the context of PP conflicts, the underlying factors of information asymmetry, moral hazard and adverse selection in PA conflicts still prevail, but the problems lie mainly in the conflict between large and small shareholders (Su, Xu, & Phan, 2008). In other words, PP conflict occurs between owners/principals themselves, or in precise between majority and minority shareholders.

Large shareholders are needed to monitor manager and look for actions to maximise firm's wealth (Shleifer & Vishny, 1986). It also mentioned that agency considerations may also be the solution to the dividend puzzle brought famous by Black (1976) in optioning for the best dividend policy. For an effective legal protection for minority shareholders, dividend payments may bring down the agency conflicts of PA (La Porta, Lopez-De-Silanes, & Shleifer, 2000).

However, this issue has raise another problem of PP where large shareholders may expropriate cash holding through payments of dividends for own benefits (Chiou, Chen, & Huang, 2010). There is literally a vacuum of research for this issue in banking studies. A study by Banchit & Locke (2011) has found that there is evident that PP conflicts in the developing markets of Asian market by large shareholders paying higher dividends at the expense of the companies' growth.

Lower dividends may also indicate PP conflicts Large shareholders expropriate by paying out less dividends to keep resources in the company and within their control (Easterbrook, 1984; Faccio, Lang, & Young, 2001; La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2000) and likely to accumulate more cash (Mancinelli & Ozkan, 2006).

Performance Of Islamic Banking

Suleiman (2000) sums in his paper that the Islamic banking must adhere to two main features that form the basis of its corporate governance, vis-a-vis, "rules from the Holy Qur'an and meeting the expectations of Muslim community by providing Islamically-acceptable financing modes' which are different from the interest-based borrowing and lending."

Due to these natures of adhering to strict principles of Islamic requirement, Islamic banking should portray a vast difference in its dynamics of day to day operations and relationships among related parties.

Many studies focusing in conventional banks state the importance of ownership to its performance and efficiency. A study of banks by Claessens, Demiguc-Kunt, & Huizinga (2001) in eighty developing and developed countries conclude that foreign shareholders help improve the overall banks' performances. Other studies also support that in developing countries, foreign owned banks perform better than domestic state-owned banks as shown by increased in their returns due to lower overhead cost incurred (Bonin, Hasan, & Wachtel, 2005; Micco, Panizza, & Yanez, 2004). Domestic state-owned banks located in the developing region of South and East Asia, Latin America and Eastern Europe seem to incur the lowest profits with higher non-performing loans as compared to the foreign owned banks. Another study in eleven transition economies by Bonin and colleagues (2005) also find that foreign-owned banks perform better.

Many studies use conventional approach to measure performance of banks. In Islamic banking, some study also utilises financial performance indicator (Bashir, 2001; Kuppusamy, Saleh, & Samudhram, 2010) which are return on asset (ROA). By adopting to the traditional financial indicator, both risks and returns can be captured (Tarawneh, 2006). Bashir (2001) also claims in his research the importance of certain bank characteristics that can be the determinants of Islamic banks. These include capital and liquidity ratios, risk and leverage.

Data and Methodology

In this section, the set of variables expected to affect the performance of Islamic banks are explained and controlled in the regression analysis. Leverage, overhead, loan and liquidity ratios, bank size and large shareholdings are used as control variables.

Table 1: Number of Islamic banks and country

Country	Number	Percent
United Arab Emirates	7	16.67
Bahrain	3	7.14
Egypt	3	7.14
Great Britain	1	2.38
Hong Kong	1	2.38
Jordan	2	4.76
Malaysia	10	23.81
Pakistan	3	7.14
Qatar	7	16.67
Saudi	5	11.9

Islamic banks financial data are collected each year in the 2005 – 2010 periods from Thomson One Banker database. The original number of Islamic banks as described by Thomson database as shariah-compliant generates 53 banks. The numbers of banks for this study remain at 37 banks across ten countries and 190 observations after eliminating banks with missing ownership and dividend data. With the exception of developed countries of Great Britain and Hong Kong, all the other countries are categorized by the International Monetary Fund (2011) as developing. The full sample is shown in Table 1 above.

Table 2: Variables definitions and sample descriptive statistics

Dependent variable	Definition	Mean	Standard Deviation
ROE	Return on Equity	16.91291	55.11221
ROA	Return on Assets	1.994516	5.105648
Principal-Agent Conflicts			
OpExpSales	Operating expenses to Sales	0.705975	0.225412
Principal-Principal Conflicts			
DPO	Dividend payout	27.41515	25.61738
DY	Dividend Yield	4.856636	23.31318
CDCF	Ratio of Cash Dividend Cash Flows	30.19524	33.52552
cdta	Ratio of Cash Dividend Total Assets	0.810014	13.59608
Control Variables			
TDTA	Ratio of Total Debt to Total Assets	13.79175	10.70636
EPS	Earnings Per Share	0.447878	0.748342
SalGr	Sales Growth	22.13273	38.56395
TAGr	Total Assets Growth	20.29226	21.5974
TLTA	Ratio of Total Loan to Total Assets	71.25431	13.75032
TLTD	Ratio of Total Loans to Total Deposit	404.2841	2937.342
NonInt~c	Non-Interest Income to Total Assets	21.53982	8.231611
LDTC	Ratio of Long term debt to Total Capital	19.40024	18.61229
LS	Largest shareholder	0.3721429	0.2287977
For_1	Foreign as largest shareholder equal 1		
lgta	Log of Total Assets	9.876571	0.5736742

The definition of Islamic bank taken for this study includes banks with branches that operate side-by-side with conventional bank. Malaysia has the highest number of Islamic banks followed by Qatar and United Arab Emirates.

The main explanatory variables for performance are return on assets (ROA) and return on equity (ROE). As the results are similar, models using ROA will be explained here according to past studies(Bashir, 2001). Brief descriptions of how the variables are constructed with the summary statistics are shown in Table 2 above.

PA conflicts is being proxied using ratio of operating to sales (OpExpSales), while dividends for PP conflicts. These conflicts, if they do exist in the Islamic banks will show either or both PA and PP to be negatively related to performance. For robustness, four dividend variables are used to capture this PP effects. Other control variables that may affect Islamic bank performances which are size (log of Total Assets), risks (sales growth), capital (ratio of total loan to total assets and total deposits), liquidity ratios (Non-Interest income to total Assets), leverage (ratio of total debt total assets), large shareholders (LS), foreign ownership (forgn_1) and country dummies.

The assumptions related to regression analysis were examined before proceeding with the analysis of the data. The initial distribution exhibited both heteroscedasticity as with most of cross-sectional data (Green, 1993) and autocorrelation problem as with time series. Therefore, to fit the balanced panel-data estimation technique, feasible generalised least square (FGLS) method is performed in Stata 11 software (Stata Press, 2009). This method allows data to be transformed algebraically to eliminate the errors from the violation of regression assumptions.

The main equation is as follows

$$Y_{it} = \alpha_1 + \beta_2 PA_{it} + \beta_3 PP_{it} + \beta_4 X_{it} + \omega_{it} \quad (1)$$

Where Y_{it} denotes the dependent variable (ROA or ROE) in company i at time t, PA_{it} and PP_{it} are the conflicts between principal-agent (PA) and principal-principal (PP), and X_{it} the vector of control variables. The composite ω_{it} denotes the company specific error component ε_i and the combined cross section and time series error component of μ_i (Baltagi, 2005).

Estimation Results

The descriptive statistics of the variables shown in Table 2 above shows that the ROE and ROA of these banks are at ratios of 16 and 2 consecutively. The sizes of these banks were relatively similar with very minimal standard deviation between the samples. Average percentage of largest shareholder in these banks is at 37 percent. This differs very much in terms of largest shareholding found in Asean 4 companies at 64 percent in Banchit and Locke (2011) study.

Table 3 below shows the correlation matrix between the variables in the study.

Table 3: Correlation matrix of variables

Variables	ROA	ROE	OpExpSa	DPO	TDTA	EPS	SalGr	TAGr	TLTA	TLTD	LDTC	fcfta	NinTA	NintSA	LS	For_1	lgta
ROA	1																
ROE	0.59	1															
Op. ExpSa	-0.7731	-0.5906	1														
DPO	0.1165	0.098	-0.1853	1													
TDTA	0.0322	-0.1826	0.0132	0.1602	1												
EPS	0.5501	0.4525	-0.4837	0.2342	0.0138	1											
SalGr	0.3602	0.2618	-0.3104	-0.1896	-0.093	0.1283	1										
TAGr	0.2911	0.2401	-0.2112	-0.1361	-0.0442	0.1906	0.5887	1									
TLTA	0.2309	0	-0.2123	0.0829	0.2781	0.0341	-0.0349	-0.1142	1								
TLTD	0.2694	-0.0273	-0.2013	0.0457	0.2316	-0.0364	-0.0555	-0.052	0.2399	1							
LDTC	-0.0745	-0.1307	0.0595	0.2135	0.6636	-0.0403	-0.0907	-0.1218	0.2634	0.0157	1						
fcfta	0.2983	0.1262	-0.2121	-0.0694	0.0994	0.1644	0.0615	-0.0724	0.2868	0.1335	0.0549	1					
NinTA	0.4357	0.2448	-0.2366	-0.2069	-0.1381	0.2459	0.4823	0.1956	-0.0822	-0.0558	-0.1577	0.0523	1				
NintSA	0.2965	0.2239	-0.201	-0.1629	-0.1023	0.2699	0.3433	0.1631	-0.1265	-0.1685	-0.1031	-0.0145	0.7635	1			
LS	-0.1964	-0.0363	0.1819	-0.2453	-0.0708	-0.2719	0.0043	-0.0176	-0.2063	0.0869	-0.1191	-0.069	-0.1511	-0.2389	1		
For_1	0.0017	0.08	-0.0558	0.0786	-0.058	0.0107	-0.0482	-0.0482	0.04	-0.0384	0.0215	-0.0234	-0.0448	-0.0233	-0.0344	1	
lgta	0.0327	0.0185	0.0617	0.0582	0.1022	-0.1517	0.0121	0.0694	0.044	0.0281	0.092	-0.0338	0.0355	0.0537	0.0725	0.0255	1

The GLS results are shown in Table 4 below.

The aim of the paper is to observe the sign and statistical validity of PA and PP conflicts of the coefficients of β_2 and β_3. It is hypothesised that the PA and PP conflicts may impact the performance - negatively influenced the profitability of Islamic banks.

Results reveal that the hypothesis that PA conflict is negatively related to performance of Islamic banks is true. OpExpSales is strong negative and statistically significant with ROA and ROE (not reported as results are similar). This shows that PA conflicts are much inherent in the Islamic banks as well as in other studies of capital markets (Ang et al., 2000; Michael Jensen & Ruback, 1983).

PP conflicts however, does not show significant result in the analysis except for Model 3 using cash dividend to cash flow. The predicted negative sign here also is also positively significant showing that the large shareholder may be the internal control to monitor the performance of these banks. This inconclusive result is also not surprising as the levels of large shareholders in these Islamic banks are not too concentrated that may permit them to expropriate.

The other control variables that may impact performance show almost similar results to other studies. Capital (ratio of total loan to total assets and total deposits) and liquidity ratios (Non-Interest income to total Assets) show positive significant result with performance. However, risks and foreign ownership do not show significant outcome as predicted. This may be due to the fact that these banks are very large and mostly are domestically owned by various institutions.

Concluding Remarks

The empirical results from this paper have shed some lights to the extent of whether PA and PP conflicts have an impact to the performance of Islamic banks all over the world. Investigation was conducted in 37 Islamic banks in 10 countries covering over a period of 5 years of financial data using generalized least square regression method.

The ownership of these Islamic banks is not found owned by any large shareholders. Therefore, the hypothesis that PP conflicts exist is not proven conclusively. Ratio of cash dividend to cash flow may show that there is some level of PP conflicts and call for future research to understand why is not robust to other dividend metrics. However, data do instigate

that PA conflicts is prominent and should be a main concern in Islamic banking. This is due to the fact that results for PA proxy of operating expenses show an inverse and statistically significant to the dampening of Islamic banks' performances.

The paper has some limitations represented in the financial accounting data from the database. Also, the investigation of the PP and PA link with the performance is based on a small sample of Islamic financial institutions, limited to only five year performance metrics and may not be sufficiently robust.

It is hoped that the paper might initiate future research to extend the insights presented to other parts of the world. Despite these limitations, the paper's contributions are still significant as it takes a preliminary move in to an unexplored but growing area of research in principal-principal conflicts.

Table 4: PA and PA conflicts in Islamic Banks

VARIABLES	Model 1	Model 2	Model 3	Model 4
OperatingExpSales	-4.48***	-5.30***	-5.17***	-4.91***
	(0.411)	(0.412)	(0.505)	(0.371)
DPO	0.00			
	(0.003)			
DY		0.03		
		(0.020)		
CDCF			0.01**	
			(0.004)	
cdta				-0.00
				(0.005)
TDTA	0.00	0.01	0.01	0.00
	(0.008)	(0.009)	(0.010)	(0.009)
EPS	0.44***	0.37***	0.27*	0.42***
	(0.102)	(0.110)	(0.112)	(0.108)
SalGr	-0.00	-0.00	-0.00	-0.00
	(0.003)	(0.004)	(0.003)	(0.003)
TAGr	0.01*	0.01	0.01	0.01**
	(0.005)	(0.006)	(0.007)	(0.005)
TLTA	0.01	0.01	0.01	0.01
	(0.005)	(0.006)	(0.006)	(0.006)
TLTD	0.00**	0.00*	0.00*	0.00**
	(0.000)	(0.000)	(0.000)	(0.000)
LDTC	-0.00	0.00	0.00	0.00
	(0.005)	(0.006)	(0.006)	(0.005)
fcfta	6.08**	4.04	4.15	4.91*
	(2.249)	(2.784)	(3.310)	(2.376)
NinTA	68.35***	74.11***	66.27***	67.19***
	(13.318)	(15.462)	(15.047)	(14.039)
NintSA	-2.17	-1.45	-0.15	-1.95
	(1.370)	(1.582)	(1.557)	(1.410)
LS	-0.06	-0.11	0.61	-0.19
	(0.361)	(0.390)	(0.429)	(0.371)
For_1	-0.06	-0.07	-0.09	-0.00
	(0.214)	(0.227)	(0.225)	(0.225)
lgta	0.22*	0.20	0.17	0.17
	(0.111)	(0.121)	(0.130)	(0.117)
Cntry_dum	Yes	Yes	Yes	Yes
Constant	1.35	1.72	1.04	2.00
	(1.228)	(1.316)	(1.399)	(1.298)
Observations	178	174	155	190
Number of com	37	36	35	37

Notes: All regressions are fixed effects GLS on sample panel of Islamic banks in 10 countries from 2005 to 2010.
Standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05 statistically significance.

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The Effective Use Of The Bloomberg Terminal In A Finance Course

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Abstract

Developing projects for students that require them to use the Bloomberg terminal makes it possible for them to become familiar with the extensive set of financial analysis tools that are available on this terminal. There is a list of projects that have already been created on the Bloomberg terminal which are based on recent business news. This paper shows how to access these projects and provides a demonstration of the execution of a particular project using the tools available on the Bloomberg terminal.

Introduction

The Bloomberg terminal provides extensive financial data and tools to analyze this data. In order to familiarize students with the capabilities of this terminal, class projects could be created that require students to use the Bloomberg terminal. The Bloomberg terminal already has a long list of projects available that are based on recent business news. To access these projects, from the Bloomberg main menu select option 13) News and Research. From the News and Research menu select option 27) Functions for the Market. From the Functions for the Market screen, select option 4) All stories. This will bring up the list of projects. The project that we selected was posted on 2/19/2013 and was titled "Analyzing the Ascendancy of Emerging Market Banks in M&A". This project was based on a news report titled "Wall Street Fading as Emerging Market Banks Gain Share" written by Stefania Bianchi, Ambereen Choudhury and Michael J. Moore which appeared on the Bloomberg website on Feb 11, 2013. The report stated that investment banks based in Western Europe and the U.S.A. have lost market share in emerging economies to smaller domestic competitors according to data provided by Freeman and Co., a New York based consulting firm. This data is shown in Table 1.

The article by Bianchi et.al, suggested that global investment banks based in Europe and the US have lost market share in the emerging market countries due to regulatory and cost cutting pressures in the home countries. At the same time, investment banks in emerging market countries were able to increase their market share by following several strategies. They raised capital through issuing shares to fund their expansion. For example, BTG, Brazil's largest stock underwriter, reported in November 2012 that investment-banking revenue increased 59 percent to 148 million reais ($75 million) in the third quarter from a year earlier. The company, based in Sao Paulo went public in April 2012, selling shares in Sao Paulo and Amsterdam. Secondly, investment banks in emerging market countries hired bankers from larger firms and exploited contacts with governments and companies in their home countries. For example, Banco Itau BBA SA, which handles the investment-banking business of Sao Paulo-based Itau Unibanco Holding SA, hired financiers from Credit Suisse and UBS AG. Thirdly, investment banks in emerging market countries used acquisitions as a means of increasing their resources. In Russia, OAO Sberbank, once the Soviet Union's state-owned savings bank, in 2011 bought Troika, the country's oldest brokerage, for $1 billion to compete with VTB Capital and foreign firms in bond underwriting and stock trading.

Local investment banks have an advantage over the global investment banks because the majority of deals in the emerging market economies are local deals where local investment banks have superior knowledge, better networks and long-established client relationships. Western European banks have reduced lending to emerging markets as they try to recover from the Western European sovereign-debt crisis. In addition, the financial crisis of 2008 led to a liquidity shortage in the U.S.A. and Western Europe. This caused a shift in financial resources to the domestic markets. The situation was made worse by the introduction of new capital rules that required higher weightings on risky emerging market assets. Global investment banks responded by focusing on the largest, most complex, cross-border and regional transactions, where they can add the greatest value to their clients.

The Bloomberg Project

The purpose of the Bloomberg project was to examine the impact of the Dodd-Frank regulations which were signed on July 21, 2010 on the market share of the emerging market investment banks. Two periods were considered, the first from Jan 1, 2008 to July 20, 2010 and the second from July 21, 2010 to Feb 11, 2013. The Bloomberg project description gave step by

step instructions to replicate the data analysis that had been done in the project. The first step was to select the Merger and Acquisition Analysis screen. Next, we chose the following countries: Asia Pacific (Emerging), Latin America and Caribbean, Eastern Europe, Middle East and Africa. If the target, seller or acquirer was located in these regions, the deal was selected. A custom date range was then selected. The starting date was set to 7/21/2010, the signing of Dodd Frank. The end date was set to 2/11/2013 the date the report appeared on Bloomberg.com. The dates were applied to any deals which had amendment, completion and competing bid dates falling in this range. The League Table tab displayed the top financial advisers by market share rank. The results are shown in Table 3.

As the project suggested, we also ran the same search for the two and a half years before the signing of Frank-Dodd. We set the starting date to 1/1/2008 and the end date to 7/20/2010. Although the project description does not mention this, it is necessary to delete the previous date range or else that will also factor into the results. The investment banks from the emerging market economies are: VTB Capital, Banco BTG Pactual SA, Banco Itau BBA SA, China International Capital, Renaissance Capital Group and CITIC Securities Co Ltd. The results are shown in Table 4.

Conclusion

From table 4, we see that the market share of the emerging market investment banks in the top 20 investment banks by market share increased from 10.35% to 14.98% in the period after the passage of the Frank-Dodd act, thus adding credibility to the article by Bianchi, et. al. These results were not exactly the same as those in the Bloomberg project description because new data relevant to the time periods studied had become available subsequent to the time that the project was created and because we had decided not to use overlapping dates as described in the Bloomberg project.

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Appendix

Table 1: Investment Banks Market Share (%)

	Latin America		Middle East		Russia and Eastern Europe		China		India	
	2005	2012	2005	2012	2005	2012	2005	2012	2005	2012
U.S.A.	36	31	14	12	24	24	34	7	39	11
Western Europe	40	31	47	28	51	38	24	16	22	13
Regional	12	26	25	47	9	24	23	69	19	62

Table 2: League Table for deals occurring between 7/21/2010 and 2/11/2013

Adviser	Rank (Market Share)	Market Share (%)	Total Deal Size (USD, M)	Average Deal Size (USD, M)	Deal Count
Goldman Sachs & Co	1	13.9168	322929.4459	1251.664519	258
Citi	2	13.4722	312614.1948	1467.672276	213
Morgan Stanley	3	13.3551	309896.7891	1187.34402	261
Credit Suisse	4	12.6538	293622.8516	1091.534764	269
Bank of America Merrill Lynch	5	12.1593	282147.799	1730.968092	163
JP Morgan	6	10.3771	240793.7488	990.920777	243
Barclays	7	10.3493	240148.8219	2501.550228	96
Deutsche Bank AG	8	10.0112	232304.2369	1248.94751	186
Rothschild	9	9.0044	208940.4714	1009.374258	207
UBS	10	7.4518	172914.9422	1054.359403	164
HSBC Bank PLC	11	4.0749	94555.07752	710.940432	133
VTB Capital	12	3.5666	82760.92127	2177.918981	38
Lazard Ltd	13	3.544	82236.36145	790.734245	104
Banco Santander SA	14	3.4832	80824.60881	1122.564011	72
Banco BTG Pactual SA	15	3.4622	80337.12599	528.533724	152
Banco Itau BBA SA	16	3.2133	74563.74363	642.790893	116
China International Capital Corp	17	2.4702	57319.51159	830.717559	69
Nomura Holdings Inc	18	2.4514	56883.27886	646.400896	88
Standard Chartered Bank	19	2.313	53671.57346	813.205658	66
Renaissance Capital Group	20	2.2703	52680.2595	1145.223033	46

Table 3: League Table for deals occurring between 1/1/2008 and 7/20/2010

Adviser	Rank (Market Share)	Market Share (%)	Total Deal Size (USD, M)	Average Deal Size (USD, M)	Deal Count
Credit Suisse	1	12.3798	254679.0983	979.534993	260
Citi	2	11.5093	236772.1039	1101.2656	215
Morgan Stanley	3	11.4769	236105.5896	911.604593	259
JP Morgan	4	10.4605	215195.7686	867.724873	248
Bank of America Merrill Lynch	5	10.3843	213627.2225	1167.361872	183
Goldman Sachs & Co	6	9.1463	188158.6685	1069.083344	176
UBS	7	8.6683	178326.6061	1024.865553	174
Rothschild	8	7.0693	145431.2136	860.539726	169
Deutsche Bank AG	9	5.538	113929.7268	619.183298	184
China International Capital Corp	10	3.8597	79403.29521	1764.517671	45
Banco Santander SA	11	3.5769	73585.12774	1149.767621	64
Nomura Holdings Inc	12	3.5612	73261.4024	882.667499	83
BNP Paribas Group	13	3.2905	67691.73456	663.644457	102
Lazard Ltd	14	3.1365	64524.64894	837.982454	77
Barclays	15	2.9031	59723.24134	1571.664246	38
HSBC Bank PLC	16	2.6534	54585.64124	574.585697	95
CITIC Securities Co Ltd	17	2.4124	49627.99238	1102.844275	45
Banco Itau BBA SA	18	2.1207	43626.87662	779.051368	56
Banco BTG Pactual SA	19	1.9525	40166.74149	627.605336	64
Credit Agricole CIB	20	1.7392	35779.36947	1325.161832	27

Table 4: Changing Market Share of the Emerging Market Banks in the top 20

Emerging Market Investment Bank	Market Share in top 20 1/1/2008-7/20/2010	Market Share in top 20 7/21/2010-2/11/2013
VTB Capital	0	3.5666
Banco BTG Pactual SA	1.9525	3.4622
Banco Itau BBA SA	2.1207	3.2133
China International Capital	3.8597	2.4702
Renaissance Capital Group	0	2.2703
CITIC Securities Co. Ltd.	2.4124	0
Totals	10.3453	14.9826

An Analysis Of Relationship Banking: Case of Main Banks In New Zealand And Their Relationship-Managed Small And Medium Sized Enterprises

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Abstract

This paper analyses how the bank-SME relationship works. The research questions developed called for a qualitative methodology and extensive data was collected via interviews across representative banks in New Zealand. The value of this study is threefold. First, it is the first study to investigate the mechanisms and processes banks use to deal with their relationship managed SMEs. Secondly, it demonstrates the importance of character assessment. Thirdly, it suggests a need for alternative method(s) of character assessment other than the current computer-based credit scoring, if banks are going to improve the flow of funds to the smaller end of the business market.

Introduction

There exists an extensive theoretical and empirical literature on relationship banking that goes as far as 1960s if not earlier (Baas & Schrooten, 2006; Allen N. Berger & Udell, 2002; Boot, 2000; E. F. Fama, 1985; Hodgman, 1961; Leland & Pyle, 1977; Ongena & Smith, 2000; Ramakrishnan & Thakor, 1985). This literature deals with various aspects of relationship from its definition to its role in mitigating the perennial problem of information asymmetry between banks and their small and medium sized enterprise (SME) clients, and its advantages to informationally opaque businesses such as small businesses (SBs) in accessing bank loans. Yet an analysis of how lending relationship between banks and their SBs clients actually works is virtually non-existent. For example, acknowledging the paucity of research it this area, Allen N. Berger and Udell (2002) stated that "despite the recent academic focus on relationship lending, there is remarkably absent in the literature a fully satisfying analysis of precisely how bank-borrower relationships work" (p. F33). More recently, the same issue has been raised once again with Udell (2008) expressing it this way "because banks comprise an important pillar in the architecture of any financial system, it is critical that we understand what makes these financial intermediaries tick… In short, if we are to understand the contribution of commercial banks to economic performance, we must first understand how they lend money. This, in turn, requires an understanding of relationship lending, and its role in SME loan underwriting" (p. 94).

This study aims at contributing towards bridging this important gap in the literature and the main purpose of this paper is to analyse how the bank-SME relationship works, focusing on how banks handle relationship managed SBs clients. More precisely, the analysis will specifically examine the lending approach(es) and criteria used by banks to assess loan applications from their relationship managed SMEs clients. There are two other objectives that this research has: (i) to investigate the level of congruence in terms of lending practices and processes among the sample banks in New Zealand, and (ii) to discern how the assessment of the SB owner/manager is done within the relationship banking framework.

From a research approach perspective, these research objectives concern investigating processes and not variances (Mohr, 1982), and consequently point to a qualitative research approach being adopted. It emphasises the understanding of processes and mechanisms, rather than demonstrating regularities between variables in the relationships which is the realm of quantitative research approaches. The adopted approach has allowed access to a privileged sample of players in the area of SB relationship banking, mostly relationship managers, as well as giving access to privileged and specialist Data. Primary data were collected through in-depth semi-structured interviews with SB bankers from the five main banks and across the five main cities in New Zealand. The relationship managers are at the coalface/forefront of relationship banking, responsible for carrying out the banks' policies with their relationship managed SB clients. The approach has also facilitated and allowed for new insights to be gained about how relationship banking actually works because it has allowed reporting straight 'from the horse's mouth' enabling a front-line report of the bank policy in action to be captured and analysed.

