Pennsylvania Economic Association

Annual Conference Proceedings
June 2 – June 4, 2016
PENNSYLVANIA
ECONOMIC
ASSOCIATION

ANNUAL CONFERENCE

June 2 – June 4, 2016

Slippery Rock University
of Pennsylvania

Slippery Rock, Pennsylvania

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2015 – 2016

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Submit an electronic copy of your paper or comments to:

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Penn State Berks
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For submission information, see the style sheet posted at the association website – http://www.econpea.org/pub/proceedings.html.

The deadline for proceeding submissions is **July 31, 2016**.
Acknowledgement

Dr. Cheryl Norton, President, Slippery Rock University of Pennsylvania
Dr. Phillip Way, Provost, Slippery Rock University of Pennsylvania

Dr. Lawrence Shao, Dean, College of Business, Slippery Rock University of Pennsylvania
Dr. Jerry Chmielewski, Interim Dean, College of Health, Environment and Science, Slippery Rock University of Pennsylvania
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Faculty in the School of Business, Slippery Rock University of Pennsylvania
Brenda Best, Administrative Assistant, School of Business, Slippery Rock University of Pennsylvania
Missy Orr, Administrative Assistant, School of Business, Slippery Rock University of Pennsylvania

Student interns at the Sustainable Enterprise Accelerator, Slippery Rock University of Pennsylvania

Chris Cole, Director, Robert M. Smith Student Center & Conference Services, Slippery Rock University of Pennsylvania
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Dr. Robert Graboyes, the Keynote Speaker, Mercatus Center at George Mason University
Lisa Nelson, the Fed Panel Speaker, the Federal Reserve Bank of Cleveland
Kyle Fee, the Fed Panel Speaker, the Federal Reserve Bank of Cleveland
Dr. Elliot L. Smith, MD, Healthcare Panel Speaker, President and Chief Medical Officer of the Butler Health System, Physician Hospital Organization
Ms. Charleeda Redman, Healthcare Panel Speaker, Vice President of Accountable Care at UPMC

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2016 CONFERENCE AGENDA

THURSDAY, June 2

04:00 pm – 09:00 pm Registration (3rd Floor Elevator Lobby, SSC*)
05:00 pm – 06:00 pm Board of Directors’ Dinner (SSC 322)
06:00 pm – 08:00 pm Board of Directors’ Meeting (SSC 322)
06:00 pm – 09:00 pm Reception (SSC 320)
*Robert M. Smith Student Center

FRIDAY, June 3

08:00 am – 12:00 pm & 2:00 pm – 4:00 pm Registration (3rd Floor Elevator Lobby, SSC)
07:30 am – 10:30 am Cengage Breakfast (3rd Floor Lobby, SSC) – Continental Breakfast
Sponsored by Cengage Learning
08:15 am – 08:45 am Cengage Demo (SSC 319)
09:00 am – 10:15 am Concurrent Sessions (SSC 319, 320, 321, 322)
10:15 am – 10:30 am Pearson Coffee Break (3rd Floor Lobby, SSC) – Coffee/Refreshment
Sponsored by Pearson Education
10:30 am – 11:45 am Concurrent Sessions (SSC 319, 320, 321, 322, 323, 324)
12:00 pm – 12:45 pm Luncheon and 12:45 pm – 01:45 pm Speaker – Dr. Robert Graboyes:
“Fortress and Frontier: Health Care Innovation for a Digital World”
(Multipurpose Theater, SSC Room 315)
02:15 pm – 03:30 pm Concurrent Sessions (SSC 319, 320, 321, 322, 323, 324)
03:30 pm – 03:45 pm Pearson Coffee Break (3rd Floor Lobby, SSC) – Coffee/Refreshment
Sponsored by Pearson Education
03:45 pm – 04:45 pm Fed Lecture – Lisa Nelson and Kyle Fee (SSC 321)
05:00 pm – 08:00 pm Fed Sponsored Reception (Multipurpose Theater, SSC Room 315)

SATURDAY, June 4

07:30 am – 10:30 am Registration (3rd Floor Elevator Lobby, SSC)
07:30 am – 09:00 am McGraw Hill Breakfast (3rd Floor Lobby, SSC) – Coffee/Refreshment
Sponsored by McGraw Hill Education
09:00 am – 10:15 am Concurrent Sessions (SSC 319, 320, 321)
10:30 am – 11:00 am General Membership Meeting (SSC 321)
11:00 am Closing
FRIDAY, June 3, 2016

Conference Registration – 3rd Floor Elevator Lobby, SSC
08:00 AM – 12:00 PM
02:00 PM – 04:00 PM

Cengage Continental Breakfast – 3rd Floor Lobby, SSC
07:30 AM – 10:30 AM

Session F1: Friday, June 3, 2016
09:00 AM – 10:15 AM

F (Friday); F1 (Friday Concurrent 1); F1A (Friday Concurrent 1 Session A)

Session F1A: Student Paper Session 1 ....................... SSC 319 (09:00 – 10:15 am)

Chair: Stephanie Brewer, Indiana University of Pennsylvania

[1] Natural Disasters and the Open Macro Economy in the United States, Japan, and Haiti
Mary Jo Milford, Clarion University of Pennsylvania

Derek Hanely, Indiana University of Pennsylvania

[3] Does Regional Variation in Startup Concentration Predict Employment Growth?
Brian Sloboda, University of Maryland University College
Yaya Sissoko, Indiana University of Pennsylvania

Discussants:
[1] Andrew Economopoulos, Ursinus College
[2] John Ruddy, University of Scranton
Session F1B: ........................................... SSC 320 (09:00 – 10:15 am)

Chair: Rocky Jui-Chi Huang, Penn State Berks

Thomas O. Armstrong, Dellicker Strategies

Tracy Miller, Grove City College

[3] Pennsylvania Volunteer Fire Companies: An Analysis of Fraud - Frequency, Methods, and Damages
Melanie Anderson, Slippery Rock University of Pennsylvania

Discussants:
[1] Jolien Helsel, Youngstown State University
[3] Natalie D. Reaves, Rowan University

Session F1C: ........................................... SSC 321 (09:00 – 10:15 am)

Chair: Rick Tannery, Slippery Rock University

Stuti Jha, Rowan University

[2] Local Labor Markets and Shale Gas: What’s Next?
Rick Tannery, Slippery Rock University of Pennsylvania
Larry McCarthy, Slippery Rock University of Pennsylvania

