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CONTENTS

ARTICLES

A Brief History of the New York State Economics Association
Wade L. Thomas.....3

Estimating Natural Resources and Energy Flows from New York State Economic Activity
James F. Booker.....21

The Effects of Gun Ownership Rates and Gun Control Laws on Suicide Rates
Mark Gius.....35

Capital Flows to Russia, Ukraine, and Belarus: Does “Hot” Money Respond Differently to Macroeconomic Shocks?
Scott W. Hegerty.....47

Regional Differences in Fan Preferences for Minor League Hockey: The AHL
Rodney J. Paul and Robert Chatt.....63

Referees.....74

Final Program (63rd Annual Convention – September 24 & 25, 2010).....75

EDITORIAL

The *New York Economic Review* is an annual journal, published in the Fall. The *Review* publishes theoretical and empirical articles, and also interpretive reviews of the literature. We also encourage short articles. The *Review's* policy is to have less than a three month turnaround time for reviewing articles for publication.

MANUSCRIPT GUIDELINES

1. Please submit three copies of a manuscript.
2. All manuscripts are to be typed, double spaced and proofread. Prepared on a IBM PC/compatible computer in Microsoft Word format, the computer disk should be submitted in addition to the three hard copies.
3. All charts and graphs *must* be reproduction quality (Microsoft Word or Excel).
4. Footnotes should appear at the end of the article under the heading of "Endnotes."
5. Citations in the text should include the author and year of publication, as found in the references, in brackets. For instance (Marshall, 1980).
6. A compilation of bibliographic entries should appear at the very end of the manuscript under the heading "References."

Manuscript submissions should be sent to the editor, William O'Dea.

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A Brief History of the New York State Economics Association

Wade L. Thomas*

Abstract

The New State Economics Association (NYSEA) is among the oldest learned societies of academics and professionals interested in the economics discipline. However, the beginning date of 1948 could not be verified by the archives and documents of the association. The association's records prior to 1968 are practically nonexistent. Members of the organization with knowledge or experience with the period before 1968 are either retired or dead.

This paper establishes the historical timeline of organization from its creation in 1948 to the present. The author reconstructs the history of the New York State Economics Association before remaining documents or witnesses to the association's development are lost to the ravages of time. This is accomplished through conversations and communications with former members of the Association and efforts to locate any documents pertaining to the New York State Economics Association.

The results of inquiries with former members and officers trace operation of the organization to the 1950s. The discovery of a copy of the first volume of *The Proceedings of the New York State Economics Association* (December 1968) in the library of SUNY Geneseo, which was missing from the archives of the NYSEA, provides the most definitive documentation of the organization's origins. It contains an article by former president Sanford Gordon who chronicles the NYSEA's history from 1948 to 1968. This combination of sources permits the construction of a fairly complete historical record of the association.

The investigation also documents critical points in the organization's development, including incorporation, its journal, and entrance into the digital age.

Background

The New York State Economics Association has long maintained that it began in 1948, making it one of the oldest learned societies of academics and professionals devoted to the economics discipline. Table 1 provides founding years for selected economic associations. Reference to 1948 is stated in organization's logo, in the *New York Economic Review*, and in its other public releases and publications. However, this author has made inquiries over the course of a more than a decade to members and long-time members about the origins of the organization. No strong evidence was ever

*Professor of Economics and Associate Dean, Division of Economics and Business, SUNY Oneonta, Oneonta, NY 13820, Thomaswl@oneonta.edu, Tel.: 607-436-3458, Fax: 607-436-2543. ACKNOWLEDGMENTS: The author acknowledges the assistance of Robert B. Carson, Sanford Gordon, David Martin, Dale Tussing, Alfred Lubell, William P. O'Dea, Edward Beck, Barbara Howard, Stanley Engerman, and Kent Klitgaard in the development of this paper. The author thanks Nianyong Wang for his remarks on a version of this paper presented at the 63rd Annual Conference of the New York State Economics Association. The author also recognizes the secretarial support and help with archive mining provided by Dawn Tompkins. The author assumes responsibility for errors or omissions.

offered or could be found to verify the beginning date of 1948. In fact, not even a scintilla of evidence was found. The 1948 founding could not be verified by the archives or documents of the association. The association's records prior to 1968 are practically nonexistent. Members of the organization with knowledge or experience with the period before 1968 are either retired or dead.

Organization Name	Year Founded
American Economic Association	1885
Western Economic Association	1922
Southern Economic Association	1922
Econometric Society	1930
Midwest Economic Association	1934
Economic History Association	1940
Industrial Relations Research Association (became Labor and Employment Relations Association in 2005)	1947
<i>New York State Economics Association (forerunner Central New York Economics Conference became NYSEA in 1960)</i>	1948
National Association of Business Economists	1959

The records for the period 1968 until 1977 are better, but incomplete. Recordkeeping became much more consistent after incorporation of the NYSEA in 1978. With no artifacts in the headquarters' records, the greatest challenge to chronicling the history of NYSEA was filling the vacuum of 1948-68.

Reconstructing the 1948-1968 Period

In attempting to uncover the origins of the NYSEA, several people with lengthy affiliations to the organization were contacted. All had been officers or past presidents. They were: Alfred Lubell, Robert B. Carson, A. Dale Tussing, Sanford Gordon, David Martin, Edward Beck, William P. O'Dea, and Barbara Howard. The age distribution of the group was the determining factor in how much information each subject could provide. Carson, Gordon and Tussing were initially the only ones with information concerning the period prior to 1968.

Robert Carson could recall his professors, John Gambs (Hamilton College) and Melvin Eggers (Syracuse University) being involved in the organization. Carson believed a link existed between the Joint Council on Economic Education (1949) and the activities of the NYSEA or a forerunner organization that he thought might have been called the Western New York Economic Association.

Dale Tussing also believed there had been a Western New York Economic Association and that "Western" being in the name had some bearing on resources received in connection with the economics education mission. Tussing's memory is second-hand information from Melvin Eggers who spoke with Tussing about the organization when he was a graduate student. Seemingly innocent at the time when Tussing's recollection was elicited was his statement: "There may have also been a Central New York Economics Association in the mix at one time."

Sanford Gordon recalled presenting a paper at the NYSEA conference at Syracuse University in the late 1950s and emphatically rejected that NYSEA was called “west” or “western” at that time. He also remembered Louis Salkever of SUNY New Paltz and later SUNY Albany serving as president, but could not pinpoint the year. Moreover, throughout the time of Gordon’s participation, meetings were held in conjunction with the New York State Council on Economic Education (NYSCEE). Gordon said J. Woodrow Sayre was the director of NYSCEE in the late 1950s and early 1960s.¹ The author’s exchanges with Gordon involved trying to determine if Virgil Crisafulli was president from 1968-69 or if it was Gordon instead or if Gordon was president before Crisafulli. Although Gordon could recall things that lent support to the existence of the organization, perhaps as early as the 1950s, he no longer had any documents pertaining to the organization in his possession.

An Old Photograph

Gordon has in his possession an old photograph of the meeting when he assumed the presidency. The photograph he sent to the author is presented in Exhibit 1 and the date stamp at the upper right indicates when it was received. The caption he typed below the photograph is self explanatory. Sanford Gordon is on the right in the photograph. Is it Virgil Crisafulli or Louis Salkever who appears in the photo at the far left? Robert Carson inspected the photo. He said it is definitely not Louis Salkever and believed it could be Frank Farnsworth of Colgate University. However, the author is convinced that it is indeed Virgil Crisafulli after examining photos posted online by Utica College². Gordon has since confirmed as well that it is Virgil Crisafulli on the far left in the photograph. Hence, Gordon is the outgoing president and Crisafulli is the incoming president in 1968. The identity of the prize-winning visiting scholar at SUNY Binghamton is undetermined at this time.

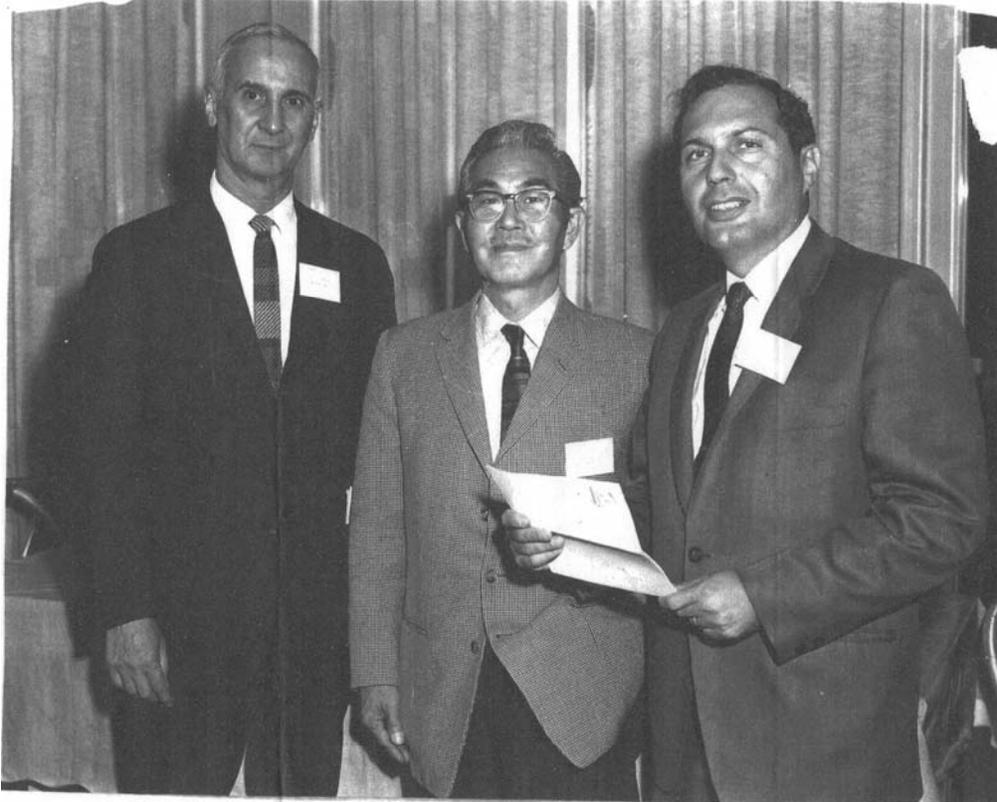
Gordon’s hand written note to the right side admits uncertainty on his part. The photo is an interesting artifact of the NYSEA from 1968.

Where Was Volume One?

Unfortunately, the first volume of the published *Proceedings of the New York State Economics Association* was missing from the headquarters’ records and archives maintained and left by Alfred Lubell (emeritus professor of economics, SUNY Oneonta). Volume 1 was also not in the archive of proceedings and journals held by William O’Dea editor of the *New York Economic Review*. The Milne Library at SUNY Oneonta, long thought to have a complete collection, did not have volume 1 of the *Proceedings*.

At this point, finding a copy of the first *Proceedings* would complete the NYSEA collection and possibly settle the matter of when Gordon was president because officers of the organization were printed in every other known NYSEA publication. The relatively new digital development of SUNY Connect allows searching the collections of all SUNY libraries, which revealed that SUNY Geneseo and SUNY Institute of Technology had copies of the first *Proceedings* in their libraries. Barbara

Exhibit 1: Photograph Provided by Sanford Gordon Presumed to Be from 1968



Taken when I became President of the New York State Economics Association. To the far left is the outgoing president and in the center was the Distinguished Professor of Economics and winner of the Einstein Chair at SUNY Binghamton.

Howard, an assistant dean and faculty member in the School of Business at Geneseo whose long association with NYSEA included serving on the board of directors was contacted with a request for her to copy the volume.³ Professor Howard persuaded the Milne Library of Geneseo to donate the first *Proceedings* to the NYSEA.

Dawn of the Dead Binding, Birth of the Organization

Upon arrival at SUNY Oneonta, it was evident that the plastic binding from 1968 had succumbed to dry rot and chemical degradation. The volume was removed from the shipping envelope by Dawn Tompkins, secretary to the Division of Economics and Business and clerical support to NYSEA on a contract basis for many years. Ms. Tompkins who had also been a former library employee at the Milne Library of SUNY Oneonta was no stranger to artifacts in long-term storage. She found the binding shattered into small pieces and dust. The volume that arrived on the author's desk was secured by a binder clamp. Despite the destruction of the binding, the front and back covers and all the pages between were in very good condition.

The front cover carried the library seal of the Milne Library, which was initially surprising and confusing because Milne is the name of the libraries both at SUNY Oneonta and SUNY Geneseo. Having established that the volume was not an unreturned inter-library loan from 40 years earlier, the first few pages would not only eliminate the ambiguity surrounding the presidency in 1968, they would establish the beginning of the NYSEA right down to the exact date and day of the week.⁴

Sanford Gordon's Thumbnail Sketch of the New York State Economics Association

The Proceedings of the New York State Economics Association in April 1968 led with Sanford D. Gordon's "Thumbnail Sketch of the New York State Economics Association." Gordon had intended to write a "brief history," but settled for a shorter "thumbnail sketch."

Gordon contacted living persons whose experiences with the NYSEA were of sufficient duration and depth with the organization throughout its existence. They were Arnold Tolles of the School of Industrial Relations at Cornell University, Melvin Eggers, Chairman of the Economics Department at Syracuse University, and Laurence Leamer, Social Science Chairman at SUNY Binghamton. Gordon infers that a longer piece consistent with a brief history was sacrificed in favor of the thumbnail sketch because of conflicting testimony, limited documentation, and inconsistent interpretations of past events.⁵

Nonetheless, Gordon pinpoints the date and location for the beginning of the NYSEA to Saturday, May 15, 1948, at Wells College in Aurora, New York. Professor Mabel Magee of Wells College (an all female college at the time) hosted the meetings. Professor Wilfred Cook of Colgate University (an all male college at the time) presided over the meeting. The group was to be known as the Central New York Economics Conference, which Gordon identifies as the predecessor to the NYSEA. Dale Tussing's recollection of the involvement of a "Central New York Economics Association" had found corroboration.

The Central New York Economics Conference held meetings from 1948 to 1956 on the campus of the president of the organization for the particular year. Gordon found that in at least three of those years meetings were held in both fall and spring. Locations included Syracuse University, Cornell University, Harpur College, Rensselaer Polytechnic Institute, Hartwick College, Wells College and Colgate University.

Gordon recounts the format of the conference agendas, types of papers and participants during the period. A meeting scheduled for Niagara University in 1957 was not held. Gordon could not find records of meetings for 1958 and 1959.

Transition to the New York State Economics Association

The organization held its first meeting under the name of the New York State Economics Association at Syracuse University in 1960. Gordon reckoned that: "The new organization must logically be considered as a revival of the old—with a new title."⁶ He arrives at this conclusion largely

by comparing the key figures of the Central New York Economics Conference with those of the new organization and by discounting the unexplained cancellation of the Central New York Economics Conference in 1957 and the absence of records for meetings in 1958 and 1959. However, the use of the word “revival” implies, perhaps accurately, that something had gone awry with planning and logistics or that other unexpected events had led to the cancellation of the 1957 meeting. An ensuing breakdown in continuity may in fact have occurred and it is not known whether meetings were held in 1958 and 1959. Additionally, Gordon is persuaded by the central role played by Arnold Tolles in the formation and operation of each organization.

The author matched all the key individuals identified by Gordon as having been involved in either organization from the time period 1948 to approximately 1963. The results are presented in Table 2. Clearly, Arnold Tolles, Melvin Eggers, Lester Blum, Archibald Mclsaac, and John Gambs were common leading figures in the creation of both organizations. It also seems very plausible that the new organization’s title was a re-branding effort to expand its territory to all of New York rather than a liberally defined swath of territory running through central New York from the Canadian to the Pennsylvania borders.

One cannot discern from Gordon’s account who was president in each year from 1960 to 1963. However, the process of elimination led the author to converge on three of the individuals reported in Table 2: William Hoskings (Colgate University), Laurence Abbott (Union College), and Archibald Mclsaac (Syracuse University). It probably would have seemed a safe bet that Mclsaac was president in 1960, given that the meeting was at Syracuse. However, Dale Tussing thought that Mclsaac might have died in 1960. The *American Economic Review* in fact reported that Mclsaac died on January 12, 1960.⁷

Gordon has the NYSEA taking shape in the fall of 1960. Clearly, Mclsaac was dead by then and his purported role in forming the new organization has to be regarded as tenuous. However, the presidential leadership of the NYSEA from 1964 forward appears to be now almost completely established based upon Gordon’s article and documents in the NYSEA records from 1968 forward.

Recall that Table 2 is derived from Gordon’s account. Martin recalls that Tolles and Mclsaac were key to the Central New York Economic Conference. Mclsaac dies and Eggers becomes chair of the Economics Department at Syracuse University (after Jesse Burkhead’s short stint as acting chair). Martin regards Tolles, Eggers, and Leamer as important to the development of the NYSEA in 1960. He also notes the involvement of Morris Copeland (Cornell University), William Dunkman (University of Rochester), and Edward Holstein (Rensselaer Polytechnic Institute) in the early years.

“Woody” Sayre bears influence upon the organization under its new name because he could ply the monies of the economic education movement in support of the organization. According to Martin, “Sayre had a printing press, a budget and a secretary.” Those were rare and enviable commodities in those days. Both Carson and Martin recall a routine of the economic education participants holding a

Table 2 Comparison of Key Participants in the Central New York Conference and the New York State Economics Association Using Sanford Gordon's Historical Account

Central New York Economics Conference		New York State Economics Association	
Participant	Affiliation	Participant	Affiliation
 Arnold Tolles	Cornell University School of Industrial and Labor Relations	Arnold Tolles	Cornell University School of Industrial and Labor Relations
 Melvin Eggers	Syracuse University	Melvin Eggers	Syracuse University
 Lester Blum	Colgate University	Lester Blum	Colgate University
 Archibald McIsaac	Syracuse University	Archibald McIsaac	Syracuse University
 John Gambs	Hamilton College	John Gambs	Hamilton College
G. Ralph Smith	Harpur College		
Mabel Magee	Wells College		
Jack Taylor	University of Rochester		
Wilfred Crook	Colgate University		
William Kessler	Colgate University		
		J. Woodrow Sayre	Syracuse University
		William Hoskings	Hobart and William Smith Colleges
		Laurence Abbott	Union College
		Laurence Leamer	Harpur College/SUNY Binghamton
		Louis Salkever	SUNY New Paltz and SUNY Albany
		Frank Farnsworth	Colgate University

Friday meeting that was financed through Sayre's resources with the hope that the conventioners would stay overnight and participate in the paper presentations and roundtable sessions the next day. Martin's reflection upon circumstances of the time was that the economic education movement was the stronger force in the organization—a sentiment echoed by Carson. The New York State Council on Economic Education paid the conference expenses for an economist from each institution affiliated with the Council.⁸

However, in Martin's estimation, "Nothing much happens until Sandy Gordon." Gordon advances and widens the NYSEA's profile by leveraging the resources of the economic education movement and aggressively seeking private sponsors. The production of the first proceedings is tangible evidence.

First Constitution

The organization's first constitution was ratified at the 21st annual meeting at SUNY Brockport on April 18, 1970. The first constitution was effectively superseded by the corporate by laws in 1978. Joseph Eisenhauer (Canisius College at the time) called for revision of the constitution, which occurred under his presidency on October 13, 2001.

The first constitution coincided with the presidency of Rawle Farley (SUNY Brockport). Farley's ambitious ideas followed Gordon's energizing of the NYSEA. Farley wanted to turn the NYSEA into the Eastern Economics Association. This endeavor faced competition from T.S. Saini of Bloomsburg University. Records show Saini also participated at NYSEA conferences. History shows that Saini succeeded with the Eastern Economics Association's first conference in 1974.

In the meantime, the NYSEA had assumed the posture of a much more serious organization. The keynote speaker in 1970 was Paul Samuelson. The 1972 conference featured Kenneth Boulding as the luncheon speaker. Other notable participants that year included Murray Rothbard, Abba Lerner and Stanley Engerman. Wassily Leontief was a panel speaker in 1974. Leon Keyserling was also involved in this period.

Incorporation

The NYSEA ignored legal formality for many years. Officers were selected and dues and sponsors' fees were collected without regard to legal obligations, liability issues, or proper financial record keeping and reporting requirements. It is not clear how its treasurers handled funds or in whose accounts monies were deposited.

Alfred Lubell's (SUNY Oneonta) ascendancy to the presidency in 1977 would be accompanied by his recognition that the association was inviting trouble. Lubell sought, with the assistance of attorney Steve Blumenkrantz (SUNY Oneonta), to incorporate the New York State Economics Association as:

a corporation defined in Section 102 (a) (5) of the Not-For-Profit Corporation Law and [as] a Type B Corporation within the meaning of Section 201. The purposes of the corporation are educational within the meaning of Section 501 (c) (3) of the Internal Revenue Code and its regulations, and this corporation is organized exclusively for educational purposes within the meaning of Section 420 of the New York Real Property Tax Law.

In short, the NYSEA officially became a tax-exempt, not-for-profit corporation on July 19, 1978. The articles of incorporation were signed by President Alfred M. Lubell, Vice-President Stanton A. Warren (SUNY Albany) and Secretary-Treasurer George H. Webster (Hartwick College).

The first meeting as a corporation of the members and directors was held at 4:45 p.m. on April 7, 1979, in Newhouse I, Room A1 at Syracuse University and was attended by Directors Edward Beck (SUNY Oneonta), Alfred Lubell (SUNY Oneonta) and James Price (Syracuse University). The directors elected Alfred Lubell as temporary chairman and Edward Beck as temporary secretary. At

this meeting, by-laws were adopted, directors were appointed, and the office of the corporation was set at SUNY Oneonta. Officers elected at this meeting were:

Alfred Lubell, president

James Price, vice president

Robert Carson, secretary

Edward Beck, treasurer.

The minutes of the meeting were also signed by NYSEA members Guy Mhone (SUNY Oneonta), Carolyn Ingalls (SUNY Oneonta), Philip Robbins (SUNY Oneonta), Grace Ts'ao (SUNY Oneonta), Stanton Warren (SUNY Albany) and Angela Hardy (SUNY Oneonta). The signing of the minutes constituted a full ratification of the actions taken and waiver of notice of the meeting. It seems this action was taken for expediency in commencing corporate operations and establishing a proper bank account.

In 1978, the 30th meeting was held at SUNY Oneonta. The dues were 15 dollars and conference registration was 10 dollars. For what it is worth, that would be \$83.59 in 2010 compared to the actual comprehensive registration of \$75 in 2010.

Saving the NYSEA

When Alfred Lubell sought to incorporate the NYSEA, he was not only trying to avoid trouble. In fact, the organization was in trouble. It was headed for bankruptcy. Kelvin Lancaster's presidency in 1974-75 served the organization poorly—perhaps because of insufficient commitment, perhaps owing to true confusion on Lancaster's part about the year in which he was supposed to organize the conference. Martin and Gordon scrambled to rescue the meetings that year, which Martin describes as inferior in comparison to other years. For example, in 1972, Martin presided over the largest conference attendance at SUNY Geneseo of some 200 participants.

After 1975, the NYSEA went into rapid decline. Economic education money had dried up. The development of the Eastern Economic Association adversely affected the NYSEA. As the organization's attendance and financial problems mounted, no one wanted to assume the role of president. In 1977, Alfred Lubell would step forward with the courage and savvy to turn the failing organization around.

Leadership History

Using Gordon's article, information from David Martin, pre-corporation archives, and corporate records, the author has been able to construct the most complete list of presidents and presiding officers of the organization from 1948 forward. This is provided in Table 3.

The organization was founded at a women's college and, clearly co-founded by a woman, Mabel Magee of Wells College. This study regards Wilfred Crook of Colgate University as the first person to preside over the organization because he chaired the organizational meeting. The group then elected

William Kessler of Colgate University to chair the organization. One could argue about whether it should be Crook or Kessler. Whichever side of the argument one favors, Crook is undeniably a cofounder of the organization.

Angela Hardy Isaac of the Rochester Institute of Technology was the first woman to hold the title of president. She served from 1985 to 1987. Rawle Farley of SUNY Brockport is believed to be the first black president of the NYSEA in 1969-70. SUNY Brockport would be the source for an African-American president from 1992 to 1994: Charles Callahan III who might also contend for the tallest person to hold the office.

Alfred Lubell claims the record for the most terms as president, six and all consecutive. His lengthy service contributed immensely to SUNY Oneonta having the most terms for the presidency at 9 with Ithaca College at 8. Ithaca College has had the most individuals serve as president (4): Frank Musgrave, Sherry Wechtler, Elia Kacapyr, and William Kolberg. The only president to come from a two-year college was Peter Pasqualino of Fulton-Montgomery Community College, serving from 1998 to 2000. Richard Dietz of the New York Federal Reserve Bank has been the only president from a non-academic institution (2001-2003).