This research also presented an opportunity to answer increasing calls for different methodologies in finance to be used, particularly those advancing qualitative approaches to finance (Bettner, Robinson, & Mcgoun, 1994; Bragues, 2011; Burton, 2007; Frankfurter et al., 1994; McGoun, 2003). Calls for alternative approaches in finance have never been so high as they are at the present time, where the recent and on-going global financial crisis has led to questioning the continuous

commitment to the dominant empiricist epistemology. For example, recently Bragues (2011) put it this way, "while the mathematical-positivist techniques continue to hold some promise in the study of finance, it has become obvious that this dominant approach needs be enhanced by more qualitative techniques" (P. 177).

Through this research we seek to contribute to the literature on bank-SB relationship in several ways. Firstly, we contribute by reporting a detailed analysis of how this relationship actually works. Secondly, we contribute by showing how in New Zealand, the main banks use three criteria of lending (financials, security, and character) as a framework of assessing loan applications from relationship-managed clients - which is different from the 5Cs that are widely used and discussed as the framework of lending. Furthermore, we contribute by providing an explanation as to why and how character assessment (the SB owner/manager) is different from the other criteria of lending.

The paper proceeds with a brief summary about the different stages of development that banking theory has gone through. This provides a background on the development of the lending technologies paradigm within which relationship banking is one technology. This is then followed by a short discussion around the definition and related details about relationship banking in the context of banks dealing with their SB clients. Next we make the case for the use of a qualitative research methodology and we elaborate on how the research was carried out. Section IV reports the findings and finally section V, entitled discussions and implications, concludes the paper.

Literature review

According to Udell (2008), banking theory and commercial underwriting have gone through four stages of development. At the start, traditional finance theory was developed on the basis of a set of assumptions, which together formed the perfect capital market assumptions (E. Fama & Miller, 1972). These assumptions included (i) capital markets being frictionless where there are no transaction costs –such as application and brokerage fees – with supplying and obtaining funds. Consequently, financial intermediaries, particularly commercial banks, have no special task to perform in the world of finance.

However, during the 1980s financial economists begun investigating the peculiarities behind the existence of commercial banks in the realistic world of finance, characterized by imperfect information. Subsequently, these commercial banks (and other financial intermediaries) started to gain a theoretical backing for their existence. This was motivated by their active, positive and multiple roles (Berlin & Mester, 1999; Sharpe, 1990) which included monitoring functions (Diamond, 1984; E. F. Fama, 1985), and reputation building (Diamond, 1991). The outcome was modern bank theory.

While this new and improved theory of banking managed to do some justice to banking as it is practiced in reality, thus bringing the theory a little closer to the real peculiarities of the imperfect capital market in terms of information asymmetry, and free rider problems; still it suffered from what has been described as a simplistic and dichotomous view (Ref). This vision has subsequently segregated the activity/world of lending into (i) commercial bank loans labeled as informed lenders, and (ii) arm's length loans labeled as uninformed lenders (Diamond, 1991; Rajan, 1992). An important outcome of this was that "the primary focus in the literature on banking through the 1990s was on how bank commercial lending differed from corporate bond underwriting, while substantially ignoring the differences in loan underwriting within the commercial bank loan market" (Udell, 2008, p. 96). This realization (and others) has led to further improving the modern theory of banking, resulting in a refined view of it culminating in the identification of two types of loans underwriting: relationship-based lending and transactions based lending. The former were better suited to, and aimed at, informationally opaque firms such as SBs, whereas the latter were better suited to transparent types of businesses (A. N. Berger, Frame, & Miller, 2005; J. A. Scott, 2004; Stein, 2002).

Finally, criticizing the view that all transactions-based lending modes are aimed at transparent businesses borrowers, along with other developments (in the finance research) have contributed towards a new paradigm regarding commercial loan underwriting. This new paradigm was articulated in Allen N. Berger and Udell (2006) where it was maintained that there were many transactions-based modes of lending which, while they were individually discussed elsewhere (e.g. A. N. Berger et al., 2005; Burkart & Ellingsen, 2004; Carey, Post, & Sharpe, 1998; Hendel & Lizzeri, 2002), Allen N. Berger and Udell (2006) united them in one 'unifying framework'. Also while they were all based on hard data, apart from the financial statements-based lending, they are well suited for providing finance to informationally opaque businesses. The unifying framework has been termed lending technologies (Allen N. Berger & Udell, 2006). This is now a technical term in its own right that describes a lending technology "as a unique combination of primary information source, screening and underwriting policies/procedures, loan contract structure, and monitoring strategies/mechanisms". From the banks' perspective, a primary objective of these technologies is to minimize risk and to increase returns.

Using this description, there are at least nine lending technologies (please see Table below) which can be categorized by/according to each of the elements used in the description individually or in combination. A crucial element is the primary information used - soft or hard - and the use of this element is how a lending technology is qualified as a transaction based technology (when the primary information is hard) or relationship based (when the information is soft). Furthermore,

depending on how informationally opaque/transparent the borrower is, these technologies can be categorised into three groups: technologies suitable for opaque borrowers only (4), transparent only (1), and for both (4).

There are other details around the use of these lending technologies. For example, each technology can be used in combination with another technology or other technologies. This suggests that one lending technology can be used as the primary technology, which can then be supported by another technology (or technologies), and that these technologies are not interchangeable.

Table 1: Lending technologies

Technology	Type	Borrower's information level: opaque and/or transparent	Information used
Relationship lending	Relationship	Opaque	Soft
Financial statement lending	Transaction	Transparent	Hard
Asset-based lending	Transaction	Opaque	Hard
Factoring	Transaction	Opaque	Hard
Leasing	Transaction	Opaque & Transparent	Hard
SB credit scoring	Transaction	Opaque	Hard
Equipment lending	Transaction	Opaque & Transparent	Hard
Real estate-based lending	Transaction	Opaque & Transparent	Hard
Trade credit	Transaction	Opaque & Transparent	Soft & hard

Source: Taketa and Udell (2007)

Relationship Banking

A lending technology that received much attention is relationship banking. An early definition of this lending technology was provided by Ongena and Smith (2000), who stated that it is "the connection between a bank and a customer that goes beyond the execution of simple, anonymous, financial transactions" (p. 4). However, they went on to add two dimensions to this definition; time or the duration of this connection, and scope, being "the breadth of services offered by the bank to its customer" (p. 5). A more elaborate and widely used definition is that of Boot (2000) who notes that relationship banking is "the provision of financial services by a financial intermediary that: (i) invests in obtaining customer-specific information, often proprietary in nature; and (ii) evaluates the profitability of these investments through multiple interactions with the same customer over time and/or across products" (p. 10). Boot added three conditions for relationship banking to be accorded as present: (i) "The intermediary gathers information beyond readily available public information [through screening loan applications and monitoring]; (ii) Information gathering takes place over time through multiple interactions with the borrower, often through the provision of multiple financial services; (iii) The information remains confidential (proprietary)" (Boot, 2000, p. 10).

Two remarks about how relationship banking is generally defined in the finance literature. First, more dimensions of this relationship have been added to the definition by different authors depending on the area of relationship banking under study. An example of this is Elsas (2005) where relationship lending is defined as "a long-term implicit contract between a bank and its debtor…" (p. 34). Secondly, it must be noted that all these definitions are from a bank's perspective. That is, banks are the only active players according to these definitions and the business partner's role is viewed as being passive. Maque (2007) arrived at the same conclusion in her PhD dissertation. Freixas (2005) seems to have touched on this issue. This might point to a gap in the definition of relationship banking in the finance literature.

Berger and Udell described relationship banking as "one of the most powerful technologies available to reduce information problems in small firm finance" (Allen N. Berger & Udell, 2002, p. F32). Allen N. Berger and Udell (2003) also asserted that the relationships between the bank, the entrepreneur and the SB become more important than the pure financial condition of the company. The bank bases its decisions regarding the approval or refusal of a loan application from its SB partner, and the interest rate to charge, largely on proprietary information about the firm, its owner, and its community. This information is garnered partly in the course of the relationship through the provision of loans (Allen N. Berger & Udell, 1995; Petersen & Rajan, 1994) deposits services (Allen, Saunders, & Udell, 1991; Berlin & Mester, 1999; Cole, 1998; Degryse & Cayseele, 2000; Nakamura, 1993), or the delivery of other financial services to the firm and/or to the entrepreneur. Specifically, "Deposit accounts provide further information in the form of balance information, transactions activity, payroll data, etc. that help give a more complete picture of the financial health of the firm. Information about the

quality of the entrepreneur may also be culled from the provision of personal loans, credit cards, deposit accounts, trust accounts, investment services, etc., and from other business dealings or personal contact[s] outside the firm. Knowledge of the local community gained over time may also be valuable because it allows the bank to judge the market in which the business operates, to obtain references and feedback on borrower performance, and to evaluate the quality of the firm's receivables" (Allen N. Berger & Udell, 1998, pp.645-6).

Further information may also be collected from contact with the borrower's customers and suppliers who may give specific information about the firm and owner or general information about the business environment in which they operate (Allen N. Berger & Udell, 2002).

Having discussed briefly the overall context of banking and where relationship banking is situated, we next move into making the case for qualitative research, after which we turn to how the research was done.

Methodology

Due to the unorthodox nature of the research approach used in this project (compared with the dominant approach in the finance discipline), a case for qualitative research is made up front.

Case For The Qualitative Approach

Philosophers of science and social science methodologists divide research approaches into two broad categories, variance theory and process theory (Blumer, 1956; Joseph A. Maxwell, 2004; Mohr, 1982; Ragin, 1989; Yin, 2003a). With variance theory the (quantitative) researcher is interested in whether, and to what extent, variance in x causes variance in y. however, with process theory the (qualitative) researcher asks how x plays a role in causing y, and what the process is that connects x and y (Joseph A. Maxwell, 2004). The main aim of this research is on analysing how bank-SME relationship banking works. That is by tracing the range of events and processes that are involved in a relationship (George and Bennett, 2005)

With qualitative research emphasis is on understanding processes and mechanisms, rather than demonstrating regularities in the relationships between variables, therefore demonstration of causation is achieved via a description of sequence of events, each event flowing into the next. Quantitative studies, however, support an assertion of causation by showing a correlation/association between an earlier event and a subsequent event (Weiss, 1994) with what goes on in between explained by either theory or guesswork.

Research Method: Case Study

Process explanation, since it deals with specific events and processes, is less amenable to statistical approaches. "It lends itself to the in-depth study of one or a few cases or a 'relatively small' sample of individuals, and to textual forms of data that retain the chronological and contextual connections between events" (J.A. Maxwell & Loomis, 2003, p. 248). Hence in this research we identified the case study a suitable research strategy. A case study has been defined as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context" (Yin, 2003b, p. 13). Furthermore, it deals with a situation where a "An explanatory question (how or why did something happen?)" (Yin, 2006, p. 112) are being asked.

When investigating dynamic organisation processes, case studies have shown to be effective at producing explanations that incorporate the constructs and frameworks of the cases' participants rather than those of the researchers. Therefore, this format also facilitates the paper's aim of analysing how relationship banking works investigating the processes incorporating inputs from the banks' interviewees' (relationship banking managers in this case) on how those processes actually happen.

It is worth mentioning here that the objective from this research is in line with that from the use of case studies being not a universal generalisation but a deeper and a more formal understanding of the phenomenon (analysis of how relationship banking works when dealing with their relationship managed SBs) in a single setting (New Zealand) within its context (New Zealand banking) from the participants' perspective (banks' relationship managers). In this way, an inside understanding not the singular understanding is generated (Flyvbjerg, 2006). The understanding generated from the single setting studied can then be used as a template in other settings to test for generalisation and replication and to see if the shared elements of that understanding exist across all settings, and/or to what degree.

In light of the above arguments and as Alasuutari (1995), Bryman (1988), and Silverman (2005) suggested, extrapolation is a more appropriate concept than generalisibility in this case because it demonstrates how the analysis of this paper, and its findings, relate to other contexts about studies on analysis of how relationship banking actually works. The next section deals with selections of banks that constituted sample of the study.

Selection of the Subject "Banks"

Thomas stated that the case will be "selected because it is an interesting or unusual or revealing example through which the lineaments of the object can be refracted" (Thomas, 2011, p. 514).This, however, can only be achieved through purposive sampling of a case(s) which, allows the researchers "to choose a case because it illustrates some feature or process in which [they] are interested" (Silverman, 2009, p. 141). Also, this method of sampling demands the researchers to "think critically about the parameters of the population [they] are interested in and choose [the] sample case[s] carefully on this basis" (Silverman, 2009, p. 141). As stated above, the goal is not to representatively capture all possible variations but to gain a deeper understanding of the phenomenon and so the selection of case(s) to be studied should be done on the basis of its/their relevance to the paper's research questions, and most importantly the explanation or account which s/he is developing (Mason, 2002).

Finally, Mason (1996) recommendation is that to select a sample which can represent a wider population a sample needs to be selected "of particular processes, types, categories or examples which are relevant to or appear" (p. 92) to be so within that wider population or universe. "So in qualitative research the relevant or sampleable units are often seen as theoretically defined" (Silverman, 2009, p. 144). This is consistent with the aim of this research regarding the generalisability of cases being to theoretical propositions rather than populations or universes (Bryman, 1988).

Practically, the case selection was guided by Stake (2005) typology of cases where he distinguishes between three types of cases: intrinsic, instrumental, and collective or multiple.

In a multiple case study or collective case study, data is coordinated from a number of cases which are studied jointly so as to examine a phenomenon. Each case illustrates the same phenomenon, hence, a collective case study is an "instrumental study extended to several cases. Individual cases in the collection are [thus]...chosen because it is believed that understanding them will lead to better understanding, and perhaps better theorizing, about a still larger collection of cases" (Stake, 2005, p. 446). An example would be a collective case study of how three community-banks X, Y, and Z in country B manage to retain their SBs clients.

Since the aim/interest of the current study is in banks that use relationship banking with their SB clients, the decision has been to select the five main banks in New Zealand (ANZ, ASB, BNZ, National, and Westpac). Therefore, this paper identifies itself as a collective case study. The five main banks in New Zealand exemplify the analytic frame/topic, the object, which is the process on how relationship banking works.

Furthermore, the choice of those five banks is based on a number of criteria, two key ones are: one, together these banks control 83% of the registered banks' total assets in New Zealand (Reserve Bank of NZ, 2008). This criterion reflects the importance of these banks in the New Zealand market in general and in particular, it represents a significant share of the SBs market; and two, these banks use the relationship banking model with some of their SBs clients (Ministry of Economic Development, 2003).

Interviews As a Method Of Data Collection & Selections Of Interviewees From Within Each Of The Selected Banks

As discussed above, qualitative researchers have demonstrated how using a process type of approach can be used to develop causal explanations in the sense of Miles and Huberman's statement "the actual events and processes that led to specific outcomes" (Miles & Huberman, 1984, p. 132). One such way is through qualitative interviews. Weiss (1994) maintained that: "In qualitative interview studies the demonstration of causation rests heavily on the description of a visualizable sequence of events, each event flowing into the next. ...quantitative studies support an assertion of causation by showing a correlation between an earlier event and a subsequent event. An analysis of data collected in a large-scale sample survey might, for example, show that there is a correlation between the level of the wife's education and the presence of a companionable marriage. In qualitative studies we would look for a process through which the wife's education or factors associated with her education express themselves in marital interaction" (Weiss, 1994, p. 179).

Purposive-expert sampling, a subcategory of purposive sampling, was also used to seek potential interviewees from within each of the selected banks. Purposive-expert sampling involves the selection of persons with known or demonstrable experience and expertise in some area (Kuzel, 1999; Patton, 1990). It was used to "look for individuals who have particular expertise that is most likely to be able to advance the research's interests, potentially open new doors" (Palys, 2008, pp. 697-698), and who are most conducive and accessible to gaining the understandings sought (J.A. Maxwell, 2012).

In the current study, specific qualifications, experience and practical knowledge in business/relationship banking was sought. Therefore, and in addition to looking at the organizational structure of the different banks (as well as the job description of), the people with the most practical knowledge of relationship banking and who are also responsible for implementing the banks' relationship banking policies when dealing with their relationship managed SB clients, would be relationship managers.

The banks' relationship managers were considered to be the best potential interviewees as they are at the forefront of the banks dealing with the relationship-managed SBs clients, and are also responsible for managing the relationship banking from the bank side (Ministry of Economic Development, 2003). Relationship managers are assigned to SBs clients (Ministry of Economic Development, 2003), thus occupying a position which is close to the SB client and acting as the point of contact with them (Colgate & Lang, 2005).

A job description of relationship managers - among other things - includes approving loans within their discretionary limits, communicating the banks' decisions to the SB clients in response to their loan applications (Ministry of Economic Development, 2003). Relationship managers play a critical role in the production of, and interpretation of, soft information used to provide a more complete profile of the SBs client for credit decisions assessment (Jonathan A. Scott, 2006).

Furthermore, as relationship managers have a unique position as a repository of information about borrower performance, they know more about the SB borrower than any other person from within the bank. This is because of their critical role in the solicitation and negotiation of the loan. Therefore the relationship managers have an advantage in the assessment of any information about the subsequent performance of their SB borrower. Furthermore, the advantage is improved by the fact that the relationship managers maintain personal contacts with the SB borrowers (Udell, 1989).

In addition, and in line with the study being a collective case study, the interviewees were selected using an additional goal to obtain one interviewee from each bank in each of New Zealand's five major cities with the additional benefit of being able to see if they were any nuances and/or differences between the different geographical areas. So, one business manager from each of the five main banks in each of the main cities (Auckland, Hamilton, Wellington, Christchurch, and Dunedin) was targeted.

Apart from one interviewee, who held the position of relationship strategy manager, all 26 interviewees were either relationship managers (21) or had worked as business managers previously and were still connected to the business of relationship banking management such as the regional/district manager to whom the relationship managers report (Ministry of Economic Development, 2003). Also, at the time of the interviews which were conducted between February 2009 and March 2010, five interviewees were working in senior positions, such as regional managers or, in one case, as a marketing manager for the whole bank. Table 2 below summarizes some of the interviewees' attributes.

Development Of The Interview Themes And Questions

In preparing for the interviews, and to answer the research questions developed, a review of the literature as recommended by (Cooper, 1984) on the topics related to the paper themes was undertaken, starting from the general and moving down to the more specific. The themes included SBs finance, banking in New Zealand, loan application assessments procedures, types of and sources of information used. The purpose was to determine general themes which demanded investigation, to develop sharper and more insightful questions around those themes (Yin, 2003b), and to gain some precision in formulating those questions.

However, the groups of interview 'topics' or 'themes' developed were not meant to be definitive. This was because as data was gathered, an iterative process would see ideas added to the themes or adjustments made to them as appropriate (Walker, 1985).

That way the interviews themselves informed each other and so were iterative in the sense that the 'flow' of the interview followed the ideas/interest of the respondent and each interview informed the next, giving ideas of strands to pursue for more insightful information (Kvale, 2007; Walker, 1985; Weiss, 1994).

The interview questions included: what is relationship banking to business managers? What type of information do they seek from their SBs clients? How do they assess loan applications from their (typical) relationship-managed SBs clients?

Thematic Analysis

For this research, the method of choice to analyze the data was thematic analysis. Thematic analysis has been defined comprehensively by Braun and Clarke (2006) as "a method for identifying, analyzing and reporting patterns (themes) within data. It minimally organizes and describes…data set in (rich) detail" (p. 79). Further, referencing Boyatzis (1998), Braun and Clarke added that often thematic analysis does more than that by also "interpret[ing] various aspects of the research topic" (p. 79). A systematic approach to thematic analysis by reporting the process and detail of the analysis following Braun and Clarke's (2006) six-point step-by-step guide was followed to analyze the data in the current research. The six steps process of thematic analysis is summarized in Table 2 below.

Table 2: Phases of Thematic

Analysis Phase	Description of the process
1- Familiarizing yourself with your data:	Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas.
2- Generating initial codes:	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
3- Searching for themes:	Collating codes into potential themes, gathering all data relevant to each potential theme.
4- Reviewing themes:	Checking if the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic 'map' of the analysis.
5- Defining and naming themes:	On-going analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme.
6- Producing the report:	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.

Source: Braun and Clarke (2006)

Findings

The Lending Approach & Criteria Used By Banks To Assess Their Relationship Managed SMEs' Loan Applications

From comparing the interviewees' answers to the questions about how they assess loan applications from their relationship managed (RM) SME clients, there seem to be no real differences between banks concerning lending criteria and processes. The only differences that may exist will take effect mainly as consequences of things such as the different discretional limits that the business/relationship managers enjoy.

It is obvious from the interviews that there are three criteria, similar among all banks, for assessing a loan application from an existing relationship-managed SME client.

1- Lending is done on a cash flow basis, i.e. by assessing the client's ability to service and repay the loan from the cash flow generated by the business.
2- While security is a requirement, it is only used as a second exit and a backup plan in case the SB fails to meet its payment obligations from the business cash flow.
3- Assessment of the SB owner/manager, referred to as character, is as important as cash flow and security.

The standard procedure for assessing a RM-SME loan application follows more or less the same path and these three criteria of lending are discussed next.

When an existing client approaches his/her bank manager for a loan proposal, the business manager begins the process of assessment by conducting an interview session with the client to determine things, such as what s/he needs, the amount, purpose, and duration of the loan as well as to explain to the client the information he/she needs to supply. Inputs from previously conducted interviews and information collected from other sources as part of assessing previous loan applications (and/or supplying other bank products and services) are also used.

The Lending Criteria

Financials

The financials are pivotal as the objective is to assess the business capability to service and repay the potential debt in line with banks being cash flow-based lenders and not security lenders.

The financials that the relationship manager asks for usually include an updated balance sheet, profit and loss, statement of position and particularly in the case of medium sized enterprises, a debtors and creditors schedule on an age basis. For example, explaining the purpose behind and use of the latter document as well as cash flow forecasts Interviewee 21 neatly put it this way.

Just so we can get a wee bit more understanding and substance around their liquidity, we might ask for a debtors or creditors schedule on an age trial basis and that way we can have a look at the company's historical performance – are

they looking out the back window? - and then with the cash flow forecast we can look out the front window; then we can look to mitigating the issues they might have going forward.

Banks, then, have their in-house systems or computer programs for business managers and/or their analysts to use to extract information from the financials gathered by the bank to distil and construct what they need in terms of ratios such as earnings before interest and taxes (EBIT), and to perform some more sophisticated operations, such as sensitivity analysis, particularly in the case of bigger businesses. Clarifying what the in-house system is and how it is used and elaborating on the aim of the sensitivity analysis, Interviewees 14 and 19, respectively, had the following to say

So we allow a margin line. For example, we'll generally look at a margin above the current interest rates, so building a buffer to prove that you know if there is some, if an interest rate moves they can still afford the loan.

We put their financials into a system that's called Winfast at BNZ. It's called different things. Every bank calls it differently. what that does is we just put in all their profit and loss and balance sheet and it spits out a whole lot of ratios, their quick ratio, current ratio – all just quite basic sort of stuff there, changing their sales levels. They're changing their gross profit margin and that gets, if it warrants it then, if the borrowings are enough we use that and then that talks to our rating system, and it puts certain ratios into the rating system which it helps to the rating.

Overall then, by analyzing the financials the bank relationship/business manager's aim is to establish that the cash flow generated is sustainable and sufficient to both service and repay back the loan.

Also as part of the financials, business managers, being generalists in their skills and approach of banking, have access to specialists within the bank to help them with other aspects of business banking that are beyond their expertise, especially when the level of complexity involved is too high. Elaborating more on this issue, interviewee 23 said:

The other thing we'd use is specialists within the bank. Obviously I don't handle all aspects of business banking; we've got specialists for international, credit card, card eftpos facilities, and transactional specialists if they're complex transactional structure – a lot of accounts for one business. So, just involving bank specialists as well, which are often brought into an interview situation where there would be myself plus the specialists involved. Yeah. And even interest rate specialist and that type of thing, if somebody's got a large debt exposure, just trying to assist them with how they should structure their interest rates – fixed or floating.

Security

The second key element, security, covers aspects like the collateral pledged by the RM-SME client; how is it or to be valued, how much is required for the new loan proposal and at what terms. It is predominately a tangible type of security, such as residential and commercial properties of the owner/manager(s) and some of the business assets, such as printing machinery in the case of a printing firm for example. Intangible assets are also used, but much less often, appear to only be used as a supporting security, and tend to be used with bigger businesses and higher lending amounts. Reflective of the interviewees' consensus on these points, interviewee 8 put it this way

We're predominantly landed security. So, we're talking about residential or commercial. They're the two predominant ones we deal with. We can deal with debenture or they're called general security deed. You-know, so it's a floating charge on the assets of the business. But they're few and far between. There's quite a few constraints that come along with that in terms of, you know, suitable equity, suitable projections showing good profit, good history account conduct; there's quite a huge more belts and braces if you like for debenture lend.

Overall, the rule (policy & practice) in business banking with RM-SMEs is that security is a key requirement, and there are only very few instances/exceptions where unsecured lending is possible but even then only partially. A typical scenario is related by interviewee 2 stating

If the security side is not that strong, but the business owner has a lot of experience in what he's doing and the business is going well, it's a very profitable business, we can consider unsecured lending.

However, banks won't lend against security alone if loan serviceability is missing which is in line with cash flow being the determining factor of lending and security being only a secondary factor. Another reason for not doing so is reputational risk for the bank, and interviewee 14 articulated this issue saying:

If the cash flow doesn't stack up, we don't care how much security we've got because it's costly to go down the track of selling securities and things. I mean although we get that cost back but it's also reputational risk as well. I mean that person in the meantime is going to be slagging off [bank name]. It's not a good look for us to be mortgagee selling houses.

Character

For all respondents character was unanimously paramount. In fact, character is so important that it could tip over the loan application from approved to no. Reflecting on some aspects that make character paramount, interviewees 17 and 19, respectively, said:

Because if we don't meet the client then how do we understand what they're like, what they do, how they do it, and it's not until you actually meet someone and talk to them that you actually can get more of an understanding as to what they do.

You can have somebody who on paper has the income but character – they may have a bad credit record or there may be some other aspects of them personally that indicate that even though they have the income, you're gonna have problems with them meeting loan repayments.

Character assessment covers two types of data which could be labeled as hard data and soft data. Hard data covers aspects such as number of years in business, numbers of years with the bank, and performing credit checks via VedaAdvantage.

Soft data assessment, however, is done mostly via contacts and through interviews with the SB owner/manager conducted by the business manager. Some of these interview sessions are *strategically* conducted at the client's working premises in their natural business settings. On one hand, the interview sessions represent an opportunity for the client to explain themselves, their business project, and ask questions. On the other hand, this allows the business manager, among other things, to 'look around', meet the employees, ask questions to obtain/assess information in order to gain an understanding about business's aspects such as the internal information and reporting systems as part of the management risk assessment, because, as interviewee 5 explained:

When you ask those questions some people answer, "Oh, I don't know, my accountant deals with that." You know that they don't have a good understanding. They might understand the business but perhaps not the financial management side of it. So, you can see how reliant they are on other parties, which is fine if they've got systems in place that back that up.

Also, and as part of soft data assessment, the SB owner/manager is also assessed on his/her understanding and capabilities about the financial side of the business. This is important as one interviewee 12 explained:

Because they need to know, if I ask a customer what's his gross profitability, and if he can't tell me or he doesn't know what influences it, then how's he going to be successful because the financial part of it is one thing; the actual management of the business is another thing. So, you can't sort of look at one in isolation. So, we'd ask them basically, well how do they control the day to day management of the business; what reporting systems do they use? How do they do it?