[3] Do Explained and Unexplained Conform in Measuring Multi-Dimensional Performances in the U.S. Manufacturing?
Soumendra Banerjee, Misericordia University

Discussants:
[1] Soumendra Banerjee, Misericordia University
[2] Stuti Jha, Rowan University
[3] Xuebing Yang, Penn State Altoona
Session F1D: ......................................................... SSC 322 (09:00 – 10:15 am)

Chair: David Culp, Slippery Rock University of Pennsylvania

[1] Measuring the Inter-Cultural Competence of Foreign-Born Faculty at SRU - An Exploratory Factor Analysis Approach
   Jesus Valencia, Slippery Rock University of Pennsylvania

[2] The Impact of Recruiting on College Football Performance
   John Fizel, Penn State Erie

[3] Assurance of Learning and Part-time Faculty in Higher Education
   Mark Eschenfelder, Robert Morris University
   Lois Bryan, Robert Morris University
   Tanya Lee, Valdosta State University

Discussants:
[1] Mark Eschenfelder, Robert Morris University
Session F2: Friday, June 3, 2016
10:30 AM – 11:45 AM

F (Friday); F2 (Friday Concurrent 2); F2A (Friday Concurrent 2 Session A)

Session F2A: ............................................................... SSC 319 (10:30 – 11:45 am)

Chair: Mark Eschenfelder, Robert Morris University

Timothy Wilson, Umeå School of Business and Economics
Lars Lindbergh, Umeå School of Business and Economics
Mattias Jacobsson, Umeå School of Business and Economics

William Galose, McNeese State University
Musa Essayyad, McNeese State University

Katie Jo Black, University of Pittsburgh
Jeremy Weber, University of Pittsburgh
Shawn McCoy, University of Pittsburgh

[4] Pollution Havens and their Relationship to the Environmental Kuznets Curve
John McCollough, Lamar University
Miao He, Henan Polytechnic University

Discussants:
[1] William Galose, McNeese State University
[3] Kyle Hoy, Penn State University Park
Session F2B: …………………………………………… SSC 320 (10:30 – 11:45 am)

Chair: **Carlos Liard-Muriente**, Central Connecticut State University

**Carlos Liard-Muriente**, Central Connecticut State University
**Christina Robinson**, Central Connecticut State University

**Kerry Adzima**, Penn State Erie

**Diane Galbraith**, Slippery Rock University of Pennsylvania
**Sunita Mondal**, Slippery Rock University of Pennsylvania

**Discussants:**
[1] **Steven Andelin**, Penn State Schuylkill
[3] **Brian Sloboda**, University of Maryland University College

Session F2C: …………………………………………… SSC 321 (10:30 – 11:45 am)

Chair: **Thomas O. Armstrong**, Dellicker Strategies

[1] Inflation Dynamics in the Gambia
**Tamsir Cham**, Islamic Development Bank

[2] The Recent Experiences of Capital Flows and Fiscal Imbalances since the Creation of the Eurozone
**Yaya Sissoko**, Indiana University of Pennsylvania
**Brian Sloboda**, University of Maryland University College

[3] Systemic Representation of Economic Entities
**Jeffrey Forrest**, Slippery Rock University of Pennsylvania
**Jesus Valencia**, Slippery Rock University of Pennsylvania
**Bohua Yang**, Jiangsu Normal University
**Qiaoxing Li**, Guizhou University

**Discussants:**
[1] **Mary Jo Milford**, Clarion University of Pennsylvania
[3] **Riaz Hussain**, University of Scranton
Session F2D: ......................................................... SSC 322 (10:30 – 11:45 am)

Chair: Orhan Kara, West Chester University of Pennsylvania

[1] Is the Dodd-Frank Act Killing the Thrift Industry?
Scott Deacle, Ursinus College

John Ruddy, University of Scranton

Benjamas Jirasakuldech, Slippery Rock University of Pennsylvania
Riza Emekter, Robert Morris University

Discussants:
[1] Stephen Mansour, University of Scranton
[2] David Nugent, California University of Pennsylvania
[3] Rick Tannery, Slippery Rock University of Pennsylvania

Session F2E: ............................................................ SSC 323 (10:30 – 11:45 am)

Chair: John Golden, Slippery Rock University of Pennsylvania

Elsy Thomas K, Bowling Green State University Firelands
Sunita Mondal, Slippery Rock University of Pennsylvania

[2] Comparison of the Achievement of Learning Outcomes in Online Economics Classes versus Hybrid Classes
David Culp, Slippery Rock University of Pennsylvania
Sunita Mondal, Slippery Rock University of Pennsylvania

Robert Balough, Clarion University of Pennsylvania

Discussants:
Session F2F: Student Paper Session 2 ............................ SSC 324 (10:30 – 11:45 am)

Chair: Jolien Helsel, Youngstown State University

Zhiron Shi, Skidmore College (can’t attend the conference due to the family emergencies)

[2] Cost Analysis of Treating a Heart Attack in New Jersey
Jose Calles, Rowan University

[3] Social Mobility in Non-Organizational Careers
Christopher Diem, Rowan University

Discussants:
[1] Sandra R. Trejos, Clarion University of Pennsylvania
[2] Andrew Economopoulos, Ursinus College
[3] Jolien Helsel, Youngstown State University
Keynote Speaker Luncheon
Friday, June 3, 2016
12:00 PM – 01:45 PM
Multipurpose Theater, SSC Room 315
Keynote Speaker

Friday, June 3, 2016
12:00 PM – 01:45 PM
Multipurpose Theater, SSC Room 315

“Fortress and Frontier: Health Care Innovation for a Digital World”

Dr. Robert Graboyes

Dr. Robert Graboyes (@Robert_Graboyes) is Senior Research Fellow at the Mercatus Center at George Mason University. Author of “Fortress and Frontier in American Health Care,” his work asks: “How can we make health care as innovative in the next 25 years as information technology was in the past 25 years?” In 2014, Dr. Graboyes received the Reason Foundation’s Bastiat Prize for Journalism, an international competition “which honors the writing that best demonstrates the importance of individual liberty and free markets with originality, wit, and eloquence.”
Previously, he was senior health care advisor for the National Federation of Independent Business, economics professor at the University of Richmond, regional economist/director of education at the Federal Reserve Bank of Richmond, and Sub-Saharan Africa economist for Chase Manhattan Bank. He traveled extensively in Africa and Europe for Chase. Twice, he was visiting health care scholar in the Republic of Kazakhstan. He has taught at Virginia Commonwealth University since 1999 and the University of Virginia since 2005. Previously he taught at George Mason University and the George Washington University. He earned his PhD in Economics from Columbia University; master’s degrees from Columbia University, Virginia Commonwealth University, and the College of William and Mary; and a bachelor’s from the University of Virginia.