Table 3 Presidents and Presiding Officers of the NYSEA and Its Forerunner the Central New York Economics Conference
1948-49 Wilfred Crook, Colgate University (Chairman of the Central New York Economics Conference)*
1949-50 William Kessler, Colgate University (Chairman of the Central New York Economics Conference)
1950-56 N. Arnold Tolles, Cornell University and Louis Salkever, SUNY New Paltz and SUNY Albany are believed to have served as presidents during this period. .
1952-53 Raymond de Roover, Wells College
1953-54 S.A. Anderson, Rensselaer Institute of Technology
1957 Meeting scheduled at Niagara University was not held
1957-1959 No records of meetings
1960 First meeting under the new name of New York State Economics Association at Syracuse University
1960-63 meetings were held at Syracuse University (William Hoskings, Colgate University; Laurence Abbott, Union College; and Archibald McIsaac, Syracuse University, had to be presidents during these years based upon Gordon's account. The exact years are not known.)
1963-64 Laurence Leamer, Harpur College (SUNY Binghamton)
1964-65 Gerard, Lemoyne College (first name possibly Lester)
1965-66 Frank Farnsworth, Colgate University
1966-67 Louis Salkever, SUNY Albany
1967-68 Sanford Gordon, SUNY Oneonta
1968-69 Virgil Crisafulli, Utica College of Syracuse University
1969-70 Rawle Farley, SUNY Brockport
1970-71 Edwin Holstein, Rensselaer Polytechnic Institute
1971-72 David Martin, SUNY Geneseo
1972-73 William N. Leonard, Hofstra University
1973-74 William Bennett, SUNY Buffalo
1974-75 Kelvin Lancaster, Columbia University
1975-76 Stanton Warren, SUNY Plattsburgh
1976-77 Thomas Kershner, SUNY Buffalo

1977-78 Alfred Lubell, SUNY Oneonta
1978-79 Alfred Lubell, SUNY Oneonta
1979-80 Alfred Lubell, SUNY Oneonta
1980-81 Alfred Lubell, SUNY Oneonta
1981-82 Alfred Lubell, SUNY Oneonta
1982-83 Alfred Lubell, SUNY Oneonta
1983-84 James Cicarelli, St. Bonaventure University
1984-85 James Cicarelli, St. Bonaventure University
1985-86 Angela Hardy Isaac, Rochester Institute of Technology
1986-87 Angela Hardy Isaac, Rochester Institute of Technology
1986-87 John Helmuth, Rochester Institute of Technology
1987-88 John Helmuth, Rochester Institute of Technology
1988-89 Frank Musgrave, Ithaca College
1989-90 Frank Musgrave, Ithaca College
1990-91 A. Dale Tussing, Syracuse University
1991-92 A. Dale Tussing, Syracuse University
1992-93 Charles Callahan, III, SUNY Brockport
1993-94 Charles Callahan, III, SUNY Brockport
1994-95 Sherry Wetchler, Ithaca College
1995-96 Sherry Wetchler, Ithaca College
1996-97 Wade Thomas, SUNY Oneonta
1997-98 Wade Thomas, SUNY Oneonta
1998-99 Peter Pasqualino, Fulton-Montgomery CC
1999-00 Peter Pasqualino, Fulton-Montgomery CC
2000-01 Joseph Eisenhauer, Canisius College
2001-02 Richard Deitz, Federal Reserve Bank Buffalo NY
2002-03 Richard Deitz, Federal Reserve Bank Buffalo NY
2003-04 Elia Kacapyr, Ithaca College
2004-05 Elia Kacapyr, Ithaca College
2005-06 James F. Booker, Siena College
2006-07 James F. Booker, Siena College
2007-08 William Kolberg, Ithaca College
2008-09 William Kolberg, Ithaca College
2009-10 Jeffrey Wagner, Rochester Institute of Technology
2010-11 Jeffrey Wagner, Rochester Institute of Technology
*1948-49 Mabel Magee, Wells College, hosted and Wilfred Crook, Colgate University, presided over the meeting to create the Central New York Economics Conference. This organization was the forerunner of NYSEA.

Distinguished Fellows

The NYSEA formally established a Distinguished Fellow Award in 1990 to honor those who have made significant contributions to the economics profession that are not likely to be recognized by other organizations. Frank Musgrave of Ithaca College was the source of inspiration for the award by advocating for Bogdan Mieczkowski (also of Ithaca College) to be recognized by the NYSEA as “Distinguished Fellow.”⁹ Nominations must be made by NYSEA members, though the nominee need not be a member.

The recipients of the Distinguished Fellow Award are presented in Table 4. Alfred Lubell was awarded a similar type of award in 1986 on an ad hoc basis because of his service to the association.

Given the reasons behind this recognition, Lubell is regarded as the first recipient of the award. He was again recognized in 2008.

Recipients of this award have typically had respectable records of scholarly output. However, the officers and directors have historically placed a heavy emphasis on participation and service to the organization in choosing the recipients of this award.

Table 4 Distinguished Fellows of the New York State Economics Association		
Recipient	Affiliation	Year
Alfred Lubell	SUNY Oneonta	1986
Bogdan Mieczkowski	Ithaca College	1990
Frank Musgrave	Ithaca College	1992
William P. O’Dea	SUNY Oneonta	1999
Wade L. Thomas	SUNY Oneonta	2004
Joseph Eisenhower*	Wright State University	2007
Alfred Lubell	SUNY Oneonta	2008

*Eisenhauer had been affiliated with Canisius College in New York at the time of his nomination, but had changed positions by the time of the award.

The New York Economic Review

The origins of *The New York Economic Review (NYER)* are traced to *The Proceedings of the New York State Economics Association* from 1968. The 1968 publication was the first and a direct result of the efforts of Sanford Gordon as president. He had obtained a grant from the New York Telephone Company to help finance the publication of volume 1.

The journal underwent changes in title and frequency of publication throughout the years. The present title began in 1984. Prior to that year, proceedings were the association’s journal and subsequently the publication was known as *The Journal of the New York State Economic Association*, an identification that is maintained as a subtext to the current journal.

Editorship of the NYSEA’s publications has a history unto itself. A seemingly permanent fixture throughout most of the life of the journal right up to recent times is William P. O’Dea with his remarkable passion for the subject and driving industry for the production of *The New York Economic Review*.

John Piccione, with academic and financial industry positions too numerous to list here, has served as the managing editor of the *NYER* since 1986. His role is primarily to assure physical production of the journal at reasonable cost. Piccione can only be described as fiercely dedicated to the production of the *NYER*’s printed version and continuation.

O'Dea's tenure is preceded by several editors: Gordon in 1968, an editorial board in 1969-71,¹⁰ David Martin (SUNY Geneseo) for 1973-74, and David Colander for a single edition of combined proceedings from 1975-76 and 1976-77. Edward Beck served as editor of *The Journal of the New York State Economic Association* from 1979 to 1982 Beck was managing editor in 1983 and 1984 with Alfred Lubell as the associate editor. There was also an editorial board. The managing editor performed the combined roles of the editor and managing editor in today's organization. Lubell was largely responsible for the production of the journal from 1977 to 1985.

David Ring (SUNY Oneonta) and William O'Dea were managing editors in 1985. Lubell was associate editor and there was an editorial board. Ring and O'Dea were responsible for editorial work, not production of the journal as the managing editor title might imply.

The structure changes again in 1986. Ring and O'Dea became coeditors without an editorial board. Piccione became managing editor and took over responsibility for production of the journal from Lubell. Ring ended his tenure in 1987 and O'Dea became sole editor. The current structure has been in place since 1987. Probably few editors of economics journals have served as long as O'Dea. In the past three decades, the quality of the *NYER* has been sturdy and respectable for a journal of its type, owing to the efforts of the editor, managing editor, contracted staff and self-sacrificing referees of manuscripts.

The Missing Proceedings

Published proceedings for 1973 seemed to be missing from all collections. This would be explained through a conversation the author had with David Martin on September 19, 2010, wherein Martin recounts an extraordinary episode in the *NYER*'s history. Sanford Gordon had decided to propel the journal and the organization to a higher level by arranging for selected papers from the annual conference to be published in *The American Economist*, which is associated with the international honor society in economics of Omicron Delta Epsilon. This happened just one time, but 10 papers from the NYSEA conference, including one written by David Martin, were published in the spring 1973 issue of *The American Economist*. Appendix A provides a screenshot of the front matter from the journal, showing that NYSEA papers were in the contents of that issue.

Appearance on the World-Wide Web in 1997

NYSEA was among the first economic associations to establish a presence on the World Wide Web. President Wade L. Thomas (SUNY Oneonta) coded the organization's first Web pages and uploaded them on the SUNY Oneonta web server in July of 1997 to help promote the conference held at Oneonta that year.¹¹ The NYSEA site first became live on July 22, 1997. The College at Oneonta continues to host the organization's Web pages. Exhibit 2 shows the site in 1997.

The Internet age warranted a new position in the organization: Web coordinator. Thomas was assigned the role. In February of 2000, he registered the domain NYSEA.org in advance of the

growing flurry of speculative domain registrations and squatting. A readily recognizable Web identity for the organization and its members was established without having to pay a premium to obtain it or resorting to concocting a contorted version of the organization's identity that might have remained available for domain registration.

The transition to digital media has allowed the *NYER* and other publications of the organization to begin migrating to electronic publication. While a considerable backlog of paper materials awaits conversion, the NYSEA's current publications are contemporaneously available online free of charge.

Exhibit 2: Screenshot of the NYSEA Website in August 1997

NEW YORK STATE ECONOMICS ASSOCIATION WEBSITE

Welcome!

[Audio Message](#)

This page supplies information about the New York State Economics Association, the 50th Annual Convention, and the New York Economic Review. Visit often for updates and improvements.

NYSEA 50TH ANNUAL CONVENTION TO BE HELD IN ONEONTA

The 50th Annual Conference of the NYSEA will be held Friday and Saturday, September 26-27, 1997 in Oneonta, New York, at the Morris Conference Center on the State University College at Oneonta campus. Registration, conference and lodging information are available from:

Dr. Wade L. Thomas, President
NYSEA
Department of Economics and Business
SUNY Oneonta
Oneonta, NY 13820

Telephone: 607-436-3458 Fax: 607-436-2543

[Preliminary Program of the 50th Annual Convention](#)

NYSEA Officers

- President: Dr. Wade L. Thomas, Department of Economics and Business, SUNY Oneonta
- Vice President: Mr. Peter Pasqualino, Business Program, Fulton-Montgomery Community College
- Treasurer: Dr. Alfred Lubell, SUNY Oneonta
- Secretary: Dr. David Ring, Department of Economics and Business, SUNY Oneonta

NYSEA Board of Directors

- Charles Callahan III, SUNY Brockport
- Barbara Howard, SUNY Geneseo
- Frank Musgrave, Ithaca College
- A. Dale Tussing, Syracuse University
- John Piccione, Chase Manhattan Bank
- Sherry Wetchler, Ithaca College
- Martha Wojtowycz, Syracuse University
- William P. O'Dea, SUNY Oneonta

New York Economic Review

The New York Economic Review, a semi-annual, refereed publication, is the official journal of the NYSEA. Turnaround time for article submissions is ordinarily less than three months. Submission fee is \$20 (U.S.) for non-members, which confers a one-year NYSEA membership. Submit two copies of manuscripts to:

Dr. William P. O'Dea, Editor, The New York Economic Review, Department of Economics and Business, State University College at Oneonta, Oneonta, NY 13820

Managing Editor of *The New York Economic Review*:

[John Piccione, Chase Manhattan Bank](#)

Membership Directory

Search for

This site maintained by Dr. Wade L. Thomas, Chair / Economics and Business / thomaswl@oneonta.edu / revised August 29, 1997

View our website 



How Many Conferences?

It is a simple question. How many NYSEA conferences have actually been held? As of this writing, the NYSEA maintains that 2010 was the 63rd annual meeting. This investigation casts doubt on the number of conferences and the accuracy of the annual meeting designation. However, the number 63 might be correct.

First, the meeting date was shifted from spring to fall in 1987. Two conferences were held that year and double counted as annual meetings. Records show the 39th and the 40th annual conferences both occurring in 1987. This change also explains why Angela Hardy Isaac and John Helmuth were both presidents in 1986-87. This has long been the seemingly straightforward explanation of the NYSEA's bad arithmetic, which has been a source of confusion for years.

Second, Gordon states that between 1948 and 1956, the forerunner Central New York Economics Conference held meetings in spring and fall for at least 3 of the years in that span. Perhaps that occurred in more than 3 years. The years are not specified. Nonetheless, conservatively add 3 conferences.

Third, it is known that the 1957 meeting was not held. Subtract one conference.

Fourth, the status of conferences for 1958 and 1959 is unknown. Perhaps 2 meetings should be subtracted.

Fifth, it does appear that annual meetings were held from 1960 forward except for the 2 in 1987 as noted.

Sixth, the constitution adopted at SUNY Brockport in 1970 states on the document that it is the 21st annual meeting and proceedings from 1969-70 state 21st as well. Are the documents in error? Or did the creators of the documents know that an annual conference was not held in 1957, which would explain why the document states 21st instead of 22nd? Is this evidence that conferences were in fact held in 1958 and 1959? Contrast this with the fact that the 1978 conference is identified as the 30th—eight years after the 21st conference in 1970.

The designation as “annual conference” is outright wrong, but the NYSEA and its ancestor Central New York Economics Conference do appear to have held a total of 63 conferences since 1948, but the true number is not conclusive.

Conclusion

The principal purpose of this investigation was to verify the origins of the New York State Economics Association and to construct an improved and updated account of the organization. Uncovering Sanford Gordon's earlier account of the organization's beginnings provides credible information about many years of operation before 1968. The New York State Economics Association was not founded in name in 1948. That identity began in 1960, but the evidence that it was formed from a predecessor organization in the form of the Central New York Economics Conference is quite plausible based upon written and verbal accounts. Thus, the starting date of 1948 is predicated upon

reasonable belief and intention, not fiction or exaggeration. It is also of interest that the organization began at an all women's college and one of the cofounders was a woman.

Prior to this investigation, the NYSEA records could document presidents who served from 1968-69 and forward. This study has succeeded in reconstructing the history of nearly all the known top leadership since 1948.

The NYSEA became a legal entity in 1978. From that time, it has operated dependably. Its journal began in 1968 and is the product of unrelenting professional dedication.

The NYSEA was among the first economics associations to establish a presence on the World Wide Web. The NYSEA Web site was published in the summer of 1997. Its online publications include *The New York Economic Review* and conference-related publications.

Probably from the late 1980s, the founding date for NYSEA and the number of annual conferences exceeding the elapsed years by one has been a source of confusion. Clearly, there have not been 63 annual conferences. However, the evidence suggests that the number of times the organization and its predecessor have met since 1948 could be 63. Suffice to say, it is impractical for the organization to correct this anomaly.

ENDNOTES

1. Both Robert Carson and Sanford Gordon referred to Woodrow Wilson Sayre. However, the author's investigation found that J. Woodrow Sayre was the man's actual name. Carson confirmed that "Woodrow Wilson" was a nickname used because J. Woodrow Sayre was a descendant of U.S. President Woodrow Wilson.
2. Crisafulli was one of the founders of Utica College. He died in 2008 and Utica College has a memorial page on its Web site (<http://www.utica.edu/instadvance/marketingcomm/special/cris/index.cfm>). Crisafulli appears to be wearing the same necktie in a photograph posted by Utica College as he is in this photo--additional evidence confirming his identity. David Martin said that it is "unquestionably Crisafulli" in a conversation with the author on September 19, 2010.
3. Professor Howard has stated on several occasions down through the years to the author that she thought David Martin, a former faculty member and head of the business school at SUNY Geneseo had started NYSEA. While Martin was an NYSEA president, held other offices in the organization and was an important figure in the organization for a number of years, he did not start the organization. After speaking with David Martin, the author found the explanation for Howard's belief. Martin started a Western New York State Economics Association that operated from 1969 to 1980 from Geneseo. This also explains Tussing's recollection of such an organization. This group's genesis was from the Genesee Region's Council on Economic Education, which was run by Byron Williams, social science chair at the University of Rochester. Williams' death led to transfer of the organization to Geneseo under Martin's control.

4. On September 14, 2010, the author discovered volume 1 in a file box of NYSEA records in storage at SUNY Oneonta.
5. Sanford B. Gordon, "A Thumbnail Sketch of the New York State Economics Association," *The Proceedings of the New York State Economics Association*, (December 1968), p.1. For clarification, Gordon's reference to Arnold Tolles must be to N. Arnold Tolles.
6. Ibid, p.4.
7. *American Economic Review*, Vol. 50, No. 3 (June 1960), p. 548.
8. Gordon, p.5.
9. Mieczkowski was a prolific writer who had managed to alienate himself from the Ithaca College administration by publishing unflattering accounts of campus operations in his books about bureaucracy. The conferral of the Distinguished Fellow Award occurred at the NYSEA Conference held at Ithaca College in 1990. The venue erupted into a standing ovation for Mieczkowski.
10. The board in 1969-70 was Stanley Hart (SUNY Fredonia), Edward Willet (Houghton College) and Terry Darveaux (Lincoln Rochester Trust Company). The editorial board membership is not identified for 1971-72, but it may have been the same people given that Martin had an editorial board composed of Willet and Darveaux in 1973-74.
11. For context, the Netscape browser arrived on the scene in late 1994, greatly improving the layperson's use of the Internet. Between 1995 and 1998 Netscape and Microsoft were engaged in the famed "browser wars" and the NYSEA website reflects those earliest vestiges of the rapidly changing and competing support for the evolving Hypertext Markup Language (HTML). In 1997, there were 1.3 million Web sites. At the beginning of 2000 when NYSEA.org was registered, a mere 779,950 were .ORG registrations. At the end of 2009, there are 234 million websites and 7.9 million .ORG Web sites. (Data from Zooknic.com)

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- The American Economist*, Vol. 17, No. 1 (spring, 1973).

Appendix A: Screenshot of Front Matter from *The American Economist* Vol. 17, No. 1 (Spring, 1973), Showing the Publication of Papers from the New York State Economics Association Conference

the american economist

Journal of

THE INTERNATIONAL HONOR SOCIETY IN ECONOMICS

Omicron Delta Epsilon

Vol. XVII

Spring 1973

Number 1

O.D.E.—American Economic Association, Graduate Student Papers

New York State Economics Association, Papers

Student Papers

O.D.E.—Association for the Study of the Grants Economy,
Conference Papers

Estimating Natural Resource and Energy Flows From New York State Economic Activity

James F. Booker*

Abstract:

Estimates of direct and indirect waste, energy, and material input use resulting from New York State economic activity are derived from existing input-output and natural resource and energy data bases. The work provides both a generally applicable methodology and an empirical example using national level natural resource and energy use data. The primary contribution of the work is to demonstrate a methodology for estimating life-cycle impacts from regional level economic activity. The approach is demonstrated using indirect economic linkages in an empirical example for the state of New York.

A substantial body of work utilizes energy and material flow approaches to address the environmental impact of economic activity. This work recognizes that material inputs and wastes are used and generated at all levels of the economic supply chain and at final consumption. The insights of this work emphasize that regional economic activity generates not only its own environmental effects, but a range of upstream and downstream effects that spill over to broader geographical scales. Empirical work on natural resource and energy impacts has proceeded largely at the two extremes of national and international impacts of economic activity, and in work on the life cycle impact of specific industrial products and processes. The work reported here is positioned between these extremes, and provides both a generally applicable methodology and an empirical example for estimating natural resource and energy flows at the regional level.

The paper first provides a literature review, and then introduces the specific methodology used to estimate the regional natural resource and energy impacts. The data sources used here are then introduced, followed by a brief discussion of practical issues arising in using them with the economic input-output database. The resulting direct and indirect effects of New York State economic activity are then introduced and summarized.

*Siena College, 515 Loudon Road, Loudonville, NY 12211, jbooker@siena.edu. ACKNOWLEDGMENTS: This paper originated in an undergraduate seminar "Material Nation – Exploiting the Earth" at Alfred University, and was aided by the enthusiastic support and constructive feedback provided by Dr. Chris Sinton, formerly of Alfred University's Center for Environmental and Energy Conservation and now in the Environmental Studies and Science Department at Ithaca College. The paper is dedicated to the memory of a seminar participant Benjamin Klein, who passed away while the seminar was in progress. Funding for the input-output model used in this research was provided by the United States Environmental Protection Agency through grand/cooperative agreement R-82873701 to Alfred University. The agreement was not subjected to the Agency's required peer review and does not necessarily reflect the views of the Agency. No official endorsement should be inferred.

Literature Review

There is a substantial body of work which utilizes material flow approaches to address the environmental impact of economic activity. The early work of Kneese, Ayres, D'Arge (1970) recognizes that material inputs and wastes are used and generated at all levels of the economic supply chain, and at final consumption. The insights of this seminal work lead directly to the premise of industrial ecology, that industrial activity at any level generates not only its own environmental impacts, but a range of upstream and downstream impacts as well. Thus any specific economic activity or output inevitably generates indirect energy and natural resources impacts, and economic impacts across a broad range of economic sectors. This led to a key practical concern of conventional life cycle analysis, which sought to estimate physical impacts of a specific product by examining direct impacts of a small number of specific production practices: important indirect impacts would in many cases be excluded from the analysis. One solution was to apply input-output models (Leontief, 1936) to estimate the related economic activity. In a survey of the use of economic input-output models to estimate indirect environmental impacts, Forsund (1985) notes that it was Leontief (1970) who suggested extensions to basic input-output models to address environmental impacts. A useful example for the full United States was provided by Lave et al. (1995).

Similarly, input-output models have been applied directly to quantify economic linkages in life cycle analysis of specific products (see, for example Hendrickson et al., 1998, and Joshi, 1999). Lenzen (2000) demonstrates that using such a hybrid approach to eliminate the truncation error in conventional life cycle analysis is likely to produce superior impact estimates. A useful survey of current approaches to life cycle analysis is provided by Finnveden et al. (2009). Online calculators which provide impact estimates by economic sector using an underlying input output model are now widely available (e.g. Carnegie Mellon University Green Design Institute, 2011).

Integrating input-output models with energy and environmental impact estimates also provides a framework for conducting simulations to test policy impacts of, for example, efficiency mandates and energy taxes (Hawdon and Pearson, 1995). And because input-output models are available at a variety of spatial scales, environmental impacts of changes in consumption at scales from national to city to household levels can be estimated using this hybrid approach (Munksgaard et al. 2005). Policy analysis has also been demonstrated at the state level: Miernyk and Sears (1974), for example, worked directly with an input-output model for West Virginia to demonstrate impacts of emission standards.

State Level Environmental, Energy, and Natural Resource Flows

This paper focuses on the impact of state level economic activity on natural resource and energy flows both within and outside state boundaries. Waste and energy and material input use data from several alternative sources are integrated with a state input-output model to provide insight into the total environmental effects of state economic activity. The work follows the outlines of Tracey et al.

(2000), in which total energy inputs stemming from economic production in seven northeastern states were estimated separately for 15 industrial sectors. This work differs in focusing on New York State alone, but moves beyond industrial activity to include virtually all economic sectors. In addition to energy inputs, environmental and material inputs which stem from New York economic activity are estimated.

Methodology

A primary purpose of this work is to develop an understanding of the relationship between final demand in differing economic sectors and the resulting waste, energy, and material flows. First, an input-output model is used to estimate economic flows between sectors. This allows calculation of the economic inputs required to satisfy final demand in any given sector. Second, the natural resource and energy flows by sector are used to estimate the total environmental requirements which result from the final demand.

Direct Energy and Natural Resource Flow Estimates

In order to utilize an input-output model to estimate direct natural resource and energy impacts, basic flow estimates by economic sector are needed. If region specific resource intensities are available by economic sector, then physical resource use and impacts ρ can be estimated directly from regional economic activity. But in most cases regional estimates of energy and natural resource use or intensity by economic sector are not known. In this case regional estimates can be developed from national physical impact estimates. Let \mathbf{R} be a matrix of national material flow estimates, where r_{kj} is the total impact for material flow k in the economic sector j . For this paper, economic sectors j correspond closely to the 2-digit SIC level definitions. Then the direct material flows ρ for New York State can be estimated as

$$(1) \rho = (\alpha \mathbf{I}) \mathbf{R}$$

where α is the vector of New York State to national output ratios by economic sector, and \mathbf{I} is the identity matrix.

Estimating Demand Driven Flows

With direct resource flows ρ estimated, indirect energy and natural resource impacts from New York State economic activity can be found following the basic input-output approach described by Joshi (1999). Let \mathbf{F} be a diagonal matrix of final demands for individual economic sectors j , and \mathbf{I} is the identity matrix. Then the matrix of required inputs \mathbf{X} to meet demand in sector j is given by

$$(2) \mathbf{X} = (\mathbf{I} - \mathbf{A})^{-1} \mathbf{F}$$

where \mathbf{A} is the matrix of intermediate demands by sector j for inputs from sector i . Then $(\mathbf{I} - \mathbf{A})^{-1}$ is the so-called Leontief inverse calculated from the input-output model. The vector of total material flows θ arising from final demands in sector j are then given by

$$\theta = \rho X$$

θ thus gives the material flows resulting from final demands in sector j by using the material flow database in conjunction with the input-output database to translate dollar flows to material flows.