Business managers develop a set of questions that they ask their RM-SB clients. Direct and indirect questions are used tactically, giving business managers some hints/indications as to their clients' level of understanding, commitment and knowledge, etc. Dwelling into this area the previous interviewee said

You ask them certain questions about how the business is running and if they have that information at their fingertips and they know that stuff then you can see that they're really on top of their game then you know that they're in a good space to be running that on-going, so it's a little bit around have they been running the business and has it been successful, therefore they must have some skills in that area that they've managed to do that.

In addition to the standard procedure outlined so far, with medium sized enterprises, i.e. bigger loans such as over half a million dollars in the case of one bank, the relationship manager also writes a report to build a more comprehensive profile about the business. This report seems to be judged as 'more subjective' by some managers. Interviewee 14 elaborates more on this point saying:

We also do quite an extensive write up in terms of covering why they need the money which is an important part of it. Does what they're doing fit with what the actual nature of the business is? So if it was a car yard wanting to buy a coffee shop then that wouldn't be a very good business fit sort of thing, making sure that we've got our return on equity right, looking at the debt servicing side of things, so we do a debt servicing spread sheet based on what their EBIT coverage is and things, and their payment cover. So, we take their earnings, depending on the business, earnings before interest and tax, and sometimes we'll add back depreciation depending on the nature of the business and then see how that covers their interest payments and their principal interest payments.

If the objective from assessing the financials is to establish that the businesses is able to service and repay back the loan, the objective from assessing character is to establish that the character is willing to service and repay back the loan. Having the ability to do something is no guarantee that it will be done.

Possible outcomes from processing RM-SMEs loan applications

Once all the information about character, hard and soft, security and financials are gathered, they are then processed through the scoring system toward making a final decision about the loan application, including pricing and conditions if successful. In the case of security, the exercise of using security related information as input into the scoring system is performed by way of scaling the security to get a grade as further detailed by interviewee 14 and 8 respectively saying

We take security and we scale it so that gives a number at the end. So you know what you can lend up to. In the serviceability you know what the proposed debt's going to be and the terms that may vary according to the security

The security side of it can be A through to J depending on A, sort of lots of security, and J is no security at all. And so the average customer is probably between twelve and eighteen and let's say most people would be a D which means that it's just fully secured but only just, and then what we do, unless it's a housing type, secured by housing, in which case they will go with a housing loan. That rating helps us determine what interest rate to charge, so the better rating they are, the lower the margin that we'll charge.

The final step is where another tool, described by some business managers as 'judgmental pad', is used, in combination with, and in light of the scoring tool outcomes to make the final decision about the loan application from the RM-SB and in the case of bigger loans taking into account the written report by the relationship manager. Succinctly linking the use of scoring system to/with the use of judgmental pad and explaining how the last step is done leading up to the final decision Interviewee 5 put it this way:

We have an automatic scoring tool that you input the information into and it assesses whether the deal meets the criteria or not. So, that's one tool we use. And we have another one that just, we call it a judgmental pad, so one is the tool makes the decision around whether this is the deal that ticks all the boxes for us. And the other one is a judgmental discretion that we have a big fat policy book with lots of rules in it which I'm meant to know and I have a discretion to make decisions based on if the application meets the policy and meets the certain criteria. I can then say, "Yeah, it's a deal. We will do it." And if it doesn't meet policy or if it's outside my discretion then I send it up to the next level of discretion making to make a decision.

Through this final step, there are three possible outcomes. The first one would be a 'yes', in which case a letter of conditional offer is sent to the client outlining elements such as covenants, security the bank will take, and interest rate to be charged. The second outcome could be a 'no' verdict, in which case two scenarios occur. If the application falls within the business manager's discretionary limit and s/he sees no merits in using his discretion to override the tool's decision, then that will be the end of it. If however, the application falls within his discretionary limit and he can mitigate the 'no' reasons, then he can override the tool's decision and turn it into a 'yes'.

There are different discretionary levels for different products and services and it is decided upon a matrix with certain criteria as components. The discretion levels are also affected by the general conditions of the economy. Interviewee 5 explained the components and the dynamics around the discretion issue saying:

It's got lots of criteria around it so it's scaled around the quality of customer and that's based on things like how long they've banked with us, how stable their profit's been; how good their account conduct is; if it's an existing customer; those sorts of things. That will give us sort of a risk profile around that customer and we also look at what security they're offering as well, and the combination of those two things determine what discretion I have but I have different discretions to different things. I have a big discretion for home loans and then I have a different discretion level for business loans and a different one for credit cards or foreign trade limits or depending on what they're doing. Ok, so it's based on the product that they want on one side and the quality of the customer and the quality of the security on the other. So, it's a kind of a table.

The third possible outcome is when the application falls outside the business manager's discretional limit and sees some merits in trying to get it accepted. The loan application gets transferred up to the next level with a higher discretional authority to make a decision. Because the processed application is saved on a central database, the assessors at the next level up can access it. The business manager also writes a referral report suggesting/providing a justification for why should the assessors with higher discretional authority consider the loan application.

Based on the referral report and the application, a decision will be made. However, it seems that when an application gets transferred up to the next discretion level, the assessment is more or less limited to the two factors - financials and security. Particularly that, as mentioned above, some information about character is not documented. The following quote from a SBs manager explains that further illustrating the issue with two examples.

If I send it to a credit centre, they don't know much about that one [character], so they will be assessing mainly on those two [financials and security]. So when it goes to a credit centre they almost take that personal factor out of the equation.

All interviewees were of the opinion that often, and with all declined loan applications, a 'no' answer is the start of another process of the business manager explaining to the RM-SME owner/manager why the application was declined,

offering alternatives and possible courses of action to follow to help the client, as interviewee 9, by way of example explained further:

If it is an existing client and you know the situation deteriorated and their grade has gone down, what that means is that we're going to start requesting more information and we're going to try and manage them back up to a point where we're happy with it again. Because it comes down to a certain grade doesn't mean "right you're gone", it says "okay look, there are some issues here, we need to do something" and that is perhaps you need to get your accountant involved. "We need some more regular information because there are things within your business you to need to improve," and then we sort of review on an on-going basis and try and get them back to an acceptable level.

Discussions and Implications

The results of this study show that there is a high level of congruence among banks in their lending approach and procedure to their RM-SB clients, from the use of lending criteria to the non-segregation of loan underwriting. However, in reviewing the literature with regard to the three criteria of lending – financials, security, and character - this congruence in the New Zealand context is different from what is discussed and emphasized in academics and practitioners' literature about credit analysis when lending to SBs (Bass & Rozario, 2002; Beaulieu, 1994; Bruns, D., Shepherd, & Wiklund, 2008; Greenbaum & Thakor, 2007; Koch & MacDonald, 2009). These references emphasize what is called the 5 Cs of lending as framework of lending. For example Koch and MacDonald (2009) state "when evaluating loans, bankers cite the 5 Cs of credit: character, capital, capacity, conditions, and collateral" (p. 677). At least in the New Zealand context, this might mean that another variant of the 5 Cs exist which can be termed the FSC or the 3 Cs. This has unearthed an important issue for future research and one research question that could be asked is investigate if the use of 3 C's instead of 5 C's as framework of lending would affect loan applications assessment from RM-SMEs.

Because of the high level of congruence among the five major banks, there is a considerable amount of uniformity between them in a lot of the practices as they relate to RM-SMEs. Consequently, bank managers won't need much retraining if they were to move from one bank to another. This would lead to a high level of portability of bank mangers between banks which may partly explain the high turnover of bank managers noted to in the literature (Gan, Cohen, Clemes, & Chong, 2006). In fact, bank managers would be much encouraged to move banks to enhance their careers for example. While this might be good for bank managers, it is the source of frustration for their RM-SME clients. It affects the flow of relationship banking and SME clients have to start new relationships with their newly assigned bank/relationship/business managers.

Another important finding was that from addressing the issue of how banks assess loan applications from their SME clients (above), it becomes apparent that character is a key element of relationship banking. The assessment of character by the bank manager is based on assessing the business owner/manager's management ability, business understanding, integrity, and honesty. Furthermore, a point of differentiation between micro-to-SBs and small-to-medium businesses is that the former are managed via call centres and loan applications from them are processed (i) without their character being assessed as is the case with, and in the same way as small-to-medium businesses, and (ii) without use of judgmental pad. This means that those smaller businesses will not receive full relationship banking services. However, a complete and proper assessment of 'character' is only possible when it is done by a bank manager through relationship banking built with and around the SB owner/manager. In this case the banks' system of assessing loan applications from micro-to-small businesses is designed to limit type 1 error – lending to those who should not be receiving loans rather than considering error type 2 of not approving loans to those who would repay. This is a likely indication (and explanation) as to why smaller businesses face a supply-side financing gap and/or a higher risk premium than is appropriate for their actual risk level. The higher premium is a result of an information opacity and asymmetry issue which is not resolved through mechanistic processing. This can be added to the list of reasons given for the financing gap (OECD, 2006) with responsibility attached to banks. Furthermore, and more importantly, this suggests a need for alternative method(s) of character assessment other than the current computer-based credit scoring, if banks are going to improve the flow of funds to the smaller end of the business market.

A future study to statistically test this proposition could use the following proposed experiment. First, identify a sample of similar SBs that under normal circumstances would not qualify for a proper character assessment because they are managed online. The second step is to divide these businesses into two groups. When the first group of businesses applies for a loan, all else being equal, they would be assessed on character the same way a relationship managed client would be. The businesses from the other group, the control group, would continue to be assessed the same way online businesses are assessed whenever they apply for a loan. Finally, a statistical analysis of the results will shed some light on the validity of the above proposition about the role of character assessment in the supply side finance gap.

Finally, what follows is a possible explanation as to why character is considered to be paramount among the three elements of lending that are emphasized by banks in their assessment of their SMEs clients. Character is the only element that is expected to always go up in value as time passes whereas the financials and security elements can and do go up and down depending on circumstances that are outside the control of the SME owner/manager. An example of this was the

outcome of the recent and ongoing international financial crisis when almost every house and/or work premises used as collateral decreased in value. The crisis was exogenous and the SME owner/manager had no input in it, yet it affected the value of his collateral. However, the character is endogenous in that being trustworthy requires only the SME owner/manger's freewill, is completely within their scope of control, and depends only on them and their own decisions. This indeed makes character different from the other two (or four) criteria of lending

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Estimating the Demand Elasticities of Residential Natural Gas in Louisiana

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Abstract

The purpose of this paper is to estimate the demand elasticities of residential natural gas in Louisiana. No such study has been undertaken in the past. A static log-linear model employing OLS estimation technique is used to estimate price and income elasticities of natural gas in Louisiana. Data used covers the period 1988-2011. The resulting long run price and income elasticities are found to be -0.200 and -0.624 respectively. Thus, the demand for residential natural gas in Louisiana is found to be price inelastic, and the negative income elasticity of residential demand implies that for the range of prices and incomes considered, residential natural gas in Louisiana is an inferior good.

Introduction

Modeling Louisiana natural gas demand is essential for Louisiana and US policy makers and regulators to balance the energy supply and demand and to regulate environmental and safety aspects of natural gas. Estimating demand is vital for energy planning and strategic decision-making by the key players in the US and the Louisiana natural gas industry. These include producers, local distribution companies, buyers, and transporters/pipelines.

In order to estimate the price and income elasticities of demand for natural gas, it is necessary estimate demand for natural gas. These elasticities help understand the behavior of producers as well as price volatility caused by market shocks. Previous studies have shown that elasticities of demand for natural gas can vary by geographic markets, methodology used, end users, and over time as well.

One certainly would expect price and income elasticities of demand to be greater in the long run than in the short run since it is not practical for either household users or commercial users to switch right away to an alternative fuel in the case of a price or income change. Since the consumers have significant extent of flexibility in the long run, elasticities estimates obtained in the short run and long run could vary considerably. Therefore price and income elasticities of demand need to be measured both in the short run as well as in the long run. Previous studies confirm that the price and income elasticity of natural gas are greater in the long run than in the short run. This study, however, focuses on long-run elasticity.

Background

Compared to other hydrocarbons like oil and coal, natural gas produces lower carbon emission, and, therefore, gives rise to less pollution than oil and gas (Wong, 2010). It has an excellent safety record. Natural gas meets about 22 percent of the US energy needs. Most of the natural gas consumed in the U.S. is produced domestically. However, a small amount of it is imported from Canada via pipeline and some from other countries in the form of liquefied natural gas (LNG). LNG is imported from diverse country sources thereby enhancing the security of US energy supply.

In 2010, Louisiana produced 2.107 trillion cubic feet (Tcf) of dry gas and consumed 1.351 Tcf of it. (The residential consumption of natural gas in Louisiana was 1.211 Tcf in 2011). Thus, Louisiana produced much more gas than what it consumed. Also Louisiana produced – percent of total US gas production and consumed – percent of total US gas consumption. Recent discovery of huge shale gas reserved across the US, including Louisiana, has resulted in lower prices of natural gas, and enhanced national energy security. The Haynesville-Shale play in northwestern Louisiana produced 1.415 Tcf gas in 2010, while the total gas reserves were 24.451 Tcf. This boom in shale gas production in Louisiana is concentrated in Caddo, Bienville, Bossier, DeSoto, Red River, and Webster Parishes. Increase of natural gas reserves by about 10.8 Tcf in Louisiana due to shale activity helped offset declines from non-shale sources (EIA-a, 2012).

Literature Review

Evidently, no previous study has been undertaken to estimate demand elasticities of natural gas specifically in Louisiana. This study reviews a variety of past studies on natural gas demand. The previous studies/literature on Natural Gas demand

(modeling) in the US and across countries done in the 1970's and 80's is so large that it cannot be reviewed here entirely. Thus only a few significant studies are included in this article/study.

Taylor (1977), Bohi (1981), Bohi and Zimmerman (1984), Al-Sahlawli (1989), Dahl (1993), Krichenne (2005), and Romero (2007) have surveyed previous works on natural gas demand elasticities. They analyzed each one of them, describing the methodology used; the time period involved; and summarized the elasticities estimated by end users.

Some of the few studies conducted since the year 2000 have been undertaken by Wade (EIA, 2004), Krichenne (2005), Nilsen et al (2005), Costello (EIA) (2006), Golub et al (2007), Lady (2007), Romero (2007), Joutz et al (2008), Egdogu (2011), Garen et al (2011), Bernstein and Madlener (2011), Payne (2011), and EIA (2012).

Some of the models used in the past studies included: Log-linear (dynamic); logit of the share of gas; expenditure share equations; trans-log share equations; log-linear (stock); linear fraction (stock); non-linear (stock); trans-log share function; trans-log cost share function; simultaneous equations mode; error correction model; and auto regressive distributed lag bounds approach.

And the estimation techniques used were such as: Theil's Two-stage least squares; Ordinary Least Squares; Iterative Zellner; Maximum Likelihood; Error Components; Error Components and Seemingly Unrelated Regression; Instrumental Variable; Variance Components; Generalized Least Squares; Three Stage Least Squares; co-integration; and generalized method of moments.

The price and income elasticity of demand of natural gas in the US and parts of Canada, estimated from recent studies are presented in table 2 and table 3 respectively. A very recent study by Payne (2011) estimates the residential price elasticity of demand for natural gas in Illinois to be 0.264. Joutz et al (2008) estimate the residential price elasticity of natural gas in East South Central region to be 0.01 and -0.01 in the short and long run respectively. Bernstein and Madlener (2011) on average estimated the short-run and long-run price-elasticity of residential natural gas demand for 12 OECD countries, including the US, to be -0.24 and -0.51 respectively.

Table 1. Natural Gas Price Elasticity of Demand Summary

	Low	High	Medium	Midpoint
Short-run Residential/commercial	0.10	0.18	0.15	0.14
Short-run Industrial	0.17	0.60	0.39	0.39
Short-run weighted average	0.14	0.40	0.27	0.27
Long-run Residential/Commercial	0.36	0.96	0.63	0.66
Long-run Industrial	0.67	2.39	2.36	1.83
Long-run Northwest Weighted average	0.52	1.70	1.53	1.27

Source: Romero (2007)

According to a recent study by Garen et al (2011), the short run income elasticity of natural gas in the US was estimated to be 0.0779 and long run to be 1.111. Bernstein and Madlener (2011) estimated on the average, the short-run and long-run income elasticities of residential natural gas demand in 12 OECD countries, including the US, to be 0.45 and 0.94 respectively.

Table 2. Natural Gas Income Elasticity of Demand Summary

	Low	High
Residential & Commercial (Short-run)	-0.33	0.63
Residential & Commercial (Long-run)	-2.19	6.40
Industrial(Short-run)	0.17	0.28
Industrial (Long-run)	0.32	3.07

Source: Author; Al-Sahlawli (1989)

Research Methodology

Economic theory tells us that the demand for LNG, vis-à-vis energy, in general depends on price and income variables. In this study a static demand model that involves a log-linear equation is used. The demand equation is specified as follows:

$$Y = AX_1^{\alpha}X_2^{\beta}X_3^{\gamma} \quad (1)$$

where Y is the residential natural gas consumption per capita in Louisiana, X_1 is the real price of natural gas in Louisiana, X_2 is the real price of electricity in Louisiana, X_3 is the real GDP per capita in Louisiana. Taking the natural log of the above function gives

$$\ln Y = \ln A + \alpha \ln X_1 + \beta \ln X_2 + \gamma \ln X_3 . \quad (2)$$

Letting $\ln A = a$, $\ln X_1 = x_1$, $\ln X_2 = x_2$, and $\ln X_3 = x_3$, equation 2 becomes

$$y = a + \alpha x_1 + \beta x_2 + \gamma x_3 . \quad (3)$$

Looking at equation 3, we see clearly that equation 2 is log linear and can be estimated using OLS techniques. The estimation equation is of the following form:

$$y = a + \alpha x_1 + \beta x_2 + \gamma x_3 + e \quad (4)$$

The coefficients of x_1 and x_3, α and γ, can be directly interpreted as the estimators of price and income elasticities, respectively. Given the law of demand, one would expect α to be negative. On the other hand γ could be positive or negative, depending on whether natural gas is a normal or inferior good. The coefficient β is a cross-price elasticity, namely, the elasticity of demand for natural gas with respect to a change in the price of electricity. Since natural gas and electricity are substitutes, one would expect β to be positive.

Data Used in the Study

The data used in this study (Table 3) was gathered from several sources including the US Energy Information Administration (EIA). Several energy journals, books, scholarly studies and industry reports were consulted to gain an insight into the US natural gas market.

Table 3. Data Used in Study

Year	LA Residential Gas Consumption Per Capita (Cubic Feet)	Real Residential Natural Gas Price in Louisiana (Dollars per 1,000 Cubit ft.)	Real Residential Electricity Price in Louisiana (Cents per Kilowatt-hour)	Real GDP per Capita in Louisiana*
1988	13,921.40	4.85	NA	28,936.05
1989	13,568.41	4.81	NA	29,596.72
1990	12,654.59	4.66	5.67	31,216.78
1991	12,872.82	4.24	5.43	30,268.08
1992	12,929.75	3.99	5.36	27,785.52
1993	13,211.74	4.21	5.37	28,579.17
1994	12,302.57	4.21	5.13	30,536.54
1995	12,154.17	3.94	4.74	31,960.27
1996	13,051.18	4.31	4.82	32,930.09
1997	12,113.14	4.46	4.6	31,478.79
1998	10,904.57	4.1	4.34	32,307.92
1999	10,316.48	4.1	4.27	32,818.00
2000	11,130.95	4.84	4.45	33,113.74
2001	10,985.21	5.92	4.47	34,051.87
2002	11,004.53	4.48	3.95	33,807.84
2003	10,577.19	5.59	4.26	37,037.06
2004	9,519.47	5.93	4.26	39,464.17
2005	9,150.25	6.79	4.55	43,781.08
2006	7,885.00	7.27	4.53	46,696.47
2007	8,489.25	6.85	4.52	44,595.95
2008	8,362.32	7.19	4.77	44,271.10
2009	8,128.09	6.13	3.78	41,042.27
2010	10,028.96	5.38	4.12	40,226.58
2011	8,595.06	5.04	3.98	47,765.00

*Estimated

The annual data for residential natural gas consumption, real price of natural gas, real price of electricity, and Louisiana GDP per capita covers the period between 1988 and 2011, with two missing observations. The price of electricity was not available for 1988 and 1989. Therefore, the number of observations in the regression is 22 instead of 24. The log-linear model considers elasticities to be constant. However, if data used covers a relatively long time period, as in this study, the coefficients, vis-à-vis, elasticities estimated, may not remain constant. Also, the simple model used here does not distinguish between short run and long run elasticities.

Results

The estimated demand line for residential natural gas in Louisiana is of the following form:

$$\text{Ln } Y = 15.651 - 0.200\ \text{Ln}X_1 + 0.319\ \text{Ln}X_2 - 0.624\ \text{Ln}X_3$$
$$(8.94)\quad (-1.70)\qquad (2.23)\qquad (-3.69)$$

The estimated equation explains at least 90% of the variation in natural gas consumption (R^2 of .95 and adjusted R^2 of .90) over the period considered (1990 to 2011). Given the F-statistic of 61.28, the overall regression is significant at the 1% level.

The estimated income elasticity of demand is -.2 and is significant at the 1% level. The negative sign implies that natural gas was an inferior good for these consumers over this time period. The coefficient of the price of electricity is significant (at the 5% level) and positive. The positive sign is expected given that electricity is a substitute for natural gas. The estimated price elasticity of demand for nature gas has the expected negative sign and absolute magnitude (less than one). However, the estimate is not statistically significant. If the coefficient is not significantly different from zero, this implies a price elasticity of demand of zero. Since natural gas could be considered a necessity, one would expect the consumer demand for natural gas to be price inelastic but not totally inelastic.

Table 4. Regression Equation

Dependent Variable: Natural Gas Cons. Per Capita (ft^3)	Estimated Coefficient	t-statistic
Constant	15.651	(8.94)
Real Natural Gas Price in LA	-.200	(-1.70)
LA Residential Electricity Price	.319**	(2.23)
LA GDP Per Capita	-.624*	(-3.69)
R^2, Adjusted R^2	.95, .90	
F(3,18)	61.28	
N	22	

*significant at the 1% level, **significant at the 5% level

Conclusion

A zero price elasticity of demand is not consistent with the findings of the literature. This outcome of a non-significant coefficient for the price of natural gas may be due to multicollinearity. The correlation matrix generated by the OLS analysis indicated such. Clearly the next order of business is to address this multicollinearity problem. Nonetheless the magnitude of the estimate is consistent with elasticity estimates reported in the literature.

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The U.S. Personal Income Tax Reform: Linear and Gradual Tax Simplifications

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Abstract

The complexity of the U.S. personal taxations has long been an imminent subject discussed by many legislators and policymakers. Many recommendations and proposals on the possible impacts on the economy, revenue, equity, and efficiency are emphasized. A great increase of citizens and government offices would like to reduce tax processing time and operating costs with a simplified tax system. In this paper, a new simple linear and gradual (LG) tax system has been developed and analyzed to compare with the current progressive tax system. The implied LG tax system could not only simplify our current complicated federal tax systems but also reduce substantial processing time and managing costs for individuals, businesses, and governments. The research findings include the estimations and projections of tax revenues from business and individual income taxes for federal government.

Introduction

The re-election of President Obama has set in motion over the expiration of the Bush-era tax cuts. Nearly $100 billion in automatic spending cuts and more than 50 expiring tax extenders, which include the alternative minimum tax patch for tens of millions of taxpayers. The elected President has consistently called for higher tax with upper bracket individual income tax rates and also advocated maximum capital gains rate increases. On the whole, we will anticipate some significant changes with the dynamics for the tax reform in the long run.

The existing complex federal tax systems have 6 tax brackets for individual taxes. More individuals and government officers would like to simplify our tax systems to reduce tax processing time and operating cost. This research paper has been developed a new tax system with fair tax rates by linear and gradual (LG) formulas, which can be used to simplify and replace the existing complex 12-page Tax Table, multi-tax brackets, schedules, and computations.

LG tax rates can be modified easily and reasonably during a special situation, such as a recession or a booming economy. Tax rate differences from the proposed LG tax system and the existing tax systems can be miniscule (0 to 1%). The LG tax system could be applied for combining filing status, taxable income, tax rate formula, and tax rate range check together in a simplified format for tax rate classifications and tax calculations, which can be proceeded automatically or manually. The range check is used as a tool for checking the accuracy of the calculations. The LG tax system can also be used for both federal and state individuals to simplify our existing tax systems and save tax processing time and costs.

Tax Law Enactment and Literature Reviews

Congress and the president collaborated to enact the Taxpayer Relief Act of 1997 to reduce the burden of middle-income taxpayers with children, homes, and other assets earning long-term capital gains. The result of income the tax changes benefited tax credits to those families with children, tax credits for college tuition expenses, and new incentives to save for retirement. Most of these changes have affected the distribution of some tax burdens while increasing both the complexity of the U.S. tax code and the excess encumbrance of the tax system in the U.S.

In 2001, Congress enacted another tax relief policy, called the Economic Growth and Tax Relief Reconciliation Act (EGTRRA 2001.) The main content of this new tax legislation embraced a reduction in marginal tax rates (MTRs) for all brackets. The top rate, which was set at 39.6 percent in 2000, was reduced to 35 percent. In addition, many other changes were made in the tax law to reduce the "marriage penalty" controversy that was phased in beginning of 2005 and taken into a full effect in 2009. The EGTRRA has increased in tuition credits, child credits, and in allowable contributions to tax-deferred retirement accounts.

Later, in response to the president's effort to stimulate a sluggish economy, Congress enacted the Jobs and Growth Tax Relief Reconciliation Act of 2003 (JGTRRA 2003). This legislation accelerated many of the provisions of EGTRRA to become more effective in 2003 and 2004. The Act lowered MTRs and also accelerated the marriage penalty relief in these two years. The legislation not only reduced tax rates for capital gains and dividends, but also enacted special provisions to encourage business investment activities.

All the tax changes enacted would expire at the end of 2010 unless renewed by the Congress. The reason for this restriction was because Congress was apprehensive about the budget balance projections. As a precaution, they have automatically programmed in sharp tax increases for 2011, which obligates future lawmakers to raise taxes unless funds are available to finance the tax rate reductions. Tax relief was to be phased in for 10 years unless Congress renewed it. The reduction in tax rates on capital gains and dividends enacted in 2003 was set to expire by 2009. Several changes in the income tax code were made in the following two years.

President Obama campaigned with a pledge to cut income taxes for households with less than $250,000 annual income. The major tax cut for middle-income families would be accompanied by increases in MTRs on the upper 2 percent of income earners to levels that prevailed prior to enactment of EGTRRA. Also, he promised tax cuts for senior citizens, for those who without health insurance, first-time homebuyers, and families with college age children. Another promise included consolidation of tax credits and measures to simplify the income tax. Any changes made to the tax code and redistribution of the tax burden toward upper income groups would take effect by 2011. However, some special tax cuts were incorporated into the American Recovery and Reinvestment Act of 2009 (ARRA 2009). These special emergency tax benefits were designed to encourage spending for homes and automobiles so as to stimulate sectors of the depressed economy.

Several linear income tax proposals have been discussed and analyzed in the last four or five of decades. Based upon the sum of individual utilities, the income taxation theoretically should improve income distribution and social welfare. Eytan Sheshinski (1972) supported the theorem that if the supply of labor in the economy is a non-decreasing function of the net wage rate then the optimal tax schedule of linear tax function would provide a positive lump-sum at zero income. Also, the optimal marginal tax schedule is bounded by a fraction of minimum of elasticity of the labor supply.