He currently chairs the Health Economics Roundtable for the National Association for Business Economics and was President of the National Economists Club and the Richmond Association for Business Economics. Outside of economics, Graboyes is a musician (composer and performer) and a polyglot (speaking French, Spanish, Portuguese, and a smattering of others). He lives in Alexandria, VA, with his wife, Alanna.
Session F3: Healthcare Panel Discussion ……………… SSC 319 (02:15 – 03:30 pm)

Chair: David Jordan, Slippery Rock University of Pennsylvania

“The 100-Year Doldrums of Health Economics”

What’s wrong with our health care policy discussion?
How important is health insurance reform?
What are the most important health care policy issues?
How significant is the left/right divide in health care policy?
What are the most interesting developments in health care?
What are the big trends that will change the course of health care policy?

Panelists

Dr. Robert Graboyes, Senior Research Fellow at the Mercatus Center at George Mason University

Dr. Elliot L. Smith, MD, President and Chief Medical Officer of the Butler Health System, Physician Hospital Organization

Ms. Charleeda Redman, Vice President of Accountable Care at UPMC an integrated delivery and financing system

Dr. David Jordan, Associate Professor, Health Care Administration & Management Program

Coordinator, School of Business, Slippery Rock University of Pennsylvania

* The bio of the panelists can be found in the end of the program.
Session F3B: ................................................. SSC 320 (02:15 – 03:30 pm)

Chair: Kosin Isariyawongse, Edinboro University of Pennsylvania

[1] Health Spending and Economic Growth: Evidence from Homogeneous and Heterogeneous Panel Data Estimators
Akinwande Atanda, University of Canterbury

John Golden, Slippery Rock University of Pennsylvania
Sunita Mondal, Slippery Rock University of Pennsylvania
David Culp, Slippery Rock University of Pennsylvania
Rhonda Clark, Slippery Rock University of Pennsylvania

Radhika Jha, Metropolitan College of New York
Tilokie Depoo, Metropolitan College of New York

Tomi Ovaska, Youngstown State University
Albert Sumell, Youngstown State University

Discussants:
[1] Scott Deacle, Ursinus College
[3] Tomi Ovaska, Youngstown State University

Session F3C: .................................................. SSC 321 (02:15 – 03:30 pm)

Chair: Tufan Tiglioglu, Alvernia University

[1] Do Firms Learn from Exporting if Returns to Scale are Variable?
Umut Erksan Senalp, Trakya University

Miao Ouyang, Brandeis University

[3] Trade Flows in Developing Countries and Exchange Rate Volatility
Orhan Kara, West Chester University of Pennsylvania
Tufan Tiglioglu, Alvernia University

Discussants:
[2] Umut Erksan Senalp, Trakya University
[3] Carlos Liard-Muriente, Central Connecticut State University

Session F3D: ................................. SSC 322 (02:15 – 03:30 pm)

Chair: Brian Sloboda, University of Maryland University College

[1] The Rise in Automobile Adoption and the Fall in Mortality Rates in the Early 20th Century
Hoa Nguyen, Allegheny College

Andrew Economopoulos, Ursinus College

[3] Health Insurance and Housing: Evidence from Medicaid Expansions
Kathleen McQueeney, Brandeis University

Discussants:
[1] Rocky Jui-Chi Huang, Penn State Berks
[2] Kathleen McQueeny, Brandeis University
[3] Timothy Wilson, Umeå School of Business and Economics

Session F3E: ............................................. SSC 323 (02:15 – 03:30 pm)

Chair: Stephen Mansour, University of Scranton

Pedro Esteban Moncarz, Universidad Nacional de Cordoba
Sergio Barone, Universidad Nacional de Cordoba
Ricardo Descalzi, Universidad Nacional de Cordoba

Richard Robinson, SUNY Fredonia
Charles Telly, SUNY Fredonia

[3] Dysfunctional Consequences of High Corporate Income Tax Rates
David Nugent, California University of Pennsylvania

Stephen Mansour, University of Scranton
Riaz Hussain, University of Scranton

Discussants:
[1] Stephen Mansour, University of Scranton
[2] Pedro Esteban Moncarz, Universidad Nacional de Cordoba

Session F3F: Student Paper Session 3 …………………… SSC 324 (02:15 – 03:30 pm)

Chair: James Jozefowicz, Indiana University of Pennsylvania

[1] Public Policy Formulation from the Programming of the Individual’s Needs and Preferences
Jose Ricardo Duran Barroso, Industrial University of Santander

[2] Sweep Programs: A New Aspect to an Old Game
Jordan True, Eastern Connecticut State University

Kyle Hoy, Penn State University Park

Discussants:
[1] Robert Balough, Clarion University of Pennsylvania
[2] Tracy Miller, Grove City College
[3] Katie Jo Black, University of Pittsburgh
Federal Reserve Lecture
Friday, June 3, 2016
03:45 PM – 04:45 PM
SSC 321

“Opportunity Occupation”

by Lisa Nelson and Kyle Fee
Federal Reserve Bank of Cleveland

Lisa Nelson
Lisa Nelson is a community development advisor in the Community Development Department at the Federal Reserve Bank of Cleveland. In this role, she coordinates the strategic development and execution of the department’s research initiatives and conducts data analysis and applied research with an emphasis on policy implications. Her most recent work focuses primarily on workforce development and neighborhood stabilization efforts.

Prior to joining the Bank in 2006, Ms. Nelson served as associate director for community information at the Center on Urban Poverty and Social Change at Case Western Reserve University.

Ms. Nelson holds a bachelor’s degree in political science from the University of Tennessee and an M.A. degree in public administration from the Maxine Goodman Levin College of Urban Affairs at Cleveland State University.