Data

Making input-output analysis tractable are databases which characterize the economic activity induced by and stemming from economic output by any given sector of the national or regional economy. In this study we use 1999 state data from the Minnesota IMPLAN Group, Inc. (1999) to represent the structure of the New York State economy. In this formulation economic activity is disaggregated to the two digit SIC level, representing 67 distinct industries.

The direct natural resource and energy impacts are based upon state, regional, and national level estimates. In assigning impacts to a particular sector, the highest level sector to which the impact could be fully attributed was used. Thus carbon emissions from coal combustion were assigned to the utility sector, though the energy product (electricity) is in fact used throughout the economy. Less intuitively, emissions from refined oil products are assigned to petroleum and coal products rather than to service stations. While such fuels are sold by service stations, they also enter the economy through other channels (e.g. jet fuel for airplanes).

Four databases of environmental, energy, and natural resource impact are utilized. These include the Toxic Release Inventory (Environmental Protection Agency, 2002a), commonly abbreviated as TRI, AirData emissions (Environmental Protection Agency, 2002b), energy usage estimates from the Manufacturing Energy Consumption Survey (MECs) database (Energy Information Administration, 1998) and World Resources Institute estimates following from Adriaanse et al. (1997). An alternative approach would be to utilize a collected set of impact estimates such as the Comprehensive Datae Archive (CEDA) described by Suh and Kagawa (2005).

Toxic Releases Inventory

The Toxic Release Inventory (TRI) (Environmental Protection Agency, 2002a) covers air, land, and water discharges for a broad range of industries, with aggregate discharge quantities in each category reported annually at the facility level. For purposes of this paper, total discharges are aggregated by two-digit SIC code based on specific New York State facility discharges. TRI reported discharges are limited to specifically identified chemical compounds, and do not include many wastes of substantial

concern. For example the regional pollutant sulfur dioxide (SO_2) is not reported (except when its product sulfuric acid is released as an aerosol), nor are globally important CO_2 emissions.

Air Emissions Database

An alternative emissions data source for air emissions is the AirData interface (Environmental Protection Agency, 2002b). AirData provides aggregated annual emissions data by state based on the Air Quality System and National Emission Inventory databases. Emissions coverage includes sulfur dioxide (SO_2), nitrogen oxides (NO_x), volatile organic compounds (VOC), particulates, and carbon monoxide (CO). Industry detail is provided to the four-digit SIC level, and aggregated for this paper to the two-digit level. While the emissions specificity is superior to TRI, industry coverage is limited. Emissions estimates based on AirData sources must therefore be interpreted as underestimates of total industry emissions.

Energy Database

Data for New York State industry level energy flows are derived from regional data reported by the Energy Information Administration in the Department of Energy's Manufacturing Energy Consumption Survey (1998). The regional data are reported for the states of New York, Pennsylvania, and New Jersey. The methodology outlined in equation (1) is used to estimate regional flows, with the vector α used to represent, by economic sector, the ratio of New York State output to the three state total. While most important industrial and manufacturing sectors are included, data for electricity generation by public utilities (SIC 49) is not included.

Material Use Database

World Resource Institute data (Adriaanse, 1997) provides estimates of material use in a number of manufacturing and industrial sectors for the United States. Matthews et al. (2000) provide a useful application of the database. In this paper New York State specific estimates are derived by scaling material usage to sector size as shown in equation (1). Specific material categories include biodegradable, geologic, processed materials, chemically active, and hazardous materials. As with the air emissions data, industry coverage is limited and resulting material input use estimates must be interpreted cautiously. Importantly, estimates of material use in primary agricultural sectors (e.g. SIC 01) are provided.

Direct material and energy impacts within New York State are estimated from the level of economic activity in each sector, multiplied by the estimated material or energy intensity in the sector. Second, the total direct plus indirect impact of economic activity in any one sector is estimated from economic input-output relationships between sectors. For example, these relationships (described by the 67×67 matrix of multipliers \mathbf{X} in equation 2) provide an estimate of the total impacts or footprint of an activity such as purchases from food stores (SIC 54). While supermarkets themselves "produce" few impacts,

they purchase from many sectors which do: from agriculture, transportation, and energy for example. This allows the impact estimate to capture effects of the many purchased inputs from both inside and outside New York State, including international purchases. These imports to the state thus represent material and energy impacts which result from economic activity within the state, but which occur elsewhere. Estimates of the dollar value of imports to the state are used to estimate material and energy impacts in the rest of the nation, and in the rest of the world resulting from state economic activity.

Results

Estimates of direct environmental and energy use intensities by economic sector are presented in Tables 1 and 2. The impact per million dollars of economic output (year 2000 US dollars) in the selected 2-digit SIC economic sectors is shown. Table 1 shows that toxic release intensities for air, water, and land emissions are greatest in the Leather and leather products (SIC 31), Lumber and wood products (SIC 24), and Metal mining (SIC 10) sectors respectively. Energy intensity (excluding the Electricity generation sector (SIC 49) is greatest in the Paper (SIC 26) and Chemicals (SIC 28) industries. Table 2 shows the intensity of material input use required in each sector. Notable among significant New York State industries are biodegradable and geologic materials used for agricultural crops (SIC 01), and chemically active materials used in Stone, clay, and glass products (SIC 32).

New York State direct impacts shown in Table 3 are estimated by scaling national or regional materials intensity data to the level of economic activity in the state following equation (1). Energy use, toxic releases, and specific air emissions are given for selected manufacturing and related sectors. Electricity generation (SIC 49) is the dominant source of New York State industry for air emissions. Food (SIC 20) and Lumber and wood products (SIC 24), together with Fabricated metal products (SIC 34) produce most water emissions. Land discharges are dominated by Metal mining (SIC 10); despite the industry's limited presence within the state, waste discharges per unit of economic output are so significant that impacts are estimated to substantially exceed those in other state industries. But comparison of input intensities for Agricultural crops (SIC 01) and Stone, clay, and glass products (SIC 32) in Table 2 with land discharges for Metal mining (SIC 10) in Table 1 suggest that if commensurate emissions data were available for the crops and stone products, these would be identified as even larger producers of land discharges. Energy usage (again excluding Electricity generation (SIC 49)) is greatest in the Chemical (SIC 28) industry by a factor of three, with Paper (SIC 26) a greater energy consumer than the next four industries combined.

To fully capture the natural resource and energy impacts of regional economic activity, indirect impacts that occur as a result of that activity are now considered. Figure 1 shows the full direct plus indirect air, water, and land emissions of selected industries. To provide context for the economic importance of each industry, state output is also shown for each of the fourteen selected industries.

Table 1. New York State emission and energy intensity (direct) of selected resource intensive economic activities. No data are available for entries labeled “-”.

SIC Industry	National Industry Output (million \$)	Toxic Release Inventory (TRI) categories			MECs reported	AirData reported air emissions			
		1- Air emissions (lbs/million \$)	2 - Water emissions (lbs/million \$)	3 - Land emissions (lbs/million \$)	4 - Total energy (billion BTU / million \$)	6 - CO emissions (lbs/million \$)	7 - NOX emissions (lbs/million \$)	8 - SO2 emissions (lbss/million \$)	9 - VOC emissions (lbs/million \$)
10 - Metal mining	9,138	726	34	90,933	-	-	-	-	-
20 - Food and kindred products	488,217	12	173	2	2.3	-	-	-	-
21 - Tobacco products	45,321	6	-	-	0.6	-	-	-	-
22 - Textile mill products	75,939	125	0	-	4.1	-	-	-	-
23 - Apparel and other textile products	81,449	18	-	-	0.6	-	-	-	-
24 - Lumber and wood products	122,716	810	1,524	13	4.8	-	-	-	-
25 - Furniture and fixtures	70,963	178	-	-	1.1	-	-	-	-
26 - Paper and allied products	167,294	460	12	3	16.5	542	-	2,169	271
27 - Printing and publishing	218,672	0	0	-	0.8	-	-	-	146
28 - Chemicals and allied products	399,915	38	0	5	15.2	-	178	266	266
29 - Petroleum and coal products	167,693	7	-	-	-	-	-	-	-
30 - Rubber and misc plastic products	172,026	53	0	23	1.8	-	-	-	-
31 - Leather and leather products	8,832	3,254	163	7	1.0	-	-	-	-
32 - Stone, clay, and glass products	97,758	279	0	0	10.0	-	7,189	5,991	-
33 - Primary metal industries	178,943	55	1	0	-	6,771	752	1,128	-
34 - Fabricated metal products	245,863	42	212	0	1.7	-	-	-	-
35 - Industrial machinery and equipment	419,387	5	0	-	0.7	-	-	-	-
36 - Electronic and other electric equipment	378,986	267	36	0	0.7	1,346	-	-	-
37 - Transportation equipment	608,837	19	3	-	0.7	-	-	-	-
38 - Instruments and related products	162,191	-	-	-	0.7	199	994	-	1,491
39 - Miscellaneous mfg	52,926	-	-	-	0.9	-	-	-	401
49 - Electric, gas, and sanitary services (Pub Uti	347,119	892	17	63	-	1,760	13,614	32,878	185

Table 2. New York State material use intensity (direct) of selected manufacturing and related economic activities. No data are available for entries labeled “-”.

SIC Industry	Economic Output		Direct material input intensity (metric tons per million \$ of output)				
	New York State Industry Output (million \$)	National Industry Output (million \$)	1 - Bio-degradable	2 - Geologic materials	3 - Processed materials	4 - Chemically active	5 - Hazardous materials
01 - Crops	4,457	161,722	4,300	15,920	-	-	-
02 - Livestock	2,041	95,590	1,559	-	-	-	-
10 - Metal mining	85	9,138	-	141,280	-	74,845	-
12 - Coal mining	0	23,678	-	286,776	2,042	2,119	-
13 - Oil and gas extraction	356	124,878	-	-	-	-	696
14 - Nonmetallic mineral except fuels mining	539	18,698	-	11,433	599	1,571	-
15-17 - Construction	54,787	1,209,633	-	2,947	-	-	-
20 - Food and kindred products	18,820	488,217	67	-	-	-	-
24 - Lumber and wood products	2,146	122,716	1,664	-	-	206	-
26 - Paper and allied products	7,376	167,294	276	-	-	-	-
28 - Chemicals and allied products	22,521	399,915	-	-	-	96	102
29 - Petroleum and coal products	2,709	167,693	-	-	455	4,110	614
32 - Stone, clay, and glass products	5,007	97,758	-	9,343	-	11,916	-
33 - Primary metal industries	5,317	178,943	-	-	-	259	-
49 - Electric, gas, and sanitary services (Pub Uti	21,595	347,119	-	-	-	3,170	-

Table 3. Direct emission and energy impacts of selected manufacturing and related economic activities for New York State. No data are available for entries labeled “ - ” .

SIC Industry	New York State Industry Output (million \$)	Toxic Release Inventory (TRI) categories			MECs reported	AirData reported air emissions			
		1- Air emissions (thousand lbs)	2 - Water emissions (thousand lbs)	3 - Land emissions (thousand lbs)	4 - Total energy (trillion BTU)	6 - CO emissions (thousand lbs)	7 - NOX emissions (thousand lbs)	8 - SO2 emissions (thousand lbs)	9 - VOC emissions (thousand lbs)
10 - Metal mining	85	62	3	7,764	-	-	-	-	-
20 - Food and kindred products	18,820	217	3,264	30	43	-	-	-	-
21 - Tobacco products	3,974	24	-	-	2	-	-	-	-
22 - Textile mill products	1,870	234	0	-	8	-	-	-	-
23 - Apparel and other textile products	9,454	171	-	-	5	-	-	-	-
24 - Lumber and wood products	2,146	1,739	3,271	28	10	-	-	-	-
25 - Furniture and fixtures	2,225	396	-	-	2	-	-	-	-
26 - Paper and allied products	7,376	3,393	87	19	122	4,000	-	16,000	2,000
27 - Printing and publishing	27,325	0	0	-	21	-	-	-	4,000
28 - Chemicals and allied products	22,521	857	1	108	343	-	4,000	6,000	6,000
29 - Petroleum and coal products	2,709	18	-	-	-	-	-	-	-
30 - Rubber and misc plastic products	5,860	312	2	132	11	-	-	-	-
31 - Leather and leather products	597	1,943	97	4	1	-	-	-	-
32 - Stone, clay, and glass products	5,007	1,396	0	0	50	-	36,000	30,000	-
33 - Primary metal industries	5,317	294	3	0	-	36,000	4,000	6,000	-
34 - Fabricated metal products	8,837	374	1,875	1	15	-	-	-	-
35 - Industrial machinery and equipment	20,752	109	5	-	14	-	-	-	-
36 - Electronic and other electric equipment	17,835	4,770	634	1	13	24,000	-	-	-
37 - Transportation equipment	8,581	164	25	-	6	-	-	-	-
38 - Instruments and related products	20,121	-	-	-	14	4,000	20,000	-	30,000
39 - Miscellaneous mfg	4,994	-	-	-	5	-	-	-	2,000
49 - Electric, gas, and sanitary services (Pub Uti	21,595	19,266	364	1,362	-	38,000	294,000	710,000	4,000

The significance of Metal mining (SIC 10) and Electricity generation (SIC 49) for land and air emissions respectively is immediately clear. One should be cautious in making direct comparisons of physical emissions (particularly across air, water, and land) as the environmental impact per unit of emissions varies widely. It is more useful to directly compare the scale of economic activity across sectors: while Electricity generation produced energy worth \$22 billion, output in Metal mining was only \$0.1 billion.

The upstream inputs used in industrial and manufacturing sectors are in many cases of limited importance in understanding natural resource and energy impacts. But in the service sectors in which the great majority of state economic output is focused, upstream inputs typically are the major determinant of environmental effects. In Tables 4 and 5 we present the direct plus indirect impact estimates for each of 67 sectors, treating New York State economic output in each sector as final demand in order to estimate the total impacts stemming from economic production in New York State. Electricity generation (SIC 49) again results in the largest air emissions, with over double the total emissions of Paper (SIC 26) and Electronic and other electric equipment (SIC 36) combined. Food (20) and Wood products (SIC 24) again are the largest water dischargers, with Metal mining (SIC 10) and Primary metals industries (SIC 33) the largest dischargers to land. Total energy use is greatest by almost a factor of three in the Chemicals (SIC 28) sector, recognizing that direct use in Electricity generation (SIC 49) is excluded.

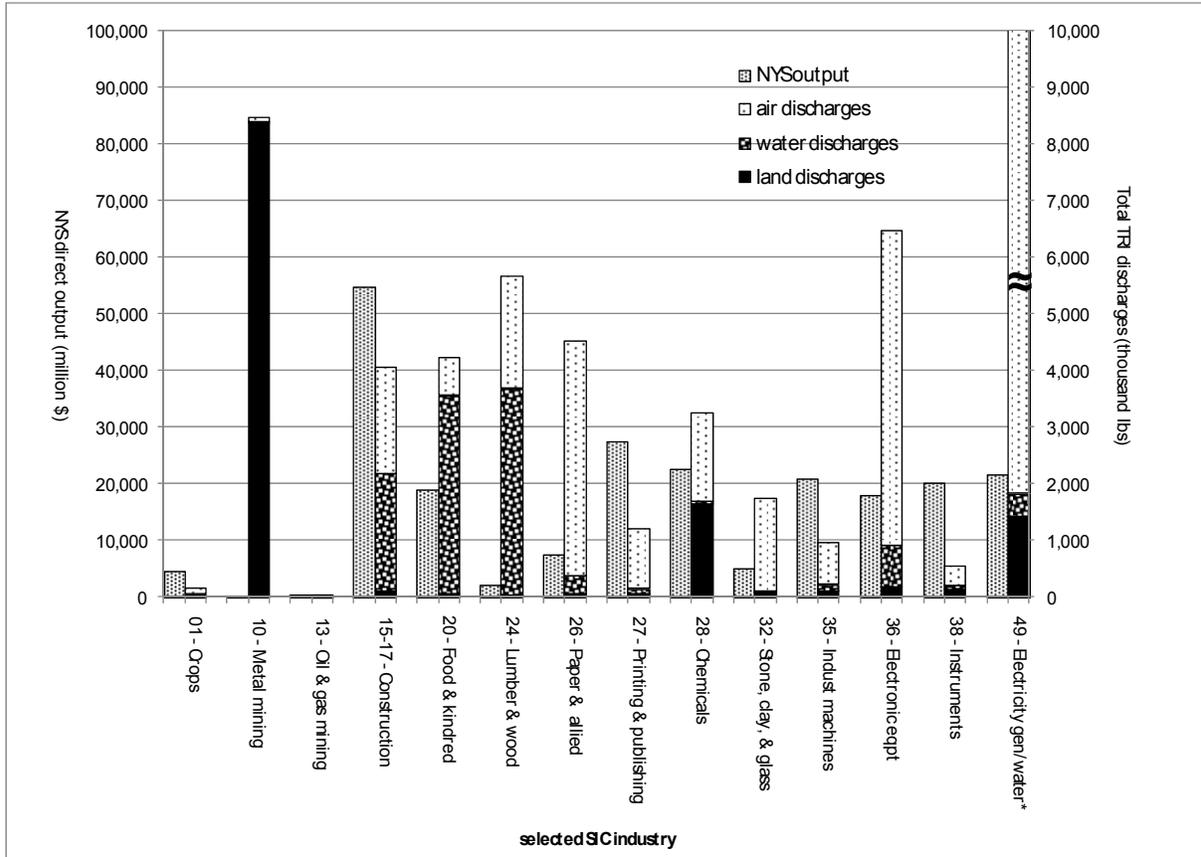


Figure 1. New York State total (direct plus indirect) Toxic Release Inventory (TRI) discharges in selected industries. Electricity generation (SIC 49) emissions are off-scale and total 22,000 thousand lbs.

Material inputs used directly plus indirectly in each sector are shown in Table 5. Notably, Construction (SIC 15-17) through its use of upstream industries is the largest users of geologic inputs, while Electricity generation (SIC 49) and Stone, clay, and glass (SIC 32) are the largest users of processed, chemically active, and hazardous inputs.

Discussion

This study shows that for New York State there is little correlation between regionally large economic sales and total energy and resource impacts. The tendency to generate particular natural resource and energy flows is highly industry specific and is based upon the characteristics of the products and/or services produced within that industry. Not surprisingly, it was found that the leading industries in economic sales are not the industries causing the largest energy and resource impacts. From Table 4, the three largest New York State economic sectors are Depository institutions (banking)

Table 4. Direct plus indirect emission and energy impacts by economic sector for New York State.

SIC Industry	New York State Industry Output (million \$)	Toxic Release Inventory (TRI) categories			MECs energy	AirData air emissions categories			
		1- Air emissions (thousand lbs)	2 - Water emissions (thousand lbs)	3 - Land emissions (thousand lbs)	4 - Total energy (trillion BTU)	6 - CO emissions (thousand lbs)	7 - NOX emissions (thousand lbs)	8 - SO2 emissions (thousand lbs)	9 - VOC emissions (thousand lbs)
01 - Crops	4,457	97	19	22	4,867	163	948	2,275	172
02 - Livestock	2,041	40	32	5	1,104	72	451	1,106	56
08 - Forestry (and hunting)	70	0	0	0	11	1	4	10	1
09 - Fishing (no hunting)	44	0	0	0	3	0	1	2	0
10 - Metal mining	85	70	3	8,379	29	6	41	98	2
12 - Coal mining	0	0	0	0	0	0	0	0	0
13 - Oil and gas extraction	356	4	0	1	62	9	63	147	3
14 - Nonmetallic mineral except fuels mining	539	18	1	2	133	38	247	596	11
15-17 - Construction	54,787	1,881	2,061	119	26,951	2,358	7,553	13,367	1,312
20 - Food and kindred products	18,820	671	3,489	66	56,874	701	3,553	9,197	631
21 - Tobacco products	3,974	75	5	4	4,217	78	259	738	89
22 - Textile mill products	1,870	306	3	21	13,083	84	636	1,483	122
23 - Apparel and other textile products	9,454	523	21	21	12,983	241	1,568	3,793	288
24 - Lumber and wood products	2,146	1,975	3,643	36	12,157	79	484	1,153	68
25 - Furniture and fixtures	2,225	511	115	7	4,102	84	364	895	76
26 - Paper and allied products	7,376	4,132	306	71	144,032	4,925	3,492	26,185	2,589
27 - Printing and publishing	27,325	1,047	85	52	56,386	1,419	3,558	12,049	5,149
28 - Chemicals and allied products	22,521	1,548	42	1,652	406,753	1,010	11,371	23,387	7,555
29 - Petroleum and coal products	2,709	129	4	15	666	214	1,636	3,931	57
30 - Rubber and misc plastic products	5,860	554	24	220	31,876	347	2,273	5,406	512
31 - Leather and leather products	597	2,033	103	7	1,131	17	123	298	17
32 - Stone, clay, and glass products	5,007	1,614	30	77	54,311	340	38,867	36,074	150
33 - Primary metal industries	5,317	533	28	4,042	1,839	36,664	6,771	12,577	196
34 - Fabricated metal products	8,837	536	1,899	105	17,491	640	1,910	4,592	221
35 - Industrial machinery and equipment	20,752	738	110	102	20,002	2,638	3,038	7,195	680
36 - Electronic and other electric equipment	17,835	5,539	738	175	20,127	27,327	2,342	5,274	513
37 - Transportation equipment	8,581	337	58	147	8,238	605	925	2,112	212
38 - Instruments and related products	20,121	929	128	149	26,960	7,565	23,620	7,871	31,247
39 - Miscellaneous mfg	4,994	105	41	19	7,902	217	535	1,367	2,169
40 - Railroads (and 4741)	1,802	11	5	1	169	24	87	202	14
41 - Local And Suburban Transit (incl IMPLAN 512)	6,990	337	56	25	2,086	816	3,598	8,588	262
42 - Trucking and warehousing (and part of 4789)	9,420	225	14	17	755	459	3,099	12,046	164
43 - Post office	5,390	78	4	6	386	151	1,041	2,568	40
44 - Water transportation	1,950	14	2	1	205	32	136	330	20
45 - Transportation by air	8,462	23	4	2	309	49	227	550	32
46 - Pipelines except natural gas	40	0	0	0	1	1	3	8	0
47 - Transportation services (except 4740)	2,695	15	6	1	193	26	117	293	16
48 - Communications	35,985	403	79	21	3,030	1,413	2,048	4,879	252
49 - Electric, gas, and sanitary services (Public Utilities)	21,595	19,914	414	1,415	1,440	39,270	303,324	732,441	4,211
50.51 - Wholesale trade	65,879	760	202	45	9,387	1,549	6,220	15,515	16,782
52 - Building materials and garden supplies	2,751	19	1	1	149	37	228	560	11
53 - General merchandise stores	5,059	52	4	3	402	100	617	1,511	29
54 - Food stores	8,569	35	3	2	268	66	410	1,005	19
55 - Automotive dealers and service stations	7,846	86	7	5	668	165	1,024	2,509	48
56 - Apparel and accessory stores	6,495	93	7	6	716	178	1,098	2,692	52
57 - Furniture and home finishing stores	3,407	30	2	2	229	57	350	859	16
58 - Eating and drinking stores	18,276	359	230	26	5,045	657	4,517	10,945	331
59 - Misc retail	14,907	133	10	8	1,029	255	1,577	3,865	74
60 - Depository institutions (banking)	84,567	547	46	35	5,544	1,097	6,095	15,174	494
61.67 - Non-depository and holding (exclude nonprofit)	13,466	19	2	1	309	39	171	433	25
62 - Security and commodity brokers	92,212	109	12	7	1,253	232	1,154	2,797	113
63 - Insurance carriers	23,093	27	4	2	394	58	253	627	33
64 - Insurance agents, brokers, service	7,739	36	5	2	504	76	335	833	43
65 - Real estate	129,584	1,233	431	88	9,160	2,177	17,780	32,084	642
70 - Hotels and lodging	7,622	169	11	12	765	324	2,324	5,569	72
72 - Personal services	6,506	113	8	8	884	218	1,350	3,284	82
73 - Business services	59,824	585	73	37	9,222	1,601	3,582	9,052	650
75 - Auto repair, services, and parking	7,052	66	8	6	661	157	685	1,606	77
76 - Miscellaneous repair services	2,662	72	9	5	632	218	378	887	67
78 - Motion pictures	8,681	69	14	4	651	169	645	1,558	92
79 - Amusement and recreation services	13,249	213	24	16	1,759	411	2,659	6,428	131
80 - Health services	63,333	722	85	171	38,449	1,358	7,898	17,687	1,785
81 - Legal services	23,878	83	12	5	1,364	166	699	1,720	101
82 - Educational services	39,393	118	33	8	1,952	236	1,001	12,317	136
83 - Social services	16,268	281	77	19	3,371	515	3,030	7,396	259
84.86 Non-profit organizations (plus some 67 & 89)	13,826	291	59	19	2,459	525	3,338	7,900	197
87.89 - Professional services	34,157	278	35	21	4,755	767	1,949	4,752	301

Table 5. Direct plus indirect material use impacts by economic sector for New York State.