Slemrod, Yitzhaki, and Mayshar (1994) have investigated two-bracket piecewise linear income tax structures. They analyzed the optimal structure of taxation for the social welfare function, utility function, and distribution with the standard optimal linear income tax system. They concluded that a linear income tax offers considerable administrative advantages over more complex graduated income tax systems. They criticized that "historically, countries have accepted the higher administrative costs in order to achieve a more progressive distribution of the tax burden than that offered by a linear income tax system." They challenged the pervasive policy and showed the benefits of allowing two brackets rather than one to parameterize the problem.

In recent study, Diamond and Saez (2011) has analyzed the optimal progressivity of earnings taxation and considered if capital income should be taxed. They argued that "a result from basic research is relevant for policy only if it is based on economic mechanisms that are empirically relevant and first order to the problem." Hence, they placed high implicit marginal tax rates on low earners in the models with only an intensive margin for low earners. Moreover, they used a decreasing marginal tax rate on very high earners by using the lognormal distribution for the Pareto efficiency. They opposed zero taxation of capital income from the aggregate efficiency result, and debated the Atkinson-Stiglitz theorem because savings rates are not uniform in the civilian.

Federal Personal Income Tax Rate Models

The existing federal individual tax rates are presented as below. *TI* is taxable income and *Yi* represent different levels of taxable income. The base tax rates are *f, h* and *j*. The tax rate (TR), marginal tax rate (m), tax amount (T), and Tax Table (TT, Tax Guide for Individuals 2011) can be expressed as the formula below.

1. The existing federal personal income tax rate models

- *If* $TI \le Y_1$ *($100,000), T = TT and average tax rate is T/TI (See Tax Table 2011)*
- *If* $Y_1 < TI \le Y_2$, *then T = 0.25 TI – a with marginal tax rate of 0.25 and tax rate is 0.25 - a / TI (Tax rate increases fast at first and then slow)*
- *If* $Y_2 < TI \le Y_3$, *then T = 0.28 TI - b with marginal tax rate of 0.28 and tax rate is 0.28 – b / TI*
- *If* $Y_3 < TI \le Y_4$, *then T = 0.33 TI - c with marginal tax rate of 0.33 and tax rate is 0.33 – c / TI*
- *If* $TI > Y_4$, *then T = 0.35 TI – d with marginal tax rate of 0.35 and tax rate is 0.35 – d / TI*

The total levied tax amount can then be summed up the above equations. However, it is not a function of *TI*. A, B, C or D is the constant of a, b, c or d times tax return number during its tax income range.

$$\text{Total levied tax amount} = \sum T(\text{Tax Table}) + 0.25\sum TI\text{-}A + 0.28\sum TI\text{-}B + 0.33\sum TI\text{-}C + 0.35\sum TI\text{-}D \ldots . \quad (1)$$

2. The proposed federal individual tax rate models

- *If* $TI \le Y_1$, *then* $TR = f + TI/g$ — *The levied tax is* $TR \times TI$
- *If* $Y_1 < TI \le Y_2$, *then* $TR = h + TI/i$ — *The levied tax is* $TR \times TI$ *(Tax rate increases linearly)*
- *If* $Y_2 < TI \le Y_4$, *then* $TR = j + TI/k$ — *The levied tax is* $TR \times TI$
- $TI > Y_4$, *then* $TR = m - d/TI$ — *The levied tax is* $TR \times TI$ *(Tax rate increases gradually)*

The total levied tax amount can then be summed up the above equations and shown as a function of *TI*. The formula can be expressed as below.

$$\text{Total levied tax amount} = f(TI) = f\sum TI + \sum TI^2/g + h\sum TI + \sum TI^2/i + j\sum TI + \sum TI^2/k + m\sum TI - D \ldots . \quad (2)$$

By the equation (2), total tax can be calculated when *TI* values are known or as a function of *TI*. These constants such as *f, g, m,* and d can be adjusted quickly according to actual situations and needs. By the equation (1), the first part is not a function of *TI*, which needs to be obtained from the complex Tax Table. Also, most of the personal taxable incomes are less than $100,000. The subtotal tax in the right parts in the equation (2) can be calculated when *TI* values are known.

Implications

1. Existing federal tax system for individuals

In our existing federal tax system for individuals, there are 6 tax brackets, which are 10%, 15%, 25%, 28%, 33% and 35% with tax rates from 10% to 35%. There are four filing statuses: (1) Married filing jointly or qualifying widow(er); (2) Head of household; (3) Single and (4) Married filing separately. For married filing jointly, the tax rate schedule shows the tax rate is at 10% to tax incomes from 0 to $17,000, which is shown in Table 3. When taxable incomes are from 0 to $100,000, the 12-page Tax Table (2011) is used for individuals to search and find their tax payments. These tax numbers in the 12-page Tax Table (2011) have no direct connection or relationship. The tax data in the Tax Table can be stored into a tax software product with more data space and search program, which is used for automatic search. Table 2 shows the differences of the Tax Table, taxable income ranges and tax computations in 2011 and 2010. These differences make our existing tax system even more complex and increase related processing time and operating costs to the government and individuals.

Table 1: 2011 Federal Tax Table for Married Filing Jointly or Qualifying Widow(er) (12 pages)

Taxable income (TI)	*Tax is*	*Taxable income (TI)*	*Tax is*	*Taxable income (TI)*	*Tax is*
0 – 5	0	10,000 – 10,050	1,003	.....	
.....		10,050 – 10,100	1,008	85,900-85,950	13,731
5,000-5,050	503	.....		85,950-86,000	13,744
5,050-5,100	508	50,000 –50,050	6,654	.....	
.....		50,050 –50,100	6,661	99,950-100,000	17,244

Table 2: Federal Tax Systems (2010 and 2011) for Married Filing Jointly or Qualifying Widow(er)

Taxable income (TI)		*2010 Tax*	*Taxable income (TI)*		*2011 Tax*
Over	*Not over*		*Over*	*Not over*	
0	100,000	Tax Table (12 pages)	0	100,000	Tax Table (12 pages)
100,000	137,300	0.25×TI - 7,637.5	100,000	139,350	0.25×TI-7,750
137,300	209,250	0.28×TI - 11,756.5	139,350	212,300	0.28×TI-11,930.5
209,250	373,650	0.33×TI - 22,219	212,300	379,150	0.33×TI-22,545.5
373,650		0.35×TI - 29,692	379,150		0.35×TI-30,128.5

Table 3: Federal Tax Rate Schedule for Married Filing Jointly or Qualifying Widow(er) (2011)

Taxable income (TI)		*Tax is*	*The Amount is over*	*Tax Computation*
Over	*Not over*			
0	17,000	10%		
17,000	69,000	$1,700 + 15%	$17,000	$1,700 + 0.15 × (TI - 17000)
69,000	139,350	$9,500 + 25%	69,000	9,500 + 0.25 × (TI - 69000)
139,350	212,300	$27,087.5 + 28%	139,350	27,087.5 + 0.28 × (TI - 139350)
212,300	379,150	$47,513.5 + 33%	212,300	47,513.5 + 0.33 × (TI - 212300)
379,150		$102,574 + 35%	379,150	10,257.4 + 0.35 × (TI - 379150)

Table 4 below shows the federal tax system for Head of household with 12-page of Tax Table, different taxable income ranges, and tax computations. Also, there is no self-check tool for tax rates. For Single and Married filing separately, their situations are similar, in which their Tax Table, taxable income ranges and tax computations are also different in 2010 and 2011. They have been checked and are different every year since 2004. Our existing federal tax system for individual income is very complex, which could involve long processing time and high operating cost.

Table 4: Federal Tax Systems for Head of Household

Taxable income (TI)		*2010 Tax*	*Taxable income (TI)*		*2011 Tax*
Over	*Not over*		*Over*	*Not over*	
0	100,000	Tax Table (12 pages)	0	100,000	Tax Table (12 pages)
100,000	117,650	0.25×TI - 5,152.5	100,000	119,400	0.25×TI - 5,232.5
117,650	190,550	0.28×TI - 8,682	119,400	193,350	0.28×TI - 8,814.5
190,550	373,650	0.33×TI - 18,209.5	193,350	379,150	0.33×TI - 18,482
373,650		0.35×TI - 25,682.5	379,150		0.35×TI - 26,065

The complexity of the existing federal tax systems on Tax Tables, tax schedules, taxable income ranges, and tax computations could be simplified and improved. The processing time and operating cost could then be reduced or saved significantly. The Tax Table provides unfair tax rates to individuals with low taxable incomes (less than $1,000), which are such as 19.6%, 15.9% or 11%, which are shown in Table 6.

2. *The proposed linear and gradual tax rate formula*

For the existing tax system for Married Filing Jointly or Qualifying Widow(er), there are two parts. One part is the 12-page Tax Table and the second part includes the four tax computations, which are shown in Tables 2 and 3. When individuals have their taxable incomes from 0 to $100,000, they need to locate their tax numbers from the 12-page Tax Table (2011), which is rather lengthy and time consuming. Also, there is no self-check tool for checking tax rates.

The significant challenge is how to build relatively simple and fair formula(s) to replace the tax rates and tax data from the 12-page Tax Table. An individual with more taxable income (*TI*) should pay more tax at a reasonable high tax rate. For individuals with taxable incomes from 0 to $100,000, a linear formula of $y = a + bx$ is found to match the tax rates from the 12-page Tax Table reasonably.

Tax rate = 0.1 + TI/1,380,453 (tax rate range check: 0.1- 0.173 at 0 - $100,000) ..... *(1/1)*

Here 1/1,380,453 (b) is a constant, which is the slope of $y = a + bx$ from 1/100,000/(0.17244-0.1)=1/1,380,453. The tax number of 0.17244 (17,244/100,000) is from the Tax Table (2011). Tax rates change linearly over taxable incomes from 0 to $100,000. The bottom tax rate is 0.1 or 10% (a).

Example: When a Married filing jointly has a taxable income of $39,960, the tax rate formula is 0.1+TI/1,380,453 with the range check (10%-17.3%). Then 0.1+39,960/1,380,453=12.89% is the tax rate, which is within the range. The tax is $5,152.72 (= Tax rate × TI). Tax rate and tax calculations can be done automatically or manually. The tax from $39,950 to $40,000 in the 2011 Tax Table is $5,146 at 12.88%. The difference $50 (40,000-39,950) from the Tax Table causes 0.13% (50/39,975). Their tax rate difference from the LG formula (1/1) and 2011 Tax Table is only 0.01% (12.89%-12.88%).

When the simple LG tax rate formula (1/1) is used to replace the 12-page Tax Table (2011), the situations have been simplified and improved significantly. Their results are compatible in the following discussions. The LG tax system has the narrow tax rate range check from 10% to 17.3% as a self-check tool to avoid or reduce calculation mistakes.

The other 3 linear and gradual (LG) tax rate formulas of linear $y = a + bx$ and gradual $y = c - d/x$ are found to match the tax rate schedules and tax computations (2011), which are shown in Table 5. The four easy taxable income ranges are designed into 0-$100,000, $100,000-$250,000, $250,000-$400,000 and over $400,000. Their filing status, taxable income, tax rate formula and range check are related together, which may be used for tax rate and tax calculations, tax projection and tax data analysis.

For Head of household, there are also two parts. One part is the 12-page Tax Table and the second part includes the four tax computations with different taxable income ranges, which are shown in Tables 6. For Head of household individuals with taxable incomes from 0 to $100,000, a linear formula of $y = a + bx$ is found to match the tax rates and tax data from the 12-page Tax Table reasonably.

Tax rate = 0.1 + TI/1,024,485 (tax rate range check: 0.1-0.198 at 0 - $100,000) ..... *(2/1)*

Here 1/1,024,485 (b) is a constant, which is the slope for $y = a + bx$ from 1/100,000/(0.19761-0.1)=1/1,380,453. The tax number of 0.19761 (19,761/100,000) is from the Tax Table (2011). Tax rates change linearly. The bottom tax rate is 0.1 or 10% (a).

When the taxable income range is from over $100,000 to $250,000, the linear tax rate formula is:

Tax rate = 0.1586 + TI/2,565,769..... *(2/2)*

Here b=1/(250000-100000)/(0.256072-0.19761)=1/2,565,769 is the slope. The number of 0.256072 is from 0.33-18482/250000 at TI=250000. The number a is from 0.19761-100,000/2,565,769=0.1586. The tax rate range check is within 0.197-0.257 at $100,000 to $250,000. These numbers and formula are found to match the existing tax schedules and tax computations (2011).

When the taxable income range is over $400,000, a gradual tax rate formula of $y = c - d/x$ is:

Tax rate = 0.35 – 26,065 / TI ..... *(2/4)*

Here the formula 2/4 is converted from (0.35×TI-26,065)/TI (2011). When taxable incomes are over $400,000, their tax rate range is within 0.284-0.35.

Besides Married filing joint or Qualifying Widow(er) and Head of household, other LG formulas and tax rate range checks for other filing statuses of Single and Married filing separately are also found, which are shown in Table 5.

Table 5: LG Tax System for Federal Individuals

Filing Status: (1) Married filing jointly (2) Head of household (3) Single (4) Married filing separately
(The formulas match 2011 Tax Table, computations and schedules)

Filing Status	*Taxable income (TI) Over*	*Not over*	*Tax rate formula*	*(Range check)*
(1/1)	0	100,000	0.1 + TI/1,380,453	(0.1-0.173)
(1/2)	100,000	250,000	0.1275 + TI/2,226,312	(0.172-0.240)
(1/3)	250,000	400,000	0.1817 + TI/4,299,791	(0.239-0.275)
(1/4)	400,000		0.35 - 30,128.5/TI	(0.274-0.35)
(2/1)	0	100,000	0.1 + TI/1,024,485	(0.1-0.198)
(2/2)	100,000	250,000	0.1586 + TI/2,565,769	(0.197-0.257)
(2/3)	250,000	400,000	0.2080 + TI/5,208,184	(0.256-0.285)
(2/4)	400,000		0.35 - 26,065/TI	(0.284-0.35)
(3/1)	0	60,000	0.1 + TI/701,643	(0.1-0.186)
(3/2)	60,000	100,000	0.1396 + TI/1,307,770	(0.185-0.217)
(3/3)	100,000	250,000	0.1804 + TI/2,804,367	(0.216-0.270)
(3/4)	250,000	400,000	0.2300 + TI/6,318,896	(0.269-0.291)
(3/5)	400,000		0.35 - 22,686/TI	(0.29-0.35)
(4/1)	0	70,000	0.1 + TI/737,730	(0.1-0.195)
(4/2)	70,000	100,000	0.1357 + TI/1,183,236	(0.194-0.221)
(4/3)	100,000	150,000	0.1511 + TI/1,446,480	(0.22-0.255)
(4/4)	150,000	200,000	0.1953 + TI/2,521,008	(0.254-0.275)
(4/5)	200,000		0.35 - 15,064/TI	(0.274-0.35)

There are about 79 million individual tax returns in the U.S. per year. These simple linear and gradual tax rate formulas in the LG tax system provide a good tool for the government and individuals to calculate, project and analyze tax data.

3. Tax rate difference from the existing tax system and LG tax system

The tax rate differences between the 2011 Tax Table (for Head of household) and the LG formula (2/1) are compared in Table 6 with compatible results (0-1% differences). Also in the Tax Table (2011), the tax rates with 19.6%, 15.9%, 12.0%, and 10.1% (*) for the low taxable income ranges from $5 to $1,000 are unreasonable because the tax rates are from 10.0% to 19.8% for the taxable incomes from $10,000 to $100,000. These tax rates for the taxable incomes from 0 to $100,000 should increase gradually from 10% to 19.8%. The tax rates calculated from the formula (2/1) are from 10.0% to 19.8% linearly and gradually, which are simple, reasonable and practical.

Table 6: Comparison of Tax Rates between 2011 Tax Table and LG Formula for Head of Household (Taxable Income: 0 - $10,000,000)

Taxable Income ($)	*2011 Tax Table Tax ($)*	*Tax Rate*	*from Formula (2/1) (0.1+TI/1,024,485)*	*Difference (Absolute Value)*
5.1	1	19.6% *	10.0%	9.6%
25.1	4	15.9% *	10.0%	5.9%
50.1	6	12.0% *	10.0%	2.0%
100.1	11	11.0% *	10.0%	1.0%
1,000	101	10.1% *	10.1%	0.0%
10,000	1,003	10.0%	11.0 %	1.0%
20,000	2,396	12.0%	12.0%	0.0%
30,000	3,896	13.0%	12.9%	0.1%
40,000	5,396	13.5%	13.9%	0.4%
50,000	7,274	14.6%	14.9%	0.3%
60,000	9,774	16.3%	15.9%	0.4%
70,000	12,274	17.5%	16.8%	0.7%
80,000	14,774	18.5%	17.8%	0.7%
90,000	17,274	19.2%	18.8%	0.4%
100,000	19,761	19.8%	19.8%	0.0%

Taxable Income ($)	*2011 Tax Rates (Tax/Taxable Income)*	*LG Formulas (Table 5)*	*Difference (Absolute Value)*
100,000	19.8%	19.8%	0.0%
120,000	20.7%	20.5%	0.2%
140,000	21.7%	21.3%	0.4%
160,000	22.5%	22.1%	0.4%
180,000	23.1%	23.0%	0.1%
200,000	23.8%	23.7%	0.1%
230,000	25.0%	24.8%	0.2%
250,000	25.6%	25.6%	0.0%
290,000	26.6%	26.4%	0.2%
320,000	27.2%	26.9%	0.3%
350,000	27.7%	27.6%	0.1%
380,000	28.1%	28.1%	0.0%
400,000	28.5%	28.5%	0.0%
1,000,000	32.4%	32.4%	0.0%
10,000,000	34.7%	34.7%	0.0%

When taxable incomes are from $100,000 to $10,000,000, their tax rate differences between the 2011 tax computations and the LG formulas are compared and shown in Tables 6 with very compatible results (0-0.4% differences). The tax rate data in these tables may also be converted into figures to show their differences visually. These minor differences mean the results from LG tax rate formulas and our existing Tax Table, tax schedules and computations are matched each other. The LG tax system is much more simple and practical. Similar data and situations are found in other filing statuses of Married filing jointly, Single and Married filing separately.

4. Tax rate modification and tax data analysis

If a special situation is taking place such as a recession, tax rates may be reduced from 10%-35% to such as 5%-30% for people to pay less tax and have more money for purchasing more goods, which may promote more sale and production and reduce unemployment rate, then LG tax rate formulas are subtracted by 3%, 5% or any reduction easily. For example, for Married Filing Jointly or Qualifying Widow(er) individuals with their taxable incomes from 0 to $100,000, their LG tax rate formula of 0.1+TI/1,380,453 may be modified into of 0.05+TI/1,380,453 easily. Their tax rate range is changed from 0.1-0.173 into 0.05-0.123. A reasonable reduction may be applied according actual situations.

Tax data analysis such as total tax or tax difference from the group may be analyzed with the LG formulas easily. When the existing Tax Table (12 pages) is changed to meet the reduction such as 5% and analyze tax data, there is much more work involved to meet these goals. For Married jointly or Qualifying Widow(er) (2011), total tax is:

$$\text{Total Tax} = 0.1\sum TIo + \sum(TI^2)o/1{,}380{,}453 + 0.1275\sum TIp + \sum(TI^2)p/2{,}226{,}312 + 0.1817\sum TIq + \sum(TI^2)q/4{,}299{,}791 + 0.35\sum TIr - 30{,}128.5\times r \quad \text{..... (7)}$$

The equation(s) can be used for tax analysis and projection. Here o, p, q and r are individual numbers. The two simple math equations of $y = a + bx$ (linear) and $y = c - d/x$ (gradual) are used in the LG Tax System, in which the constants of a, b, c and d may be modified easily according to actual situations.

Another example is for a taxable income range of $100,000 to $250,000, we may design tax rates to 20% at taxable income $100,000 and 26% at $250,000. Then their linear tax rate formula is 0.16+TI/2,500,000. Here 2,500,000 is from 1/(250,000-100,000)/(0.26-0.2)=1/2,500,000. Their tax rates change linearly within the taxable income range and tax rate range from 20% to 26%.

Conclusion

The complication of the U.S. personal taxations has long been recognized as an imminent subject discussed by many legislators and policymakers. As a result of the expired Bush tax cuts, there is an anticipation of tax increase in 2013. In this paper, a proposed new simple linear and gradual (LG) tax system has been developed and analyzed through a comparison of the current progressive tax system with this simplified LG system. Besides 2011, the LG tax system can also be modified for 2012 and 2013.

The proposed tax simplification process suggests that all filing statuses, taxable incomes, incomes, tax rate formulas, tax rate range checks, taxpayer information, tax rate, and tax calculations be combined into short tax simplification phases. Tax rate formulas could then connect to the related filing statuses, taxable income, and income brackets. Subsequently, the total tax amounts will be calculated automatically or manually with simple procedures.

Numerous benefits can be demonstrated by applying this LG system. The taxable income ranges would reduce to three simple fixed levels instead of the current Tax Table plus several variable levels. The proposed method would simplify the taxpayers' reporting process and reduce the preparation time. Consequently, the new LG formulas could provide more fine-tuned tax rates for the tax amount calculations. Furthermore, the proposed tax rates could be easily tested and monitored by the tax office and taxpayers.

In addition, the long list of tax tables can be eliminated and replaced by the modest formulas. The proposed tax rates represent the minor tax rate differences comparing to the current system, which are resulting only within an insignificant 1% of margins. For the what-if tax rate analysis, the tax office could change the rates and estimate the revised tax revenue easily. The streamline of tax analysis and revenue projection would enhance the efficiency of the Revenue Office. Overall, we could anticipate the increase of total tax revenue, which is resulted from the reduction of tax preparation time, tax rates analysis, and tax amount projections.

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Appendix

Figure 1.1: Filing Status – Head of Household with Taxable Income below $100,000

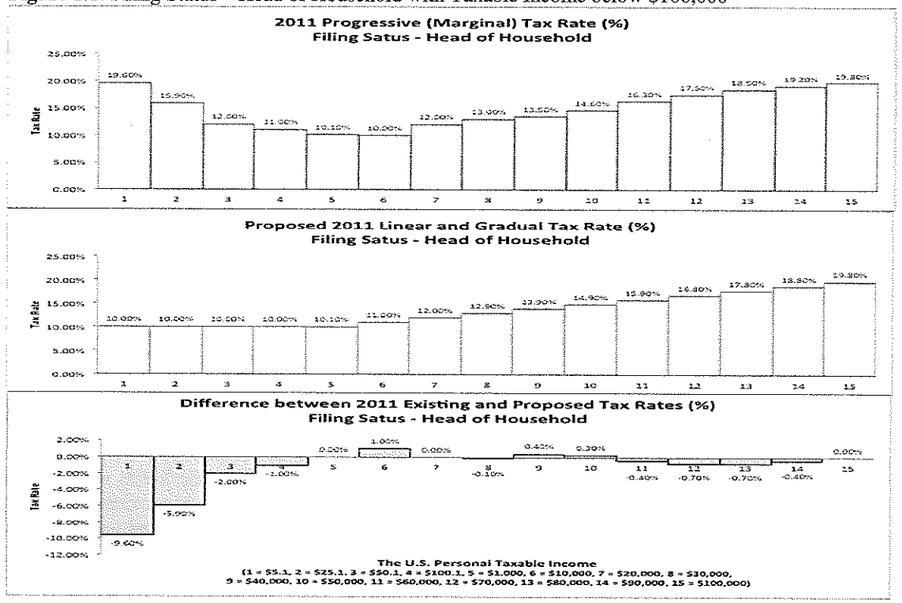
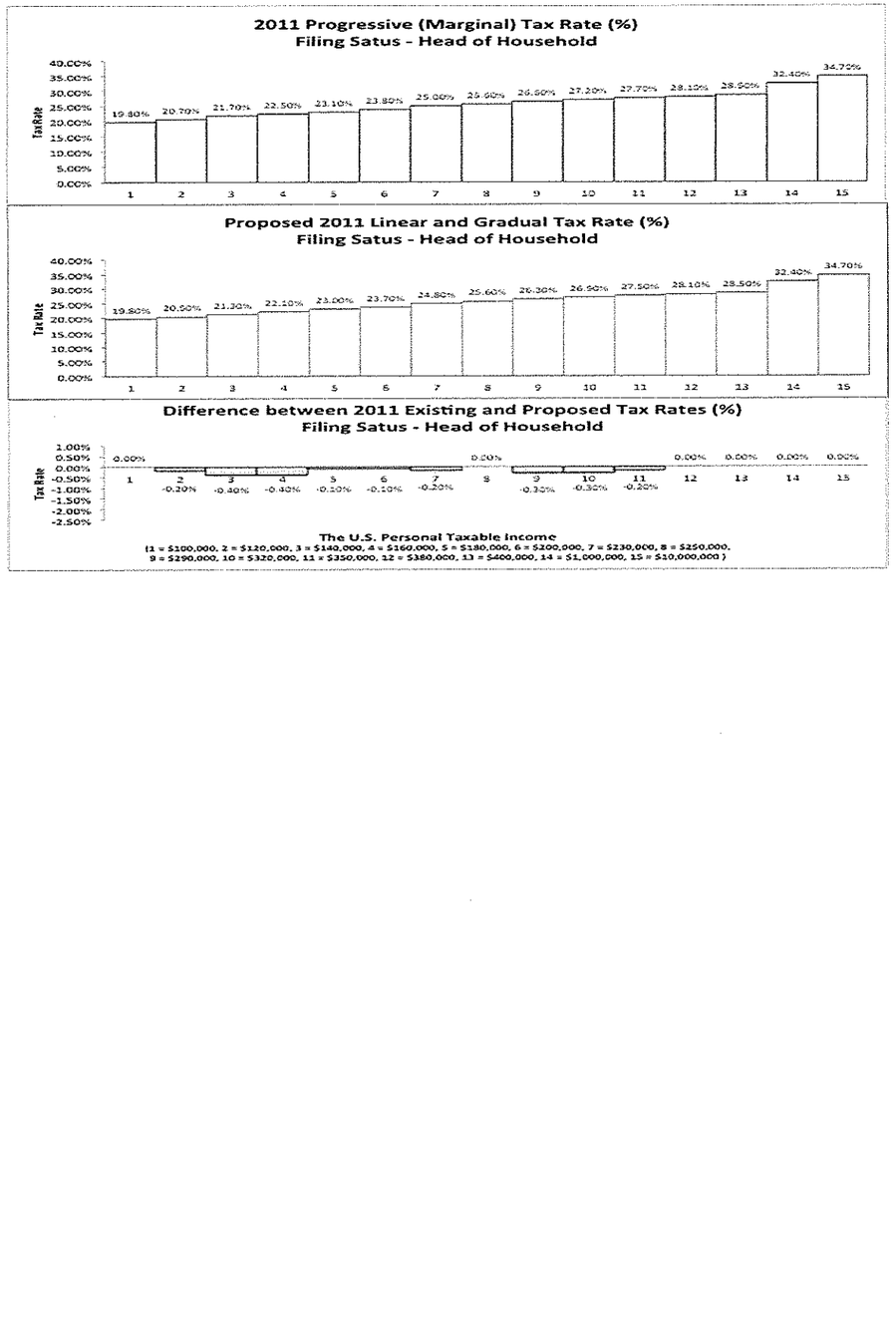


Figure 1.2: Filing Status – Head of Household with Taxable Income between $100,000 and $10,000,000



Municipal Bond Refinancing and Economic Recovery: A Lifecycle Loan Approach

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Abstract

Our paper considers a life-cycle loan model with extensions applicable to state and local municipality debt, allowing for adjustments and rescheduling of principal and interest payments in line with the economic cycle. This mechanism provides for a means of shifting the mass of municipal expenditures on bond redemptions further into the future, to free capital for infrastructure and other transfer payments until state revenues rise sufficiently through subsequent economic growth. We incorporate a stepped bond replacement process with acceleration and amortization clauses to creatively address these repayment transformation issues.