Kyle Fee

Kyle Fee is a regional community development advisor in the Community Development Department at the Federal Reserve Bank of Cleveland. In this role, he conducts applied research and outreach.
related to economic development, workforce development, neighborhood development, and economic geography in the Fourth Federal Reserve District which includes Ohio, western Pennsylvania, eastern Kentucky, and the northern panhandle of West Virginia. Mr. Fee holds a Bachelor of Science degree in economics and business administration from John Carroll University. He received an M.A. in urban studies/economic development from Loyola University, Chicago, and he is pursuing his Ph.D. at the Maxine Goodman Levin College of Urban Affairs at Cleveland State University.
Fed Sponsored Reception
Friday, June 3, 2016
05:00 PM – 08:00 PM
Multipurpose Theater, SSC Room 315
SATURDAY, June 4, 2016

Conference Registration – 3rd Floor Elevator Lobby, SSC
07:30 AM – 10:30 AM

_McGraw Hill_ Continental Breakfast – 3rd Floor Lobby, SSC
07:30 AM – 9:00 AM

Session S1: Saturday, June 4, 2016
09:00 AM – 10:15 AM

Session S1A: …............................................. SSC 319 (09:00 – 10:15 am)

Chair: David Nugent, California University of Pennsylvania

[1] Expenditure Pattern of EITC Recipients and its Influence on Economic Impacts
_Kosin Isariyawongse_, Edinboro University of Pennsylvania

_Riaz Hussain_, University of Scranton
_Stephen Mansour_, University of Scranton

_Christian Alesius_, American Marketing Association, Slippery Rocky University of Pennsylvania
_Emma Ross_, American Marketing Association, Slippery Rocky University of Pennsylvania

_Discussants:_
[1] _Jesus Valencia_, Slippery Rock University of Pennsylvania
[3] _Carlos Liard-Muriente_, Central Connecticut State University [Discuss at the Poster Presentation]
Session S1B: ........................................... SSC 320 (09:00 – 10:15 am)

Chair: Richard Robinson, SUNY Fredonia

[1] Physical Productivity of New Firms: Maybe It Is Not as High as It Appears
Xuebing Yang, Penn State Altoona

[2] Using AVL Data to Determine Bus Schedule Achievability for a Rural Transit System
Matthew Hart, Slippery Rock University of Pennsylvania
Chad Bender, Slippery Rock University of Pennsylvania
Roger Solano, Slippery Rock University of Pennsylvania

[3] The Place of Game Theory in Undergraduate Economics Education
Steven Andelin, Penn State Schuylkill

Judex Hyppolite, Monmouth University

Discussants:
[1] Judex Hyppolite, Monmouth University
[2] Xuebing Yang, Penn State Altoona
[4] Steven Andelin, Penn State Schuylkill

Session S1C: ........................................... SSC 321 (09:00 – 10:15 am)

Chair: Prasanna Venkatesan Narayanasamy, Gokhale Institute of Politics and Economics

[1] Exploring the Link between Exchange Rates and the Prices of Primary Export Commodities: The Case of US-Liberian Dollar Exchange Rate
George Gonpu, Ramapo College of New Jersey
Ciana Hamlett, Ramapo College of New Jersey

Prasanna Venkatesan Narayanasamy, Gokhale Institute of Politics and Economics

[3] The Colombian Peso: Commodity Currency or Cocaine Currency?
Yaya Sissoko, Indiana University of Pennsylvania
Alexi Thompson, Indiana University of Pennsylvania

Discussants:
[1] Jolien Helsel, Youngstown State University
General Membership Meeting

Saturday, June 4, 2016
10:30 AM – 11:00 AM
SSC 321

Our Annual Business Meeting of the General Membership of the Pennsylvania Economic Association is open to the entire membership of the PEA, including all registrants of the conference.

“Door Prizes” will be awarded!

Closing
11:00 AM
Healthcare Panelists

“The 100-Year Doldrums of Health Economics”
(Friday, June 3 from 02:15 pm – 03:30 pm)

Dr. Robert Graboyes, senior research fellow at the Mercatus Center at George Mason University. Author of “Fortress and Frontier in American Health Care,” his work asks, “How can we make health care as innovative in the next 25 years as information technology was in the past 25 years?” He currently chairs the Health Economics Roundtable for the National Association for Business Economics and was President of the National Economists Club and the Richmond Association for Business Economics.

Dr. Elliot L. Smith, MD, President and Chief Medical Officer of the Butler Health System, Physician Hospital Organization. He has a special interest in population health management, and he is currently contributing to the shaping of the changing landscape of healthcare through the Butler Health System in his administrative capacity as Chief Medical Officer and President of the Provider Hospital Organization as well as his clinical practice sites in Evans City and Zelienople.

Ms. Charleeda Redman, Vice President of Accountable Care at UPMC an integrated delivery and financing system. Ms. Redman has been a registered nurse for over twenty years and has worked in hospital case management for over eighteen years. Ms. Redman has been a member of ACMA since 2005 and Past President of the Western Pennsylvania Chapter. She is also a member of Sigma-Theta-Tau Nursing Honor Society and the American Organization of Nurse Executives.

Dr. David Jordan, Associate Professor, Health Care Administration & Management Program Coordinator, School of Business, Slippery Rock University. He held positions as an Account Executive for QRS Managed Care, Inc. and Corvel Corporation. David then held positions as a Regional Sales Executive and then Regional Vice President for Procura Management, Healthcare
Solutions, in the field of Managed Care cost containment. He also serves as an Auditor for Upper Burrell Township, Pennsylvania.

### 2016 Program Author and Participant Index

<table>
<thead>
<tr>
<th>Last Name</th>
<th>First Name</th>
<th>Email</th>
<th>Session Number</th>
</tr>
</thead>
<tbody>
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The Science Channel’s show “Myth Busters” is leaving the air after a long and popular run. The premise of the show is to examine “myths,” or more correctly, potential myths, to determine if they are actually myths or based in fact. An oddity about the show is that if a “myth” is found to be inaccurate it is said to be “Busted” rather than verified as a myth. A “myth” found to be based on fact is found to be plausible or confirmed. This paper looks at several economic “myths” to determine if they are based on fact or not. The economic myths examined are those typically espoused by political candidates or political parties. Like Adam and Jamie of the TV Myth Busters, we will rely on science, that is, historical data to confirm or bust the myths and like the television Myth Busters we will declare a myth to be Busted when it is found not to be based upon fact or agree with historical tendencies.