SIC Industry	Economic Output	Direct plus indirect material input use (thousand metric tons)		
	New York State Industry Output (million \$)	1 - Bio-degradable	2 - Geologic materials	3 - 5 Processed, chemically active, and hazardous materials
01 - Crops	4,457	19,652	72,970	424
02 - Livestock	2,041	3,851	2,238	152
08 - Forestry (and hunting)	70	15	54	1
09 - Fishing (no hunting)	44	0	5	2
10 - Metal mining	85	0	13,023	6,908
12 - Coal mining	0	0	3	0
13 - Oil and gas extraction	356	0	13	274
14 - Nonmetallic mineral except fuels mining	539	1	6,188	1,248
15-17 - Construction	54,787	2,635	168,242	7,707
20 - Food and kindred products	18,820	4,038	5,252	1,300
21 - Tobacco products	3,974	147	565	94
22 - Textile mill products	1,870	86	410	259
23 - Apparel and other textile products	9,454	63	451	503
24 - Lumber and wood products	2,146	3,990	139	684
25 - Furniture and fixtures	2,225	135	117	164
26 - Paper and allied products	7,376	2,502	570	1,101
27 - Printing and publishing	27,325	544	1,095	1,132
28 - Chemicals and allied products	22,521	147	3,610	8,598
29 - Petroleum and coal products	2,709	4	111	14,706
30 - Rubber and misc plastic products	5,860	56	572	1,005
31 - Leather and leather products	597	3	24	41
32 - Stone, clay, and glass products	5,007	49	48,005	61,436
33 - Primary metal industries	5,317	27	6,589	5,532
34 - Fabricated metal products	8,837	29	465	655
35 - Industrial machinery and equipment	20,752	81	996	1,046
36 - Electronic and other electric equipment	17,835	58	1,189	1,088
37 - Transportation equipment	8,581	25	537	467
38 - Instruments and related products	20,121	138	1,497	1,416
39 - Miscellaneous mfg	4,994	65	188	221
40 - Railroads (and 4741)	1,802	6	334	113
41 - Local And Suburban Transit (incl IMPLAN 512)	6,990	61	3,268	2,557
42 - Trucking and warehousing (and part of 4789)	9,420	17	313	1,250
43 - Post office	5,390	7	146	277
44 - Water transportation	1,950	3	37	75
45 - Transportation by air	8,462	5	63	329
46 - Pipelines except natural gas	40	0	3	1
47 - Transportation services (except 4740)	2,695	9	27	39
48 - Communications	35,985	94	3,312	676
49 - Electric, gas, and sanitary services (Public Utilities)	21,595	52	2,605	71,038

Table 5. Direct plus indirect material use impacts by economic sector for New York State (continued).

50,51 - Wholesale trade	65,879	334	1,596	1,959
52 - Building materials and garden supplies	2,751	5	55	61
53 - General merchandise stores	5,059	13	148	165
54 - Food stores	8,569	8	98	110
55 - Automotive dealers and service stations	7,846	21	245	275
56 - Apparel and accessory stores	6,495	22	263	295
57 - Furniture and home finishing stores	3,407	7	84	94
58 - Eating and drinking stores	18,276	360	1,258	1,241
59 - Misc retail	14,907	32	377	423
60 - Depository institutions (banking)	84,567	125	1,241	1,620
61,67 - Non-depository and holding (exclude nonprofit)	13,466	7	73	52
62 - Security and commodity brokers	92,212	31	484	323
63 - Insurance carriers	23,093	9	119	75
64 - Insurance agents, brokers, service	7,739	11	134	99
65 - Real estate	129,584	1,753	37,358	4,575
70 - Hotels and lodging	7,622	43	596	633
72 - Personal services	6,506	19	251	356
73 - Business services	59,824	162	1,276	1,248
75 - Auto repair, services, and parking	7,052	10	187	290
76 - Miscellaneous repair services	2,662	8	107	134
78 - Motion pictures	8,681	24	259	181
79 - Amusement and recreation services	13,249	116	941	709
80 - Health services	63,333	255	2,723	2,732
81: Legal services	23,878	36	369	214
82 - Educational services	39,393	81	2,308	432
83 - Social services	16,268	145	1,070	873
84,86 Non-profit organizations (plus some 67 & 89)	13,826	181	4,091	961
87,89 - Professional services	34,157	74	768	667

(SIC 60; \$84 billion), Security and commodity brokers (SIC 62; \$92 billion), and Real estate (SIC 65; \$129 billion), while the largest air emissions were from Paper and allied products (SIC 26; 4 million lbs), Electronic and other electric equipment (SIC 36; 6 million lbs.), and Electricity generation (SIC 49; 20 million lbs.). Across the various energy and natural resource impact measures, only Real estate caused leading impacts (fourth in use of geologic inputs, through its economic linkage to the Construction sector). For the three largest air emitters, Electronic equipment and Electricity generation each produced of about \$20 billion, while Paper output was only \$7 billion.

More generally, levels of total energy and resource intensity vary by up to five orders of magnitude. Comparing industries at the 5 and 95 percentile ranking for energy intensity, total TRI air emissions per unit of economic output vary by a factor of about 250. Specifically, Educational services (SIC 82) has air emissions at the 5 percent level of 3 lbs/million \$, while Metal mining at the 95 percent level has TRI air emissions of 818 lbs/million \$.

The study makes three primary contributions. First, a generally applicable methodology is developed for estimating regional energy and natural resource flows. Additional work would be

desirable to correct for missing energy and emissions data. Most significantly, direct energy use in Electricity generation is not captured by the energy data set. Also significant is the exclusion of primary agriculture from Toxic Release Inventory data. Recognizing the data limitations, the second contribution is an empirical example demonstrating the use of estimates of indirect economic activity in order to capture hidden natural resource and energy flows. Third, alternative measures of natural resource use are considered in developing a life-cycle impact estimate for output from each New York State economic sector.

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The Effects of Gun Ownership Rates and Gun Control Laws on Suicide Rates

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Abstract

The purpose of the present study is to determine the effects of gun control laws and gun ownership rates on state-level suicide rates. Using the most recent data on suicide rates, gun control measures, and gun ownership rates, the results of the present study suggest that states that require handgun permits have lower gun-related suicide rates, and states that have higher gun ownership rates have higher gun-related suicide rates. Regarding non-gun suicides, results suggest that stricter gun control laws may result in higher non-firearm suicides, and higher rates of gun ownership result in lower non-gun suicide rates. These results suggest that stricter gun control laws may actually induce potential suicide victims to alter the method by which they commit suicide. Hence, the overall effects of firearm availability on suicides may be muted due to the fact that while reduced firearm availability reduces firearm suicides, it also increases non-firearm suicides.

Introduction

In 2006, 33,300 suicides were committed; over 17,000 of those were by firearm. For men, the percentage of suicides committed with a firearm was 56 percent; for women, it was 31 percent. Although many factors affect an individual's decision about whether or not to commit suicide, the availability of firearms is especially pertinent since this is one factor over which a state has some degree of control. Even though gun control laws vary from state to state, most jurisdictions place some restrictions on the use and ownership of firearms. An important question then is if there is a direct correlation between availability of firearms and suicide rates. If a gun is easier to obtain, will an individual be more likely to commit suicide by firearm? Or if guns are harder to obtain, will an individual be more likely to commit suicide by another method?

Gun control advocates insist that the easy availability of firearms increases the overall suicide rate. They contend that gun control measures should be implemented in order to reduce the suicide rate, regardless of any potential constitutional issues that gun control measures may entail. Opponents of gun control measures, however, point out that a person may commit suicide using many different methods. Restricting access to firearms would only force potential victims to seek alternative methods. In addition, gun control opponents argue that gun control measures trample on the constitutional liberties of law-abiding Americans.

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Prior research on this topic generally supports the assertions of gun control advocates; restrictions on firearms or limited availability of firearms reduce the overall level of suicides and the suicide rate (Conner and Zhong, 2003; Ludwig and Cook, 2000; Cummings et al., 1997; Carrington and Moyer, 1994; Kellerman et al., 1992; Yang and Lester, 1991; Lester, 1988; Sommers, 1984; Lester and Murrell, 1982). Few prior studies suggest that gun control laws or gun ownership do not have effects on the suicide rate; one of the few articles to come to this conclusion is Duggan (2003).

The purpose of the present study is to determine the effects of gun control laws and gun ownership rates on state-level suicide rates. This paper is different from prior research in this area since estimates of gun ownership rates are used as a measure of gun availability. In most prior studies, gun control laws, and not gun ownership rates, were used as proxies of gun availability. In addition, the present study will attempt to determine if restrictive gun control laws cause individuals with suicidal tendencies to alter the method by which they kill themselves; if guns are hard to obtain, then a person who wants to commit suicide may opt for another method. Most prior studies examining the relationship between suicides and firearm availability did not consider the effects of reduced gun availability on non-gun suicides.

Literature Review

One of the first studies on this topic was Lester and Murrell (1982). The authors examined the effects of gun control laws on state-level suicide rates. In order to conduct their study, Lester and Murrell first constructed an index of gun control laws, with a zero indicating no controls and a seven indicating maximum control. Looking at data from 1960 and 1970, a principal component analysis was used to determine the correlation between gun control laws and suicide rates. The results of the study suggested that states with stricter gun control laws had lower suicide rates; however, these states also had higher suicide rates by means other than firearms. This result indicated that suicide victims may be using alternative methods when obtaining a firearm becomes difficult.

Sommers (1984) looked at state-level data for 1970 and attempted to determine the effect of several gun control laws on suicide rates. Estimating suicide rates by both race and sex, the author found that most of the gun control measures were negatively related to suicide. Of all the equations that he estimated, the one that had the most statistically-significant gun control variables was the female regression. This is an interesting result since most suicides by firearm are committed by men and not women. In addition to the gun control variables, Sommers only used two other explanatory variables in his regressions: the unemployment rate and the divorce rate; hence, the results of his study may be biased due to the misspecification of the model.

Lester (1988), in an attempt to corroborate the findings of his 1982 study, looked at not only gun control laws but also gun ownership rates. The author estimated regional gun ownership rates from data presented in an earlier study (Wright et al., 1983). His results suggested that gun control laws were not significantly related to suicide rates, but that gun ownership rates were related to suicide

rates. He concluded that limiting the availability of firearms may reduce the suicide rate for a given region.

Yang and Lester (1991) attempted to correct some perceived shortcomings in Sommers' 1984 study and attempted to determine if suicide rates by means other than firearms increased in states with restrictive gun control laws. Using a model very similar to that employed by Sommers (1984), the authors estimated equations for the total suicide rate and for various types of suicide (i.e., by firearm, by jumping, etc.). Their results indicated that the gun control variables were significant and negative only for the total suicide equation and the firearm suicide equation. For the jumping suicide regression, the gun control variables were positive. For all other types of suicide, the gun control laws were insignificant. According to the authors, these results suggested that gun control laws do not make suicide victims switch to another type of suicide. Concerning the result for suicide by jumping, Yang and Lester contended that, because suicide by jumping is so rare, this result does not significantly affect their conclusion that gun control laws do not result in suicide switching. Hence, they concluded that gun control laws are significant deterrents to suicide.

Duggan (2003) examined the correlation between gun ownership and suicide rates. His primary objective was to determine if the direction of causation is from guns to suicides or from suicides to guns. Using estimated gun ownership rates, he found that states with higher suicide rates had higher gun ownership rates. However, he noted that a significant part of this relationship between gun availability and suicides can be explained by the correlation between guns and suicidal tendencies. Duggan believed that a primary reason why most prior studies found positive relationships between guns and suicide is because individuals who own guns are more likely to have suicidal tendencies. Finally, the author found that while both gun ownership and suicide rates have declined over a twenty year period, the decline in gun ownership cannot explain a significant part of the decline in suicides during the same period. It is important to note, however, that Duggan did not use any other explanatory variables besides gun ownership rates in his regressions, and his R^2 s were all less than ten percent.

Finally, Connor and Zhong (2003) used a methodology similar to that employed by Lester and Murrell (1982) and attempted to determine if more restrictive gun control laws resulted in lower suicide rates. Using state-level data, the authors found that states with more restrictive laws had lower overall suicide rates.

The present study differs from this prior research in several ways. First, the present study uses the most recent data available regarding suicide rates, gun control measures, and gun ownership rates. Second, state-level gun ownership rates are estimated using the Behavioral Risk Factor Surveillance System (BRFSS), a data set used in only two other studies for the purposes of estimating gun ownership rates (Gius, 2009; Gius, 2008). Third, two measures of gun availability are examined in the present study: state-level gun ownership rates and state-level gun control laws. Fourth, panel data estimation techniques are used to estimate the effects of gun availability on suicide rates. Most

prior studies used only cross-sectional data, which may not be able to capture the effects of any unobserved state-level factors on suicide rates. Finally, the present study examines the effects of gun availability on not only gun-related suicides but on non-gun suicides as well. By examining both types of suicides, it will be possible to obtain a better understanding of the true effects of gun availability on the overall suicide rate and ascertain whether or not method switching is occurring due to gun availability.

Empirical Technique and Data

It is assumed in the present study that if guns are readily available then suicides are much more likely to happen, holding all else constant. Hence, gun control laws and gun ownership rates, both of which are indicators of the availability of firearms, are included as explanatory variables in the regressions estimated in the present study.

Regarding gun ownership rates, this variable is very difficult to obtain or estimate. Few states require permits for handguns and even fewer require permits for long guns. In addition, guns are durable goods; they may stay operational for years after their initial purchase. Hence, gun control laws today will only affect gun purchases today, not gun purchases made years ago. In addition, very few states regulate the sale and purchase of guns at gun shows or the private transfer of guns; such exchanges typically go undocumented. Hence, any estimate of gun ownership rates in the United States is subject to varying degrees of error.

In order to estimate gun availability, the Behavioral Risk Factor Surveillance System (BRFSS) is used in the present study. The BRFSS is a data collection program administered by the Center for Disease Control and the US states and territories. This program, which began in 1984, measures and collects data on behavioral risk factors of adults who live in households. In the BRFSS, there are several questions dealing with gun ownership; the most pertinent question is "Are any firearms kept in or around your home?" This question was asked of all respondents in all states for the years 2001, 2002, and 2004. For all other years examined in this study, this question, which the BRFSS started asking in 1995, was asked of respondents in only select states. In order to have a balanced panel data set, any missing observations for gun ownership were linearly interpolated from the observed data. The last year the gun ownership question was asked was in 2004. Hence, the data used in the present study spans from 1995 to 2004.

From this data, the percentage of state residents that own guns was estimated by determining the percentage of individuals in the BRFSS sample from a given state that have guns in their houses. This percentage is used in the present study as a proxy for the state-level gun ownership rate.

Information on gun control laws was obtained from various sources including the Brady Campaign to Prevent Gun Violence, the Legal Community Against Violence, and Vernick and Hepburn (2003). In determining which gun control measures to include in the regression, it was decided that the focus would be on any measure that may deter suicide. Hence, a concealed weapons law, which may

potentially deter armed robbers or muggers, would probably not be a deterrent to suicide. In addition, in order for a gun control measure to have a statistically-significant effect on suicide rates, a sizeable minority of the states would have to have this gun restriction. For example, until recently, handguns were banned only in the District of Columbia. Hence, including this measure would not have contributed to the model in any statistically-significant manner. Finally, since the vast majority of suicide victims using guns opt for handguns instead of long guns, only those gun control statutes that attempt to restrict access to handguns were included in the present study.

Given the above, the following gun control measures were examined: requiring permits for handgun purchases; requiring registration for handguns; and requiring waiting periods for handgun purchases. Each of these gun control measures variables is expressed as a dummy variable which takes the value of one if the state has the law in question and zero otherwise. Although dummy variables are not precise measures of gun control laws since laws typically differ from state to state, it is reasonable to assume that if a state has any type of law requiring a permit to purchase a handgun, for example, then gun ownership is more restricted in that state than in a state that has no such law. It is important to note that, for these three gun control measures, states changed their statutes very little over the ten year period (1995-2004) examined in the present study.

Regarding other factors that may affect the suicide rate, variables that proxy for potentially depressing events that may serve as catalysts for the possible contemplation of suicide are also used in the regressions estimated in the present study. In ascertaining which variables to include in the estimating equations, guidance was obtained from several studies that have investigated the risk factors associated with suicide and suicidal behavior (Nock et al., 2008; Bridge, Goldstein, and Brent, 2006; and Mann, 2002). These studies suggest that adolescent and young adult men who are white, unemployed, unmarried, and have lower educational attainment are more likely to commit suicide.

The presence of psychiatric disorders is also one of the most consistently reported risk factors for both suicide and suicidal behavior. The range of disorders that may precipitate a suicide is rather broad, and most typically, multiple disorders are usually associated with an elevated risk of suicide. Unfortunately, little data is available on the state-level prevalence of psychiatric disorders. Hence, it is not feasible to incorporate measures of the prevalence of these disorders into the estimating equations employed in the present study. In addition, given that many individuals who attempt or commit suicide have undiagnosed psychiatric disorders, any data that would be available would be highly unreliable.

Hence, the above-mentioned factors are included in order to capture the degree to which a state's population may be depressed and thus more likely to contemplate suicide. Of course, most individuals who are depressed because they are divorced or unemployed do not commit suicide. However, it is reasonable to assume that states that have more depressing environments, such as high unemployment, are more likely to have more people in a suicidal frame of mind than other, less depressing states. Descriptive statistics for all variables are presented in Table 1.

Table 1 Descriptive Statistics			
Variable	Mean	Minimum	Maximum
Gun-Related Suicide rate (per 1000,000 persons)	7.26	1.12	16.76
Non-Gun Related Suicide Rate (per 100,000 persons)	5.29	2.37	9.7
GUN	0.368	0.073	0.672
PERMIT	0.24	0	1
REGISTER	0.15	0	1
WAIT	0.34	0	1
AGE	0.254	0.212	0.335
WHITE	0.80	0.24	0.98
RURAL	0.318	0	0.725
COLLEGE	0.244	0.142	0.387
INCOME	27233	16743	45398
UNEMP	4.82	2.30	8.100
ALCOHOL	2.245	1.20	4.13
DIVORCE (per 100,000 persons)	4.32	2.2	10.4

Given the above, the following two equations are estimated in the present study:

$$\begin{aligned}
 Y_{i,t} = & a_0 + a_1 \text{WHITE}_{i,t} + a_2 \text{RURAL}_{i,t} + a_3 \text{COLLEGE}_{i,t} + a_4 \text{INCOME}_{i,t} \quad (1) \\
 & + a_5 \text{UNEMP}_{i,t} + a_6 \text{AGE}_{i,t} + a_7 \text{ALCOHOL}_{i,t} + a_8 \text{DIVORCE}_{i,t} \\
 & + a_9 \text{PERMIT}_{i,t} + a_{10} \text{REGISTER}_{i,t} + a_{11} \text{WAIT}_{i,t} + a_{12} \text{YEAR}_t
 \end{aligned}$$

$$\begin{aligned}
 Y_{i,t} = & a_0 + a_1 \text{WHITE}_{i,t} + a_2 \text{RURAL}_{i,t} + a_3 \text{COLLEGE}_{i,t} + a_4 \text{INCOME}_{i,t} \quad (2) \\
 & + a_5 \text{UNEMP}_{i,t} + a_6 \text{AGE}_{i,t} + a_7 \text{ALCOHOL}_{i,t} + a_8 \text{DIVORCE}_{i,t} \\
 & + a_9 \text{GUN}_{i,t} + a_{10} \text{YEAR}_t
 \end{aligned}$$

where Y denotes the number of suicides per 100,000 residents, WHITE is the percentage of the state's population that is white (Lester, 1988), RURAL is the percentage of the state's population that lives in rural areas, COLLEGE is the percentage of the state's population that has a four-year college degree, INCOME is per capita median income, UNEMP is the state's annual unemployment rate (Sommers, 1984; Yang and Lester, 1991), AGE is the percentage of the state's population that is under the age of 18, ALCOHOL is the per capita alcohol consumption, DIVORCE is the number of divorces per 100,000 residents (Sommers, 1984; Lester, 1988; Yang and Lester, 1991), PERMIT equals one if the state requires a permit to purchase a handgun and zero otherwise, REGISTER equals one if the state requires registration of a handgun and zero otherwise, WAIT equals one if the state requires a waiting periods for handgun purchases and zero otherwise, GUN is the estimated gun ownership rate which is defined as the percentage of households owning at least one gun, subscript i denotes the state, and subscript t denotes the year.

Two suicide rates are estimated in the presented study: the gun-related suicide rate and the non-gun-related suicide rate. It is reasonable to expect that gun availability (as measured by higher gun ownership rates or less restrictive gun laws) would be positively-related to the gun suicide rate. However, gun availability may have a negative effect on non-gun suicides. If gun control laws (which reduce gun availability) are positively related to non-gun suicides, then this may indicate that the restrictiveness of these laws is forcing some individuals to alter the method by which they commit suicide; this method switching effect of gun control laws was examined in only a few prior studies, most notable Yang and Lester (1991).

All data are state-level and were collected for the years 1995-2004. State-level socioeconomic data were obtained from the *Statistical Abstract of the United States*. Suicide rates were obtained from the Centers for Disease Control.

A panel data model is used to estimate Equations (1) and (2). This model is superior to both cross-sectional and time series models for two reasons. First, panel data models control for potentially important but unobservable state-level effects that may be correlated with other determinants. If a panel data model was not used where appropriate, state-level effects may be omitted, and omitted variable bias may result. Second, panel data greatly increases the degrees of freedom; hence, one can examine state-level data even though there are limited annual data available.

There are two ways in which a panel data model may be defined. If it is assumed that parameter estimates are independent of state-level effects, then fixed effects should be used. If it is assumed that parameter estimates vary across states, however, then a random effects model should be used. A random effects model allows for parameter estimate variation among states by utilizing a generalized regression model where the variance is dependent upon a state-level disturbance term.

A Hausman Test was used to determine if fixed effects or random effects would be more appropriate. Results of the test suggested that random effects were better suited for estimating the models in the present study. In addition, a Breusch-Pagan Test was used to determine if heteroscedasticity was present in the models, and the Ramsey Reset Test was employed to test the specification of the models. The results of the tests indicated that there was no heteroscedasticity present and that the models were properly specified.

Results

The gun control law regression results are presented in Tables 2 and 3. Gun ownership regression results are presented in Tables 4 and 5. The results of the gun law regression for gun-related suicides indicate that only one of the three laws examined in the present study had a statistically-significant effect on gun-related suicide rates; PERMIT was significant and negative. Hence, requiring a permit for purchase of a handgun raises a substantial barrier to suicide by firearm. In fact, states that do not require permits for the purchase of a handgun have a suicide rate that is 2.31 per 100,000 residents greater than states that do require permits, holding all other factors constant. This result suggests

Table 2 Gun Control Laws Regression Results Gun-Related Suicides			
Variable	Coefficient	Standard Error	Test Statistic
Intercept	146.93	42.33	3.47***
PERMIT	-2.31	0.49	-4.72***
REGISTER	-0.112	0.275	-0.407
WAIT	0.109	0.183	0.595
AGE	-1.59	5.72	-0.279
WHITE	1.44	0.889	1.614
RURAL	4.88	1.029	4.74***
COLLEGE	-5.075	2.405	-2.11**
INCOME	-0.000039	0.000046	-0.852
UNEMP	0.118	0.045	2.56***
ALCOHOL	0.639	0.301	2.122**
DIVORCE	0.415	0.0945	4.398***
YEAR	-0.0716	0.0211	-3.389***
Notes: Adjusted R ² = 0.927 N=500 Significant at 10% level = * Significant at 5% level = ** Significant at 1% level = ***			

that, if all states required permits for the purchase of a handgun, then there would be about 5,000 fewer suicides annually in the United States. The other two gun control measures had no statistically-significant effects on the gun-related suicide rate.

Table 3 Gun Control Laws Regression Results Non-Gun-Related Suicides			
Variable	Coefficient	Standard Error	Test Statistic
Intercept	-64.77	32.49	-1.993**
PERMIT	-0.384	0.405	-0.946
REGISTER	0.458	0.209	2.189**
WAIT	0.063	0.138	0.455
AGE	-11.24	4.422	-2.541**
WHITE	-0.315	0.687	-0.459
RURAL	-0.096	0.853	-0.113
COLLEGE	-0.713	1.834	-0.389
INCOME	-0.0000058	0.000035	-0.167
UNEMP	0.043	0.034	1.257
ALCOHOL	0.37	0.238	1.555
DIVORCE	0.016	0.072	0.224
YEAR	0.0361	0.0162	2.229**
Notes: Adjusted R ² = 0.822 N=500 Significant at 10% level = * Significant at 5% level = ** Significant at 1% level = ***			

For the non-gun-related suicide rate, only one of the gun control measures was statistically significant, and it had a positive sign. This result is expected since a person who commits suicide using some means other than a gun would not, of course, be deterred by any type of gun control law. However, there may be some method switching occurring because REGISTER is significant and positive for non-gun related suicides. Hence, requiring registration for handguns may create enough of a barrier to obtaining a gun that individuals who want to commit suicide in these states may be forced to seek another method. It is important to note, however, that this effect is rather minor; states that require handgun registration have a non-gun suicide rate that is only 0.458 greater than a state that does not have such a law. Hence, although there is potentially some degree of method switching that is occurring, if a state requires handgun permits and handgun registration, holding all other factors constant, then that state's overall suicide rate is on average 14.8 percent less than a state that does not have these gun control measures. Thus, although the effects of gun control laws on overall suicides are somewhat muted, they are still significant and negative.