Introduction

In a liquidity trap such as experienced in Japan (and arguably emerging in other parts of the developed world) municipalities are discovering that they must reconsider their methods of operation and funding. We propose a process by which state and local governments might conservatively and creatively make income changes to build a stronger economic base, with less financial distress during the down-cycle coupled with amelioration of expenditures during up-cycle swings, thus increasing the likelihood of a sustained economic recovery. We begin by posing the following question: Could it be that the problem with current government borrowing is not that it is too great, but rather that it is too limited to sustain economic recovery?

Consumption and spending habits of Americans tend to follow a life cycle approach. Studies by Dominitz & Manski (1997) and Guiso, Jappelli & Terlizzese (1992) point to income as a causative variable in economic life cycles. Crook (2001), Donkers & Van Soest (1999), Lea, Webley & Walker (1995) and Livingstone & Lunt (1991) add that, while income is a driving variable in a life cycle approach, cultural and psychological issues also play an important role. Spending and consumption patterns drive business cycles and also drive tax revenues and the size of the taxable base (Franco Modigliani, 1986).

This may be particularly acute if we consider a Keynesian (or Kaleckian) point of view. Long-term real interest rates in most developed countries are currently almost zero, so now would clearly be the right time for governments and municipalities around the world to borrow for investment in infrastructure or other economic growth enabling concerns.

Our paper proposes a life-cycle loan model with extensions applicable to state and local municipality debt, allowing for adjustments and rescheduling of principal and interest payments in line with the economic cycle. This mechanism provides a means of shifting the mass of municipal expenditures on bond redemptions further into the future, to free capital for infrastructure and other transfer payments, until state revenues rise sufficiently through subsequent economic growth. We incorporate a stepped bond replacement process with acceleration and amortization clauses to systematically address these issues.

Ironically the municipal bond market, which is the logical place for such fundraising, is making it difficult for this to be accommodated. Extension of the duration of existing debt and greater flexibility in the municipal debt market borrowing may well prove a pragmatic solution to this conundrum. Even if we consider a non-Keynesian perspective we can still conclude that government borrowing is too low. The fact is that government borrowing is an accounting identity, the counterpart of net lending (that is, savings minus investment) by the private sector. Our hypothesis is that the current economic crisis has been a 'balance sheet recession' with the private sector borrowing too much in the heady days of 2004-7 and, since 2008 effectively cutting spending radically in an effort to reduce debt and repair its balance sheet. From this point of view, government borrowing might be worryingly low, despite the nominal headline grabbing levels regularly portrayed in the media, because in fact this is a sign that private sector balance sheets are actually being repaired far too slowly.

Anecdotally at least, this perspective is supported in the labor market by the very long lead times for reemployment as the recession tentatively recedes. The stubbornly high US unemployment rate remains at 7.8% despite the extraordinary concerted actions of government. Since the start of 2009, households' net lending – roughly the difference between their savings (and/or debt repayments) and spending on buying houses - has totaled $130.4bn, making this hypothesis quite plausible for the household sector, since in the five years between 2004 & 2008, net borrowing totaled $546.7bn. Households, then, have reversed over the last 4-5 years, perhaps at most, one quarter of the growth in net debt incurred

during the preceding boom period. Unfortunately even this pedestrian turnaround appears to be due to savings and reduced house-buying, rather than to actual debt reduction. Mortgage statistics show that mortgage debt has actually risen by $151.9bn (2.1%) since the end of 2008!

Debt to income ratios have fallen thanks to a rise in nominal incomes, rather than due to a fall in actual household indebtedness. This protracted progress in household balance sheet repair may well be due to 'zombie households' who can barely cope with their current interest payments (even at today's ultra-low interest rates), let alone generate the cash necessary to pay down debt. Some 10% of households are having difficulty even keeping current on their mortgage payments. While these represent only a minority, there is a far larger number in the 'squeezed middle' who have suffered a fall in real wages over the recession, in addition to a collapse in household asset values, and have actually reduced their savings in order to maintain their prior living standards.

Naturally this poses the potential danger of a Japanese-style lost decade ahead. Any incipient upswing could simply result in stretched households merely attempting to repay debt rather than actually increasing their spending, with the result that any incipient recovery will soon stall. In this sense, if municipal borrowing were higher, it would be a sign of greater net saving by the private sector and thus of faster balance sheet repair - something which would lay the foundations for a proper, sustained, economic recovery. If the private sector were trying harder to repair its balance sheets, private spending would be weaker and substantiate an increased argument for stronger counter-cyclical fiscal policy.

The problem with this portrayal is that it rests on the hypothesis that households need to reduce debt. The dilemma is in knowing what the 'appropriate' debt-income level is for households, which is dependent upon their expectations for future income (Gropp, Scholz, & White, 1997). The higher their expectation, the more sustainable is any given level of debt. Herein lies a case for more accommodative fiscal policy on the part of the government, and in particular, tax cuts. This is the diametric opposite of the outcome of recent negotiations over the 'fiscal cliff' in the US. If we are indeed in a balance sheet recession, households will respond to tax rises by reduced saving - as they have been doing in real terms - which provides evidence that we are indeed in just such a recession. Against this backdrop tightening fiscal policy would be downright dangerous because the squeeze on households' incomes created by such action would slow down the process of balance sheet repair and thus prolong the stagnation in job creation (DeVaney & Yilmazer, 2005).

It is important of course to further recognize the paradox of thrift. This reminds us that it is impossible for everyone to improve their balance sheets simultaneously. If indeed a balance sheet must deteriorate, it is far better that it be the governments via municipality borrowing rather than that of households, because municipalities can borrow far more cheaply in a constrained credit environment and target these borrowing into the areas of greatest local need. It might appear that this is a contrarian heterodox response, but that would miss the point. Since spring 2012, the developed world governments have been painfully consistent in their view that borrowing will exceed forecasts, especially in the EU and the US. Furthermore, ten year bond yields have moved sideways over the last year in the major countries, suggesting that markets remain far more concerned about the weakness of the global economy than they are about high government borrowing levels. All of which underlines the case for a significant expansion of municipal borrowing along the lines of a more flexible municipal debt instrument.

To operate within a liquidity trap world; we would need to change the patterns of operation in all nations caught in a liquidity trap. As 20-year notes for $1bn are paid off, others are added on at the back end. There is no instrument equivalent to recycle debt within an open channel to the market at present. This needs to change; but there is no need to go to investment firms. Issuance could be done using a direct reissue to existing bond holders. Large amounts are owned and interest payments could be extended rather than amortized. In effect this would create an interest only payment period, followed by payments used to pay down balances further down the road in terms of principal repayment, as the economy and revenue base of the municipalities recovers. Balloon payments over time could further allow them to under pay now and use reset guidelines to shift the payments or a fraction of repayments forward as interest only.

Repayments or balloon payments can be made further out, in line with a pickup in economic growth and activity that would allow municipalities to make higher payments. Lower mortgage tax deduction would pull the rug out from under home owners. Real wealth reduction will occur among home owners if you remove this tax credit and it has a knock on effect on house prices. An inducement would be to provide a tax free premium on such bonds (perhaps using a mechanism in line with the indexation provisions of principal in TIPS) to allow for this deferral with enhancement of principal at redemption. Changes in maturity extension could be phased forward or backward as appropriate.

Population trends can be used to forecast dynamic changes in the tax base and to illustrate the important future features of the demographic composition of a nation. This provides the background within which to evaluate future consumption needs, characterized by anticipated population projections over the next quarter of a century or so. We can use this information to illustrate the impact of changing pensioner profiles, for example, and to highlight any potential asset/liability mismatch relating to their future pension incomes.

The short to long term needs of any municipality are financed through tax revenues. When the tax revenue falls it is difficult to meet such payments. [E.g. As of August 3, 2013, the United States Postal Service will eliminate Saturday delivery and risks being privatized if it upsets enough consumers. If FedEx can do it, why not the USPS? The answer apparently lies in the unreliability of service!] Municipalities require a ladder of bonds in different periods as interest rates drop such that cash strapped municipalities may raise more capital through bond issuances. Cost to retire debt are higher, probably adding to the net, and making it even harder without higher income revenue, to support existing services (Toscano et. al., 2012). Thus, when the tax revenue is reduced, services, even essential services must still be cut or eliminated.

As Michael Lewis (2012) has illustrated municipalities losing adequate resources chose to reduce police and fire services and close municipal offices. However, if the revenue base dries up, due to economic collapse, a municipality should be allowed to shift the maturity and payments on its debt to roll up interest and principal and push back towards a higher balanced budget in the short run, in order for a city to maintain public services even in a down market. Changes in tax income are not arbitrary and not used to push off indebtedness forever. Repayment plans should be tied to economic recovery. For example, a municipality should be able to choose the following scenario: a down payment of 10% of the outstanding balance could be used to securitize the future repayment of the debt. Another 10% would be paid in the future, at a date to be determined. If the interest rate were to rise, more interest would be payable unless the municipality was able to redeem a portion of the debt. Were interest rates to rise by 10%, the municipality might choose to pay down more of the debt. If the new interest rate were to be too large, it might be simpler or more effective to redeem the existing bonds by issuing a new set of bonds. A mechanism would be designed in advance and incorporated into the scheduled repayment plan to compensate for the rise in interest.

Our economic life-cycle loan model corresponds to human lifecycle profiles. They differ somewhat from one another to address the specific circumstances of each municipality. However, there are some common features. Rather than following the S curve of a pattern of boom and bust, requiring long periods of adjustment, we propose a modulated curve with a smoother adjustment period.

We now draw upon the formula from an earlier paper, Shapiro-Grosof, Sardy & Sardy, 2006, which uses a trapezoidal approach to the loan-cycle with a simple mathematical phase shift. A swing in the accumulation phase corresponds to fitting to a cyclical curve with a positive hump to shift out in times of a negative revenue position. Forced savings would not be sufficient; so as the city revenues rise, so do repayments. This ensures revenue led investment to accept later payments; but it can always payback earlier. Should a 30% increase occur, new obligation bonds are issued as a means of forced austerity - a Keynesian trigger or spanning mechanism.

So how does it work? Principal and interest are to be shifted forward in time, using duration extended variable payments. This is not the equivalent of fixed income but like other securities incomes, inverse notes payments for example, modeled on a mortgage PAC payment. To provide a stable floating PAC going down with Libor, would include caps & collars on how much rates may rise or fall over time. This would really be shifting interest payments as well as principal, if necessary, out into the future, using a combination of deferral and augmented interest rates to allow flexibility and a duration extension premium. Municipal bonds are a tax free security at the state and federal level, so higher rates can be indexed to inflation to push out or back off the resulting repayment schedule. Rates can then be reset up or down based on the prevailing rates in the market. They may stay flat, or carry a cap & collar arrangement, or never go down, other than to establish a refinancing floor to the loan.

An Algorithm to Calculate Interest Rate

We propose an algorithm to calculate the interest rate for an income sensitive loan matched to cyclical earnings. The loan of amount P is thought of as having a fixed duration (n months) but as being composed of k blocks, where different rates of interest and amortization can be altered to meet the debtor's horizon. Analysis of Income Sensitive Loan (ISL) rates can be conducted from either borrower-driven or a lender-driven viewpoint. Differences appear at the stage in the calculations when we choose the parameters whose values determine the yields or payments. Consistently we will use the following notation:

n = life of the loan in months; k = number of blocks; $b_1, b_2, \ldots, b_k$ = lengths of blocks in months, where:

$$\sum_{i=1}^{k} b_i = n \tag{1}$$

$P_1, P_2 \ldots P_k$ = amount of principal outstanding at the ends of the respective blocks; without loss of generality assume:

$$P_0 = 1. \tag{2}$$

$$\text{Clearly, } P_0 \geq P_1 \geq \ldots \geq P_k \geq 0 \tag{3}$$

$A_1, A_2, ..., A_k$ = monthly payments within the respective blocks, that is, borrower pays amount A_i during each month of the i^{th} block. A_i must be interpreted as a fraction of the principal. We will assume that within each block the amortization is steady: in the i^{th} block, the principal drops from P_{i-1} to P_i, the "average" principal is:

$$1/2(P_{i-1}+P_i) \tag{4}$$

and each month the amortization is, $$\frac{P_{i-1}-P_i}{b_i} \tag{5}$$

Also in the i^{th} block, $A_ib_i - (P_{i-1}-P_i)$ amount paid in excess of amortization (money rental cost).

Then, by the usual argument, the yield in the i^{th} block (Y_i) can be written as:

$$Y_i = \frac{A_ib_i-(P_{i-1}-P_i)}{\frac{1}{2}(P_{i-1}+P_i)} = e^{\frac{bi}{12}ri}-1 \tag{6}$$

where r_i = (yearly) rate of interest in the i^{th} block compounded continuously.

Conventionally, an assumption is made that in each block the total payment at least covers amortization, that is:

$$A_ib_i \geq (P_{i-1}-P_i) \text{ or equivalently } Y_i \geq 0 \tag{7}$$

Considering next the entire length of the loan, we see two cases;
(I) $P_k = 0$: the principal is fully paid at the end of n months
(II) $P_k \geq 0$: a "balloon" of P_k must be paid at the end of n months.

In either case the "average" principal during the n months is:

$$\sum_{i=1}^{k}\frac{\frac{1}{2}(P_{i-1}+P_i)b_i}{n} = \sum_{i=1}^{k}\frac{(P_{i-1}+P_i)b_i}{2n} \tag{8}$$

and the total amount paid in excess of amortization is:

$$\sum_{i=1}^{k}A_ib_i-(1-P_k) \tag{9}$$

The overall yield is:

$$Y_T = \frac{[(\sum_{i=1}^{k}A_ib_i)-(1-P_k)](2n)}{\sum_{i=1}^{k}(P_{i-1}+P_i)b_i} = e^{\frac{n}{12}R_T}-1 \tag{10}$$

where R_T= (yearly) rate of interest through the n months of the loan, compounded continuously. Strictly speaking if r'_i is the announced annual rate for the i^{th} block and R'_T is the announced annual rate for the n months we have:

$$Y_i = (1+\frac{r'_i}{12})^{bi}-1 \therefore r'_{i=12}[\sqrt[bi]{Yi+1}-1], \tag{11}$$

and

$$Y_T = (1+\frac{R'_T}{12})^{n}-1 \therefore R'_{T=12}[\sqrt[n]{Y_T+1}-1], \tag{12}$$

Evidently, when P_k=0, (10) reduces to

$$Y_T = \frac{[(\sum A_ib_i)-1](2n)}{\sum(P_{i-1}+P_i)b_i} \tag{13}$$

Another special case of general interest that can be handled by this approach is that in which P_k=0 and the amortization is steady throughout, i.e. principal diminishes by 1/n each month. Further notation is useful here:

$$\beta_0 = n, \beta_1 = n-b_1, \beta_2 = n-(b_1+b_2), ..., \beta_i = \beta_{i-1}-b_i = n-(b_1+b_2+...+b_i), ..., \beta_k = 0 \tag{14}$$

β_i can be interpreted as the number of months remaining after the i^{th} block. Then,

$$P_0 = \frac{\beta_0}{n}, P_1 = \frac{\beta_1}{n}, ..., P_i = \frac{\beta_i}{n}, ..., P_k = \frac{\beta_k}{n}$$

$$P_{i-1}-P_i = \frac{\beta_{i-1}-\beta_i}{n} = \frac{b_i}{n}$$

$$P_{i-1}+P_i = \frac{\beta_{i-1}+\beta_i}{n}.$$

Equation 7 becomes:

$$A_i \geq \frac{1}{n} \tag{15}$$

Formulas (6) and (13) become:

$$Y_i = e^{\frac{bi}{12}ri}-1 = \frac{A_ib_i-\frac{b_i}{n}}{\left\{\frac{\beta_{i-1}+\beta i}{2n}\right\}} = \frac{2b_i(nA_i-1)}{\beta_{i-1}+\beta i} \tag{16}$$

and

$$Y_T = e^{\frac{n}{12}R_T}-1 = \frac{[(\sum A_ib_i)-1](2n^2)}{\sum(\beta_{i-1}+\beta_i)b_i} = 2[(\sum A_ib_i)-1] \tag{17}$$

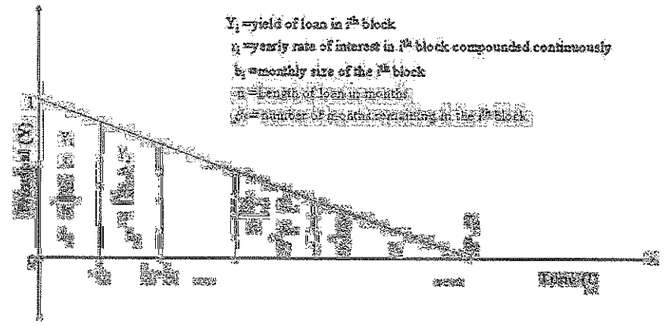
Because

$$\frac{[\sum(\beta_{i-1}+\beta_i)b_i]}{2n^2} = \frac{1}{2} \tag{18}$$

Discussion

A geometric argument in Figure 3 helps us to see that the area of Δ = n/2 =sum of areas of trapezoids. We show trapezoids consisting of the blocks in the loan. Within each block are the block number and the calculated values in the algorithm: Y_i, r_i and β_i/n. The 'y' axis is the principal; the 'x' axis is the time at point I.

Figure 1: Geometry of Amortization



area of i^{th} trapezoid = $$\frac{1}{2}b_i\left(\frac{\beta i-1}{n}+\frac{\beta i}{n}\right) \tag{19}$$

putting the foregoing together, as desired.

$$\frac{n}{2}=\sum_{i=1}^{k}\frac{(\beta_{i-1}+\beta_i)b_i}{2n} \tag{20}$$

Comments & Application

The values of many parameters, indeed many sets of parameters, are involved in equations (6) and (10). Constraints (3) and (7) must be met if computed solutions are to be at all useful.

In practice the borrower, after assessing his income and expenditure prospects, specifies k;$\{b_1,...,b_k\}$; and $\{A_1,...,A_k\}$ in requesting a loan. In effect, he is proposing a repayment schedule. The lender specifies $\{P_1,...,P_k\}$ and then computes $\{r_1,...,r_k\}$ and R_T in order to decide whether the yield on this schedule is competitive with that obtainable from other investment opportunities. It is difficult to interpret values of r, since typically r_i increases as P_i decreases; the overall R_T is of major importance. Moreover, given values of r_i the values P_i can be obtained recursively from equation (6):

$$P_i=\frac{A_ib_i-P_{i-1}\left(\frac{1}{2}Y_i+1\right)}{\left(\frac{1}{2}Y_i-1\right)} \tag{21}$$

The lender can also carry out trial 'what if' computations to see whether it is to his advantage to accept a lower yield and avoid a 'balloon' or to seek a higher yield but have less of the principal at his disposal before the end of the n months. From (12), the lender can compute R_T when all other parameters are known and can compare his value with a reference value R_0 for a competing investment.

Conclusion

Our paper describes a loan package that provides flexibility to municipalities to deal with business cycles. It should free up tight resources during periods of declining tax revenue, whilst enforcing fiscal responsibility during periods of increasing tax revenues and economic boom. As a recession ends the tax income base will expand, and as it accelerates by a certain

percentage, Municipalities adopting this deferment model would be required to pay down a higher percentage of their total loans with additional quantities of repayment as established within their respective bond covenants.

For example during a recessionary period were a government able to postpone payment for 2-3 years, thereafter they would in effect pay down a larger proportion of outstanding debt in advance of the next business cycle. This enforces austerity during profitable boom periods which frees up capital, thereby enhancing fiscal stability and investment during recessionary or 'depressionary' scenarios. Most importantly this reduces insolvency costs and risks as associated with Chapter 9 conservatorship. During periods of expansion municipalities have a tendency to say 'let's spend it'.

Our mechanism ensures fiscal responsibility, for as revenue growth accelerates debt payments increase more than the equivalent percentage of interest ordinary owed, by including the accumulation of any forgone payments under-met during the period of 'recessionary' deferment. Thus creating a virtuous cycle of paying down more when municipalities can afford it and less when they cannot; thereby reducing the welfare losses associated with bankruptcy proceedings, liquidation and restructuring negotiations.

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On the NYSE's Retail Liquidity Program's Price Improvement as a Response to Retail Investor Confidence and High Frequency Trading Events

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Abstract

The retail liquidity program proposed by the NYSE (2012) is in response to concerns that retail investor confidence has been negatively affected by certain high frequency trading events. Although this program has only recently received approval from the SEC (2012) to conduct a test before the full and permanent implementation, this paper examines a similar trading environment that essentially mirrors these trading systems and procedures. Although preliminary, results of this study indicate that the systems and procedures employed to reassure retail investors may themselves result in increased volatility.

Introduction

The retail liquidity program proposed by the NYSE (2012) is in response to concerns that retail investor confidence has been negatively affected by certain high frequency trading events. The essential question from an Exchange point of view is how to assure retail investors that there are systems and procedures in place to provide favorable execution of their trades, hence the "retail liquidity program". Although this program has only recently received approval from the SEC (2012) to conduct a test before the full and permanent implementation, this paper examines a similar trading environment that essentially mirrors these trading systems and procedures. Under the older "specialist" system, one type of price improvement took the form of "stopping"; procedurally it has changed under the "designated market maker (DDM)" system. Not to be confused with stop orders or trading halts, stopping is a procedure that exposed market orders to other trading interest over time, while providing a guarantee that the eventual execution will occur at a price no worse than the posted quote at the time the stock was stopped, similar to the retail liquidity program.

Today, it may not be so much the limit-order book that "designated market markers" (DDMs) need be concerned, from a competitive perspective, but sophisticated high frequency algorithmic trading programs, nonetheless limit orders may also be adversely affected. The rationale for the retail liquidity program is similar to the stopping rationale. SEC (2012), "The Exchanges are proposing to establish a Program on a pilot basis to attract retail order flow to the NYSE for NYSE-listed securities, and to NYSE Amex for NYSE Amex-listed securities as well as securities listed on The NASDAQ Stock Market LLC ("Nasdaq") and traded pursuant to unlisted trading privileges ("UTP"). The proposed Program would allow such order flow to receive potential price improvement, and would be limited to trades occurring at prices equal to or greater than $1.00 per share."

Comments received by the SEC (2012) during the commentary period did reflect some concerns about the ultimate impact of such a program, "one commenter noted that, by accepting and ranking non-displayed orders in sub-penny increments, the proposals could discourage liquidity by allowing "dark" liquidity to step ahead of posted limit orders for only a trivial amount. The same commenter observed that allowing non-displayed liquidity to gain an execution advantage over displayed limit orders for trivial per share amounts could result in wider bid-ask spreads," SEC (2012). This study seeks to provide an empirical framework to assess the economic impact of a host of similar policy choices as data become available.

The remainder of this paper is organized as follows: the next section provides a more detailed description of the proposed "retail liquidity program" as reported in SEC (2012), followed by a description of the data and summary statistics, empirical methodology, results, and lastly a brief summary and concluding remarks.

NYSE Retail Liquidity Program

"Under the proposed Program, a new class of market participants called Retail Liquidity Providers would be able to provide potential price improvement, in the form of a non-displayed order that is priced better than the Exchange's best protected bid or offer ("PBBO"), called a Retail Price Improvement Order. Other Exchange member organizations would be allowed, but not required, to submit Retail Price Improvement Orders. When there is a Retail Price Improvement Order in a particular security, the Exchange will disseminate an indicator, known as the Retail Liquidity Identifier, indicating that such interest exists. In response, a new class of market participants known as Retail Member Organizations could submit a new

type of order, called a Retail Order, to the Exchange. A Retail Order would interact, to the extent possible, with available contra-side Retail Price Improvement Orders. The Exchanges would approve member organizations to be Retail Liquidity Providers and/or Retail Member Organizations.

The Exchanges have proposed three kinds of Retail Orders, two of which could execute against other interest if they were not completely filled by contra-side Retail Price Improvement Order interest. All Retail Orders would first execute against available contra-side Retail Price Improvement Orders. Any remaining portion of the Retail Order would then either cancel, be executed as an immediate-or cancel order, or be routed to another market for execution, depending on the type of Retail Order.

A Retail Order would be an agency order that originated from a natural person and not a trading algorithm or any other computerized methodology. A Retail Order would be an immediate or cancel order. The Retail Member Organization submitting the order would not be able to alter the terms of such order with respect to price or side of the market. A Retail Order could be submitted in a round lot, odd lot, or partial round lot amounts. A Retail Price Improvement Order would be required to be priced better than the PBBO by at least $0.001 per share.

When a Retail Price Improvement Order is available that is priced at least $0.001 more than the PBBO for a particular security, the Exchange would disseminate an identifier, called a Retail Liquidity Identifier. The Exchanges initially proposed to disseminate the identifier through their proprietary data feeds; they then amended their proposals to state that they would implement the Program in a manner that allowed the dissemination of the identifier through the consolidated public market data stream as soon as practicable, and they now represent that they will in fact be able to disseminate the identifier through the consolidated public market data stream as soon as the Program is implemented, if it is approved. For UTP eligible securities traded on NYSE Amex, however, the Exchanges represented that the identifier will only be available through the Exchanges' proprietary data feeds ... NASDAQ will make the identifier for UTP eligible securities available through the consolidated public market data stream the symbol for a particular security and the side (buy or sell) of the Retail Price Improvement Order, but it would not include the price or size of such interest" SEC (2012).

In summary, both "stopped" orders and "retail liquidity" orders can execute against other interest if they were not completely filled. Orders would first execute against available contra-side Price Improvement Orders. They differ in that any remaining portion of the Retail Order would be executed as an immediate-or cancel order, but similar to "stopped" orders, or be routed to another market for execution. Essentially they are the same type of order differing mainly by speed of execution.

Data

The comparative period for "stopped" data is the TORQ database which contains audit trail data, order processing data, consolidated quotes, and consolidated transactions data for a sample of 144 randomly chosen NYSE stocks for the three months November 1990 through January 1991. Some of these randomly chosen stocks exhibited unusually low levels of trading activity during this period. The final sample consisted of the 100 most active stocks.

Although more recent market data exist with stopping indicators (see, for example the NYSE's Trades and Quotes (TAQ) data), the TORQ data remains the only set of publically available data on stopping which also includes important information, for example, on whether the stopped order was executed in the local market or sent elsewhere for execution, similar to the "retail liquidity" order procedure. This additional information becomes crucial in the analysis of stopped orders and retail liquidity implications. The TORQ files corresponding to these data are the following: (i) the consolidated audit trail file, (ii) the system order database (SOD), (iii) the consolidated quote file, and (iv) the consolidated transaction file.