Ten myths are considered and compared to historical data including Mr. Trump’s recent statement that the economy will be in recession next year unless he is elected president; that recessions under Democratic administrations are caused by the Democrats and recessions under Republican administrations are caused by the previous Democratic administration; that the economy grows faster under Republican leadership and slower under Democrats; that the federal deficit grows under big-spending Democrats and shrinks under Republicans; that the size of the government sector grows under big-government Democrats and shrinks under small-government Republicans; that job creation is higher under Republicans; that inflation is higher under Democrats; and that the stock market tends to do better under Republicans. Lastly we examine the statements made on the campaign trail that the economy is doing very poorly under President Obama.

ECONOMIC MYTH BUSTERS

The Science Channel’s show “Myth Busters” is leaving the air after a long and popular run. Luckily re-runs will be available for years to come until we’ve all seen every episode. The premise of the show is to examine “myths,” or more correctly, potential myths, to determine if they are actually myths or based in fact. An oddity about the show is that if a “myth” is found to be inaccurate it is said to be “Busted” rather than verified as a myth. A “myth” found to be based on fact, or at least found to be plausible, is confirmed. A similar activity in the political arena would be called “Fact Checking.” Fact checking has become popular regarding political candidates in recent election cycles but with the very large number of claims made in the current cycle, fact checkers are way behind and can’t seem to catch up. With the Myth Busters leaving the air, perhaps it would be interesting to examine the economic “myths” derived from the individual claims made by candidates and some of the “myths” generally held regarding the economy and the political parties. Like Adam and Jamie of the TV Myth Busters, we will rely on science and data to confirm or bust the myths and we will bust the myths when they are found to not be based upon fact.
Donald Trump recently made the statement that the US Economy is heading for a big recession next year unless, of course, he is elected president. Since that statement was make I have been asked several times about its possible validity, not in terms of whether Mr. Trump can save us from recession but rather whether it looks like the economy is headed into recession.

Predicting economic trends is difficult and there are many reliable organizations both in and out of government that have developed quite sophisticated statistical models to make these predictions. Best seller lists always contain at least one doom-and-gloom book that offers seemingly sound reasons why one should invest in gold or hold cash, for example, rather than invest in the US economy. I suspect that Mr. Trump’s prediction, since he offered no arguments to back up his claim, is most likely based upon guess work.

Looked at another way, Mr. Trump’s prediction is that if a Democrat is elected president, that person will preside over a recession in their first year in office and if Mr. Trump is elected president there will be no recession. Let us consider this to be our first myth and examine Mr. Trump’s statement from a historical perspective to determine whether Mr. Trump’s statement is “Busted” or confirmed.

Since the start of Mr. Truman’s elected term in 1949, there have been 11 recessions in the US economy. The first of these started two months before Truman’s inauguration, however. Since Truman was in office when that recession started, we will count that first recession as well. Nine of these eleven recessions started under Republican presidents and two under Democrats. During this span of time there were six Democratic presidents and six Republican presidents. Two of the six Democrats (Truman and Carter) presided over the start of a recession and all six of the Republican presidents presided over recession starts. One of these Republicans had three recessions start during an eight year term (Eisenhower), one (G.W. Bush) presided over two recession starts, and the other four (Nixon, Ford, Reagan, G.H.W. Bush) over one each. It would seem from this alone one would conclude that the likelihood of a recession starting in the next president’s term to be much greater for a Republican than a Democrat, in fact, Republicans are batting 1000 in that regard. Based on the number of recessions one would conclude that it is 4.5 times more likely a recession will start under a Republican (9 compared to 2), or based on the number of presidents, it could be argued that it is three times more likely to have a recession start under a Republican (6 compared to 2) than under a Democrat.

Looked at another way, since the first quarter of 1949, the US economy has been in recession for 41 quarters. Thirty two of these were under Republican presidents and nine under Democratic presidents. A footnote is in order here, however. In order to attribute nine quarters of recession to Democratic presidents, we have to assign two of the six-quarter-long 2007-2009 recession to President Obama. Looked at terms of quarters then, and assuming past trends hold true in the future, it is 3.5 times more likely that the economy will suffer recession under Republican presidential leadership than under Democratic presidential leadership.

Conclusion: Myth Busted!

Myth 2. A standard argument made by Republicans when faced with the recession data offered above, is to claim that the recessions suffered under Republican presidents were inherited from the previous Democratic administration. The term “inherited” is not clearly defined, but let’s tackle this “myth” anyway.

If we now focus on the period starting with the first term of President Eisenhower up to the present, we find that the only recession that was directly inherited, meaning a recession was underway when the president took office, was the trailing two quarters of the 2007-2009 recession under President Obama. No other president took office during a recession that started under the previous president of a different party. With that definition the myth would be busted easily but let’s also examine what might be called the “slippery slope” definition of the term inherited. This definition would have us believe the seeds of recession were planted by the previous administration and the weeds did not sprout until the Republican took over. This definition would hold true if the length of time the new president was in office was too short to have an impact on the economy. Impact lags can be short or long, so even that is not clearly defined but if consumers and business generally believe policies proposed by a new president will be effective, lags can be quite short. To examine the myth with this in mind, let us look at the number of months since the start of the presidential term that a recession began. For the myth to be upheld, we should find this to be a relatively small value. The data shows that for the nine recessions that started under Republicans during the period under examination, the average number of months from the start of the term to the start of the recessions was 31 months.

If we limit the Eisenhower and G.W. Bush recessions to only the first recessions of their administrations, our calculation is reduced to six recessions. The average number of months from the start of Republican president’s term and their first recession is 8.75 months,
or three quarters. The range of these six recessions is two to eighteen months. The two month lag was for G.W. Bush’s first recession which was a recession that ran from March to November of 2001. If one concedes that to be an inherited recession, meaning the new president’s policies could not yet have had an effect on economic behavior, the mean of the remaining five first recessions becomes 10.1 months. It is possible to argue that 10.1 months is too short to have an effect but, unfortunately, lags are generally shorter for contractionary impacts and within several months of inauguration a new president’s policy are very often proposed and openly debated in Congress and in the news and under public scrutiny. That length of time is certainly adequate for people to adjust their economic behavior to match their expectations regarding the effect of the proposed policy. In the case of President Reagan, who presided over the most severe recession up to that time since the Great Depression, recession started in November 1981 which was ten months into his first term. That was after his economic package was debated and passed through Congress and it roughly coincided with the start of government spending cuts that were part of his program. There is little doubt that this recession resulted from the contraction of the Reagan policy since the tax cut components that was expected to provide expansion were phased in over the next two years.