Regarding the other statistically-significant variables in the gun suicide regression, RURAL, UNEMP, ALCOHOL, and DIVORCE all had positive effects on suicide. Hence, those states that have more rural populations, higher unemployment, higher alcohol consumption rates, and higher divorce rates all have higher gun-related suicide rates. These results are reasonable since all of these variables are indicators of depressing events which may cause an individual to contemplate suicide. The variables YEAR and COLLEGE were negatively related to gun-related suicides. For the non-gun suicide regression, YEAR had a positive effect on suicide, while AGE had a negative effect.

For the gun ownership regressions, it was found that gun ownership has a statistically-significant and positive effect on the gun-related suicide rate. Access to firearms is thus an important determinant of gun-related suicide. For every one percentage point decrease in the gun ownership rate, the gun-related suicide rate falls by 0.087 out of an average total rate of 7.26. This drop in the gun-related suicide rate translates into over 260 lives saved annually nationwide.

For the non-gun related suicide regression, gun ownership is significant and negative, which corroborates the result in the gun law regression that suicide method switching may be occurring in states that have limited availability of firearms. However, this effect is very minor; for every one percentage point increase in the gun ownership rate, the non-gun suicide rate falls by only 0.0186 persons out of 100,000. That rate change translates into only 55 lives saved annually nationwide. Nonetheless, in those states with low rates of gun ownership, the non-gun related suicide rate is somewhat higher, indicating that potential suicide victims are just finding another way to commit suicide if guns are not readily available.

Regarding the significance of the other explanatory variables in the gun-related suicide regression, RURAL, UNEMP, ALCOHOL, and DIVORCE all had positive effects on the suicide rate while COLLEGE and YEAR had negative effects. These results are similar to those found in the gun law regression. For the non-gun suicide regression, ALCOHOL and YEAR had positive effects on suicide,

Table 4 Gun Ownership Regression Results Gun-Related Suicides			
Variable	Coefficient	Standard Error	Test Statistic
Intercept	157.43	41.16	3.825 ^{***}
GUN	0.087	0.012	6.934 ^{***}
AGE	0.57	5.32	0.107
WHITE	1.23	0.809	1.521
RURAL	1.77	0.967	1.83 [*]
COLLEGE	-5.23	2.294	-2.279 ^{**}
INCOME	-0.000052	0.000044	-1.186
UNEMP	0.0916	0.0458	2.00 ^{**}
ALCOHOL	0.875	0.262	3.335 ^{***}
DIVORCE	0.534	0.0866	6.16 ^{***}
YEAR	-0.0788	0.0206	-3.825 ^{***}
Notes: Adjusted R ² = 0.812 N=500 Significant at 10% level = * Significant at 5% level = ** Significant at 1% level = ***			

Table 5 Gun Ownership Regression Results Non-Gun-Related Suicides			
Variable	Coefficient	Standard Error	Test Statistic
Intercept	-76.16	32.73	-2.327 ^{**}
GUN	-0.0186	0.01	-1.788 [*]
AGE	-10.911	4.377	-2.493 ^{**}
WHITE	-0.376	0.675	-0.557
RURAL	0.589	0.927	0.636
COLLEGE	-0.78	1.82	-0.428
INCOME	-0.000019	0.000034	-0.578
UNEMP	0.0524	0.035	1.497
ALCOHOL	0.385	0.233	1.651 [*]
DIVORCE	0.009	0.069	0.13
YEAR	0.0422	0.016	2.572 ^{**}
Notes: Adjusted R ² = 0.274 N=500 Significant at 10% level = * Significant at 5% level = ** Significant at 1% level = ***			

while AGE had a negative effect. Finally, given that the results of the gun law regressions and the gun ownership regressions are very similar, the relationship between guns and suicides is statistically robust.

Concluding Remarks

The purpose of the present study was to determine if gun availability had a statistically significant effect on suicide rates, both gun-related and non-gun-related. Using data from all fifty states for a ten

year period, it was found that gun availability has a positive effect on gun-related suicides but a negative effect on non-gun-related suicides. In addition, it was found that while only one of three gun control measures examined in the present study deterred gun-related suicides, requiring the registration of handguns may actually increase the non-gun related suicide rate. Hence, these results suggest that, while the net effect of gun control laws on the overall suicide rate is negative, it may be somewhat less than previously thought.

The results of the present study are more robust than those of prior studies for two reasons. First, panel data estimation techniques are used. These techniques allow the researcher to control for potentially important but unobservable state-level effects that may be correlated with other determinants. If a panel data model was not used, then significant state-level effects would have been omitted, and omitted variable bias would have resulted. The results of the present study suggest that these unobservable, state-level effects are statistically significant and may account for much of the state-level differences in suicide rates; such effects may include the overall mental health of a state's residents, particularly traumatic events that may have affected a large proportion of the state's population, and other factors that are not readily observable but which may nonetheless play a large role in the determination of suicidal tendencies. Prior studies, since they did not use panel data, did not take account of these state-level effects and thus may have improperly attributed differences in suicides rates to differences in gun ownership rates or differences in gun control laws. By accounting for these unobserved state-level differences, the models used in the present study are more accurate predictors of suicide rates at the state level.

Second, in the present study, the determinants of both gun-related and non-gun related suicide rates are estimated. By estimating both suicide rates, it is possible to compare the relationships between gun availability and these different types of suicides. While it is reasonable to assume that there should be a positive relationship between gun availability and the gun-related suicide rate, it is rather novel to conclude that there may be a negative relationship between gun availability and the non-gun suicide rate. This negative relationship may result in method switching among suicide victims. This theory found support in the present study. Very few other studies either considered the concept of method switching or estimated separate regressions for these two types of suicide. Thus, prior studies could not ascertain the actual effects of gun availability on gun-related suicides or suicides in general. Therefore, the present study makes a significant contribution to the literature in this area by identifying method switching among suicide victims and by showing how the effects of gun availability on the overall suicide rate is muted by this phenomenon.

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Capital Flows to Russia, Ukraine, and Belarus: Does “Hot” Money Respond Differently to Macroeconomic Shocks?

Scott W. Hegerty*

ABSTRACT

Capital flows into the former Soviet bloc have increased tremendously since the mid-1990s. Since the new members of the European Union have received most of the attention, few empirical studies have looked at Russia or the rest of the CIS. This study applies the structural VAR model of Ying and Kim (2001) to investigate the macroeconomic “push” and “pull” factors behind net flows of FDI, portfolio, and other investment into Russia, Ukraine and Belarus. Impulse-response and variance decomposition analysis shows that domestic income and monetary shocks, as well as foreign income and interest-rate shocks, have effects that vary by flow and by country. Russian FDI and portfolio investment show significant, but different, responses to income and foreign interest-rate shocks. In addition, Belarus responds positively to improved macroeconomic fundamentals.

I. Introduction

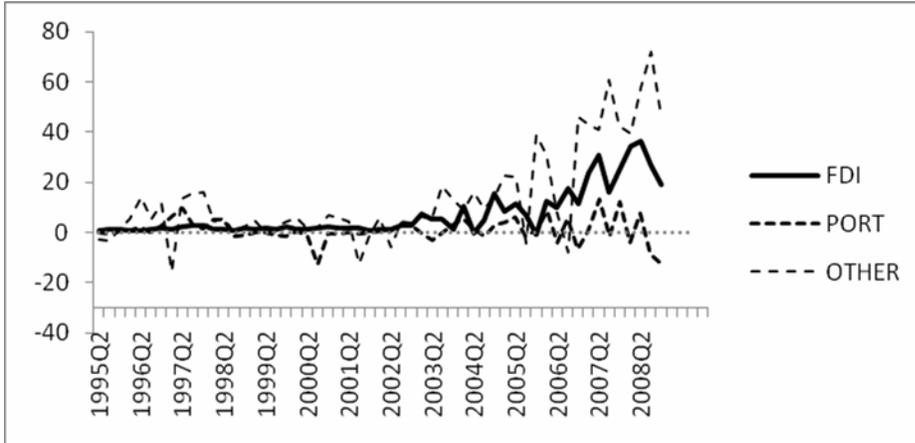
With the ongoing transition to a market economy, foreign capital has poured into the former Soviet sphere. Some countries, particularly those that reformed rapidly enough to join the European Union in 2004, have been particularly attractive destinations for this investment. Others (such as the Balkan countries and most former Soviet republics) have not received as much. In between these extremes lie Russia, Ukraine, and Belarus, which comprised the “core” states of the former Soviet Union. Russia attracted more than U.S. \$16 billion in Foreign Direct Investment (FDI) and \$8 billion in portfolio investment during the fourth quarter of 2007.¹ Figure 1 shows the growth in FDI, portfolio, and other investment flows into these three countries since the mid-1990s. While FDI has been increasing, particularly in recent years, other investment (classified by the IMF to include loans and trade credits) has grown even faster.

While these flows can be beneficial—FDI can facilitate technology transfers and other positive spillover effects, and portfolio investment can help deepen a country’s capital markets—there are also risks. Capital can also be withdrawn, particularly “hot money” flows such as portfolio investment. These outflows can cause major problems—including, as Melecky (2005) noted, slower future growth. Russia, for example, experienced a capital outflow in late 2008 that could be simultaneously attributed to the world recession, domestic factors, or investor dissatisfaction after the Georgia invasion.

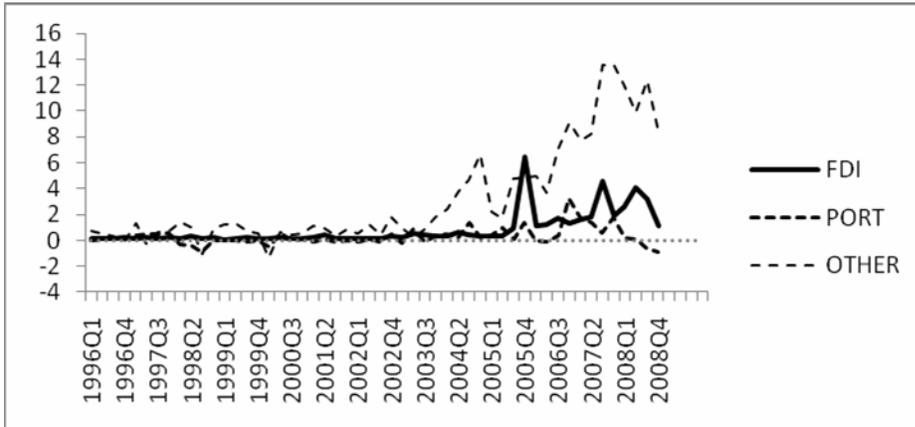
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Figure 1. Net Capital Inflows (Real, Billions of U.S. dollars)

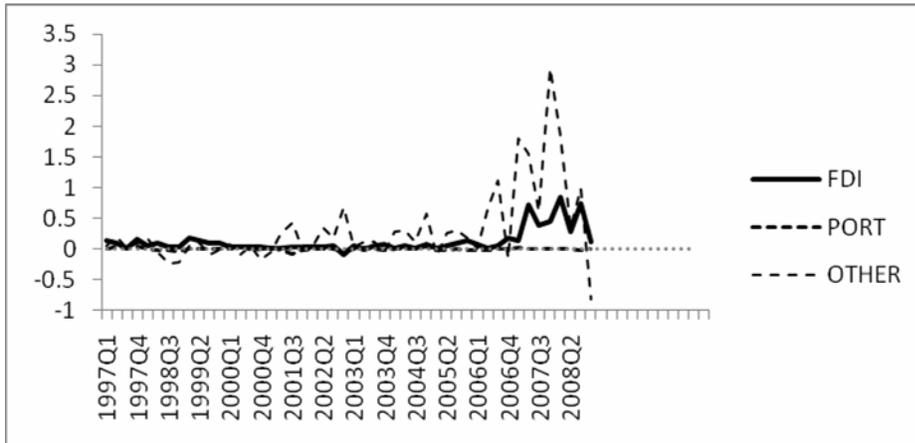
Russia



Ukraine



Belarus



Source: International Financial Statistics of the IMF. Deflated with U.S. GDP Deflator, 2005 = 100.

As a result, it is important to empirically model the macroeconomic determinants of capital flows, both for various countries as well as for different flows. This paper examines the effects of macroeconomic shocks for Russia, Ukraine, and Belarus in particular. These are chosen to add to the burgeoning literature on transition economies, which are belatedly following the path formed by other emerging markets in Latin America and Asia. In addition, these three countries occupy a specific position among other Soviet successor states. The top performers (particularly the Baltic nations) are now members of the European Union and either have adopted or plan to adopt the Euro, so they are included in numerous analyses of the EU and its periphery. The laggards (in the Caucasus and Central Asia), on the other hand, are institutionally weak and often lack reliable data for time-series analysis. As a result, Russia, Ukraine, and Belarus best represent the parts of this region that are still in transition.

As these specific cases are being analyzed, two sources of ambiguity in the literature—the effects of income shocks and the differences between the responses by different types of capital flow—are given considerable attention in this study. The application of a structural VAR using quarterly data provides some surprising and useful results.

1.2 Relationship to the Literature

The so-called “push-” and “pull factors” that drive capital flows can include income and monetary shocks. Economic theory, however, suggests that the effects of these shocks are ambiguous; they can decrease capital flows as well as increase them. Glick and Rogoff (1995) show that current accounts are driven by savings and investment decisions that differ depending on the persistence of income shocks. Since extra income can be saved or invested abroad in varying proportions, the current account (and thus capital flows) can be pro- or countercyclical and must be modeled empirically.

Likewise, this paper addresses another source of ambiguity: whether FDI and non-FDI flows really behave differently from one another. The literature is divided between two views. One, proposed by Claessens *et al.* (1995) suggests that these differences might be minimal. On the other hand, Chuhan *et al.* (1996) and Sarno and Taylor (1999) find that FDI and portfolio flows might indeed exhibit unique properties.

The three countries in question are also dissimilar, since each is in a different stage in the transition process. Belarus is the smallest and has the weakest market economy, which politically and economically is still Soviet in many ways. As a result, it has attracted the smallest net inflows. Ukraine has also undergone a series of currency devaluations, in addition to having a rocky relationship with Russia. Its political environment is unstable as well; following Viktor Yanukovich's 2010 election, many investors fear a return to repression. Russia's oil exports make that country more dependent on global factors, but its political situation might also make investors wary. In addition, Russia's sheer size and regional diversity dwarf the others. As Broadman and Recanatini (2001) note, most of Russia's

then meager FDI flows went to only four regions, centered around Moscow and St. Petersburg. It is expected that this study will arrive at different results for each country.

This type of analysis has not been done for these countries. Previous research on capital flows to Central and Eastern Europe has neither focused on individual countries nor included foreign macroeconomic influences. Lipschitz *et al.* (2006) provide a theoretical framework behind the movement of capital (or lack thereof) to transition economies, emphasizing the importance of structural and institutional factors, without focusing on any specific economy. Working papers such as those by Ötoker-Robe *et al.* (2007) and Von Hagen and Siedschlag (2008) describe recent developments regarding the growth of capital inflows, but omit Russia, Ukraine, and Belarus entirely. Other studies, such as Garibaldi *et al.* (2001), include these three countries, but focus on more microeconomic variables. Likewise, Lane and Milesi-Ferretti (2007) omit these three economies and the role of foreign shocks in their analysis. Hegerty (2009) investigates the role of foreign shocks using a VAR methodology, but looks only at the aggregate capital account for each of six recent EU entrants. These include the three Baltic countries, of which Estonia and Latvia were shown to be more vulnerable to domestic income shocks than to foreign shocks. No non-EU transition economies were included in that study.

As a result, there is ample room in the literature for a study that looks at the macroeconomic determinants of capital flows to Russia, Ukraine, and Belarus, while also focusing on the theoretical ambiguities regarding income shocks and “hot money.” Using a structural VAR method based on that of Ying and Kim (2001) to model the effects of macroeconomic variables for Russia, Ukraine and Belarus, this study finds that FDI, portfolio, and other flows do indeed respond differently from one another, and that the effects of income shocks vary from country to country as well.

This paper proceeds as follows. Section II describes the econometric methodology, particularly the structural VAR model used in this study. Section III provides the results, focusing on differences between countries and among flows. Section IV concludes.

II. Methodology

The effects of a set of domestic and foreign macroeconomic shocks on capital flows will be assessed with a Structural Vector Autoregressive (SVAR) model that will allow for impulse-response and variance decomposition analysis for Russia, Ukraine, and Belarus. Quarterly time series beginning in the mid-1990s are used to study the impacts of these macroeconomic shocks to net FDI, portfolio, and other investment for each country. Following Ying and Kim (2001) (or a later extension of the paper by De Vita and Kyaw, 2007), each flow is modeled as a function of a set of (unobservable) shocks, each defined as u . These shocks are to foreign income (u^{FY}), to the foreign interest rate (u^{FR}), to domestic productivity (u^{DS}), to domestic money (u^{DM}), and to each capital flow itself (u^{FLOW}). At each point in time, the flows can be modeled as:

$$flow_t = f_1(u_t^{FY}, u_t^{FR}, u_t^{DS}, u_t^{DM}, u_t^{FLOW}) \quad (1)$$

Because the shocks are unobservable, the model uncovers the underlying structural model through the following VAR model, which maps the shocks to a set of observable macroeconomic variables:

$$Y_t = \sum_{i=0}^{\infty} A_i U_{t-i} = A(L)U_t \quad (2).$$

These macroeconomic variables include (log) Domestic M2, divided by the country's GDP deflator, denoted M ; and (log) domestic real GDP, denoted Y . Germany, as a major trade partner and source of foreign investment for these countries, serves as the "foreign" country. The remaining variables include the Euro Area Interbank Rate (r^*) and (log) German real GDP (Y^*). These four variables are included as first differences, and all original GDP series are seasonally adjusted using the Census X-12 procedure.

This extension of the model includes disaggregated capital flows in place of the capital account. These flows are net FDI (inward minus outward), portfolio investment, (liabilities minus assets), and other investment (liabilities minus assets). These are all measured in shares of GDP for each country and are labeled fdi , $port$, and $other$, respectively. As a secondary measure, they are calculated in real terms (divided by the GDP deflator).

In Equation (2), A_i is a matrix of impulse responses to endogenous variables to exogenous shocks and

$$Y_t = (\Delta y_t^*, \Delta r_t^*, \Delta y_t, \Delta m_t, fdi_t, port_t, other_t)' \quad (3a) ;$$

$$U_t = (u_t^{FY}, u_t^{FR}, u_t^{DS}, u_t^{DM}, u_t^{fdi}, u_t^{port}, u_t^{other})' \quad (3b) ;$$

$$A(L) = \sum_{i=0}^{\infty} A_i L^i \quad (3c) .$$

The structural model makes use of a set of long-run restrictions (following the Blanchard-Quah decomposition) that stipulates the following: foreign variables can only be affected by foreign shocks, and monetary shocks do not have any long-run impact on domestic output. In addition, capital-flow shocks do not affect any other variable. The three capital flows are ordered as in (3a) or (3b) because FDI is thought to be more stable than portfolio investment, and other investment is shown (using the sample standard deviations of the time series) to be more variable than portfolio investment. Thus, the $A(L)$ or $A(1)$ matrix is as follows:

$$\begin{bmatrix} \Delta y_t^* \\ \Delta r_t^* \\ \Delta y_t \\ \Delta m_t \\ fdi_t \\ port_t \\ other_t \end{bmatrix} = \begin{bmatrix} * & 0 & 0 & 0 & 0 & 0 & 0 \\ * & * & 0 & 0 & 0 & 0 & 0 \\ * & * & * & 0 & 0 & 0 & 0 \\ * & * & * & * & 0 & 0 & 0 \\ * & * & * & * & * & 0 & 0 \\ * & * & * & * & * & * & 0 \\ * & * & * & * & * & * & * \end{bmatrix} \begin{bmatrix} u_t^{FY} \\ u_t^{FR} \\ u_t^{DS} \\ u_t^{DM} \\ u_t^{fdi} \\ u_t^{port} \\ u_t^{other} \end{bmatrix} \quad (4) .$$

Except for the flows, all variables are in logs, as well as first differences. The flow series are in levels, but deflated by each country's nominal GDP for the sake of stationarity (see below). Using the software *JMulti* (see Lütkepohl and Krätzig, 2004), impulse-response functions and forecast error variance decompositions are obtained for capital flows for each country.

III. Results

Quarterly data from the International Financial Statistics of the IMF are used in this study. The time spans for the estimation are 1995q2-2008q4 for Russia, 1996q3-2008q4 for Ukraine, and 1997q1-2008q4 for Belarus. Difference terms are constructed using data beginning one quarter before the start of the estimation period.

The Phillips-Perron stationarity test is first performed on each variable; the results are provided in Table 1. Capital flows are tested using two deflators that are standard in the literature: each country's GDP deflator (to capture real flows in domestic currency) or GDP itself. While the macroeconomic variables are first-difference stationary, or $I(1)$, the test suggests that the flows as shares of GDP show more evidence of stationarity in levels. A SVAR(1) is then estimated for each country using flows deflated by GDP; it was also estimated using flows in terms of real national currency, but the results are very similar.² While the capital flows themselves can influence each other, only the impulse response functions (IRFs) for shocks to the four main macroeconomic variables are presented. IRFs with 8-quarter horizons, as well as bands of ± 1.96 standard errors (representing 95 percent confidence intervals), are given in Figure 2.

Table 1. Phillips-Perron Stationarity Tests.

Country		<i>Real (GDP Deflator)</i>		<i>Share of GDP</i>	
		Level	1st Diff.	Level	1st Diff.
Russia	FDI	-2.839	-14.369	-3.904	-15.043
	PORT	-5.922	-14.419	-5.512	-13.454
	OTHER	-4.244	-14.825	-5.464	-15.475
	M	1.227	-7.348		
	Y	1.182	-5.251		
Ukraine	FDI	-4.984	-14.002	-5.472	-14.013
	PORT	-5.790	-16.272	-6.513	-16.708
	OTHER	-1.737	-9.274	-2.837	-11.342
	M	-0.329	-6.203		
	Y	0.414	-7.183		
Belarus	FDI	-3.664	-16.258	-4.483	-13.748
	PORT	-5.673	-11.759	-5.566	-11.979
	OTHER	-4.937	-12.480	-5.290	-12.922
	M	0.285	-7.637		
	Y	0.87	-6.503		
Germany	r*	-1.304	-5.065		
	Y*	-2.441	-3.641		

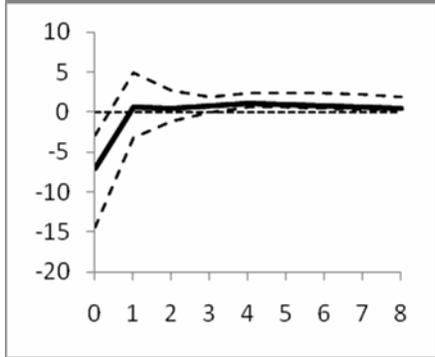
Critical Values: -3.60, -2.90, and -2.60 at 1, 5, and 10 percent, respectively.