To visualize the dramatic effect of stopping on limit order participation, price improved stopped orders and non-price improved stopped orders exhibit considerably different levels of limit order participation. The overall average participation rate of limit orders on the contra side of price improved stopped orders is 15.7% and the average participation rate of limit orders on the contra side of non-price improved stopped orders is 49.4% (additional descriptive statistics are available from the author). It is expected that orders in the Retail Liquidity program would exhibit a similar impact on limit orders.

The t-statistic testing the null hypothesis of no difference between the sample proportions is 6.02. The null is clearly rejected at conventional levels of significance. This result suggests that price improvement for stopped orders results in limit orders being delayed. Hasbrouck, Sofianos, and Sosebee (1993) do mention that stopping may delay the execution of limit orders. However, that study concludes that it is unclear what impact stopping may have on limit orders. They suggest that offering the possibility of price improvement for market orders by stopping may actually attract market orders, eventually increasing the probability of limit order execution. On the other hand, Ready (1999) shows that specialists can foist an adverse selection problem onto the quotes which allows specialists to make a market in-between the best bid and offer on the book. In order to investigate whether stopping may be serving as a mechanism to foist another adverse selection problem onto the quotes; this study constructs tests which examine stopping strategies specialists may employ to back away from their posted quotes.

The approach here is to examine the Intermarket Trading System (ITS) contra side of stopped orders. Specifically, for the stopped orders which have been partitioned into whether or not they received price improvement, the proportion of stopped orders with an 'ITS' contra is examined. It is observed that price improved stopped orders and non-price improved stopped orders exhibit considerably different levels of ITS participation. The average participation rate of incoming ITS participants in price improved stopped orders is 13.39% and the average participation rate of incoming ITS participants in non-price improved stopped orders is a mere 1.22%. The t-statistic testing the null hypothesis of no difference between sample proportions is 5.84, which is clearly rejected at conventional levels of significance (additional descriptive statistics are available from the author).

Stopped orders which received no price improvement, but are executed against an incoming ITS order, suggests that specialists have backed away from their posted quotes. Specialists are under no obligation to yield a trade to an incoming commitment conveyed over the ITS if the quote is matched. Given that the quotes to be matched were posted by these specialists, it appears they have reconsidered their quotes and choose not to trade at these prices in lieu of other trading interest. For the price improved stopped orders with an incoming ITS contra, the NYSE stopped order may be viewed as receiving price improvement. However, this would imply that the incoming ITS contra experienced price deteoriation. Again, as with stopped orders, from Section 2, Retail Liquidity Orders can be routed to other markets.

The proportion of ITS orders that are outgoing is interesting to examine in that it involves an identifiable outcome of the decision process of specialists. Although the overall levels of outgoing ITS participation are quite low and test statistics may arguably be less reliable, the raw results of are striking. Virtually without exception, outgoing stopped orders are price improved. It is expected that the same would apply to price improved orders in the Retail Liquidity program. The absolute low levels reflect the general reluctance of specialists to send orders elsewhere. The limit order prices must have been wide enough to fall outside specialists prices, otherwise the order would not have been sent elsewhere.

In the next section a methodology will be proposed to examine the time series properties of prices conditional on stopping in order to better understand the interaction between market structure and the evolution of the price process. In order to conduct the time series tests, the stopped data that has been merged with the audit file must now be aligned with the consolidated transactions file and the quote file. With the aid of the transaction and quote sequence numbers which correspond to the transaction sequence numbers in the audit file, the final data set is obtained.

Empirical Methodology

For each of the 100 stocks, a version of the ordered probit approach developed by Hausman, Lo, and MacKinlay (1992) is employed to construct empirical tests. The ordered probit can be viewed as a generalization of a linear regression model to situations with a discrete dependent variable. However, the ordered probit allows for greater flexibility in terms of empirically modeling the conditional distribution. In comparison to the linear probability models, the ordered probit allows for nonlinear effects by letting the data determine the state probabilities.

The following is a brief overview of the ordered probit methodology employing similar notations as Hausman, Lo, and MacKinlay (1992). Let $P(t_o)$, $P(t_1)$, ... ,$P(t_n)$ denote a sequence of transaction prices at time t_o, t_1, ... , t_n. The symbols Z_1, Z_2, ... , Z_n represent the corresponding price changes, where $Z_k == P(t_k) - P(t_{k-1})$ is assumed to be an integer multiple of a tick. However, the 'true' price changes are unobservable. Let the following represent the unobservable true price process:

$$Z_k^* = X_k'\beta + \epsilon_k \tag{1}$$

$$E[\epsilon_k|X_k] = 0 \qquad \epsilon_k \ i.i.d. \ N(0,1)$$

Where "*i.i.d.*" indicates that the ϵ_k's are independent and identically distributed and the X_k is a $q \times 1$ vector of predetermined variables that governs the conditional mean of Z_k^*. Subscripts denote transaction time and time arguments t_k denote clock time.

The number of partitions in the models presented in this study is based upon similar criteria as Hausman, Lo, and MacKinlay (1992) and Fletcher (1995). Based upon this partitioning scheme and Gaussian ϵ_k's, the conditional distribution of the observed price changes is obtained for a pre-specified matrix of explanatory variables. Once the conditional distribution is specified, likelihood function is readily obtained. Fletcher (1995) adapted the ordered probit approach to the volatility process by estimating the conditional distribution of absolute price changes. In this case, the ordered probit approach is employed to uncover the mapping between the unobservable 'true' volatility process and the observable volatility process. In order to study the impact of stopping on the volatility process, absolute price changes are conditioned on the following linear combination:

$$X'_{k,1}\beta = \beta_1\ STOP_{k-1} + \beta_2\ DV_k + \beta_3\ DV_{k-1} + \beta_4\ DV_{k-2} + \beta_5\ SPREAD_k \tag{2}$$

$X_{k,1}$reflects the pre-specified set of conditioning variables as defined below and β is a q × 1vector of coefficients to be estimated. The variablesDV_k, DV_{k-1}, and DV_{k-2}represent the dollar volume of transactions k, k-1, and k-2, respectively. The variable $SPREAD_k$ is the prevailing bid-ask spread. The variable $STOP_{k-1}$ is an indicator variable which takes the value of 1 if the order had been stopped and 0 otherwise:

$$STOP_{k-1} = \begin{cases} 1 & \text{if} \quad \text{aprice} > 0 \\ 0 & \text{otherwise} \end{cases} \tag{3}$$

Stopped orders are identified in the SOD file of the TORQ data by the declaration 'aprice'. The coding procedure for stopped stock involves placing the stop price in the 'aprice' position at the time of the stop; the time of the stop is coded in the 'atime' position of the SOD record. The 'aprice' position contains a '0' for stock which was not stopped. With five states and a minimum tick size of an eighth, the response categories are defined by the following: (i) $Z_{k,1} \leq -0.25$, (ii) $Z_{k,1} = -0.125$, (iii) $Z_{k,1} = 0.0$, (vi) $Z_{k,1} = 0.125$, and (v) $Z_{k,1} \geq 0.25$. The 5 response categories are then modified to reflect the absolute value transformation. By construction this transformation results in the following response categories: (i) $|Z_{k,1}| = 0$, (ii) $0 < |Z_{k,1}| \leq 0.125$, and (iii) $|Z_{k,1}| > 0.125$.

If Y_{ik} is an indicator variable which takes on the value of 1 if the realization of the k^{th} observation $|Z_{k,1}|$ is in the i^{th} state, and zero otherwise, then the log-likelihood function L for the vector of absolute price changes conditional on the matrix of explanatory variables, X_1, is given by:

$$L(|Z_1||X_1) = \sum_{k=1}^{n} Y_{1k} \cdot log\Phi(\alpha_1 - X'_{k,1}\beta) + Y_{2k} \cdot log\left[\Phi(\alpha_2 - X'_{k,1}\beta) - \Phi(\alpha_1 - X'_{k,1}\beta)\right] + Y_{3k} \cdot log\left[1 - \Phi(\alpha_2 - X'_{k,1}\beta)\right] \tag{4}$$

To numerically maximize the likelihood function, the procedure attributed to Brendt, Hall, Hall and Hausman (1974) is employed. The algorithm is similar to the Gauss-Newton procedure in that it requires only first derivatives. What differs is that their iteration process approaches the inverse of the Hessian of the likelihood, while convergence is assured by their choice of the step length and their restrictions on the matrix which serves as the asymptotic covariance matrix of the parameter estimates. The algorithm is as follows:

i. Using parameter values from the previous iteration, compute the gradient evaluated at these values, g^i, where i refers to iteration i, i=1 for starting values. Compute the matrix of second partial derivatives, G^i, and invert. For the first iteration use arbitrary initial values, compute the gradient evaluated at these initial starting values, g^1, compute the matrix of second partial derivatives, G^1, and invert.
ii. Calculate the direction vector, $g^i = -[\ G^i]^{-1}\ g^i$.
iii. Check for convergence. Convergence is defined as meeting the following conditions:

Condition 1 (C1): $|L(\beta^*) - L(\hat{\beta})| < 0.001$
Condition 2 (C2): $(\beta^* - \hat{\beta})'(\beta^* - \hat{\beta}) = \|(\beta^* - \hat{\beta})\| < 0.001$
Condition 3 (C3): $\|g(\beta^*)\| < 0.001$
If Cl,C2, C3 < 0.001, then go to 6, otherwise go to 4. (5)

iv. Search for λ and update β.
a) λ is a scalar that maximizes the objective function subsequent to determining the direction vector. The criteria choice for λ is the following: let δ be a prescribed constant in the interval (0, 0.5) and define

$$\gamma(\beta^i, \lambda) = \frac{L\ (\beta^i + \lambda d^i) - L\ (\beta^i)}{\lambda d' g} \tag{6}$$

If $\gamma(\beta^i, \lambda) \geq \delta$, then take λ = 1. Otherwise, choose λ to satisfy

$$\delta \geq \gamma(\beta^i, \lambda) \leq 1 - \delta \tag{7}$$

Brendt, Hall, Hall, and Hausman (1974) showed that a λ satisfying this condition will always exist under a weak set of assumptions. Convergence is assured provide λ satisfies the above and the possibility that $[\ G^i]^{-1}$ approaches a singular matrix is precluded as the process iterates.

b) β is updated according to the recursion which takes the familiar Gauss-Newton form:

$$\beta^{i+1} = \beta^i - \lambda[\ G^i]^{-1} g^i \tag{8}$$

v. Go to i
vi. Report β^i and $[\ G^i]^{-1}$.

The representative model for this test requires the estimation of 7 parameters: the partition boundaries α_1 and α_2, and the coefficients of the explanatory variables $\beta_1, \ldots, \beta_5$. If β_1 is found to be significantly different from zero, then it will be concluded that volatility subsequently rises following stopping. The economic interpretation of the remaining coefficients will be discussed in the next section.

Results

Following the development above, this section presents the results of the maximum likelihood estimation. The hypothesis tested is whether volatility subsequently increases after stopping. The test is performed by estimating the coefficients of the following ordered probit model:

$$|Z_{k,1}| = X'_{k,1}\beta + \epsilon_{k,1} \qquad E[\epsilon_{k,1}|X_{k,1}] = 0 \qquad \epsilon_{k,1} \sim i.i.d.\ N(0,1) \tag{9}$$

$$X'_{k,1}\beta = \beta_1\ STOP_{k-1} + \beta_2\ DV_k + \beta_3\ DV_{k-1} + \beta_4\ DV_{k-2} + \beta_5\ SPREAD_k$$

all symbols have been previously defined. Table 1 below contains the results for five representative securities.

Table 1: Probit Results

	Ticker=BG		*Ticker=ARX*		*Ticker=CP*		*Ticker=MDP*		*Ticker=W*	
Variable	***Est.***	***S.E***	***Est.***	***S.E***	***Est.***	***S.E***	***Est.***	***S.E***	***Est.***	***S.E***
β_1	0.3164	0.0784*	0.1981	0.0551*	0.2266	0.0329*	0.1921	0.0772*	0.1848	0.0534*
β_2	0.0882	0.0019*	0.0916	0.0007*	0.1105	0.0006*	0.0121	0.0038*	0.0530	0.0004*
β_3	-0.0028	0.0036	0.0222	0.0007*	0.0334	0.0004*	0.0062	0.0051	0.0114	0.0004*
β_4	0.0283	0.0017*	0.0368	0.0004*	0.0441	0.0003*	0.0095	0.0049***	0.0119	0.0005*
β_5	1.7239	0.3297*	1.9336	0.2352*	0.0909	0.2624	1.6976	0.2706*	1.1971	0.1900*
α_1	1.1119	0.0987*	1.6712	0.0556*	1.4409	0.0501*	0.7704	0.1012*	0.9432	0.0502*
α_2	2.2270	0.1080*	2.2594	0.0854*	1.6125	0.0501*	1.6268	0.1131*	2.3161	0.0610*

*significant at the 1% level , ** significant at the 5% level, *** significant at the 10% level

The symbols Est. and S.E refer to the parameter estimate and standard error, respectively in Table 1. Note that the stopping coefficients, β_1, are positive and significantly different from zero. This suggests that volatility subsequently rises following stopping. Although the underlying casual relation between stopping and volatility requires further investigation, as well as the relation between stopping and retail liquidity orders, the results presented in this study suggest that the rise in volatility is related to stopping rules that allow specialists to disrupt trade against the book. It is also interesting to note that the β_5's are positive and significantly different from zero, this indicates that spreads widen as well. Under the retail liquidity program a widening of the spreads would decrease the profitability of algorithmic trading while retaining the possibility of making a retail order market within the quote.

Table 2 below summarizes the results for the entire sample. These results indicate that in some cases, albeit a minority, stopping does provide a mechanism to smooth the order flow and reduce volatility.

Table 2: Total Sample Summary Statistics of Ordered Probit Models

	$\hat{\beta}_1$
Positive and Significantly Different from Zero	76
Positive and Not Significantly Different from Zero	11
Negative and Not Significantly Different from Zero	6
Negative and Significantly Different from Zero	7

Table 2 provides a summary of the results for the stopping coefficient, β_1. In the vast majority of the ordered probit models estimated, the results are consistent with increased volatility following stopping. However, given that stopping occurs in minimum variation markets as well as at least twice minimum variation markets, the explanation that stopping is principally a mechanism to smooth order flow becomes suspect and the data support this suspicion, i.e. stopping provides a mechanism to layoff market making risk by providing the specialist with a look forward option. Similarly, under the retail liquidity DDMs have the option to send orders elsewhere. The data suggest that stopping and perhaps retail liquidity orders actually exacerbated the adverse selection problem and result in a widening of the best bid and offer on the book which in turn lowered the supply of liquidity and increased volatility.

Conclusion

Interesting, as the NYSE has evolved from a "specialist" system to a "designated market maker" system and the rules regarding order handling have evolved over time, competition and influences of algorithmic trading have led the NYSE to implement trading systems and procedures that have mirrored a common practice of stopping for the purpose of price improvement. Although there are some important differences, they are remarkably similar in many respects, this study provides further detail of the similarities and difference, suggests that insights may be possible by re-examining stopping, contributes to the policy discussion on SEC (2012) rule changes and pilot studies, and provides a basis for further study.

Lastly, it is perhaps ironic, that following the study of Hendershott, Jones and Menkveld (2011) on automated trading that finds "for large stocks in particular, AT narrows spreads, and reduces adverse selection," that systems and procedures may have been inadvertently considered that, to some extent, lessen the positive economic benefits of automated trading. Although more study is necessary before drawing definitive conclusions, this study argues that the NYSE's Retail Liquidity Program is likely to widen spreads, increase adverse selection and volatility.

Obviously the next step in this line of research is to repeat the preceding model estimation with data from the recently adopted retail liquid program. Data should become available soon as the NYSE (2013) reports that 600 million trades have executed under the program since August. When data with sufficient identifiers become publically available the periods can be compared.

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When IPOs Migrate

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Abstract

We show that IPOs in countries with well-developed capital markets exhibit a home bias when going public. There appears to be an increasing trend of migrating IPOs to destinations other than the U.S. We find that migrating IPOs are more likely to choose the U.S. as their IPO market destination when 1) the U.S. economic freedom index is higher and 2) the IPO is larger. IPOs are more likely to migrate to other markets when 1) the IPO is smaller, 2) in the period following Sarbanes-Oxley (SOX), and 3) if the IPO home and destination country are part of the same regional trading bloc.

Introduction

Over the past 15 years, the number of companies going public has plummeted relative to historical norms. The peak of publicly traded companies occurred in 1997 when there were 7,888 listed firms. By 2011, the number of public companies had decreased by 38 percent in America and 48 percent in Britain's main markets (2012 The Economist). The U.S. Department of Treasury reports the average number of companies going public in the U.S. from 1991 through 1999 was 547 and the average number of companies going public from 2000 through June of 2011 was 192 per year. In addition, they point out the decline in small company IPOs is even greater. The report goes on to examine just venture-backed emerging growth companies to illustrate the extreme drop in smaller IPOs. From 1991 through 2000, approximately 2000 smaller companies went public and from 2001 through 2010, only 477 companies did IPOs. Even the President's Council on Jobs and Competitiveness report in October of 2011 indicated the importance of new public companies by noting that firms under five years old have accounted for about 40 million new jobs in the past three decades. Weild and Kim (2009) estimate the decline in U.S. IPO market has cost as many as 22 million jobs through 2009.

As the world has become more global, access to markets has increased and as was mentioned, the U.S. has seen a decline in the number of IPOs. The objective of this research is to examine country specific factors that may play a role in a firm's decision to move their IPO from their home country to another country. Using data from several sources, we consider the level of economic freedom in a country as well as the relative exchange rate among countries. We find that IPOs that deviate from their domestic market are more likely to choose the U.S. as their IPO market destination when 1) the U.S. economic freedom index is higher and 2) the IPO is larger. There is some evidence, although marginal, that a strong dollar helps. IPOs are more likely to migrate to other markets if 1) they are smaller, 2) the IPO is after the passage of SOX, and 3) if the IPO home country is part of a regional trading bloc with the market chosen (such as being a member of the EU or ASEAN, PIF, etc.).

Literature Review

Luchetti (2011) shows the decline in the number of stocks listed in the U.S. and compares U.S. stock listings to the rest of the world. Part of the decline may be attributed to the fact that U.S. exchanges aren't as competitive due to relatively high listing costs. The main reason however why there is a decline in number of stocks listed is the prolonged slump in U.S. IPOs. He says that at least some U.S. IPOs, that in the past might have turned to a U.S. exchange, list abroad where fees are lower and they don't face such high compliance costs such under Sarbanes-Oxley. Luchetti points to a Dealogic report that indicates that five large corporations gobbled up 134 private U.S. companies in 2010, which is nearly equal to the entire crop of IPOs on the nation's two big exchanges. Jay Ritter, Professor of Finance at the University of Florida says, "Companies going public have generated a lot of jobs and economic growth. The prolonged drought in IPOs in the U.S. raises concerns about whether an important engine of growth in the U. S. economy has come to an end."

When private companies do proceed with IPO plans, at least some look abroad. Besides the compliance costs of being a public corporation, listing fees are also more expensive in the U.S. HaloSource Inc., a water-purification company in Seattle decided to go public on the London Exchange AIM in 2010. Its annual listing fee is about $8600 whereas Nasdaq fees range from $27,500 to $99,500 and NYSE fees range from $38,000 to $500,000. Besides the lower fees, the AIM market does not require a minimum number of shares publicly held, bid price, or market capital in order to be listed. Although the AIM market has surpassed the number of IPOs in U.S. markets for several years, more money was raised from IPOs on AIM than

NASDAQ for the first time in 2006. Over the past five years, 45 U.S. companies, worth about $5.2 billion, have gone public on the AIM market. Luchetti (2011) reports that 74 U.S. companies have gone public in foreign countries since 2005 which is a small fraction of the 650 U.S. companies that have gone public on U.S. exchanges. Mary Schapiro, Chair of the SEC, informed the House Committee on Oversight and Government Reform that the SEC is reviewing how the SEC regulates security offerings in both the private and public markets. In private offerings, in which securities are sold to qualified investors or to large institutions, Rule 144A applies. Firms use Rule 144A to avoid the mandatory disclosure rules applicable to public offerings such as Section 404 of the Sarbanes-Oxley Act (SOX). The SEC's survey in 2009 indicated that costs to comply with Section 404 of SOX had declined but that in 2009, the average direct costs of compliance for an average firm was still two million dollars. Scott (2011) points out that these costs may help explain why U.S. companies prefer to remain private. He also noted that in 2010, 79.3 percent of the funds raised in the U.S. by foreign companies in global IPOs were raised through the private Rule 144A market. In the public markets, Stephens (2011) points out that the lack of rebound of our economy can be attributed in part to the lack of small firm IPOs. He indicates the primary reason for the lack of IPOs is the excessive regulation and compliance and subsequent costs that are required of public companies.

IPO Task Force

In response to the declining IPOs and the perceived loss of jobs, the U.S. Treasury Department in March of 2011 formed the Access to Capital Conference to gather information and make recommendations of how to make capital markets more accessible to emerging companies. Emerging companies were defined as any non-reporting issuer with total annual gross revenue of less than one billion dollars. From this conference, the IPO Task Force (2011) was created to examine what caused the IPO decline and to make recommendations to bring the emerging growth companies back to the public markets through IPOs. "The mandate of the IPO Task Force was to examine the root causes of the current U.S. IPO crisis and quickly develop reasonable and actionable steps that can restore access for emerging growth companies to the capital they need to create jobs and expand their businesses globally," (Kate Mitchell, chairman of the IPO Task Force). William Sahlman, professor at the Harvard Business School and IPO Task force member, stated, "As a country, we need to stop debating how to slice a shrinking pie and start working to grow the pie." If the capital market system is to expand, some type of reform needs to be made to grow the economy. The IPO Task Force noted there were a number of regulatory actions rather than one event that caused the decline in IPOs.

The IPO Task Force presented their findings to the U.S. Department of the Treasury on October 20, 2011. They state the regulatory changes have driven up the costs of going public for smaller companies. Young companies on average are spending $2.5 million in legal and compliance costs to go public and then $1.5 million per year to meet ongoing compliance costs. The IPO Task Force went on to say they found that there is little information known about smaller companies when they try to go public and there is little incentive to invest in small companies for the long term.

The IPO Task Force stated that their recommendations would preserve investor protection while also bringing existing regulatory structure in line with current market realities. It was noted that government policies targeted at just small business or at just big business affect all firms, not just firms of a particular size. The one-size-fits-all regulatory regime should be replaced with a scaled approach whereby emerging growth companies would transition in the SEC's disclosure and compliance regime over a period of years following an IPO. The first recommendation by the IPO Task Force was to reduce costs for companies trying to go public. If the firm's total annual gross revenue is less than one billion dollars at IPO registration and the firm is not recognized as a well-known seasoned issuer, the firm will be given up to five years from the date of the IPO to move up to meet full SEC compliance. The scaled regulations focus on the high cost compliance areas and will not compromise investor protection or disclosure.

The second recommendation was to increase visibility for emerging growth companies while maintaining transparency for investors. During the capital formation process, they suggest enacting modifications to existing restrictions on banking research, and expanding permissible pre-filing communications. The final recommendation was to lower the capital gains tax rate for investors who purchase shares of an IPO and hold the shares for a minimum of two years. This will help emerging growth companies to attract long-term investors at the initial allocation so the firm will raise sufficient capital through the IPO. The goal of the three recommendations is to efficiently connect the investors to the sellers of emerging company stocks. The IPO Task Force argued the need for meaningful small-cap IPO reform is urgent as the U.S. continues to lose public offerings and jobs to foreign markets. Cowan (2011) in an interview with Henri Leveque, head of PricewaterhouseCoopers's, stated that more clients are interested in going public in capital markets outside of the U.S. According to Leveque, 278 U.S. companies did IPOs in London in the five years ending in 2010, to 177 in the U.S. and 25 in Hong Kong.

Weild and Kim (2010) examined a number of these regulatory actions mentioned by the IPO Task Force and also argue that they caused the decline in IPOs. Some of the events behind what they called the perfect storm were End of the Four Horsemen by 1999, Regulation Fair Disclosure in 2000, decimalization in 2001, Sarbanes-Oxley in 2002, the Global

Settlement in 2003, and Regulation NMS in 2005. The IPO Task Force (2011) and Weild and Kim (2010) point out that all the events were meant to champion a pro-consumer agenda to help the individual investor.

The End of the Four Horsemen refers to merger of four investment banks into commercial banks: Alex Brown, Montgomery Securities, Robertson Stephens, and Hambrecht & Quist. All four when independent played a critical role in connecting investors with innovators by supporting smaller venture-funded companies to market. The merger of these investment banks with commercial banks can be attributed to the Gramm-Leach-Bliley Act of 1999, which led to increased concentration of the financial services industry. The argument is these four investment banks were merged out of existence because it was viewed their economic model of equity research, equity sales, and equity trading did not work anymore.

Regulation Fair Disclosure in 2000 leveled the information playing field for all investors by requiring all public companies to disclose material information at the same time. The unintended consequence was the deterioration of the depth and breadth of company research coverage available to investors. What is the value of the research if all investors have the same information? The problem is that Fair Disclosure limited the ability of small stock issuers to freely and fully communicate one-on-one with investors and analysts. Weild and Kim (2010) argue that Regulation Fair Disclosure enabled an increase in speculative trading and a decrease in long-term investing.

Decimalization lowered trading costs but as spreads disappeared so did economic incentives for firms to provide research and liquidity support for smaller stocks. The decimalization started with the SEC approving Regulation ATS (Alternative Trading System) in 1998. Conversion to a decimal system from a fraction system made sense for some but it's another area where we find a set of unintended consequences. Diminished spreads increased the risk to market makers displaying limit orders which decreased the liquidity provided by the orders. Consequently, the buy side moved to algorithmic trading breaking up block orders that could no longer be handled efficiently. The bottom line was that the process of moving from pricing stocks in cents rather than fractions took profits out of trading that had previously given brokers the incentive to list small companies. This lack of liquidity has pushed institutional investors away from small-cap growth markets.

The passage of Sarbanes-Oxley (SOX) in 2002 further reduced the U.S.'s international competitive position by creating a regulatory burden for public companies that has discouraged foreign and domestic issuers from going public in the U.S. In addition to the added regulatory burden, SOX has increased the cost of outside legal and accounting experts through higher insurance. This increased imposition of personal liability on officers by SOX reporting is another factor that deters companies from listing in the U.S.

The Global Settlement was an enforced agreement between the ten largest U.S. securities firms to address conflicts between research and investment banking in their businesses. The settlement separated equity research from investment banking. For IPOs, investment banking was prevented from having any input into research compensation or coverage decisions. Further, research analysts were prohibited from going with investment bankers on road shows to market new issues. The settlement disconnected the economic incentive for brokers to generate investment research on companies with which they had banking relationships. This led to a further decline in the equity research coverage and support for small-cap stocks because it eliminated the ability to pay analysts directly with investment banking fees. While the IPO market has become more honest and transparent as a result of regulatory change, smaller IPOs have become harder to market. Weild and Kim (2010) argue there is no one event that has led to the demise of the IPO in the U.S. but instead it is a culmination and interaction of many factors.