Conclusion: Myth Busted for all but one of nine Republican recessions.

Myth 3. Republicans have always touted that their policies, particularly tax cuts, will grow the economy. So the Myth to be tested is the economy grows more under Republicans than Democrats.

A recent study by well-known and respected economists, Alan Blinder and Mark Watson of Princeton University, recently examined growth in the post WWII era and compared growth in real GDP under Republican presidents and Democratic presidents. They found that economic growth under Democratic presidents averaged 4.35 percent per year while under Republicans it was only 2.54%. The 1.8 percentage point difference in growth rates is highly statistically significant. Even if you remove war periods, such as Korea, then Vietnam, then the gulf wars, which could be argued will skew the analysis, in each case growth is still significantly higher under Democrats.

They also analyze growth relative to congressional control. Interestingly with a Democratic president and Democrats in control of both houses of Congress, growth averaged a whopping 4.69 per cent per year. With Republican presidents and Republicans in control of both houses, growth averaged only 2.84 percent. Democratic presidents and Republicans in control of both houses growth was 3.88 percent per year compared to only 2.84 percent per year when there was a Republican president and Republicans in control of both houses. No matter how you slice it, growth under Democratic presidents has been much better than under Republicans.

Conclusion: Myth Busted!

Myth 4. The stock market does better under Republicans.

Another standard of the Republican Party is that they are the party for business and what is good for business is good for the economy. This has been restated so often that many Democrats concede that the Republican is the party for business, but is it? Two “Myths” will be examined as part of this “better for business” hypothesis. First we will examine stock market performance and then corporate profit.

Stock market performance has long been recognized as an economic indicator and although the majority of the wealth represented by the market value of stocks is attributed to high income households, many households in the bottom 80% of the income distribution have 401(k) and other retirement savings tied to stock market performance. If a person is planning to retire in a few years, should that person be hopeful of the Democrats retaining the White House or pushing for a Republican presidential victory?

The best overall measure of the stock market is the S&P 500 index. For this same period of time as examined above, that is since Eisenhower’s first term, the rate of growth in the S&P 500 index overall averaged 8.28% per year which is very impressive. Under Democrat administrations this growth rate was 11.20% per year and under Republicans only 6.09%. Over this entire period the S&P growth rate was nearly twice as high (1.84) under Democrats as compared to Republicans.

If we split the time period up and look first at the 1950s, 60s, and 70s and then the remainder of the time period, we can see a big difference in this variable. The end of the Carter term and the beginning of the Reagan term is a convenient break point in that it splits the full time period about in half and we then have four Democratic and five Republican administrations in place if we combine Kennedy/Johnson and Nixon/Ford but keep Reagan and GHW Bush separate. If we consider changes in parties in control of the presidency, then this split provides four changes in each direction. Politically, it may also be convenient break point since...
it is generally considered to be under President Reagan that the change in southern states from Democrat to Republican was solidified and completed but that discussion is beyond the scope of this analysis.

Using this break point we find the stock market, as measured by the S&P 500, did about equally well under Democratic and Republican administrations with Democrats at 7.28% annual growth rate and Republicans at 6.97%. The thirty-five year period under analysis shows a dramatic shift with the annual growth rate under Democrats at 14.35% and Republicans at 5.39%, that is, the market did 2.66 times better under Democrats than Republicans as can be seen in Chart 2 below.

Let us now consider the question raised above, specifically, if a person is planning to retire in a few years, should that person be hopeful of the Democrats retaining the White House or pushing for a Republican presidential victory? To answer this question we would need to examine stock market performance after a change party control of the presidency. We’ve seen how the market performs differently under Democratic presidents and Republican presidents overall what about the first year in office or the second year in office after a change in party control? Over the period of analysis we can observe four changes in presidential party from Democrat to Republican and four changes from Republican to Democrat. The result of this analysis for the S&P 500 is shown in Chart 3 below.

The first year into presidential terms for Democrats resulted in a growth rate of the S&P 500 averaging 10.27%. The first year into presidential terms for Republicans resulted in a growth rate of the S&P 500 of negative 10.16%. The second year in office for Democrats showed an average growth rate of 4.30%. The second year in office for Republicans showed an average growth rate of 11.23%. Also presented is the average growth rate of 11.23%. Also presented is the average growth rate of 5.92% for Democrats and Republican time periods is 6.88% annual growth rate and Republicans at 4.7% for Republicans.

For the 1980 to 2015 period these growth rates were 5.0% for Democrats and 4.7% for Republicans. This analysis uses quarterly data of corporate profits after tax, adjusted for inflation using the Implicit GDP Deflator. Examining the percentage change from the same quarter in the previous year over the entire period of analysis (1953:1 to 2015:3), we find the growth rate of corporate profits averaged 5.55% per year under Democrats compared to 4.71% under Republicans. This difference while notable is not statistically significant. Similar results were obtained for the 1953 to 1980 period and for the 1980 to 2015 period. Although many small businesses and partnerships may not be incorporated, we can assume a strong correlation exists between corporate profit and overall profitability of business, in the economy. If the claim is true, we should find that corporate profits grow faster under Republicans and have a lower growth rate under Democrats.

In comparing the individual presidents in terms of S&P 500 performance and using January 1 as a start date rather than January 20 due to data availability, President Clinton comes in first at 15.0%, and President Obama second at 12.0% (through January 1, 2016). The negative 5.3% for President G. W. Bush may seem surprising but it is accurate. The S&P 500 was at 1335.6 on January 1, 2001 and at 865.6 on January 1, 2009. The data is presented in the graph below.

Conclusion: Myth Busted! The stock market has done better under Democrats and particularly so in the past 35 years. The stock market does quite poorly during the first year and in the first two years combined when a Republican administration replaces a Democratic one and the stock market does particularly well for the first year and for the first two years combined when a Democrat replaces a Republican in the White House.

Myth 5. Business is more profitable under Republicans than under Democrats.

Government regulation and market intervention is often cited as reasons why Republicans should be preferred to Democrats if business is to prosper. The well-known “get government off our backs” or the famous statement of President Reagan, “. . . government is not the solution to our problem; government is the problem” states this argument quite succinctly. To see if business actually does better under Republicans, a second measure is used to examine the Better for Business Myth, corporate profit. Corporate profit is arguably the best measure of how well business is doing and although many small businesses and partnerships may not be incorporated, we can assume a strong correlation exists between corporate profit and overall profitability of business in the economy. If the claim is true, we should find that corporate profits grow faster under Republicans and have a lower growth rate under Democrats.