We first look at Russia. Our main finding is that non-FDI flows, particularly portfolio investment, react more strongly to macroeconomic shocks. Some of these effects are expected: a decrease in the European interest rate results in an increase in portfolio investment (and an increase in the rate would reduce it), implying that foreign capital might seek out Russia as a profitable place to invest. On the

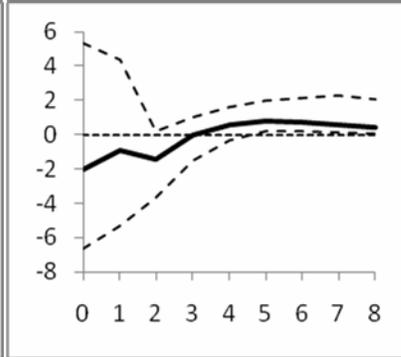
**Figure 2. Structural VAR Impulse-Response Functions
(With ± 1.96 Standard Error Bands)**

Russia

FDI after shocks to M

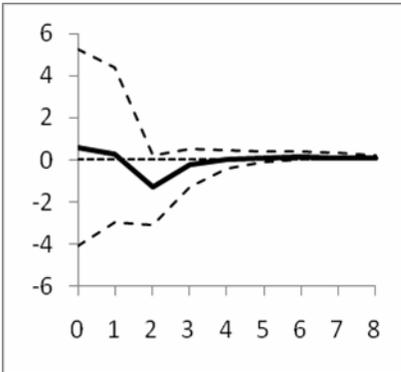
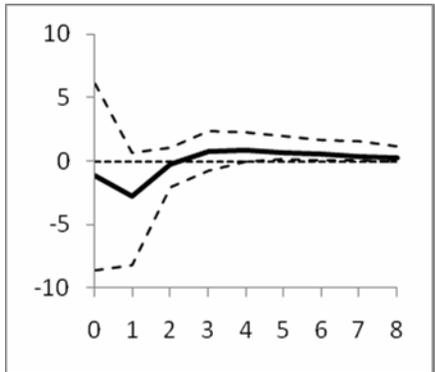


Y

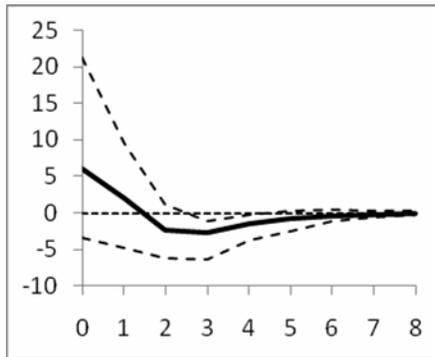


r^*

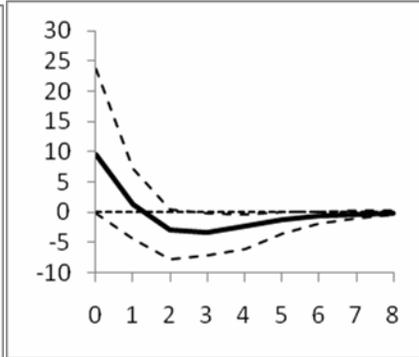
Y^*



PORT after shocks to M

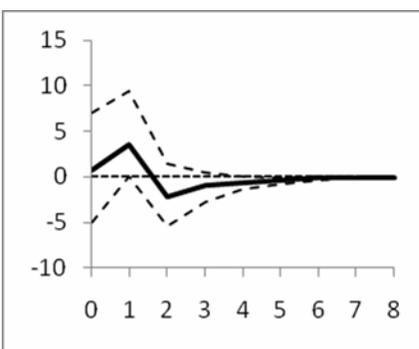
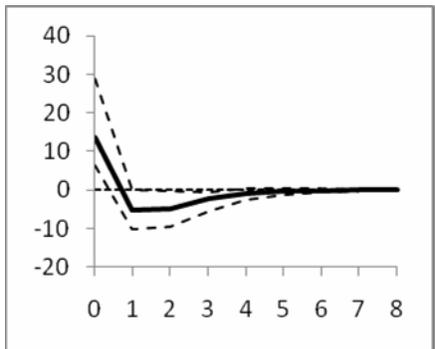


Y

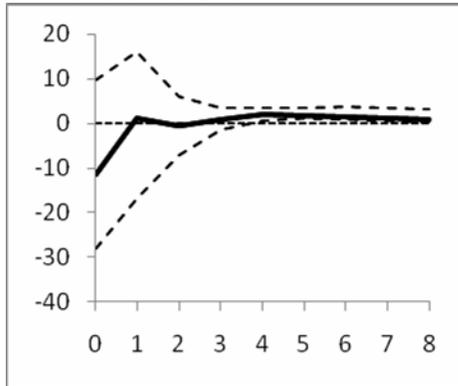


r^*

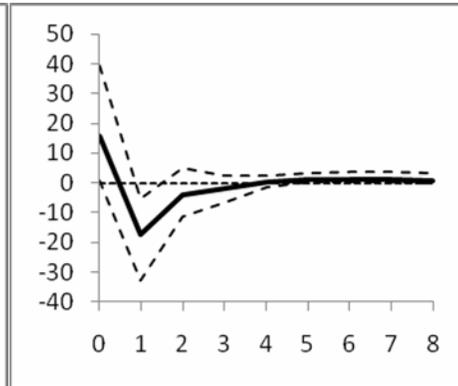
Y^*



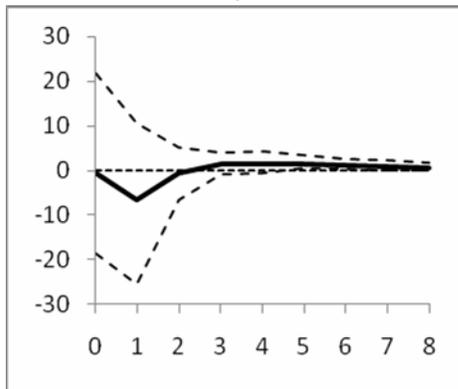
OTHER after shocks to M



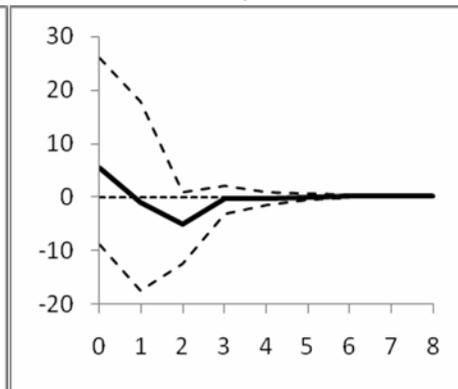
Y



r^*

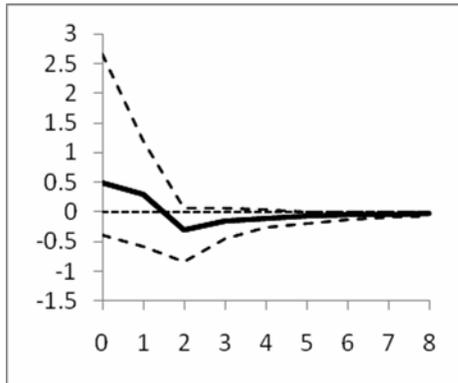


Y^*

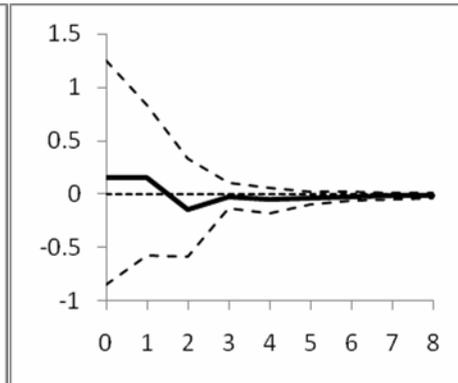


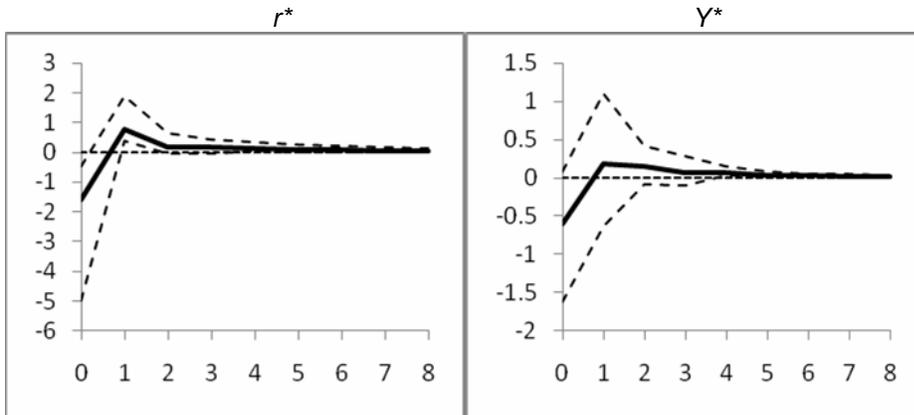
Ukraine

FDI after shocks to M

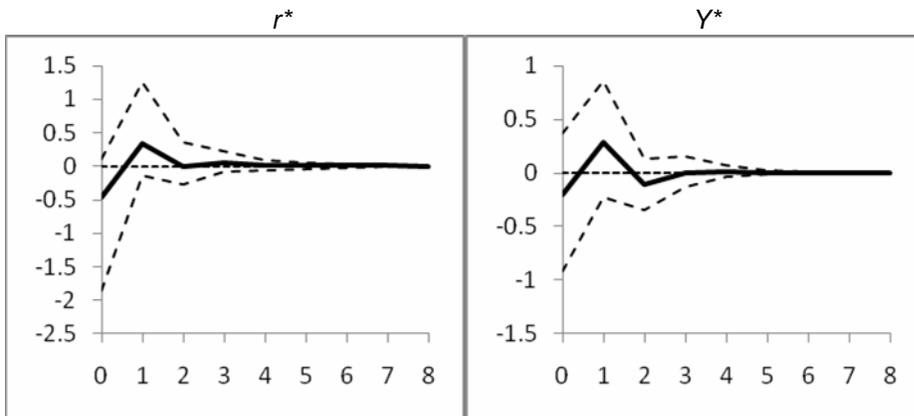
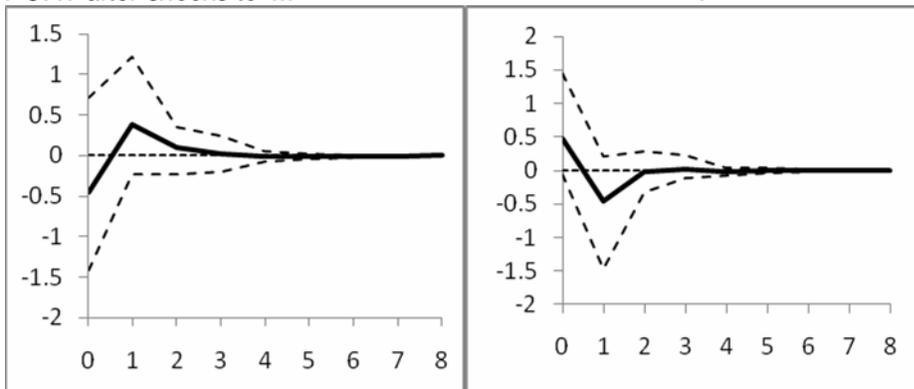


Y

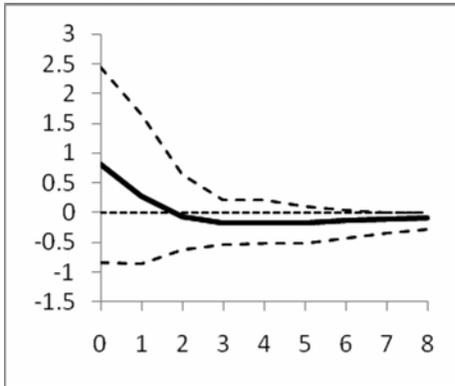




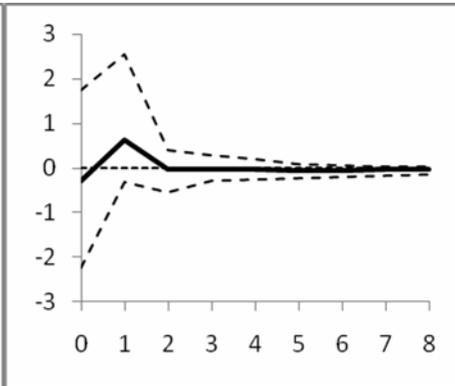
PORT after shocks to M



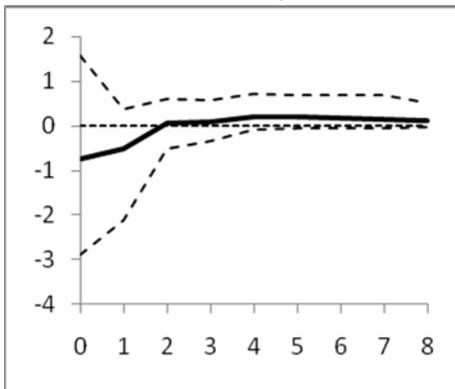
OTHER after shocks to M



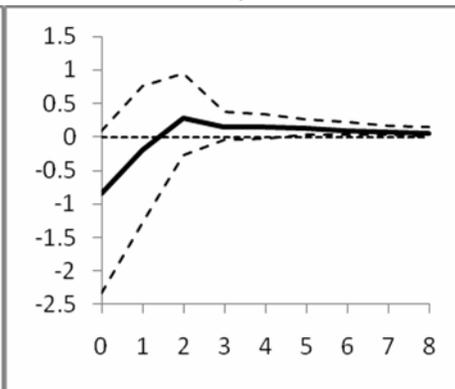
Y



r^*

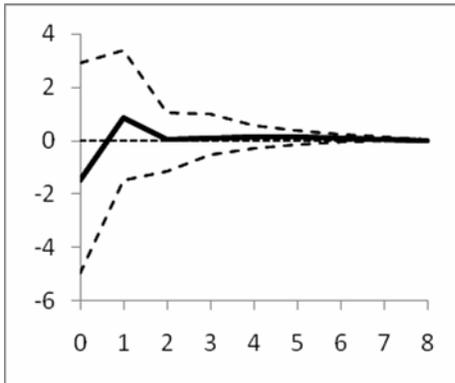


Y^*

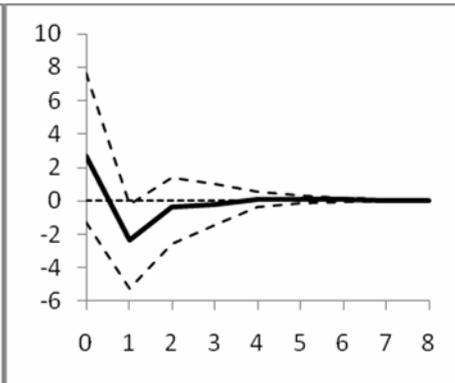


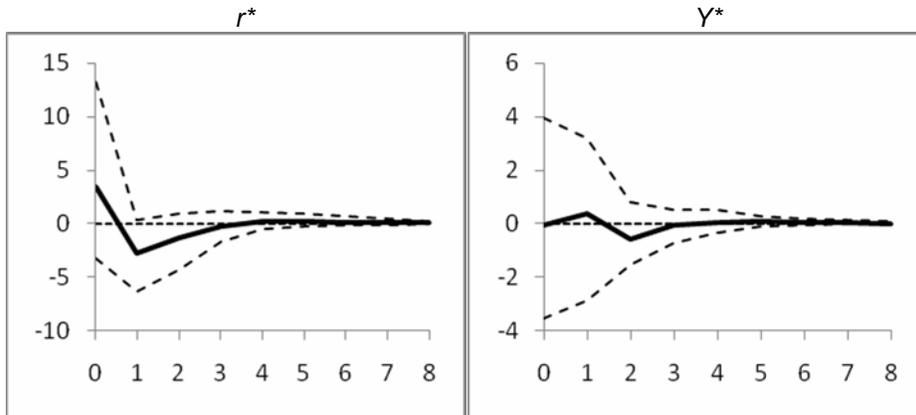
Belarus

FDI after shocks to M

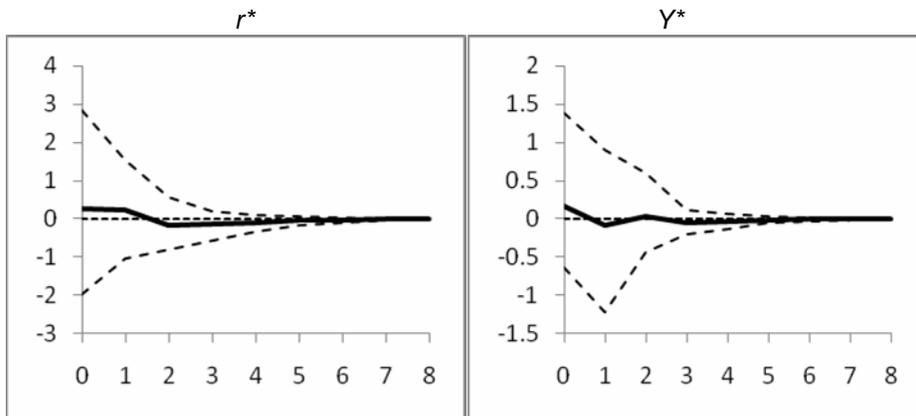
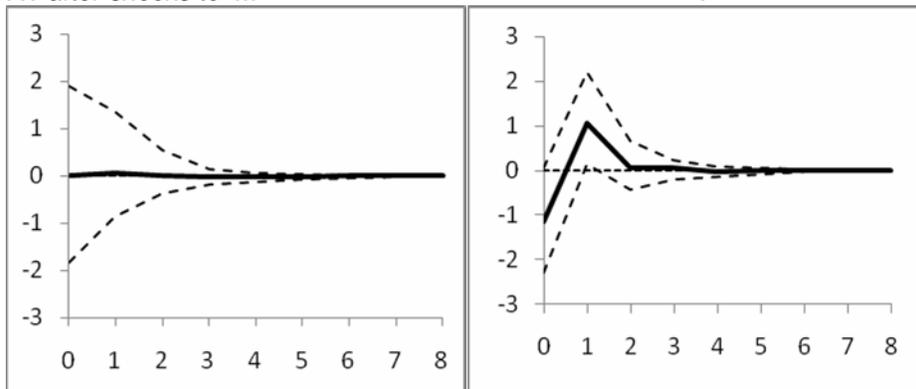


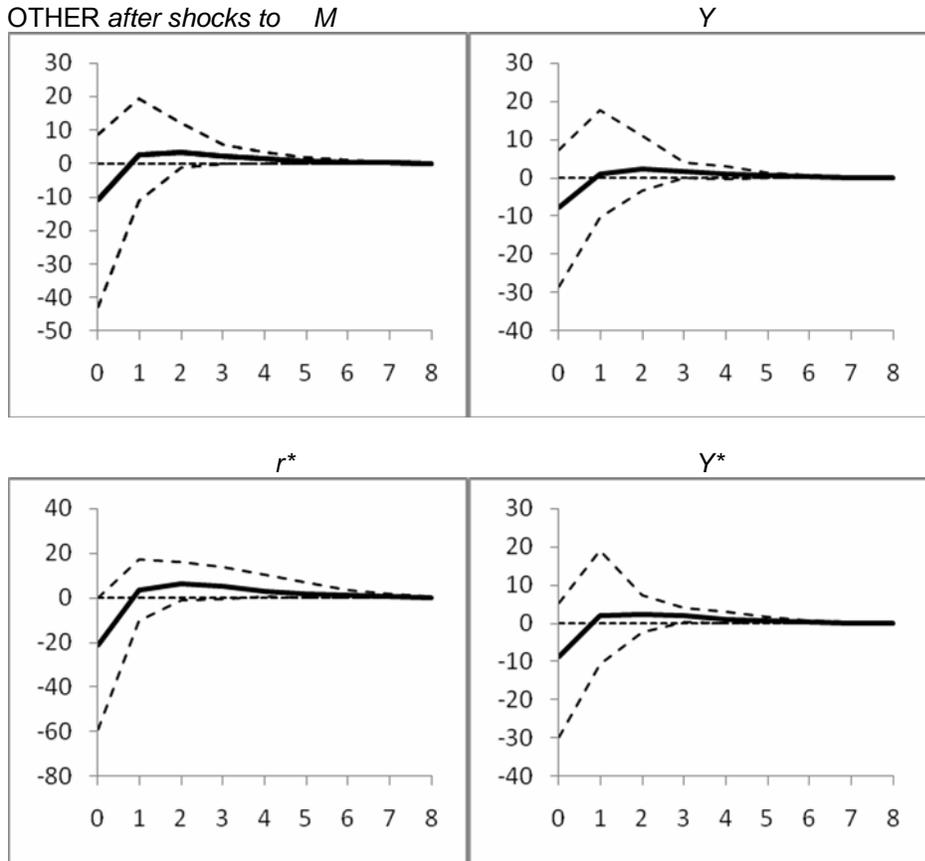
Y





PORT after shocks to M





other hand, the effect on FDI is small, but becomes positive after about a year. This suggests that Russian FDI is more strongly determined by structural and institutional factors, rather than simply the interest rate.

The three types of flow clearly seem to behave differently with regard to monetary shocks. Portfolio investment sees a decrease a few months after an increase in the domestic money supply. Investors may be withdrawing these short-term investments as inflation or deterioration in the Russian economy becomes apparent. At the same time, FDI and other investment increase after a positive monetary shock, but to a lesser degree.

Income shocks appear to have an influence on all types of investment, but again, the effects on non-FDI are stronger. Foreign shocks reduce FDI, suggesting that people in other countries may be choosing to save the gains from increased productivity, or invest them at home, rather than make long-term investments in Russia. On the other hand, portfolio investment increases after such an income shock. This again highlights the differences between “hot” money and FDI, and the fact that foreigners might make more short-term investments after they experience growth in their own economies. Investors may be less willing to commit to long-term projects in Russia.

The differences among flow types hold for domestic income shocks as well. Growth in Russia reduces all three types of net capital flows in the short term. Portfolio investment experiences a

sustained and significant reduction, which could represent a capital outflow to havens abroad. FDI, however, registers a significantly positive effect after a year. This again suggests that investors are less willing to undertake FDI in Russia and that only sustained growth might encourage them to do so.

In Ukraine, however, the effects of these variables are weaker for all flow types. The foreign interest rate has little effect, except on FDI, which responds positively to an interest-rate increase. This finding is difficult to explain, but it is plausible that the “wealth effect” is responsible. The only other significant effect of note is that of domestic monetary shocks, which tend to reduce FDI. This is highly plausible, since Ukraine’s experience with inflation will make investors less confident in the country’s prospects for macroeconomic stability. Ukraine’s local macroeconomic environment plays more of a leading role in attracting foreign capital than was the case in Russia, and that the country’s relative financial isolation makes it less sensitive to global shocks in general.

Belarus shows a stronger response to these shocks. Two key results are noted: First, FDI increases after a decrease in the foreign interest rate, while other investment goes in the other direction, and portfolio investment is not affected. Belarus’ relatively closed economy means that “hot money” (other than lending) is not drawn in as with Russia. Second, FDI responds negatively to a domestic income increase, while portfolio investment registers a positive effect. The small size of these flows makes these results more difficult to interpret, but this hints at the role of domestic macroeconomic factors (including investor confidence) driving investment in Belarus. Improving economic fundamentals might be more influential in attracting capital into Belarus than are more traditional factors such as returns on investment.

To further assess the influence of each variable, we turn to the forecast error variance decompositions (FEVDs) for the flows in each SVAR. They are reported in Table 2 at one, four, eight, and 20 quarters. In general, they confirm many of the conclusions from our impulse-response analysis; they also show that the contributions of many of these variables are time-varying.

The foreign interest rate makes a large contribution to the forecast error of Russian portfolio investment—this value is as large as 18 percent after four quarters. Domestic income also makes a large contribution to Russian portfolio and other investment (about nine percent). These results further suggest that investment inflows are helped by relatively high interest rates, while income growth (a domestic factor) might prompt capital (out)flows. In Ukraine, most of the variance of the flows is from the flows themselves, with one main exception: that of r^* on FDI. This matches the key result from the IRFs. In Belarus, the foreign interest rate has a fairly large effect on other investment, as well as a lesser effect on FDI. In addition, domestic income is a contributing factor in net portfolio flows, corroborating the idea that economic growth in Belarus helps make the country a more attractive place to invest.

Overall, we find that the IRFs and FEVDs support the same conclusions. Each country—and each flow—responds to different macroeconomic “push” and “pull” factors. Russia, with the largest flows in

dollar terms, sees outflows of all types of capital after a domestic income increase. Increases in the foreign interest rate, however, make Russia a more attractive destination for portfolio investment.

Table 2. Forecast Error Variance Decompositions.