In 2005, the rules promoting the National Market System were consolidated into regulation NMS. The main rules were order protection, access rule, sub-penny rule and market data rules. The order protection (or trade through) rule provides intermarket price priority for quotations that are immediately and automatically accessible. The order protection rule has been controversial because it requires traders to transact at the lowest price rather than trades offering the quickest execution or the most reliability. The rule is viewed by many as an improper government intervention into private business affairs. The access rule tries to improve access to quotations from trading centers in the National Market System by requiring greater linking and lower access fees. Sub-penny rule tries to help small investors by not allowing high-frequency traders to jump to the front of the line in the National Best Bid and Offer (NBBO). The NBBO is the highest posted bid and the lower posted offer for a trading instrument, by making a price improvement in increments of 1/100th of a penny. Thus a high-frequency trader transaction would be executed first and provide the trader with the best opportunity to capture the spread. The rule specifies that the minimum pricing increment for stocks over $1.00 must be $0.01; stocks under $1.00 have a minimum pricing increment of $0.0001. The market data rules are designed to promote the wide availability of market data and to allocate revenues to self-regulatory organizations that produce the most useful data for investors. The goal was to strengthen the existing market data system, which provides investors in the U.S. equity markets with real-time access to the best quotations and most recent trades. For each stock, quotations and trades are continuously collected from many different trading centers and then disseminated to the public in a consolidated stream of data. Therefore, investors of all types have access to a reliable source of information for the best prices.

JOBS Act 2012

Based on the recommendations of the IPO Task Force and the perceived need to reduce barriers to growth and investment, the Jump-Start Our Business Start-Ups Act (JOBS) was made law on April 5, 2012. As the IPO Task Force pointed out, this JOBS act was needed to create more potential jobs. The task force showed that when emerging growth firms go public, research shows that more than 90 percent of their job creation happens after the IPO. The new law will clearly reduce the regulatory burden on upstart businesses trying to raise capital and allow them more freedom to communicate with investors.

The JOBS act will allow many new public companies to avoid some of the accounting rules and restrictions that larger, more established firms face. What the act calls "emerging growth companies" are those with annual revenues under $1 billion and publicly traded for less than five years. The JOBS act intends to create an on-ramp that eases the regulatory burden and costs for these emerging growth companies. First, these emerging growth companies will be given five years before being subjected to the full weight of federal regulation such as section 404 of SOX regarding the redundant external audit of internal audit of their business processes. However, after the five year period, all companies will have to comply with all regulations in place and regulators will still have antifraud enforcement authority when the firms go public.

Another provision in the JOBS act allows aspiring public companies to share information confidentially with the SEC, accept feedback and disclose SEC-mandated changes to their disclosures later. This provision will allow companies to avoid disclosing potentially sensitive information to competitors. The companies will still have to release the financial documents 21 days before they try to persuade institutional investors to buy into the IPO during the road show.

Nonetheless, firms are moving IPOs to countries around the world as market conditions change in the home country. They are no longer bound to the home country for such IPO offerings. Clearly, greater globalization has led to increased mobility of capital.

Data

Table 1 provides a distribution of the number of total global IPO offerings and U.S. IPOs by year from 2000 through 2009. The IPO data is from the Securities Data Corporation (SDC) database. We exclude offers with share prices below $1, firms in the 6000 SIC code, offerings less than one million dollars, and IPOs where the market exchange is missing. As Table 1 indicates, the percentage of U.S. IPOs to total global IPOs has declined over the time period. Table 1 also shows the number of IPOs that go outside their home country market. Of the IPOs that go abroad, the percentage of those coming to the U.S. appears to be declining. This raises the concern that the U.S. may have lost its competitive edge in attracting foreign IPOs.

Table 1: U.S. versus World IPOs that go abroad

Year	Total # of IPOs		Percentage of Total U.S. to World IPOs	IPOs that go abroad		U.S. IPOs going abroad (3)	% of World IPOs that go abroad	% of non-U.S. IPOs that come to U.S. 2/(1-3)
	World	U.S.		World (1)	To U.S. (2)			
2000	1037	348	33.6%	103	66	6	9.9%	68.0%
2001	457	135	29.5%	20	11	0	4.4%	55.0%
2002	519	167	32.2%	18	13	2	3.5%	81.2%
2003	478	130	27.2%	8	8	0	1.7%	100.0%
2004	843	298	35.3%	58	28	5	6.9%	52.8%
2005	873	276	31.6%	93	36	13	10.7%	45.0%
2006	1109	245	22.1%	134	45	16	12.1%	38.1%
2007	1456	331	22.7%	177	68	17	12.2%	42.5%
2008	428	50	11.7%	43	16	4	10.0%	41.0%
2009	444	78	17.6%	38	17	2	8.6%	47.2%

Table 2 shows the export and import of IPOs by country for the 2000 through 2009 time period. The table shows the home country bias of listing but also shows whether each country is a net importer or exporter of IPOs. As shown in the table, most countries are net exporters of IPOs. The largest net exporter of IPOs is China. Of the few countries that are net

importers, the U.S. and U.K. stand out as the main net importers of IPOs. Over the time period examined, 85.5% of companies listing in the U.S. were domestic companies and 96.6% of U.S. firms going public chose the U.S. as their listing destination.

Table 2: The Importing and Exporting of IPOs by Country

	Domestic as a % of listing companies	Percentage Listing domestically	IPOs exported	IPOs imported	Net Import (Export) of IPOs
Argentina	100.0%	36.4%	7	0	(7)
Australia	98.4	93.1	9	2	(7)
Austria	96.4	75.0	9	1	(8)
Belgium	90.9	92.6	4	5	1
Brazil	97.3	90.7	11	3	(8)
Bulgaria	100.0	91.7	1	0	(1)
Canada	96.9	94.8	31	18	(13)
China	99.3	84.1	140	5	(135)
Cyprus	100.0	16.7	10	0	(10)
Denmark	97.4	97.4	1	1	0
Finland	100.0	88.9	3	0	(3)
France	93.0	96.8	8	18	10
Germany	90.7	96.0	9	22	13
Greece	100.0	81.6	21	0	(21)
India	100.0	95.7	13	0	(13)
Ireland	72.7	26.7	30	11	(19)
Israel	90.9	17.9	46	1	(45)
Italy	99.2	91.9	11	1	(10)
Japan	99.5	99.8	2	4	2
Jersey	0.0	0.0	27	0	(27)
Luxembourg	50.0	7.7	12	1	(11)
Mexico	100.0	61.1	7	0	(7)
Netherlands	44.8	28.3	33	16	(17)
New Zealand	91.7	84.6	2	1	(1)
Norway	86.1	94.9	4	12	8
Poland	95.3	100.0	0	7	7
Portugal	90.0	90.0	1	1	0
Russia	100.0	61.4	17	0	(17)
Singapore	63.6	58.3	5	4	(1)
South Africa	100.0	46.7	8	0	(8)
South Korea	98.8	99.0	7	8	1
Spain	100.0	93.7	2	0	(2)
Sweden	94.9	93.3	4	3	(1)
Switzerland	80.4	77.6	13	11	(2)
Thailand	100.0	80.0	2	0	(2)
Turkey	100.0	88.9	2	0	(2)
United Kingdom	55.2	80.8	66	225	159
United States	85.5	96.6	64	308	244
Vietnam	100.0	85.7	6	0	(6)
All others			44	3	(41)

There may be a number of reasons why a firm would migrate from their home country market to offer an IPO. Two important reasons may be economic freedom and the ability to capture a larger value for their IPO. The Economic Freedom Index (EFI) is published annually the Fraser Institute (Gwartney and Lawson, various) and is based on 42 data items designed to capture, in a broad sense, the role of government, the rule of law, money, barriers to trade internationally, and overall business regulation. Research suggests that countries with more economic freedom have greater economic output, higher income, and better overall amenities in their society. Therefore, a company may migrate out of their home country in order to try and enjoy of benefits associated with a country with a higher EFI. Table 3 shows the EFI for the U.S., the average EFI for non-U.S. countries importing IPOs, and the average EFI of countries exporting IPOs. The U.S. has historically been rated

very highly and continues to enjoy a high ranking although recent years have seen a decline from as high as number two in the world down to number eighteen in the most recent update of the EFI. Table 3 also shows the U.S. Dollar Index which is used to track the dollar against the currencies of six major U.S. trading partners. The higher dollar index reflects the fact that the U.S. has a dominant currency and is an indicator of the economic health of the U.S. Foreign firms that migrate here for their public offering may want to issue in the U.S. to take advantage of having dollars for business transactions. Higher values of the dollar would also be associated with higher returns in the foreign firm's home currency.

Table 3: Economic Freedom Index (EFI) of the World and U.S. Dollar Index

	EFI for U.S.	Average EFI of non-U.S. Import Markets for IPOs	Average EFI of Nations Exporting IPOs	U.S. Dollar Index
2000	8.45	7.83	7.53	118.387
2001	8.23	7.60	7.50	125.347
2002	8.23	7.76	7.26	130.183
2003	8.18	---*	7.24	127.021
2004	8.15	7.88	7.28	115.066
2005	8.09	8.01	7.19	108.816
2006	8.03	7.91	7.33	111.753
2007	8.10	7.80	7.06	107.545
2008	7.91	7.87	7.15	100.196
2009	7.60	7.13	7.10	110.025

* All migrating IPOs in 2003 came to the U.S.

The Model and Empirical Results

We expect the decision for a foreign firm to go public in the U.S. is a function of various firm and offer characteristics and U.S. market conditions. We estimate a logit model where the dependent variable, U.S. IPO, takes the value of one if the foreign firm went public in the U.S., and zero otherwise.

$$U.S.\ IPO\ (1/0) = \beta_0 + \beta_1 EFI + \beta_2 SOX + \beta_3 Size + \beta_4 Dollar\ Index + \beta_5 Economic\ Union \quad (1)$$

Table 4 presents the results of the logistic regression analysis. Model 1 presents the choice of a U.S. IPO as a function of the relative economic freedom of the target market, a dummy indicating whether the IPO was pre or post-Sarbanes Oxley (SOX), the size of the IPO, the U.S. dollar index and a dummy variable indicating membership in a trading bloc such as the EU or ASEAN. To capture the relative economic freedom of the U.S. market we use two measures. *Higher U.S. EFI* takes the value of one if the U.S. EFI is higher than the domestic market and zero otherwise and is used in Model 1. *EFI difference* is the U.S. EFI less the EFI of the domestic market and is used in the alternative Model 2.

Table 4: Logistic Regression of U.S. Market Choice for Non-U.S. Migrating IPOs

	(1)	Wald Chi-Square	(2)	Wald Chi-Square
Intercept	-5.06	2.47	-3.95	1.55
Higher U.S. EFI	0.62**	3.95		
EFI Difference			0.37***	9.85
Post Sox	-0.91**	5.51	-0.87**	5.08
Log of IPO proceeds	0.30***	20.28		
Inverse of proceeds			-3.29**	6.19
U.S. Dollar Index	0.40	2.28	0.44*	2.84
Union bias	-2.07***	69.39	-1.82***	53.02
Number of observations	582		582	
Likelihood ratio Chi-Square	143.60***		135.53***	

* Significant at the 1% level, ** significant at the 5% level, *** significant at the 10% level

The results suggest that the choice to remain in the U.S. for an IPO is positively related to the level of economic freedom as well as the overall size of the IPO. The probability that a migrating IPO firm will choose the U.S. market as its destination is higher when the U.S. economic freedom index is greater than their home market and when the IPO is larger and is reduced post-SOX and when the IPO firm's home country is part of a regional trading bloc.

Model 2 in Table 4 presents a slight modification of Model 1 using *EFI difference* and measuring IPO size using the inverse of IPO proceeds. These results further support the view that firms do choose the U.S. for IPO offerings based largely on the level of economic freedom as well as size of the offering. Further, there is some slight evidence in this model that a strong dollar does help. Also, the size proxy here suggests that smaller IPOs tend to not offer in the U.S. Likewise, IPOs subsequent to the passage of Sarbanes-Oxley tend to migrate to other markets rather than the U.S.

Summary and Conclusions

This study of 692 IPOs, covering the period from 2000 through 2009, is intended to examine migration of IPOs from the home country. While most countries are net exporters of IPOs, the United States and the United Kingdom are the primary net importers of IPOs. However, the data suggest that there is an increasing trend for migration to countries other than the U.S. Overall, we find that IPOs that deviate from their domestic market are still more likely to choose the U.S. when the level of U.S. economic freedom is higher and the IPO is larger. There remains some slight evidence that a strong dollar may play some role in this choice. IPOs are more likely to migrate to other markets when they are smaller IPOs, when the IPO is done after the passage of Sarbanes-Oxley and when the home country is part of a larger trading bloc such as the EU or ASEAN. Clearly, the migration of IPOs is important and given the drop in economic freedom in the U.S. as evidenced by the Economic Freedom Index, one may find that IPOs continue to decline in the U.S.

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Which Students Trade the Most? – Five Years of Evidence from Simulations in an Introductory Investments Course

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Abstract

In investment literature, overconfidence among male investors has been shown by their relatively high trading frequency in spite of the evidence that more trading reduces returns by way of transactions costs. In this study, given the assumption that modern, college-educated students taking an investments class should be better educated than the average investor, we posit that female and male students should not have a significant difference between them in (over)confidence, and therefore, trading frequency. We also introduce a new concept of whether domestic or international students trade more frequently, and posit some possible explanations for the results.

Introduction

Investment trading frequency is often cited as an example of investor confidence. There have been numerous studies put forth showing that men trade more often than women, which has been interpreted as "overconfidence."[1] However, a few studies conclude that gender is not a significant factor in overconfidence.[2]

Graham, Harvey, and Huang (2009) use trading frequency as a measure of competence. They find that male investors perceive themselves to be more competent than female investors. Further, they find that investors who feel competent have higher trading frequencies than those who feel less competent. While not directly examined, one may infer that these results imply that male investors trade more frequently than female investors.

Generally, the differences in trading frequency between genders have been attributed to a miscalibration by male investors of their abilities to choose profitable investments. Deaves Lüders and Luo (2009) find that miscalibration is an important reason for overconfidence. But, they also find that the perception that a trader feels that he or she is better than average plays a factor in trading frequency as well. In their study, gender was not a significant factor in trading frequency.

Most analysis involves trade-level data with investors who have investment accounts. The age of the investor has generally not been consideration. However, it is less clear how those of the college-aged population trades. Students exhibit the major trait that they are younger than the typical investor. Theory says that younger investors should be less risk-averse, on average, since they have more time to absorb losses and recover before retirement.[3] Further, students in a college-level Investments course may have (or be gaining) more knowledge of investing and how investments work than those who have not taken such a course. This profile may be significantly different enough from older adult traders that we may see a difference in results.

Trinugroho and Sembel (2011) performed an experiment with undergraduate students who have some finance background, but have not yet traded in their own accounts. They found that student-traders with higher confidence traded more than those with lower confidence, especially after bad news. However, they do not distinguish between genders. Wang (2011) looks at gender differences in younger generations, defined at ages 18-45, as they pertain to investing in mutual funds. He finds that gender is the most important factor that influences the way younger generations' invest, although, knowledge, experience and income are also important.

Younger women, enrolled in a college Investments course are, arguably, as informed, as their male counterparts due to the nearly identical levels of education. Both groups learn about trading stocks and other assets at the same time. Therefore, one might expect that these women will have a similar level of confidence to men in the same class. In this paper, we posit that the difference has narrowed and should be insignificant between college-age males and females.

Another factor that does not seem to have been considered in previous studies is a possible difference between domestic (United States) students and international students. International students come from a wide variety of backgrounds and are difficult to lump into a single category. Oftentimes, students from developing countries prefer to be educated in a developed country. Only an elite group of these students are able to make it out of their home countries to receive their educations abroad. There appear to be two distinct groups of students that come to the United States (a developed country) from developing countries around the world. The first is the group that includes good students who have very high achievement levels and get good scholarship offers at schools located in the United States. The second group includes students who are from wealthy families that can afford to send their children to the United States regardless of the tuition costs. These may or may not be high achieving students.[4] For students in either group, the ability to raise their stature in their home country by being able to receive an education abroad, in the United States, may be a confidence builder. Therefore, we may expect

international students to have higher relative confidence levels, and consequently higher trading frequencies, than domestic students.

In this study, a simulated investment game was run for 12 weeks in each introductory Investments class for the past five years at an upper-Midwest liberal arts undergraduate institution.[5] Students at this school tend to be either from the upper Midwestern United States, or of international origin, and almost all students taking this class are between the ages of 19 and 24. Approximately 90% of students enrolled in the class major in accounting and finance (a single major at this institution). The remaining students enrolled are typically management or economics majors. The number of trades for each student for each week of the game was recorded and separated into males and females and into domestic and international students. Regressions were performed to parse out the differences between groups.

The results indicate that the significant gender difference in trading frequency seen in other studies comparing men and women traders is persistent, even in college-aged, traditional students. Further, international students trade significantly more than domestic students. In order, from the least to most trades per person in the simulations was: domestic females, domestic males, international females, and international males, who traded with the most frequency. To be clear, though, there was no statistical significance between the number of trades by international females and international males. All other differences were significant.

Data and Methods

Data was collected in an online simulation game. The participants were students in an introductory, undergraduate Investments class spanning from 2008 to 2012. Three different online trading platforms were used in the five year sample period. For the first two years, Stock-Trak® was used. During the third and fourth years, Investopedia Stock Simulator was used. For the most recent year, StockLinkU was used for the simulation game.

The rules for the game were generally consistent. Each student was required to trade a minimum of two trades per week for the duration of the 12 week game. Also, there were requirements to trade different types of investments, for example, stocks, ETFs, mutual funds, options, etc. This is called the "breadth" requirement. The breadth requirement has always been included as part of students' grades, although the specifications for the requirement have changed with the different online platforms due to their differing capabilities. Even though some results may be affected by the differing platforms, all platforms give students an opportunity to trade in a realistic market scenario. Since our primary focus is trading frequency, we used dummies to control for the platform in the regression equation.

For this study, the primary variable with which we are concerned is the total number of trades per student. In the Stock-Trak® online trading platform, up to 200 trades were allowed in the normal course of the game and paid for with the subscription price. The student could then purchase more trades, if desired (100 trades per purchase). In the Investopedia platform, students were allowed an unlimited amount of trades. In the StockLinkU platform, students were allowed up to 500 trades. The only time the trade limit became an issue was with an individual (international, male) student who traded 1,217 times in the Investopedia platform. Such a large number of trades clearly skewed the results, especially since students were unable to trade more than 500 times in the other two platforms. For this reason the single day-trading student was removed from the sample as an outlier for testing purposes.[6] No student ever came close to the upper limits in the two games that had limits, and only one other student exceeded 200 trades during all five years (327 trades).

As an added incentive to participate and do well in the game, the winner of each game and several runners up were awarded bonus points on the final exam based upon their portfolios' total returns. The final sample had 177 students, 113 were male, domestic students (of US origin), 27 were female, domestic students, 21 were male, international students, and 16 were female, international students. Only three students were from developed countries, two from Hong Kong[7] and one from Sweden.[8] Of the different platforms used, 67 students used Stock-Trak ® (38%), 69 students used Investopedia Stock Simulator (39%), and 41 students used StockLinkU (23%).

A multivariate regression model is used to investigate what may affect the student's trading behavior. The model used takes the standard, linear form.

$$lnTT = \beta_0 + \beta_1(Gend) + \beta_2(IntDom) + \beta_3(Investop) + \beta_4(StockLink) + \beta_5(Particip) + \beta_6(Course) + \varepsilon \quad (1)$$

The dependent variable, *lnTT*, is the natural log of the total number of trades for each student. The independent variables of concern are gender (*Gend*) and the domestic status of the student (*IntDom*), both of which are dummy variables. For *Gend*, 0=male and 1=female, and for *IntDom*, 0=domestic and 1= international. So, the default student is the domestic male student. There are two other dummy variables inserted to control for the online stock simulation platform. The default platform is Stock-Trak®. If the student participated in either the Investopedia game (*Investop*) or the StockLinkU game (*StockLink*), the dummy for that game is relevant.

There are two scalable independent variables. They are the grade for participation in the investment simulation game (*Particip*) and the overall grade the student received in the Investments course (*Course*). Both grades are expressed as a percent with a maximum of 100%. The student's grade for the participation portion of the investment simulation game (*Particip*) records whether or not the student actually traded at least twice per week and fulfilled the breadth requirements of the game. So, a student could receive 100% on his or her participation grade with a minimum of 24 trades (2 per week for 12 weeks), assuming the breadth requirements were met within those trades. This variable is chosen to control primarily for students who chose not to participate in the game as required, and thus, received a lower participation grade for the investment simulation. The student's grade for the entire course (*Course*) is expected to be a proxy for a student's competency in investments, generally. Good students may have a better understanding of markets and investments and how they work. This superior knowledge may inform them to trade more or less than a student with inferior knowledge of markets and investments.

Empirical Results

The primary focus of the paper is to compare relative trading frequencies between genders and domestic statuses. Therefore, total trades were tracked for each student for each week of each game. These are parsed out by gender and national origin. Some descriptive statistics are found in Table 1. Since the total number of trades per student was not normally distributed, it was transformed using its natural logarithm. The transformed version of total trades is our dependent variable and is also included in Table 1.

The overall mean number of trades per student was 61 throughout the 12 week period of the simulation game. It is useful to breakdown the total trades further to see what is happening between the genders and domestic statuses. In the breakdown, male students trade more than female students, and international students trade more than domestic students. The order from least average trades to most is: domestic females (35.8 trades), domestic males (60.7 trades), international females (79.4 trades), and international males (81.1 trades), who trade most frequently. The difference seems quite large, so t-tests were performed to see if the differences are significant, given the sample sizes. There were a few students who had less than the minimum required number of trades for the entire simulation game. That, obviously, reduced the participation grades for those students. The simulation participation grades were, on average, higher than the overall course grades, though.

TABLE 1: Descriptive Statistics

	N	*Mean*	*Std. Error*	*Median*	*Min*	*Max*
Total Trades	177	61.04	3.43	45.0	10	327
lnTotalTrades (lnTT)	177	3.91	0.05	3.81	2.30	5.79
Female Trades	43	52.02	5.87	40.0	14	173
Male Trades	134	63.93	4.10	47.0	10	327
INTL Trades	37	80.35	8.77	58.0	15	184
US Trades	140	55.94	3.56	42.0	10	327
F/I	16	79.38	12.87	59.5	26	173
F/D	27	35.81	2.22	31.0	14	69
M/I	21	81.10	12.21	57.0	15	184
M/D	113	60.74	4.26	45.0	10	327
Particip	177	0.915	0.0070	0.9444	0.5250	1
Course	177	0.856	0.0058	0.8645	0.6101	0.9913

F/I: Female, international students; F/D: Female, domestic students; M/I: Male, international students; M/D: Male, domestic students

T-tests were performed for equivalence of means between the groups. These results are found in Table 2. In the t-tests, we compared the sample in several ways. First, using all students, we compared the means between domestic and international students. The means were significantly different. International students traded significantly more, as a group, than domestic students. The second way we compared means was using all students and looking only at gender. Males traded more than females, but the difference was not statistically significant. A third way we looked at the data was by using only the sample of female students, we compared domestic and international students. Here again, we find a significant difference. International female students trade much more than domestic female students. The fourth grouping looked only at male students, comparing domestic males with international males. In this case, although international male students did trade more than domestic male students, the difference was not statistically significant. Our fifth comparison parses out only international students, comparing males with females. The result shows that there is no gender difference in trading frequency among international students. Our sixth, and final comparison, was of domestic students comparing again males with females. Domestic male students trade significantly more than domestic female students.

TABLE 2: T-Tests for Equality of Means (Equal Variances Not Assumed)

		Mean Difference	*Std. Error Difference*	*Sig. (2-tailed)*
All Students:	Domestic vs. International	-24.416	9.465	***.013***
All Students:	Male vs. Female	11.910	7.162	.100
Female Students:	Domestic vs. International	-43.560	13.060	***.004***
Male Students:	Domestic vs. International	-20.352	12.936	.128
International Students:	Male vs. Female	1.720	17.743	.923
Domestic Students:	Male vs. Female	24.929	4.803	***.000***

Correlations among independent variables were performed see if there might be any potential for multicollinearity in the regression equation. Correlations are found in Table 3. There were several statistically significant correlations among the variables. Gender (*Gend*) and domestic status (*IntDom*) were correlated, and the Investopedia dummy (*Investop*) was correlated with *Gend* and the investment simulation participation grade (*Particip*). Fortunately, these correlations, although statistically significant are all below 0.250 suggesting that, while they are correlated, the correlation is reasonably low. Of the other variables, we found that two combinations were significantly positively correlated, *Investop* was significantly correlated with the StockLinkU dummy (*StockLink*), which is to be expected since they are two of the three platforms and they cannot both have a value of "1" at the same time. The final statistically significant correlation is between *Particip* and the overall course grade (*Course*). The correlation for this was 0.463. So, there may be some multicollinearity in the regression equation. However, when substituting the variables in and out of the equation, there seemed to be no material effect on significance of any of the variables in the regression equation. Therefore, it was decided to retain both independent variables due to their theoretical justifications described above.

TABLE 3: Correlations/Significance

Variable	*Gend*	*IntDom*	*Investop*	*StockLink*	*Particip*
IntDom	***.227***				
	.002				
Investop	.006	***.216***			
	.933	***.004***			
StockLink	.001	.080	***-.439***		
	.987	.290	***.000***		
Particip	.021	-.025	***.169***	.050	
	.786	.741	***.024***	.506	
Course	-.045	-.074	.091	-.025	***.463***
	.554	.329	.226	.737	***.000***

The result of the multivariate regression is in Table 4. The independent variables taken together explain 41.2% of the percentage change in trading frequency. The regression coefficients are mostly significant at the 1% level. Looking at the coefficient to the student's participation grade for the simulation game (*Particip*), for an increase of one unit (%) in the student's participation grade for the simulation game, his or her total number of trades increases by 2.8%. the results for the coefficient of the gender dummy (*Gend*) show that being female decreases the number of trades by 25.8% which is consistent with the finding in Trinugroho and Sembel (2011). The coefficient for domestic status (*IntDom*) indicates that being an international student increases the number of trades by 25.8%, which was consistent with our hypothesis that international students would trade more frequently. Investopedia participants had significantly more trades than those that traded using other platforms. This was expected since Investopedia was the only platform with no trading limits. *StockLink*, the dummy associated with students who participated in the StockLinkU online simulation platform, and *Course*, the student's overall Investments course grade were not significant.

The results may also help us to predict a specific number of trades that a student would make in a semester, given student's other traits. Choosing a random student, for example a female, domestic student who participated in the Investopedia platform with grades for simulation participation and the course of 85% and 91%, respectively, we may input this information into the equation and get: $lnTT = 1.732 + 1(-0.258) + 0(0.258) + 1(0.496) + 0(0.055) + 85(0.028) + 91(-0.007)$; $lnTT = 3.713$. Taking e to the power 3.713, we get 40.97655, or approximately 41 trades. The average domestic female student traded 36 times. This particular example student is expected to trade slightly more because she participated using in the Investopedia platform. However, she is expected to trade significantly less than the average student (mean = 61 trades) because she is both a female and her national origin is domestic.