As one might expect the rate of growth in corporate profit has a fairly large degree of variability. The overall growth rate in corporate profit for the entire period for both parties is 5.07% with a standard deviation of 15.9 percentage points. Comparable numbers for Democrats and Republican time periods is
14.5 and 17.0 percentage points respectively for standard deviations and 0.021 and 0.029 for variances. This difference in variability may seem slight but because of the large number of observations available because of the use of quarterly data, it is significant at the 5% level. Not only has after-tax corporate profit adjusted for inflation grown faster under Democrats than Republicans, it also shows a significantly lower level of variability.

Based on corporate profit and S&P 500 performance, the Republican “Better for Business” Myth is busted!

Myth 6. Closely related to the Better for Business claim is the claim that Republican policies are designed to create jobs better than Democratic policies. Job creation is something that Republicans regularly brag about and accuse Democrats of promoting “job killing” programs, but is it true?

To examine this, the end-of-period level of employment for each year from 1953 to 2015 was used to compute the percentage change from year-to-year to give the annual growth rate. The employment growth rate for the entire period for both parties was 1.45% per year on average. The average annual employment growth rate under Republican presidential administrations was 1.28 percent. Under Democrats employment growth averaged 1.68 percent.

Who were the best job creators among the presidents in this period? As one would expect it was those during the baby boom period of the late 1960s, 70s, and early 80s. The civilian population expanded at a rate of 2.0% per year during the 1970s. In the 1980s the rate dropped off dramatically to 1.19% and has been at 1.12% for the 2010s thus far.

The “Myth” examined was that Republicans are better at creating jobs than Democrats. Once again, Myth Busted! Overall Democrats have done slightly better than Republicans at creating jobs but not significantly so.

Myth 7. Republicans are better at controlling inflation. We have been hearing a lot of complaining from Republicans in general and from the Republican presidential candidates in particular about the Federal Reserve being too accommodating with monetary policy with the certainty of inflation to follow. Inflation has remained low, too low in the eyes of some, in spite of QE1, QE2, and other accommodative monetary policies.

To test the myth, let us compare the inflation rates under Democrat and Republican control of the White House. Using the CPI and going back to the first year of the Eisenhower administration (1953) and comparing CPI annual inflation under Democrats and Republicans, we find the average annual CPI inflation rate for the entire period to be 3.58%. The average inflation rate under Democrats was 3.18% and under Republicans it was 3.87%. If the overall time period is split as described above, we find an interesting result. For the early period, that is, 1953 to 1980, the average rate of inflation overall was 4.19% per year with the rate under Democrats being 4.61% per year and Republicans averaging 3.88%. For the 1981 to 2015 period CPI inflation averaged 2.87% per year. We now find the rate to be lower under Democratic administrations at 2.03% per year while Republican administrations averaged 3.87%. This difference is significant (< 0.01). It is clear that Republicans are very consistent averaging 3.87% per year over the entire period and in the sub periods as well. Democrats, however, improved their inflation record dramatically cutting it more than in half from 4.61% in the early period to 2.03% in the recent period.

What conclusion can we draw? It should be clear that Republicans have no bragging rights when it comes to controlling inflation: Myth busted!

Myth 8. Democrats are “budget busters” and Republicans are better able to control federal deficits.

If this myth is true, we should find that federal deficits would tend to shrink under Republican administrations and increase under Democrats. Using annual data from the GDP accounts and examining the period from the first year of the Eisenhower administration up to the latest available data, there were 63 budget years total. In 32 of those years the budget deficit increased from the previous year and in 31 of those years the budget deficit decreased from the previous year. This is a pretty even split but how do they compare when broken down by Democrat and Republican?

When Republicans were in the White House the deficit increased 63.9% of the time and decreased only 36.1%, that is, of the 36 Republican budget years, the deficit increased in 23 of those years. The federal deficit increased under Democratic presidents only 33% of the time and decreased two-thirds, 66.7%, of the time, or of the 27 Democratic budget years, the deficit increased only in 9 of those years. By this measure Democrats were twice as likely to decrease the deficit as to increase it and nearly twice as likely (1.84) to decrease the deficit as compared to Republicans.

Again, reality is pretty much the opposite of the standard Republican propaganda. Myth Busted!

There are two ways to examine this Size of Government Myth. The first is simply with government expenditure and the second is with government expenditures as a percent of GDP. Looking first at government expenditure adjusted for inflation using chained 2009 dollars and examining the year to year percentage change we can examine the growth rates and make a comparison. Since the Eisenhower administration, the overall annual growth rate in government expenditures was 1.9% per year. Under Democratic administrations this growth rate was 1.98% and under Republican administrations it was 1.72%; not much difference and certainly not a significant difference. If we split the time period up and look first at the 1950s, 60s, and 70s, we can see a big difference and easily realize how this myth was started. From the Eisenhower administration in 1953 through the end of the Carter administration in 1980, the growth rate in government expenditures averaged 2.0% per year overall but the distribution between Democratic and Republican administrations is noteworthy with a growth rate of 4.0% per year under Democrats and only 0.4% per year under Republicans. This difference is highly significant with a p-value 0.005. Such a profound difference could hardly have gone unnoticed and very likely has fueled this myth ever since.

When we examine the period since President Carter, that is, since the start of the Reagan administration in 1981, however, we see a much different picture. Since the Reagan administration through 2015 under President Obama the rate of growth in real government expenditures averaged 1.7% per year. Under Democrats the average growth rate was 0.4% while under Republicans government expenditures grew at 2.4% per year. This difference too is highly significant (<0.001) and although this period covered the past 35 years, it has not reversed the perception that led to the myth established in the first thirty-year period.

The general rule of thumb we have always taught in principles of economics courses is that the government sector should be no more than 20% of GDP. If one examines the government expenditures components of Real GDP as a percent of total expenditures as a measure of relative government size, you would find that the government sector in the US for 2015 was only 17.5%. An examination of recent data reveals this to be relatively small. The size of the government sector reached 21% under President G.W. Bush and has declined under President Obama. That can only mean that the government sector has been expanding at a slower pace than real GDP under President Obama. There has been a general downward trend in this variable under all presidents since Eisenhower with a notable sixteen year stall in this process under Presidents Carter, Reagan, and GHW Bush when government expenditures were stuck at 25% of real GDP.