<i>Russia</i>	<i>FDI</i>							<i>Portfolio</i>							<i>Other</i>							
	<i>horizon</i>	<i>Other</i>	<i>Port</i>	<i>FDI</i>	<i>M</i>	<i>Y</i>	<i>r*</i>	<i>Y*</i>	<i>Other</i>	<i>Port</i>	<i>FDI</i>	<i>M</i>	<i>Y</i>	<i>r*</i>	<i>Y*</i>	<i>Other</i>	<i>Port</i>	<i>FDI</i>	<i>M</i>	<i>Y</i>	<i>r*</i>	<i>Y*</i>
1	0.35	0.01	0.52	0.10	0.01	0.00	0.00	0.01	0.69	0.02	0.03	0.08	0.17	0.00	0.53	0.02	0.36	0.03	0.06	0.00	0.01	0.01
4	0.54	0.01	0.36	0.06	0.01	0.01	0.00	0.01	0.66	0.02	0.04	0.08	0.18	0.01	0.55	0.02	0.30	0.02	0.09	0.01	0.01	0.01
8	0.55	0.02	0.34	0.06	0.01	0.01	0.00	0.01	0.66	0.02	0.04	0.09	0.17	0.01	0.56	0.02	0.29	0.02	0.09	0.01	0.01	0.01
20	0.55	0.02	0.34	0.06	0.01	0.01	0.00	0.01	0.66	0.02	0.04	0.09	0.17	0.01	0.56	0.02	0.29	0.02	0.09	0.01	0.01	0.01

<i>Ukraine</i>	<i>FDI</i>							<i>Portfolio</i>							<i>Other</i>							
	<i>horizon</i>	<i>Other</i>	<i>Port</i>	<i>FDI</i>	<i>M</i>	<i>Y</i>	<i>r*</i>	<i>Y*</i>	<i>Other</i>	<i>Port</i>	<i>FDI</i>	<i>M</i>	<i>Y</i>	<i>r*</i>	<i>Y*</i>	<i>Other</i>	<i>Port</i>	<i>FDI</i>	<i>M</i>	<i>Y</i>	<i>r*</i>	<i>Y*</i>
1	0.18	0.00	0.62	0.02	0.00	0.16	0.02	0.22	0.72	0.00	0.02	0.02	0.02	0.00	0.89	0.00	0.08	0.01	0.00	0.01	0.01	0.01
4	0.29	0.01	0.50	0.02	0.00	0.16	0.02	0.22	0.68	0.00	0.03	0.03	0.03	0.01	0.93	0.00	0.05	0.01	0.00	0.01	0.01	0.01
8	0.30	0.01	0.49	0.02	0.00	0.16	0.02	0.22	0.68	0.00	0.03	0.03	0.03	0.01	0.93	0.00	0.05	0.01	0.00	0.01	0.01	0.01
20	0.30	0.01	0.49	0.02	0.00	0.16	0.02	0.22	0.68	0.00	0.03	0.03	0.03	0.01	0.93	0.00	0.05	0.01	0.00	0.01	0.01	0.01

<i>Belarus</i>	<i>FDI</i>							<i>Portfolio</i>							<i>Other</i>							
	<i>horizon</i>	<i>Other</i>	<i>Port</i>	<i>FDI</i>	<i>M</i>	<i>Y</i>	<i>r*</i>	<i>Y*</i>	<i>Other</i>	<i>Port</i>	<i>FDI</i>	<i>M</i>	<i>Y</i>	<i>r*</i>	<i>Y*</i>	<i>Other</i>	<i>Port</i>	<i>FDI</i>	<i>M</i>	<i>Y</i>	<i>r*</i>	<i>Y*</i>
1	0.05	0.05	0.83	0.01	0.03	0.04	0.00	0.00	0.95	0.00	0.00	0.04	0.00	0.00	0.79	0.03	0.02	0.03	0.01	0.10	0.02	0.02
4	0.12	0.04	0.74	0.01	0.04	0.06	0.00	0.01	0.92	0.00	0.00	0.06	0.00	0.00	0.79	0.03	0.02	0.03	0.01	0.10	0.02	0.02
8	0.13	0.04	0.74	0.01	0.04	0.06	0.00	0.01	0.92	0.00	0.00	0.06	0.00	0.00	0.78	0.03	0.03	0.03	0.01	0.10	0.02	0.02
20	0.13	0.04	0.74	0.01	0.04	0.06	0.00	0.01	0.92	0.00	0.00	0.06	0.00	0.00	0.78	0.03	0.03	0.03	0.01	0.10	0.02	0.02

Russian income shocks also have an effect on its capital flows. In addition, while Ukraine shows comparatively little response to the main macroeconomic determinants, Belarus might see its relatively small capital inflows increase if its macroeconomic fundamentals—particularly economic growth—improve.

IV. Conclusion

While not as attractive as some other emerging markets in Latin America and Asia, the former Soviet republics of Russia, Ukraine, and Belarus have drawn in a growing amount of foreign capital in recent years. Since these flows can be highly destabilizing, it is important to study their macroeconomic determinants, and responses to foreign and domestic shocks. Since the underlying theory suggests that the effects of these shocks can be either positive or negative, they must be studied empirically.

This study examines quarterly time series of each country’s FDI, portfolio investment, and other investment from 1995 to 2008, and these flow series are placed in a Structural VAR model that was introduced by Ying and Kim (2001). Applying an appropriate set of long-run restrictions, the flows are modeled as functions of domestic monetary and income shocks, as well as foreign interest-rate and income shocks.

Impulse responses and variance decompositions uncover certain key results. First, a distinction must be made between portfolio investment and FDI flows. Second, the impact of macroeconomic shocks can vary over time. Finally, each country shows a unique response for each type of flow. Many of these effects are surprising, but can explain specific issues within each country.

In Russia, for example, certain flows follow what might be expected intuitively. Portfolio investment responds positively to a decrease in European interest rates, suggesting that investors are attracted to a higher rate of return. At the same time, they also increase along with increased foreign income, suggesting that foreigners are choosing to invest this income abroad. On the other hand, these flows decrease after a positive shock to home income. This implies that capital flight is indeed an issue, particularly if Russia continues its recent growth. The differences between the flow types support the “hot money” hypothesis: FDI responds only to income shocks—but only weakly, and temporarily after about two quarters.

The other two countries show unique responses as well, both with regard to the other countries’ results and across each type of flow. Ukraine registers very little response for any flow, perhaps due to the fact that it is not yet very well integrated with Western Europe. Belarus might see portfolio inflows increase as a result of economic growth, but this effect does not hold for FDI. As a result, further studies of these countries’ capital accounts, now that sufficient time series are available, should take care to pay attention to the country-specific differences between “hot” portfolio flows and FDI.

These results differ from previous research on emerging markets in other parts of the world. Ying and Kim (2001), for example, note that foreign shocks showed a dominant—and growing—influence on capital flows to Mexico and Korea over their period of study. De Vita and Kyaw (2008) examine a broader set of countries and find that income shocks play more of a role than do monetary shocks. Our results differ from these for all three countries.

These results have important policy conclusions. First of all, the region should be aware of the fragility of capital inflows and the possibility of a damaging outflow—but this potential is greater for Russia, and for non-FDI investment. Secondly, this study underscores the fact that these countries cannot be considered a homogenous unit. While Russian investment most closely resembles the “typical” pattern by which foreign capital seeks the highest rate of return, Belarus’ closed economy and Ukraine’s experiences with partial reform and hyperinflation mean that their capital inflows are driven more by local determinants rather than global ones.

ENDNOTES

1. Source: International Financial Statistics of the IMF.
2. Not only does a length of one lag preserve as many observations as possible, it also minimizes the log likelihood (out of four possible lags) for these specifications. The results of this test, as well as a SVAR(1) using real flows, are available upon request.

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Regional Differences in Fan Preferences for Minor League Hockey: The AHL

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Abstract

Regional differences in fan preferences for minor league hockey in the United States are explored using simple linear regression models. The top-level minor league for the NHL, the American Hockey League (AHL), was studied for the 2008-09 season. Key attributes with respect to attendance are studied for hockey including population, income per capita, promotions, scoring, and winning percentage. In addition, a key socio-economic variable, fighting is also investigated. Major differences are found for fan preferences across geographic regions in relation to population, income per capita, a variety of promotions, and team success. In addition, fan reaction to fighting tends to differ greatly by region, with it having a positive effect in the Mid-Atlantic (East Division) and Western (West Division) regions, but having a negative and significant effect in the New England-area (Atlantic division).

An attendance model for the top minor hockey league in North America, the American Hockey League (AHL), is specified and a variety of factors which may influence fan attendance are studied. Game-by-game attendance figures were gathered from the AHL website, www.theahl.com, along with the day of the game, team records, team scoring, and per-game fight data. Demographic data were gathered for the cities which host AHL franchises and, in addition, promotional data from individual team websites and pocket calendars were collected and converted into dummy variables representing different types of promotions. Upon gathering the data, it became apparent that substantial regional differences appeared to exist in fan preferences for certain attributes. Therefore, regressions for the overall league and for each individual division, to account for regional differences, were run and the results are presented.

A focus is placed on a variety of factors to attempt to determine what influences fan decisions to attend AHL hockey games. One key variable examined is the role of fighting, which has been explored in the NHL before in Jones, Stewart, and Sunderman (1996) and Paul (2003). In these papers, fighting was shown to have a positive and significant effect on attendance. The importance of winning, which may or may not be as important at a minor-league level as compared to a major-league level, was also studied on a game-by-game basis throughout the season. A proxy for in-game

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excitement, scoring in these games, was also tested. Promotions were also studied which include events, merchandise giveaways, reduced food and beverage prices, group nights, etc. These data were used to determine how much of an impact, if any, these promotions have on attendance.

Upon gathering and studying the data, it became apparent that there are some key regional differences in fan preferences for AHL games. To illustrate this, the regression model for the AHL as a whole is also run for each of the four divisions. The four divisions consist of the Eastern Division (Mid-Atlantic Region), Atlantic Division (New England), North Division (Canada, Western NY, Ohio), and West Division (Midwest US – both Northern and Southern). A full listing of the team cities and their division is given in Appendix I at the conclusion of this paper. These regional distinctions illustrate where certain performance-based variables and demographic variables differ for AHL Fans in relation to attendance.

The paper proceeds as follows. A simple game-by-game attendance model for the AHL is set up and the dependent and independent variables are explained. The regression results are presented and explained in the context of their relationship with per-game attendance. Regional differences are then explored by division. Discussion of the results and conclusions occur in the final section.

II. American Hockey League Attendance Model

Hockey attendance has not been studied as often as baseball attendance. The literature surrounding hockey attendance has mainly focused on the effects of fighting and rule changes. Past studies of the National Hockey league include Jones (1984), Jones, Ferguson, and Stewart (1993), Jones, Stewart, and Sunderman (1996), and Paul (2003). These studies found that fighting increases attendance at the National Hockey League level. Attendance at minor league games has been studied recently by Hong (2009) and Rascher, Brown, Nagel, and McEvoy (2009).

Per-game attendance is used as the dependent variable for the model for each league. Independent variables are grouped by categories which include timing of the game (days of the week dummies with Wednesday being the omitted day and January being the omitted month), opponent (division rivals), promotions, demographics (population and income per capita), and on-ice team performance (win percentage, total goals scored per game, fights per game average).

Days of the week and months of the year dummy variables are included in the regression to account for daily and monthly effects. Weekends and months later in the season (during the playoff push) are expected to show positive and significant results. Wednesday is the omitted dummy for the days of the week and January is the omitted dummy for the months of the hockey season, with all other daily and monthly results compared to these days. A dummy variable is included for within-division games. This variable accounts for the opponent. If divisional games attract a greater number of fans to the arena, this variable will have a positive and significant coefficient.

Promotional data were taken from the team websites and from pocket schedules which listed game promotions. Promotions can have an important impact on per-game attendance for sports

teams. Promotions may even be more important at the minor-league level, where team winning may not be the most important factor to fans when making the decision to purchase tickets. Promotions have been studied before in the literature for sports such as Major League Baseball (McDonald and Rascher, 2000), where some promotions were found to increase attendance.

The promotional information available from the teams was made into a series of dummy variables representing the different categories promotions could fall into. After observing the data, the promotions were broken into ten categories. These categories included opening night festivities, merchandise giveaways, autographs, fan appreciation nights, group nights, bobble head giveaways, food giveaways or discounts, free or reduced-price ticket nights, and beer nights. If the goal of these promotions is to bring a greater number of fans to the arena, their effects should be positive and significant.

The on-ice performance variables were broken into the effects of winning (win percentage), scoring, and fighting. The AHL uses a point-based standings system, with two points for a win, one point for an overtime loss or shoot-out loss, and no points for a regulation loss. Therefore, win percentage was calculated by the number of points attained by the home team out of the total points possible (two times the number of games played). This variable was calculated as a running average and the value at any given time is the percentage of possible points achieved going into the current home game. If fans value a winning team at the minor league level, instead of only valuing marketing gimmicks or seeing certain players who are approaching the major league level, the win percentage entering the game is expected to have a positive and significant effect on attendance.

Scoring is also calculated as a running average going in the current home game. Originally, the regression was run with goals for average and goals against average (and with just goals for average), but we recognize that teams need to score to win. Therefore, there is likely multicollinearity between winning and goals scored. To avoid these problems, the goals for per game and goals against per game variables are summed to get the total goals in the game each team plays. This allows the goals variable to distinguish teams which play high scoring games as opposed to low scoring games, still allowing for the independent effect of win percentage in the model.

Fighting in hockey is often a hotbed issue for the media, fans, and the leagues in general. Past studies on the effects of fighting have shown that increases in fighting have led to increases in attendance. A positive and significant effect of fighting on attendance was shown for teams based in the United States in Jones, Stewart, and Sunderman (1996). Using data from a decade later, the 1999-2000 season, positive increases in attendance were found in relation to fighting for both U.S. and Canadian based teams (Paul, 2003). The effect of violence in sports, particularly hockey, is of great interest to researchers in many disciplines and determining the importance of fighting for hockey at the minor league level will allow a deeper exploration of this topic. Fighting was calculated on a per-game basis (as were the scoring and winning variables above) and the variable is the average fights per game going into the current home game.

The first table below presents the summary statistics¹ of the non-dummy variables involved in the regression. The second table presents the regression results for the AHL as a whole (first column after the listing of the independent variables) and for each division in the AHL. Overall, each team in the AHL plays 40 home games in an 80-game regular season. Seven teams did not have promotional information listed on their website and did not respond to our requests for promotional information. These teams are Iowa, Rockford, Hamilton, Syracuse, Toronto, Worcester, and Philadelphia. These teams are not included in the regression results in table II below.

Given issues with heteroskedasticity, the regression was run with White's heteroskedasticity-consistent standard errors and co-variances. Those adjusted results are what are presented in the table below. Omitted promotional categories for some divisions signify that none of the teams in that division had those types of promotions during the season. Statistical significance in the regression results is noted with *-notation as * represents significance at the 10 percent level, ** at the 5 percent level, and *** at the 1 percent level.

Table I: Summary Statistics of Non-Binary Variables

	Population	Income Per Capita	Total Goals Per Game	Fights Per Game	Per Game Attendance
Mean	510,093.207	38,574.966	5.879	1.148	5,111.763
Standard Deviation	757,896.114	6,947.247	0.659	0.377	2,420.939

Table II: AHL Attendance – Overall and by Division

Variable	AHL	AHL – East	AHL-Atlantic	AHL-North	AHL- West
Constant	457.2861 (0.5946)	-7096.578*** (-5.5253)	5609.421** (2.2965)	-1145.867 (-0.2463)	11888.40*** (4.5204)
Sunday	838.6949*** (4.2121)	906.9577*** (2.8150)	186.4546 (0.4651)	383.6768 (0.8367)	63.7488 (1.6375)
Monday	-89.2800 (-0.2391)	-1545.590*** (-4.8339)	-262.6466 (-0.2171)	275.5802 (0.3100)	-485.4387 (-0.8187)
Tuesday	-25.7988 (-0.0879)	-523.5714 (-0.9875)	271.7424 (0.2563)	180.3114 (0.2604)	-234.3723 (-0.4470)
Thursday	114.5782 (0.3816)	-237.6598 (-0.4501)		-75.9937 (-0.1612)	-700.4484 (-1.4408)
Friday	1305.860*** (7.2939)	618.7203** (2.4624)	1020.949*** (3.0247)	1510.861*** (3.0242)	1842.626*** (4.5859)
Saturday	2032.642*** (10.7034)	1264.470*** (4.6253)	1687.037*** (4.9706)	2069.043*** (3.4614)	3067.576*** (6.8446)
October	-1530.977*** (-6.8969)	-1308.487*** (-2.7787)	154.3419 (0.2727)	-1190.593* (-1.9556)	-2002.694*** (-5.3413)
November	-667.7743*** (-3.6773)	-530.6127* (-1.8572)	-492.4150 (-1.4572)	-565.3075 (-1.0578)	-1160.448*** (-2.8989)
December	-607.1012*** (-3.3098)	-601.1853** (-2.2005)	-833.1882*** (-2.7139)	-528.6852 (-1.1366)	-662.9456 (-1.8091)
February	48.0064 (0.2422)	228.2428 (0.9099)	-117.2129 (-0.3557)	467.7853 (0.8076)	-439.6132 (-1.0813)

March	303.4990 (1.5602)	222.0875 (0.7840)	-212.3153 (-0.6083)	695.5023 (1.3231)	233.7231 (0.5265)
April	834.7148** (2.4443)	244.8502 (0.8124)	662.0598 (1.5082)	1148.063* (1.7200)	662.4376 (1.2851)
Division Opponent	-66.2989 (-0.5672)	24.2350 (0.1443)	-103.4826 (-0.4659)	-118.6524 (-0.4264)	-67.2631 (-0.2686)
Opening Night	2114.186*** (4.5564)	1708.680 (1.3909)	4702.606*** (4.5638)	3404.619*** (4.0246)	1440.423** (2.1500)
Merchandise	946.8431*** (5.4621)	377.5592* (1.7270)	1550.297*** (5.3141)	86.0713 (0.1539)	555.6066 (1.6254)
Event	809.6809*** (4.8390)	64.6771 (0.3377)	931.8654** (2.3810)	1661.611*** (3.5654)	727.9321** (2.3578)
Auto	-452.1576 (-0.7333)	1727.538* (1.6558)	-1279.894* (-1.8356)	287.2153 (0.4836)	-182.2269 (-0.5875)
Fan Appreciation Group	1500.445** (2.0489)	765.4899 (1.5084)	1129.452 (1.2754)	3833.263 (1.3285)	1595.106** (2.06676)
Bobble Head	-114.9739 (-0.5945)	-492.2404** (-2.2503)	194.3184 (0.4200)	-107.0170 (-0.2096)	324.5036 (0.7352)
Food	-82.8916 (-0.2846)	769.5472** (2.3353)	-972.2449** (-2.5356)	-530.3340 (-0.6369)	-58.0551 (-0.1240)
Free Ticket	924.7972*** (3.0206)	310.6862 (0.6971)	-2302.121*** (-6.5245)	107.3401 (0.1607)	1212.033** (2.0577)
Beer	-591.4992*** (-2.6186)		190.6006 (0.2741)	-802.0791 (-1.7426)	-1020.393 (-1.6248)
Population	-29.1789 (-0.0816)		-115.2712 (-0.2123)	736.3395 (0.7282)	1445.537** (2.0193)
Income	0.0005*** (5.0502)	-0.0092*** (-5.6586)	0.2039*** (3.3811)	0.0028 (1.3505)	0.0014*** (9.3036)
Win Percent	-0.0058 (-0.6292)	0.0952*** (5.8911)	0.0408** (2.1251)	0.2170** (2.3449)	-0.2336*** (-5.6177)
Total Goals	3425.871*** (7.9351)	4214.860*** (3.5248)	1645.213 (1.3769)	2786.686*** (2.6657)	1034.122 (1.1591)
Fights	436.7462*** (4.5030)	727.4128*** (5.8148)	-790.5202** (-2.4737)	-599.9608* (-1.8443)	-189.4496 (-0.9865)
R-Squared	-802.1457*** (-4.5071)	1539.385*** (3.2995)	-2010.110*** (-3.1018)	199.6766 (0.3618)	592.6106* (1.6844)
R-Squared	0.3867	0.7394	0.5449	0.7037	0.6763

In interpreting the results, we'll first discuss the findings for the AHL overall, then discuss the differences found regionally across divisions. For the overall AHL, the intercept was found not to be significantly different from zero. In relation to the days of the week, which were all compared to the omitted day – Wednesday, weekends were found to be the most popular in terms of attendance. Saturday was found to have the highest attendance, with over 2,000 additional fans in attendance compared to the mid-week omitted dummy variable, and was found to have a significant effect at the 1 percent level. Friday was also found to have a positive (over 1,300) and significant effect (at the 1 percent level). Sunday was also found to have a positive and significant effect (over 800 additional

fans). Mondays generated the lowest attendance (-89 fans compared to Wednesday), but was not found to be statistically significant.

The months of the year dummies revealed that attendance in the AHL generally increased throughout the season. Compared to January, the omitted month, October, November, and December were found to have negative and significant effects at the 1 percent level. April revealed positive and significant (at the 5 percent level) results. The push for the playoffs may contribute to these results, or possibly nicer weather in the spring could bring in larger crowds to the arena.

Various forms of promotions appeared popular across the cities in the American Hockey League. The promotions that brought the largest increases in attendance were found to be opening night festivities, fan appreciation nights (which often feature major lottery giveaways such as trips or game-worn jerseys), free or reduced-price food, merchandise giveaways, or events (such as concerts or special appearances by celebrities or costumed cartoon-characters). Other promotions, however, did not generate positive and significant increases in attendance. Promotions such as bobble-heads, autograph sessions, and group nights did not appear to have an effect on attendance. Free ticket promotions were found to generate negative and significant returns. These free ticket giveaways likely occur on otherwise unpopular games (mid-week games, etc.), which may generate these negative results.

In relation to the demographic fixed-effects, population was found to have a positive and significant effect on attendance, as larger cities attracted more fans. Income per capita was not found to have a significant effect on per-game attendance. The sign on income per capita was negative, suggesting some possibility of the AHL as an inferior good.

As for on-ice play, fans generally appear to enjoy winning teams, higher-scoring games, and fewer fights, although, as discussed in the next section, there seems to be considerable regional differences in fan preferences when examining individual divisions. For the AHL as a whole, the win percentage of the home team entering the game was found to have a positive and significant effect on attendance at the 1 percent level. Fans also seemed to enjoy higher-scoring games as the total goals variable (goals-for-per-game average plus goals-against-per-game average – both computed entering the game), was found to have a positive and significant effect on attendance. If goals are a proxy for excitement in a game, fans appear to respond favorably to more exciting games. In relation to fighting, a negative and significant effect on attendance was found. This is the opposite of the results found for the NHL (Paul, 2003 and Jones, et al., 1990), which could mean that minor-league fans do not enjoy fights as much as major-league fans. There are significant regional differences across the league, when it comes to fighting, as seen in the division regression results and discussed in the next section.

III. AHL Attendance Regression Results by Division

Table II presents the results by division, in addition to the results for the overall AHL, which were discussed in the previous section. Although there are relative magnitude differences between attendance by division in the AHL due to the day of the week and month of the year dummies, which are interesting and would be important to ascertain why they are different (perhaps due to substitute entertainment activities in regions of the country, existence of local professional sports teams and their success level, weather differences, etc.), the main focus of this section is on the effects on attendance due to promotions, demographics, and the hockey-related game factors of winning, scoring, and fighting.

In relation to the effects of promotions, there were key similarities and differences across divisions and geographic regions. Opening night festivities were shown to have positive and significant effects on attendance in three of the four divisions (Atlantic, North, and West). Merchandise giveaways were found to have a positive and significant effect in two divisions (East and Atlantic). Events were found to have positive and significant effects in three divisions; these divisions were the Atlantic, North, and West. Fan appreciation games and beer-related promotions were only found to have a significant effect (positive) in the West division.

Other interesting results in relation to promotions seemed to be grouped by division. The Atlantic division, mainly in the New England states, appeared to dislike games with autographs and bobble heads. In addition, fans in the Atlantic division seemed to have an extreme aversion to games with food-related promotions. Over 2,000 fewer fans attended Atlantic division games where food promotions were sponsored by the teams. It seems unlikely these fans would dislike lower priced or free food, but they may have turned away due to negative externalities generated by this promotion. In other words, the clientele which attends games for free or reduced price food may deter other fans from attending games, particularly in the Atlantic division (New England region).

Fans of the East Division teams (Mid-Atlantic States region) had distinctly different preferences. While they enjoyed autograph nights and bobble heads (positive and significant effects), they had a dislike for group nights. Group nights led to nearly 500 fewer fans per game in the East division. Fans of these teams may dislike nights aimed at distinct groups and could possibly feel alienated when these fans attend a group night not aimed at them. Therefore, it appears many fans in this region simply do not attend games on group-themed nights.

The demographic variables, population and income per capita, are shown to have different effects across divisions and regions. Higher population within the city area led to increases in attendance in the Atlantic and West divisions. In the East and North divisions, more populous cities actually led to a decrease in overall attendance. The existence of NHL hockey substitutes near cities in the East and North divisions may contribute to this result. Income per capita was found to have a positive and significant effect on attendance in the East, Atlantic, and North divisions, but a negative effect on the West division, which apparently drove the overall results at the AHL level.

The effects of variables related to the play on the ice in AHL hockey were also found to have mixed results across divisions and geographic regions. The importance of winning was mainly seen in the East and North divisions, which were the only divisional regressions where this variable was found to have a significant (positive) result. This could represent differences in the preferences of fans for winning, as opposed to enjoyment from just watching a game. However, given the proximity of these teams to major NHL markets (and the availability of the other minor league hockey cities in the ECHL and others) and the results discussed above relating to the effects of population, having a winning team may be more important here than other divisions.

The effects of scoring were also found to be mixed. Although the overall regression results were shown to be positive and significant, the only positive and significant effect for the individual divisions was again found for the East division. These fans appear to attend more games when they are expected to be higher-scoring. Negative effects of scoring, which could represent a preference for more defensive-oriented hockey, were found in the Atlantic and North divisions as negative and statistically significant effects were found.

Substantial differences were also found with respect to fan interest in hockey fights. As stated previously, the overall effect for the AHL was found to be negative. This result, however, appears to be driven by fans in New England (the Atlantic Division). These fans appeared to have a disdain for fighting, as teams which fought more saw significant decreases in attendance². This anti-violence sentiment (which may be consistent with anti-war sentiment in New England) led to fewer fans at these AHL games.

In contrast, the East and West division fans seemed to appreciate fighting at AHL games, as fights-per-game were found to have a positive and significant effect on attendance (the North division was shown to have a positive effect, but was not significant). Fighting could also be a proxy for more exciting games overall, as more fights may occur when teams are playing a more intense-style game (i.e. a high energy game with many hits which may eventually lead to fights). Alternatively, fighting could emerge as result of games involving clutching-and-grabbing, which may ultimately frustrate the players and the fans in attendance, leading to less interest in these types of games. The positive results on attendance related to fighting in these divisions are consistent with what was found in studies of the NHL (Paul, 2003 and Jones et al., 1990). The negative effects of the Atlantic division, however, dominate at the aggregated AHL level, which is why the overall league regression reveals fighting as having a negative and significant effect.