TABLE 4: Model Results

R	*R Square*	*Adjusted R Square*	*Std. Error*	
.657	.432	.412	.4681036921	
Model	***Sum of Squares***	***df***	***F***	***Sig.***
Regression	28.316	6	21.537	.000
Residual	37.251	170		
Total	65.566	176		
Variable	***B***	***Std. Error***	***t***	***Sig.***
(Constant)	1.732	.442	3.922	.000
Gend	-.258	.085	-3.050	.003
IntDom	.258	.094	2.753	.007
Investop	.496	.086	5.760	.000
StockLink	.055	.096	.570	.569
Particip	.028	.004	6.487	.000
Course	-.007	.005	-1.392	.166

Conclusion

In this paper, we revisit the idea that men trade more than women. More specifically, we attempt to find out if younger, college-aged investors exhibit the same overconfidence traits as their elder counterparts. Also, we look at domestic students and compare them to international students, parsing out both genders to see if differences in trading frequency exist there as well. Finally, we run a regression to see what factors may affect students' trading frequencies and to predict the number of trades for a given student.

We find that there are several significant differences between genders and domestic status. Domestic students trade far less than their international counterparts, regardless of gender. Also, domestic male students trade significantly more than domestic female students. However, the difference in trading frequency between genders among international students was not significant. A reason for this may be that international female students may be less risk averse than their domestic counterparts, and the gap may be wider than the difference between international and domestic male students. Since international female and male students did not statistically differ in their trading frequencies, it may be that international students have, on average, essentially the same levels of (over)confidence, regardless of gender, whereas, domestic students clearly have differing levels of confidence.

Our regression shows that simply by noticing a few traits in students entering an introductory Investments class, such as the gender and domestic status of students, we can predict 41.2% of the variation in (the natural log of) total trades within our 12-week investment simulation. Both gender and domestic status were significant predictors in the equation, as was the participation grade within the simulation itself.

In our attempt to explain the result that international students trade more frequently than domestic students, we first suggest that students from developing countries often seek to be educated in developed countries, such as the United States. The students that succeed in getting to the United States in order to receive their undergraduate education may be more confident than typical domestic undergraduate students in the United States. Therefore, we may expect international students to have higher relative confidence levels, and higher trading frequencies than domestic students. We feel that this is the best and most likely explanation. However, there are at least two possible alternate explanations. First, the desire to receive one's undergraduate education in another country may imply that such a student has a lower risk aversion than a person who chooses a domestic education. It may be true that the type of person that risks leaving his or her home country to get an education in another country may be more willing to take risks than a person who decides to be educated in his or her own country. Therefore, these students may have more confidence than the average domestic student, resulting in higher trading levels. Another possibility is that international students who prefer not to participate in many extracurricular activities may have little to do at times, and either out of boredom or refocused interest, they may trade more in the investment simulation. However, there is no clear evidence to support this hypothesis. Generally, it may be seen that the motives for international students to have more confidence than domestic students may be a fruitful avenue of research.

There is an additional factor, not considered in the paper, which may play a role in the results. A large proportion of students who enroll in this college from other countries are from Asia. Approximately 80% of international students in the sample studied were of Asian descent. China and Vietnam were the most represented individual countries. It is not known if Asian students react similarly to students from other continents. This may suggest another avenue of future research. One

could compare international students from various global regions to determine risk aversion and trading frequency. In fact, there may be several lines of explorable research here comparing the behaviors of investors from developed and developing countries, especially where stock trading is a relatively new phenomenon for the average investor.

Notes

1. The most famous and most cited of these is by Barber and Odean (2001).
2. For example, see Deaves, Lüders and Luo (2009).
3. For example, see *A Random Walk Down Wall Street*, by Burton Malkiel, pp. 411.
4. Source: personal interviews by author with international students and international and domestic faculty.
5. The College of St. Benedict and St. John's University in St. Joseph and Collegeville, MN, respectively
6. Descriptive statistics that include this student are available upon request.
7. Hong Kong is considered an "advanced" or "developed" economy by many authorities due to its GDP relative to the rest of the world. See "IMF Advanced Economies List," *World Economic Outlook*, October 2012, p. 180.
8. Exclusion of these three participants did not materially affect the results.

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Has a Profitable Momentum Strategy with REITs Disappeared?

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Abstract

This study examines whether investors earned momentum profits in the Real Estate Investment Trusts market during a period of significant flux; from 2000 to 2009. We find that from 2000 onward, momentum traders would have failed to earn significant profits from a relative strength trading strategy. This contrasts with positive and significant momentum returns before 2000 as documented in prior literature. Our findings provide evidence in favor of market efficiency for the REITs market over the extended sample period. REIT momentum profits seem to dissipate during times of high investor scrutiny such as during the 2000-2009 U.S. real estate bubble.

Introduction

The recent real estate crisis and subsequent financial meltdown has led researchers to re-examine the returns and volatility of many financial assets (Aït-Sahalia et al., 2009; Parhizgari and Pavlova, 2010; Fratianni and Marchionne, 2010; Veronesi and Zingales, 2010; Huerta et al., 2011). Overall, these studies find that returns and volatility did change during and after the recession. The aforementioned findings lead to the following question; were relative strength trading strategies (momentum) successful in generating abnormal profits during the real estate bubble and subsequent burst?

Momentum trading is based on purchasing stocks that had the highest returns in the recent past and selling those which had the lowest returns, then holding the zero-cost portfolio over some period (Jegadeesh and Titman, 1993). Jegadeesh and Titman (1993) test simple momentum trading strategies and find that they yield significant positive returns over 3- to 12-month holding periods. Moreover, their results indicate that the profitability of these strategies cannot be explained by systematic risk or by a lagged response to common factors. A growing body of literature corroborates Jegadeesh and Titman's findings even after controlling for size, book-to-market equity, and individual stock momentum among others (Fama and French, 1996; Moskowitz and Grinblatt, 1999; Lee and Swaminathan, 2000; Grundy and Martin, 2001; Jagadeesh and Titman, 2001; Cooper, Gutierrez, and Hameed, 2004; Asem and Tian, 2010).

The momentum effect observed by empiricists has motivated theoretical researchers to develop models of security prices which seek to explain this anomaly (see, e.g., Daniel, Hirshleifer, and Subrahmanyam, 1998; Hong and Stein, 1999). Daniel et al. (1998) argue that biased self-attribution may lead to short-run momentum, a behavioral bias that has also been documented among REIT investors (Lin et al., 2010). Hong and Stein (1999) suggest that information diffuses gradually, which leads to the underreaction of security prices. The underreaction implies that momentum strategies may be profitable.

The robustness of the momentum anomaly for the general stock market has lead researchers to examine if it exists for particular industries. For example, recent research also shows that real estate investment trusts' (REITs) returns exhibit momentum (Stevenson, 2002; Chui, Titman, and Wei, 2003a; Chui, Titman, and Wei, 2003b; Capozza and Israelsen, 2007; Hung and Glascock, 2008; Beracha and Skiba, 2009; Hung and Glascock, 2010; Parhizgari and Pavlova, 2010). Stevenson (2002) finds evidence of price continuation, or momentum, for international real estate securities over the short- and medium-term horizons. Chui et al. (2003a) report a significant momentum effect in REITs for the post-1990 period; however, they fail to find this same effect in the pre-1990 period. Their findings are robust even after controlling for variables such as those found in the Fama and French (1993) three-factor model and adjusting returns using Daniel and Titman's (1997) characteristic-based model. Consistent with the Daniel et al. (1998) model, Chui et al. (2003a) attribute momentum profits to a delayed overreaction by positive-feedback traders and to higher valuation uncertainty. The greater valuation uncertainty in the post-1990 period arises due to changes in management style and the umbrella partnership REIT structure. REITs' momentum effect is also observed across various market states. Hung and Glascock (2008) report higher momentum returns for REITs during up markets, when compared to down markets. Furthermore, they also find larger momentum profits after the legislative events of 1992.

The 2000 to 2008 period may be characterized by rapid real estate price appreciation, followed by rapid price depreciation; where the inflection during this period occurred in January of 2007 (Parhizgari and Pavlova, 2010). There is

growing evidence which suggests that this period, when compared to previous periods in the real estate market, was unique (Wheaton and Nechayev, 2008; Mayer, Pence, and Sherlund, 2009; Mian and Sufi, 2009; Demyanyk and Van Hemert, 2009; Parhizgari and Pavlova, 2010). For example, Wheaton and Nechayev (2008) show, using time series forecasting models, that home price inflation, for 59 MSA markets, during the "bubble" cannot be explained by demand fundamentals (e.g., population, income growth, and interest rates). Furthermore, the forecast errors were largest in relatively large MSAs, where speculative traders were active, and where active sub-prime markets prevailed. Mayer, Pence, and Sherlund (2009) suggest that the rise in mortgage defaults (the "bust" in the real estate market) is primarily due to poor underwriting standards, falling prices, and economic distress. Parhizgari and Pavlova (2010) study global REITs from 2000 to 2008 and find that momentum returns for global REITs are insignificant during the boom years, while statistically significant during the bust. One of the short-comings of this study is that it does not examine momentum profits for each individual country (e.g., U.S., Japan) during the boom and bust periods, it only studies momentum profits for each individual country for the full-sample (2000-2008). Furthermore, the results for the individual countries are for a six-month formation and six-month holding period momentum strategy, thus ignoring any other combinations of formation and holding periods. In addition, their research mostly focuses on finding optimal ranking and holding periods using an innovative technique; an evolutionary (genetic) algorithm. In general, the above-mentioned studies suggest that real estate markets were in a constant ebb and flow.

In contrast to the aforementioned studies, this paper investigates whether a profitable momentum strategy was present for U.S. REITs during and after the real estate bubble, which triggered one of the worst economic downturns in United States history (Office of Financial Stability, 2010). Our focus on REITs is driven by the fact that these securities have become an attractive vehicle of diversification for many investors due to their growth in market capitalizations and strong performance (Kang and Choi, 2011). This paper contributes to the existing literature by first investigating whether there was a significant and profitable momentum strategy for REITs during one of the longest and most important bull markets in U. S. REITs' history. Second, we investigate whether momentum profits were present after the correction. Third, unlike previous research, our sample extends to 2009. Fourth, we examine whether different formation and holding period combinations impact momentum profits during this important period.

Econometric estimations reveal the following empirical results. Our findings indicate that from 2000 to 2009, lucrative momentum profits were absent from the data. Furthermore, after splitting the sample into boom and bust periods (2000 to 2006 and 2007 to 2009, respectively) the momentum strategy is unprofitable during the former period, and worsens during the latter period. That is, momentum profits are positive during the boom but become negative during the bust; both are, however insignificant. When examining momentum profits under different ranking-holding period combinations we find that momentum strategies were not profitable from 2000 to 2009, and similarly for the boom and bust periods. Overall, the findings suggest that REIT investors did not profit from momentum strategies during this unstable real estate period.

The remainder of this paper is organized as follows. Section 2 describes the data and sample selection. Section 3 describes the methodology used to create and evaluate the various momentum portfolios. Section 4 reports the results of our analyses and Section 5 concludes.

Data

The sample is comprised of REITs traded on the NYSE, AMEX, and Nasdaq. The sample period begins in 1972, since there are not enough REIT observations before this year to form momentum portfolios (Huang and Glascock, 2008), and ends in 2009. The sample is restricted to REITs identified by the National Association of Real Estate Investment Trusts (NAREIT), and must have return data available with the Center for Research in Security Prices (CRSP). Returns for REITs are obtained from CRSP. Following Hardin et al. (2005) and Hung and Glascock (2008), REITs are identified as securities with SIC code 6798 and CRSP share codes 11, 18, and 48.

Methodology

Both value-weighted and equal-weighted REIT momentum portfolios are constructed following Chui et al. (2003) and Hung and Glascock (2008). At the end of each month, REITs are ranked in ascending order based on the prior six-month buy-and-hold abnormal returns (BHARs). REITs in the lowest 30 percent of buy-and-hold abnormal returns are assigned to the loser portfolio and those in the top 30 percent are assigned to the winner portfolio. These portfolios are then held for six months. The monthly BHARs are calculated using geometric returns as follows:

$$BHAR_t = \langle \left[\prod_{i=t-5}^{t} (1+r)_i \right] -1 \rangle - \langle \left[\prod_{i=t-5}^{t} (1+rm)_i \right] -1 \rangle \quad (1)$$

in which BHAR are the buy-and-hold abnormal returns, r are REIT returns and rm the returns of the CRSP market portfolio.

Previous REIT momentum studies conventionally use a 6 month evaluation and 6 month holding period strategy to construct momentum portfolios. We incorporate evaluation periods of 3, 6, and 12 months and hold the portfolios for 3 and 6 months to further examine the presence of a profitable momentum strategy; this yields a total of 12 momentum portfolios. We build value-weighted portfolios using the market capitalization of each security at the end of the ranking month. Accordingly, we do not consider market capitalization for equal-weighted portfolios.

The portfolios we employ in our analysis are overlapping. Similar to Chui, Titman and Wei (2003), we rebalance the portfolios each month according to the previous 6 months of buy-and-hold abnormal returns. We reduce the effect of nonsynchronous trading and the bid-ask bounce by measuring returns on momentum portfolios one month after the ranking period (Jegadeesh and Titman, 1993). We test for a statistically significant difference between the buy-and-hold abnormal returns of the winner's portfolio and the loser's portfolio using pooled and Satterthwaite approximation t-tests. A lucrative momentum strategy is present if a positive statistically significant difference exists between the two portfolios.

Results

Following the convention in previous REITs momentum studies, we first analyze the momentum returns for a six-month evaluation and six-month holding strategy. We find that for the full sample period, from 1972 to 2009, there is a significant average monthly return (0.56%). The returns for an alternative six-month evaluation and three-month holding period momentum strategy are statistically insignificant. In fact, returns are negative and insignificant for the 2007-2009 period.

Table 1: Momentum portfolio returns based on previous six month BHARs.

	Holding Period			
	6 month EW	6 month VW	3 month EW	3 month VW
Panel A				
1972-2009	0.56%	0.56%	0.41%	0.39%
	(3.28)***	(3.06)***	(1.71)*	(1.52)
Panel B				
1972-1989	0.74%	0.69%	0.54%	0.41%
	(2.91)***	(2.41)**	(1.36)	(1.84)*
1990-1999	0.79%	0.73%	0.52%	0.39%
	(2.97)***	(2.33)**	(1.53)	(1.04)
2000-2006	0.29%	0.30%	0.37%	0.45%
	(1.06)	(1.17)	(0.97)	(1.20)
2007-2009	-0.58%	-0.21%	-0.64%	0.10%
	(-0.60)	(-0.26)	(-0.58)	(0.09)
Panel C				
2000-2009	0.03%	0.15%	0.07%	0.34%
	(0.07)	(0.47)	(0.15)	(0.82)

This table reports momentum returns for portfolios held for three and six month periods after formation. We report momentum returns for both equal-weighted (EW) and value-weighted (VW) portfolios. The momentum return is the difference between the winners (top 30% of returns) and losers (bottom 30% of returns). Similar to Chui, Titman and Wei (2003), portfolios are overlapping, that is, rebalanced each month according to a previous period of six months of buy and hold abnormal returns. T-statistics are calculated using Satterthwaite approximation t-tests and reported in parenthesis. Panel A reports momentum returns for the entire period from January 1972 to December 2009. Panel B breaks down momentum returns by different time periods. Panel C reports momentum returns from January 2000 to December 2009. *, **, *** indicates significance at the 10, 5, and 1 percent level.

The results in Table 1 show, similar to previous studies, that a profitable and significant momentum strategy was present from 1990 to 1999. Consistent with Chui et al. (2003) and Hung and Glascock (2008), we find positive and statistically significant momentum returns prior to 1990. However, from 2000 to 2009 these momentum returns decrease considerably to 0.03% (t-statistic = 0.07) for equal-weighted portfolio, and 0.15% (t-statistic = 0.47) for value-weighted portfolio. The statistically insignificant results suggest that the momentum strategy becomes less effective after the boom and bust of the real estate market. If we further evaluate momentum returns by modifying the holding period to 3 months, we observe that these returns were statistically insignificant in all periods.

In their seminal paper, Jegadeesh and Titman (1993) examine various formation-holding period combinations. Similarly, we analyze momentum portfolios based on prior 3 and 12 month BHARs and which are subsequently held for 3 to 6 months.

Table 2 reports the results for a 3 month evaluation period and a 3 and 6 month holding period strategy for equally-weighted and value-weighted portfolios.

Table 2: Momentum portfolio returns based on previous three month BHARs.

	Holding Period			
	6 month EW	6 month VW	3 month EW	3 month VW
Panel A				
1972-2009	0.20%	0.14%	0.23%	0.01%
	(1.25)	(0.92)	(1.04)	(0.06)
Panel B				
1972-1989	0.48%	0.20%	0.50%	0.00%
	(2.27)**	(0.89)	(1.69)*	(0.01)
1990-1999	0.30%	0.32%	0.27%	0.17%
	(1.06)	(1.17)	(0.75)	(0.44)
2000-2006	-0.60%	-0.37%	-0.80%	-0.41%
	(-1.22)	(-0.86)	(-1.28)	(-0.72)
2007-2009	0.05%	0.29%	0.70%	0.35%
	(0.09)	(0.71)	(0.94)	(0.53)
Panel C				
2000-2009	-0.39%	-0.15%	-0.32%	-0.15%
	(-1.01)	(-0.45)	(-0.65)	(-0.33)

This table reports momentum returns (BHARs) for portfolios held for three and six month periods after formation. We report momentum returns for equal-weighted (EW) and value-weighted (VW) portfolios. The momentum return is the difference between the winners (top 30% of returns) and losers (bottom 30% of returns). Similar to Chui, Titman and Wei (2003), portfolios are overlapping, that is, rebalanced each month according to a previous period of three months of buy and hold abnormal returns. T-statistics are calculated using Satterthwaite approximation t-tests and reported in parenthesis. Panel A reports momentum returns for the entire period from January 1972 to December 2009. Panel B breaks down momentum returns by different time periods. Panel C reports momentum returns from January 2000 to December 2009. *, **, *** indicates significance at the 10, 5, and 1 percent level.

Table 3: Momentum portfolio returns based on previous twelve month BHARs.

	Holding Period			
	6 month EW	6 month VW	3 month EW	3 month VW
Panel A				
1972-2009	-0.13%	-0.03%	0.03%	0.14%
	(1.94)*	(-0.15)	(0.11)	(0.46)
Panel B				
1972-1989	0.17%	0.28%	0.22%	0.19%
	(1.64)	(0.90)	(0.55)	(0.43)
1990-1999	0.33%	0.25%	0.68%	0.78%
	(1.76)*	(0.61)	(1.58)	(1.34)
2000-2006	-1.55%	-1.28%	-1.44%	-1.14%
	(-2.60)**	(-2.22)**	(-1.97)**	(-1.58)
2007-2009	-0.78%	-0.52%	-0.59%	-0.01%
	(-0.89)	(-0.69)	(-1.97)**	(-0.01)
Panel C				
2000-2009	-1.25%	-0.98%	-1.10%	-0.71%
	(-2.48)**	(-2.05)**	(-0.53)	(-1.15)

This table reports momentum returns for portfolios held for three and six month periods after formation. We report momentum returns for equally-weighted (EW) and value-weighted (VW) portfolios. The momentum return is the difference between the winners (top 30% of returns) and losers (bottom 30% of returns). Similar to Chui, Titman and Wei (2003), portfolios are overlapping, that is, rebalanced each month according to a previous period of twelve months of buy and hold abnormal returns. T-statistics are calculated using Satterthwaite approximation t-tests and reported in parenthesis. Panel A reports momentum returns for the entire period from January 1972 to December 2009. Panel B breaks down momentum returns by different time periods. Panel C reports momentum returns from January 2000 to December 2009. *, **, *** indicates significance at the 10, 5, and 1 percent level.

The results show that a momentum strategy is not profitable for any of the time periods, with the exception of the equally-weighted portfolio evaluated for 3 months and held for 6 months in the 1972 to 1989 time frame shown in panel B. While

most of the returns are of the expected sign for most of the time periods, most are not statistically different from zero. Under the 3 month evaluation strategy, the returns for the period from 2000 to 2006 are negative and insignificant. For the 2000-2009 period in panel C, the returns are insignificantly negative as well.

The results for a strategy with a 12 month evaluation period and 3 and 6 month holding periods are reported in Table 3. Surprisingly, the average monthly momentum return is negative (-0.13%) and significant at the 10% level for equally-weighted portfolio for the period from 1972 to 2009 in Panel A. This negative return is apparently driven by the significant -1.55% (t-statistic = -2.60) average monthly return from 2000 to 2006 in Panel B. For the periods from 1972 to 1989 and from 1990 to 1999, the returns exhibit the expected positive sign; however, only the period from 1990 to 1999 is statistically significant at the 10% level with an average monthly return of 0.33% (t-statistic = 1.76) for the equally-weighted portfolio. In the case of value-weighted portfolios, the returns for neither of the 1972 to 1989 or the 1990 to 2000 periods are statistically significant.

Under the 12 month evaluation period strategy, momentum returns for portfolios held for 6 months are on average -1.25% per month (equally-weighted) and -0.98% per month (value-weighted), both significant at the 5% level after 2000. The results are consistent with the idea that a momentum strategy under this criterion (12 month evaluation and 6 month holding) is detrimental for investors' wealth after 2000, especially between years 2000 and 2006.

In summary, we present evidence of a profitable momentum strategy for a 6 month evaluation and 6 month holding modality for time periods before 2000. Our results support the findings of Chui et al. (2003) and Hung and Glascock (2008), in which they find significant and profitable momentum returns before 1990, which become higher after 1990 up to 1999. Nevertheless, we find no evidence of profitable momentum generated returns after the year 2000 for Real Estate Investment Trusts.

Conclusion

Momentum in finance is the documented performance continuation of securities introduced by Jegadeesh and Titman (1993). This phenomenon reveals that securities which performed positively or negatively in one period will tend to maintain this same performance over the short-run. Previous research documents momentum in for Real Estate Investment Trusts. Chui et al. (2003) and Hung and Glascock (2008) report a profitable momentum strategy before 1990, which accentuates after legislation changes for REITs that occurred post-1990 until 1999.

This paper confirms the findings of these authors and investigates whether a lucrative momentum strategy persists for REITs after the fundamental changes occurred in the real estate sector due to the post-2000 real estate bubble and the economic crisis that is closely linked to the real estate market in recent years. We study publicly traded REITs from 1972 to 2009, as well as several sub-periods. Our evidence concurs with the results in studies by Chui et al. (2003) and Hung and Glascock (2008). There are positive and significant momentum generated returns in the periods from 1972 to 1989 and from 1990 to 1999 for value-weighted and equally-weighted REIT portfolios. They observe profitable momentum returns for the six month evaluating and six month holding period modality. However, when we introduce other modalities of momentum strategy, momentum returns are not statistically significant. That is, if the strategy is modified based on 3 or 12 previous months with 3 or 6 months holding periods, there is no evidence of a profitable momentum strategy. In fact, under a strategy that evaluates REITs in the previous 12 months and held for 6 months after portfolio formation, momentum returns are negative and significant. One could argue that under this modality of the strategy, investment based on momentum is detrimental to investors' wealth.

We conclude that the dissipation of momentum strategy returns after 2000 makes a case in favor of the efficient market hypothesis. Apparently, investors have managed to incorporate information into REIT prices effectively. REIT investors appear to exhaust any profits generated from a momentum strategy for this type of securities. Moreover, investors seem to detect and correct the performance continuation of REITs efficiently. Our findings suggest that the market can be efficient even during times of rapid price increases, as in the case for REITs after 2000. Our evidence supports that returns associated with momentum trading strategies create an illusion of profit when, in fact, none exists (Lesmond, Schill and Zhuo, 2004).

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Personal Finance a Mandatory Course for High School and College Freshman

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Abstract

The lack of Financial Education was one of the major causes of the recent financial crisis. It is vital for the population that has been traditionally underserved by America's financial system. Incorrect financial decisions have long-term damaging effects. Hence teaching the youth financial literacy is as critical as teaching them reading and writing. Personal financial literacy is an essential skill that is necessary in current times and yet it is not a required subject at any level of the young adult education.

Introduction

From 1968 to 2008 the income share received by the highest quintile rose from 43 percent to 50 percent. The shares received by other quintiles fell. The lowest quintile share fell from 4 percent to 3 percent. The gap between the rich and the poor has widened. Excluding the ultra-rich, the families with highest incomes are likely to be college educated Asian married couples between the age of 45 and 54 living together with two children somewhere in the West. The person with the lowest income is a black woman over 75 years of age who lives somewhere in the South with less than nine years of elementary education. Another low income group is young single mothers who have not completed high school. The characteristics of household that determine income and eventually wealth are: Education level, Household size, Age, Race, and Region.

The poorest 40 percent of households own only 0.2 percent of total wealth. Ninety-nine percent of households own 65.6 percent of total wealth. The richest 1 percent own 34.4 percent of total wealth. Studies show that minorities especially African American and Hispanics in the United States have lower savings rates, invest less, and less likely to be knowledgeable about investing. They begin financial planning later in life and invest more conservatively than other groups. As a result, they accumulate less wealth and are destitute when they retire

Justification for Personal Finance

In the era of certain defined benefit pension plans and social security the need for financial literacy was not essential. Now the situation is very different. The need for financial literacy is more critical as more and more people will be responsible for their retirement savings in the defined contribution plans such as the 401(k). Various surveys conducted by Securities Exchange Commissions, National Foundation of Credit Counseling, and The Network Branded Prepaid Card Association suggest that individuals are just not prepared to make decisions regarding their financial affairs. Forty-four percent of Americans learn about personal finance at home or from their parents. The others who are predominantly minorities are not exposed to financial literacy as their parents do not have any financial knowledge themselves and do not own financial assets such as bonds and stocks. This is going to make the wealth gap between the rich and the poor larger over the long run.

Previous research has found that financial literacy can have important implications for financial behavior. People with low financial literacy are more likely to have problems with debt (Lusardi and Tufano 2009), less likely to participate in the stock market (van Rooij, Lusardi, and Alessie 2007), less likely to choose mutual funds with lower fees (Hastings and Tejeda-Ashton 2008), less likely to accumulate wealth and manage wealth effectively (Hilgert, Hogarth, and Beverly 2003; Stango and Zinman 2007) and less likely to plan for retirement (Lusardi and Mitchell 2006, 2007a, 2009). Financial literacy is an important component of sound financial decision making, and many young people wish they had more financial knowledge. In a 2009 survey on credit card usage among undergraduate students, 84% of students said they needed more education on financial management topics, 64% would have liked to receive information about financial management topics in high school and 40% would have liked to receive such information as college freshmen (Sallie Mae 2009). Understanding financial literacy among young people is thus of critical importance for policymakers in several areas; it can aid those who wish to devise effective financial education programs targeted at young people as well as those writing legislation to protect younger consumers.

Conclusion

Minorities do not bank, buy insurance or invest in stocks. Instead they borrow money from payday lenders and cash their pay checks at check cashing services paying even higher rates for their services. This is because they lack financial education. "Knowledge is empowerment" Pass it on… so that the next generation can enjoy a higher standard of living in the

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[xxxii] Financing trade in Islamically permissible commodities

[xxxiii] Interest or any ex ante return derived on loan/debt

[xxxiv] Entering into contract in absolute risk or uncertainty about the ultimate result of the contract/quality/subject matter or the rights & obligations of the parties

[xxxv] Games of chance – gambling

[xxxvi] Terms large shareholder and concentrated ownership are used interchangeably

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