IV. Conclusions

The top-level minor league in professional hockey, the American Hockey League (AHL) was studied and the determinants of per-game attendance were analyzed. The data set included demographic information on the cities of the teams, the day and month of the game, team performance on the ice, and promotions at these hockey games. The results for the overall AHL were

explored, but results were also shown by division, to illustrate some significant regional differences in preferences for factors which influence fans' decisions to buy tickets.

For the overall AHL, expected results were found in relation to the timing of games. Weekend games were much more popular than weeknight games and attendance increased later in the season during the playoff push. Per-game attendance was found to increase with the size of the population, but income per capita was not shown to have a significant effect. Some promotions were found to be quite popular with fans of the AHL. Opening night festivities, merchandise giveaways, post-game events, fan appreciation nights, and free or reduced-price food all had positive and significant effects. In relation to on-ice performance, winning teams attracted more fans as the win percentage entering the game was shown to have a positive and significant effect on attendance. Total goals per game, measured as the sum of the average goals for per game and goals against per game of the home team (to avoid multicollinearity problems with win percentage), was also shown to have a positive and significant effect, suggesting fans prefer higher-scoring contests to lower-scoring contests. Fighting (measured as an average of fights-per-game for the home team) was shown to have a negative and significant effect for the AHL, which was the opposite of the result found by Jones, Stewart, and Sunderman (1996) and Paul (2003).

In gathering and observing the data by team, there appeared to be some distinct regional differences, therefore regressions were also run by division. Although promotional effects and timing of game effects existed across the divisions, the key differences for this analysis lie in the demographic data and in the on-ice performance. Population was found to have a positive and significant effect in the Atlantic (New England) and West (Midwest – as the AHL does not extend very far west) divisions, but a negative and significant effect in the East division (Mid-Atlantic States). The West division was the only division found to have a negative (and significant) effect of income per capita on per-game attendance, while the other divisions were found to have positive and significant effects.

In relation to on-ice performance, in the East division (Mid-Atlantic) region of the country, win percentage and total goals per game were found to have large positive and significant effects on attendance. Fans in the North division also appeared to respond favorably to home team win percentage where positive and significant effects from this variable were shown. Total goals were found to have a negative and significant effect in the Atlantic and North divisions, a positive and significant effect in the East division, and non-significant effects in the West division.

In relation to preferences for fighting, there were distinct differences across divisions. The Atlantic division (New England) seemed to have a general disdain for fighting as the fights per game variable was found to have a big negative and significant effect on attendance. Although this division dominated the overall regression results for the league, upon closer inspection of the individual division, the other three divisions showed positive effects related to fighting, with the East and West divisions having statistically significant positive effects.

The results of this study reveal that there are distinct regional differences in preferences for attending hockey games which may have to do with attitudes toward violence, available substitutes for hockey (the NHL, college hockey, other minor-leagues, etc.), or other factors. Although fans of the top minor hockey league, the AHL, appear to generally value teams which win, exciting high-scoring games, and fun and/or valuable promotions, key regional differences may play an important role in attempting to maximize attendance and revenues at the team- or league-level.

ENDNOTES

1. Canadian dollars were converted into U.S. dollars at the exchange rate at the conclusion of the season (shortly after the data were gathered).
2. The AHL has seen an overall decline in average penalty minutes per team since the NHL lockout of 2004-05. Teams in the Atlantic Division averaged nearly 2000 penalty minutes per season during the NHL lockout year, but it had declined in the seasons since then to a level of slightly over 1400 penalty minutes per team per season.

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Appendix I: AHL Cities and Divisions

East Division: Albany (NY), Binghamton (NY), Bridgeport (CT), Hershey (PA), Norfolk (VA), Philadelphia (PA), Wilkes-Barre/Scranton (PA)

Atlantic Division: Hartford (CT), Lowell (MA), Manchester (NH), Portland (ME), Providence (RI), Springfield (MA), Worcester (MA)

North Division: Grand Rapids (MI), Hamilton (ONT, Canada), Lake Erie (Cleveland), Manitoba (Winnipeg, Canada), Rochester (NY), Syracuse (NY), Toronto (ONT, Canada)

West Division: Chicago (IL), Houston (TX), Iowa (Des Moines), Milwaukee (WI), Peoria (IL), Quad City (Moline, IL), Rockford (IL), San Antonio (TX)

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2. Robert Culp
3. Elia Kacapyr
4. David Martin
5. Jeanette Mitchell
6. Rodney Paul
7. David Ring
8. Katherine Schmeiser
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Editor,
New York Economic
Review

William O'Dea
SUNY Oneonta

Friday, September 24

6:00-8:00 p.m. Reception RIT Inn and Conference
Center

Saturday, September 25 on the RIT Campus

7:30-8:00 a.m. Registration and Continental
Breakfast

8:00-8:15 a.m. Welcome

8:15-9:35 a.m. Concurrent Sessions: Group 1

9:35-9:50 a.m. Morning Break

9:50-11:10 a.m. Concurrent Sessions: Group 2

11:25-12:40 p.m. Luncheon and Keynote Address

12:50-2:10 p.m. Concurrent Sessions: Group 3

2:10-2:25 p.m. Afternoon Break

2:25-3:45 p.m. Concurrent Sessions: Group 4

4:00-5:00 p.m. Business Meeting (all are
welcome)

Friday, September 24

**6:00-8:00 p.m. Reception, RIT Inn and Conference Center
Welcome, 6:30 p.m.**

Robert Ulin
Dean, College of Liberal Arts
Rochester Institute of Technology

Saturday, September 25

**7:30-8:00 a.m. Registration and Continental Breakfast
7:55-8:05 Welcome**

William W. Destler
President
Rochester Institute of Technology

8:15-9:35 Concurrent Sessions: Group 1

Session 1-A: Undergraduate Research Session 1

Chair: Arindam Mandal
Affiliation: Siena College, Department of Economics
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Title: *A Balanced Climate Change Policy Proposal: Reducing Emissions from the United States' Transportation Sector*

Presenter: Garrett W. Blair
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Discussant: Bharat Bhole
Affiliation: Rochester Institute of Technology, Department of Economics
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Title: *The Black Gold Rush: Analysis of the Economic Viability and Impact of the Alberta Oil Sands*

Presenter: Christopher John de Bruyn
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Discussant: Richard Deitz
Affiliation: Federal Reserve Bank of New York, Buffalo Branch
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Title: *The Effects of Structural Deregulation on State Banks in New York during the 1970s*

Presenter: Michelle Turtora Zagardo
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Title: *A Study of the Linear Relation between Values of the Chinese RMB and U.S. Dollar: 1994 to the Present*
 Presenter: Kevin Cuneo-Tomasi
 Affiliation: SUNY Potsdam, Department of Economics
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Discussant: Bríd Gleeson Hanna
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Session 1-B: International Economics (JEL code F)

Chair: Katherine Schmeiser
 Affiliation: Mount Holyoke College, Department of Economics
 e-mail: kschmeis@mtholyoke.edu

Title: *Capital Flows to Russia, Ukraine, and Belarus: Does "Hot" Money Respond Differently to Macroeconomic Shocks?* (F, E, P)
 Author: Scott Hegerty
 Affiliation: Canisius College, Department of Economics and Finance
 e-mail: hegertys@canisius.edu

Discussant: Dal Didia
 Affiliation: American University of Nigeria, Yola, School of Arts and Sciences, and Jackson State University, Department of Economics, Finance and General Business
 e-mail: dal.didia@aun.edu.ng

Title: *The Geography of Russian Exporters* (F, L, D)
 Authors: Andrew J. Cassey and Katherine Schmeiser (Presenter)
 Affiliation: (Cassey) Washington State University, School of Economic Sciences; (Schmeiser) Mount Holyoke College, Department of Economics
 e-mail: kschmeis@mtholyoke.edu

Discussant: Amit Batabyal
 Affiliation: Rochester Institute of Technology, Department of Economics
 e-mail: aabgsh@rit.edu

Title: *African Growth and Opportunity Act: Impact on U.S. Trade Relations with African States* (F)
 Author: Dal Didia
 Affiliation: American University of Nigeria, Yola, School of Arts and Sciences, and Jackson State University, Department of Economics, Finance and General Business
 e-mail: dal.didia@aun.edu.ng

Discussant: Scott Hegerty
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 e-mail: hegertys@canisius.edu

Title: *The Impact of Neutral and Non-Neutral Productivity Growth on Creative Capital in Trading Regional Economy* (R, F, E)
 Author: Amit Batabyal
 Affiliation: Rochester Institute of Technology, Department of Economics
 e-mail: aabgsh@rit.edu

Discussant: Katherine Schmeiser

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Session 1-C: Economics and Class Struggle (Contributed Session)

Chair: Jeannette C. Mitchell
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Title: *Economic Literacy and the Millennial Generation: Distribution and Distortion*
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Discussant: Jeannette C. Mitchell
Affiliation: Rochester Institute of Technology, Department of Economics
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Title: *The Power Structure Behind Economic Education Reform: The Reagan Era to NCLB*
Author: Johanna Mitchell
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Discussant: Jeannette C. Mitchell
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Title: *International Trade and the Perspectives of US Labor: Theory and Evidence*
Author: Laura Rolston
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Discussant: Jeannette C. Mitchell
Affiliation: Rochester Institute of Technology, Department of Economics
e-mail: jcmgsm@rit.edu

Session 1-D: Health Economics (JEL Code I)

Chair: Emma Bojinova
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Title: *The Far Reaching Effect of Ground Water Reductions (Z)*
Author: Anthony Signorelli
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Discussant: Javier Espinosa
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Title: *Racial Differences in the Intensity of Breast Cancer Treatment (I, A)*
Author: Emma Bojinova
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Discussant: Anthony Signorelli
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Title: *Displaced Workers, Displaced Health Insurance (I, J)*
 Author: Javier Espinosa
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Discussant: Emma Bojinova
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9:35-9:50 Morning Break

9:50-11:10 Concurrent Sessions: Group 2

Session 2-A: Undergraduate Research Session 2

Chair: Manimoy Paul
 Affiliation: Siena College, Department of Quantitative Business Analysis
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Title: *The Effects of the 2007-2009 Financial Crisis on U.S. Corporate Debt Structure*
 Presenter: Amanda E. Willsey
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 e-mail: willae38@oneonta.edu

Discussant: Cynthia Bansak
 Affiliation: St. Lawrence University, Department of Economics
 e-mail: cbansak@stlawu.edu

Title: *Determining Optimal Firm and Consumer Research and Development Spending in the Medical Technology Sector*
 Presenter: Sameer J. Shah
 Affiliation: New York University, Department of Economics
 e-mail: sameerjshah@gmail.com

Discussant: Darius J. Conger
 Affiliation: Ithaca College, Department of Economics
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Title: *The Effect of Strict Alcohol Policies on America's Sexually Transmitted Disease Rates*
 Presenter: Karolyn Caprara
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Discussant: Rodney Paul
 Affiliation: St. Bonaventure University, Department of Finance
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Title: *Contraception and Development in Rwanda*
 Presenter: Steven Mello
 Affiliation: Hamilton College, Department of Economics
 e-mail: smello@hamilton.edu

Discussant: John J. Heim
Affiliation: Rensselaer Polytechnic Institute, Department of Economics
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Title: *The Effectiveness of Term Auction Facility (TAF) on the LIBOR-OIS Spread*
Presenter: Harpreet Singh
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Discussant: Florence Shu
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Session 2-B: Microeconomics (JEL Code D)

Chair: Bríd Gleeson Hanna
Affiliation: Rochester Institute of Technology, Department of Economics
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Title: *Optimal Communication Contract under Imperfect Information (D)*
Author: Gaoquan Liu
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Discussant: Tyler Pugliese
Affiliation: Rochester Institute of Technology, Department of Economics
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Title: *Impure Public Goods and the Sustainability of the Theater Arts (H, Z, D)*
Authors: Tyler Pugliese (Presenter) and Jeffrey Wagner
Affiliation: Rochester Institute of Technology, Department of Economics
e-mail: tgp4623@rit.edu

Discussant: William Kolberg
Affiliation: Ithaca College, Department of Economics
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Title: *Price and Quantity Determination in Monopoly with Unknown Demand (D, L, B)*
Authors: Bharat Bhole and Bríd Gleeson Hanna (Presenter)
Affiliation: Rochester Institute of Technology, Department of Economics
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Discussant: Gaoquan Liu
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Title: *Some Conjectures on Defining the Nature of the Product for Demand and Inverse Demand Relationships (D)*
Author: William Kolberg
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Discussant: Bríd Gleeson Hanna
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Session 2-C: Labor Economics, Demography and Economic Geography (JEL Code J)

Chair: Arindam Mandal
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Title: *Geography of NY Expansions and Contractions* (E, J)
 Author: Robert Jones
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Discussant: Arindam Mandal
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Title: *Wages, Education and Race: Measuring Wage Differentials for Native Americans* (J, I, H)
 Authors: David Burnette (Presenter), Jeffrey D. Burnette, and Bríd Gleeson Hanna
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Discussant: Dene T. Hurley
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Title: *Job and Worker Flows: Evidence from New York State Counties* (J, C, E)
 Author: Arindam Mandal
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Discussant: David Burnette
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Title: *Hispanic Buying Power in New York State: Trends and Determinants* (R,A, J)
 Authors: Dene T. Hurley (Presenter) and Mario A. Gonzalez-Corzo
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Discussant: Robert Jones
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Session 2-D: Industrial Organization (JEL Code L)

Chair: Dunli Li
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Title: *Is Small Beautiful? Firm Size and Productivity in India* (O, L, Z)
 Authors: Prabal De (Presenter) and Priya Nagaraj
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Discussant: Vicar Valencia
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Title: *Innovative Entrepreneurship and Economic Growth: Evidence from a Panel of Countries* (O, L)

Author: Dunli Li
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Discussant: Mark Krystofik
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Title: *R&D Alliance: Evidence on Participation and Delisting of Newly Listed High Tech Firms* (L)

Author: Vicar Valencia
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Discussant: Prabal De
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Title: *Sustainability Concerns Related to Product Design in Tying Arrangements* (L, Z)
Authors: Mark Krystofik (Presenter), Jeffrey Wagner, and Gabrielle Gaustad
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Discussant: Dunli Li
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11:25-12:40 p.m. Luncheon and Keynote Address

“Sense and Surprise in Competitive Trade Theory”

Ronald W. Jones
Xerox Professor of Economics
University of Rochester

12:50-2:10 p.m. Concurrent Sessions: Group 3

Session 3-A: Economic History (JEL Code N)

Chair: Michael McAvoy
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Title: *Free Women, Slave Society: Henrico County VA, 1780-1860* (N)
Authors: Catherine L. McDevitt and James R. Irwin (Presenter)
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Discussant: Michael McAvoy
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Title: *The Development of the Gold Settlement Fund and the Beginning of Federal Control of Monetary Gold in the United States (N, E)*

Author: Michael McAvoy
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Discussant: James R. Irwin
 Affiliation: Central Michigan University, Department of Economics
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Title: *Just How Much is China's Banking Sector Liberalized? (G, N, O)*

Author: Nianyong Wang
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Discussant: Wade Thomas
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Title: *A Brief History of the New York State Economics Association (A, N, Z)*

Author: Wade Thomas
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Session 3-B: Research in Sports Economics (Contributed Session)

Chair: Richard Vogel
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Title: *Substitution Effects in Sports Betting: An Analysis across Professional and College Sports*

Authors: Rodney J. Paul (Presenter) and Andrew P. Weinbach
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 (Weinbach) Coastal Carolina University, Department of Accounting, Finance and Economics
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Discussant: Darius Conger
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Title: *And the Winner Is: Lake Placid? An Account of Candidate Cities' Efforts to Host the Youth Olympic Games*
Author: Emese Ivan
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Discussant: Richard Vogel
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Title: *The Role of Professional Sports in Economic Development*
Authors: Richard Vogel (Presenter) and Bala Veeramacheneni
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Discussant: Glenn Gerstner
Affiliation: St. John's University, Division of Hospitality, Tourism, and Sport Management
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Title: *The Economics of Big-Time Sports at SUNY Institutions*
Author: Glenn Gerstner
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Discussant: Rodney J. Paul
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Session 3-C: Macroeconomics (JEL Code E)

Chair: Scott Hegerty
Affiliation: Canisius College, Department of Economics and Finance
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Title: *How Much Does "Crowd Out" Reduce the Effects of Keynesian Stimulus? (E, G)*
Author: John J. Heim
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Discussant: Florence Shu
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Title: *United States Monetary Policy during the Current Financial Crisis (E)*
Author: Marwan M. El Nasser (Presenter) and Richard Robinson
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Discussant: Scott Hegerty
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Title: *Determining the Causes of the Recent U. S. Recession and the Economic Slowdown in China (E, B)*
Authors: Suprabha Baniya and Florence Shu (Presenter)

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Discussant: John J. Heim
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Title: *Exchange-Market Pressure and Currency Crises in Latin America: Empirical Tests of their Macroeconomic Determinants* (F, E)

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Session 3-D: Mathematical/Quantitative Methods and Law and Economics (JEL Codes C and K)

Chair: Shatakshee Dhongde
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Title: *Recidivism and Uncertainty in Deterrence* (K, C)
 Author: Gregory DeAngelo
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Discussant: Elia Kacapyr
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Title: *The Efficiency of Pari-Mutuel Betting in Standard Bred Racing* (G, C)
 Author: Elia Kacapyr
 Affiliation: Ithaca College, Department of Economics
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Discussant: Shatakshee Dhongde
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Title: *Forecasting the Threat of Non Conventional Terrorism* (C, F)
 Authors: Shatakshee Dhongde (Presenter) and Nathaniel Bush
 Affiliation: Rochester Institute of Technology, Department of Economics
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Discussant: Gregory DeAngelo
 Affiliation: Rensselaer Polytechnic Institute, Department of Economics
 e-mail: gregory.deangelo@gmail.com

2:10-2:25 Afternoon Break

2:25-3:45 Concurrent Sessions: Group 4

Session 4-A: Modern Macroeconomic Issues (Contributed Session)

Chair: Kent Klitgaard
Affiliation: Wells College, Economics and Management Program
e-mail: kentk@wells.edu

Title: *The Fed, the Panic of 2008 and History*
Author: William T. Ganley
Affiliation: Buffalo State College, Department of Economics and Finance
e-mail: ganleywt@buffalostate.edu

Discussant: Kent Klitgaard
Affiliation: Wells College, Economics and Management Program
e-mail: kentk@wells.edu

Title: *The Macroeconomic Federal Stimulation: The Impact on New York State Regions*
Author: Bruce Fisher
Affiliation: Buffalo State College, Department of Economics and Finance, Center for Economic & Policy Studies
e-mail: fisherbl@buffalostate.edu

Discussant: William T. Ganley
Affiliation: Buffalo State College, Department of Economics and Finance
e-mail: ganleywt@buffalostate.edu

Title: *The Phillips Curve: Does Gender Matter?*
Author: Angela Rieker
Affiliation: Blue Cross/Blue Shield
e-mail: Riekam12@mail.buffalostate.edu

Discussant: Bruce Fisher
Affiliation: Buffalo State College, Department of Economics and Finance, Center for Economic & Policy Studies
e-mail: fisherbl@buffalostate.edu

Title: *Macroeconomic Policy and Institutional Change in the Age of Limits to Growth*
Author: Kent Klitgaard
Affiliation: Wells College, Economics and Management Program
e-mail: kentk@wells.edu

Discussant: Angela Rieker
Affiliation: Blue Cross/Blue Shield
e-mail: Riekam12@mail.buffalostate.edu

Session 4-B: Pedagogy (Contributed Session)

Chair: Della Lee Sue
Affiliation: Marist College, School of Management, Economics Program
e-mail: della.lee.sue@marist.edu

Title: *The Rate of Time Preference, Seat Location Choice and Student Performance in the Classroom*

Authors: Wisdom Akpalu, Richard Vogel (Presenter) and Xu Zhang
 Affiliation: SUNY Farmingdale, Department of History, Economics and Politics
 e-mail: richard.vogel@farmingdale.edu

Discussant: Michael McAvoy
 Affiliation: SUNY Oneonta, Department of Economics, Finance and Accounting
 e-mail: mcavoym@oneonta.edu

Title: *A Survey to Measure Economic Ideology in Principles Students*
 Authors: Lester Hadsell, Michael McAvoy (Presenter) and Jaime McGovern
 Affiliation: SUNY Oneonta, Department of Economics, Finance and Accounting
 e-mail: mcavoym@oneonta.edu

Discussant: Della Lee Sue
 Affiliation: Marist College, School of Management, Economics Program
 e-mail: della.lee.sue@marist.edu

Title: *A Chair's Guide to Student Evaluations of Teaching: A Fishing Expedition*
 Author: William O'Dea
 Affiliation: SUNY Oneonta, Department of Economics, Finance and Accounting
 e-mail: odeawp@oneonta.edu

Discussant: Richard Vogel
 Affiliation: SUNY Farmingdale, Department of History, Economics and Politics
 e-mail: richard.vogel@farmingdale.edu

Title: *Pilot Program: Design and Implementation of Economics Courses to be Taught in a Hybrid Format*
 Author: Della Lee Sue
 Affiliation: Marist College, School of Management, Economics Program
 e-mail: della.lee.sue@marist.edu

Discussant: William O'Dea
 Affiliation: SUNY Oneonta, Department of Economics, Finance and Accounting
 e-mail: odeawp@oneonta.edu

Session 4-C: Economic Methodology (JEL Code B)

Chair: Alain Bourdeau de Fontenay
 Affiliation: Queens College of CUNY, Department of Economics
 e-mail: ad2239@columbia.edu

Title: *Estimation of Water Productivity Using Incomplete Data: In the Example of Farmers in Uzbekistan (B, D, Q)*
 Author: Aziz Karimov
 Affiliation: University of Bonn, Center for Development Research (ZEF)
 e-mail: akarimov@uni-bonn.de

Discussant: Joseph Cheng
 Affiliation: Ithaca College, School of Business
 e-mail: cheng@ithaca.edu

FALL 2011

Title: *Detection and Correction of Heteroscedasticity and Autocorrelation in the Undergraduate Econometrics Teaching* (B)
Author: Florence Shu
Affiliation: SUNY Potsdam, Department of Economics and Employment Relations
e-mail: shufp@potsdam.edu

Discussant: Alain Bourdeau de Fontenay
Affiliation: Queens College of CUNY, Department of Economics
e-mail: ad2239@columbia.edu

Title: *What Can Knightian Uncertainty Teach Us about the Respective Roles of Neoclassical and Heterodox Economics?* (B, D, A)
Author: Alain Bourdeau de Fontenay
Affiliation: Queens College of CUNY, Department of Economics
e-mail: ad2239@columbia.edu

Discussant: Aziz Karimov
Affiliation: University of Bonn, Center for Development Research (ZEF)
e-mail: akarimov@uni-bonn.de

Title: *Using Percentile Transformation in Regressing Financial Returns* (G)
Author: Joseph Cheng
Affiliation: Ithaca College, School of Business
e-mail: cheng@ithaca.edu

Discussant: Florence Shu
Affiliation: SUNY Potsdam, Department of Economics and Employment Relations
e-mail: shufp@potsdam.edu

Session 4-D: Financial Economics (JEL Code G)

Chair: Robert Culp
Affiliation: Dalton State College, School of Business
e-mail: rculp@daltonstate.edu

Title: *Strategic Asset Allocation with Markov Regime-Switching in GARCH Processes* (G)
Author: Wendy Wang
Affiliation: Queens College of CUNY, Department of Economics
e-mail: drwwang@gmail.com

Discussant: Robert Culp
Affiliation: Dalton State College, School of Business
e-mail: rculp@daltonstate.edu

Title: *Bankruptcy Prediction Using Neuro Fuzzy: An Application in Turkish Banks* (G)
Author: Soner Akkoc
Affiliation: SUNY Oswego, Department of Economics, and Department of Banking and Finance at Dumlupinar University, Kutahya, Turkey
e-mail: akkocsoner@hotmail.com

Discussant: Wendy Wang
Affiliation: Queens College of CUNY, Department of Economics
e-mail: drwwang@gmail.com

Title: *The Declining Exchange Rate Impact on the U.S. Economy 2000-2009* (E, F, G)

Author: John J. Heim
Affiliation: Rensselaer Polytechnic Institute, Department of Economics
e-mail: heimj@rpi.edu

Discussant: Soner Akkoc
Affiliation: SUNY Oswego, Department of Economics, and Department of Banking and Finance
at Dumlupinar University, Kutahya, Turkey
e-mail: akkocsoner@hotmail.com

Title: *Inflation as a Credit Rationing Device? The Tilt Effect's Impact on Household
Borrowing (G, E)*

Author: Robert Culp
Affiliation: Dalton State College, School of Business
e-mail: rculp@daltonstate.edu

Discussant: John J. Heim
Affiliation: Rensselaer Polytechnic Institute, Department of Economics
e-mail: heimj@rpi.edu

4:00-5:00pm Business Meeting (all are welcome)

NYSEA

64TH ANNUAL CONFERENCE

FRIDAY AND SATURDAY

SEPTEMBER 23-24, 2011

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