Myth 10. The economy has done very poorly under President Obama. If you listen to the Republican candidates for president, this line is repeated over and over again and used as justification for voters to switch to Republican control of the White House. To examine this myth, let’s take a tally thus far of the Obama legacy. The Obama years have brought us 18 million people who now have health insurance under the Affordable Care Act, health care costs rising slower than they have in 15 years, 14 million new jobs have been created, 12 million of these since the so-called “job killing” Affordable Care Act went into effect for a net increase in employment of 11.5 million. Seventy three continuous months (and counting as of March 2016) of private sector job growth, the longest such streak in the post-war period (the second longest streak was 51 months under President Clinton). The unemployment rate is down to 5.0%, the inflation rate is under one percent, mortgage rates are below 4%, and gasoline prices are in the $2 per gallon range. The federal deficit has fallen by 67% under President Obama and the deficit as a percentage of GDP has dropped from 9.8% in President Obama’s first year in office to 2.5% in 2015, a 74% drop. The size of the government sector in our economy is down from 21% of GDP under George W. Bush to only 17.5% in 2015.

It would, of course, be incorrect to conclude there are no issues with the economy. The current economic expansion is approaching seven years of age (June 2009), a little more than three years short of the U.S. record expansion of 128 months in the 1990’s. The prospect of breaking our record is difficult to ascertain, but to think, as Mr. Trump might from his statement regarding likely recession next year, that the length of the current expansion increases the chances of a downturn, that is, the longer an expansion lasts, the greater the probability it will soon end, is incorrect.

The world record economic expansion, according to the Economic Cycle Research Institute, is over 25 years and that record may soon be broken by Australia now in its twenty fifth year of continuous expansion.

What are the threats to our current expansion? A looming continuous threat is that of self-destruction. One would think it should be obvious that austerity on the fiscal side based upon reducing or eliminating a
federal deficit would weaken or end the expansion as such policies did in Great Brittan and Europe in recent years, and very likely not have the desired impact on the federal budget. Yet Mr. Paul Ryan, as chair of the House Budget Committee yearly proposes budgets that would do just that. Self-destruction of the economic expansion from the fiscal side is always a looming threat particularly now when the Fed views its expansionary arsenal to be limited by current low interest rates and may not be able to counteract the impact of a fiscal contraction.

Assuming we do not commit suicide regarding our own economic expansion, what threats do we face? The major immediate threats to continued growth in the U.S. economy are primarily external such as weakness in the Chinese and European economies dragging down our export industries. There are also longer-term issues internally that threatened sustained growth. Primary among these is the lack of growth in real wages and real income over a broad range of middle-income households. While real GDP continues to rise, real wage growth continues to decline. Households are feeling the pinch. While the Fed would like to see inflation increase to about 2% per year as an indication that labor markets have improved, that is, as labor markets become tight, wages should rise, and rising wages push up prices. The pinch is that rising prices depress real wages for those whose skills are not in short supply and who have not experienced wage inflation. Average growth in real weekly earnings in the service sector has declined steadily since January 2015. In manufacturing, it has been erratic averaging less than 1% during this period. Overall, the erosion of purchasing power to the largest segment of the economy, the middle-income household sector representing the largest proportion of consumption expenditures, is threatening to a prolonged economic expansion. This fact alone is largely fueling the popularity of Mr. Sanders’ Democratic candidacy for President.

Accomplishing increased real wage growth in a slow growing economy is unlikely. Increased demand for labor in a more rapidly growing economy will accomplish increased wage growth and also help bring inflation up closer to the Fed’s target rate. A more rapidly growing economy in the face of international weakness is unlikely to be accomplished, however, in today’s political climate with the leaders of Republican-controlled legislature continually proposing budgets calling for fiscal contraction.

REFERENCES


All data used in this analysis along with data sources, calculations, and graphs can be found at:

THE PLACE OF GAME THEORY IN UNDERGRADUATE ECONOMICS EDUCATION

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ABSTRACT

Game theory is used to describe oligopolistic competition in a first course on microeconomics. The prisoner’s dilemma appears to be the preferred means for explaining oligopoly. But the prisoner’s dilemma is applicable to oligopolistic competition under certain conditions. Other games are appropriate descriptions when, for example, there is a single dominant firm. Some oligopolies, such as bulk processors, have reached a state where the competitive market structure (perfect competition) is an adequate description and game theory is not needed. An intermediate course on game theory is taken by economics students as an elective or requirement. The intermediate course is built up from decision-making principles and should emphasize applications and case studies over mathematical details.

INTRODUCTION

A first course in microeconomics will typically present descriptions and theories of market structures. The basic forms are the competitive market structure (also called perfect competition and, more frequently in business schools, hyper-competition), monopoly and oligopoly. Most elementary microeconomics texts also present a special case, monopolistic competition, in which there are many firms in a specified market with each firm offering a differentiated product. The theories of the competitive market structure and monopoly follow the analysis given by Robinson (1934). The description of monopolistic competition is usually based on the framework of Chamberlain (1950).

The description of oligopoly (a few firms selling identical or differentiated products in a market with barriers to entry) can take several directions. McConnell, Brue and Flynn (2012), for example, provide three models of oligopoly: the kinked demand curve, collusive pricing, and price leadership. Their chapter on oligopoly has a brief appendix where a game theoretic description of oligopoly is given. In contrast, Hubbard and O’Brien (2013) and Parkin (2012) use game theory exclusively in their description of oligopoly. In both of these introductory books, the only game presented is the prisoner’s dilemma. Sexton (2013) describes oligopoly using the prisoner’s dilemma and the location game. The location game explains why firms in direct competition locate their businesses close to each other. For example, Lowe’s and Home Depot stores are often situated in close proximity. McMillan (1992) provides an excellent discussion of this game and others. Although I have not made a thorough review of elementary microeconomics textbooks, it appears that trend is to use the prisoner’s dilemma as the principle context for analyzing oligopolies.

The second place where game theory enters is an intermediate course for economics majors. It should be noted, however, that game theory courses are being offered in departments of mathematics, political science, psychology, and biology. In the business schools, game theory is becoming an important part of courses in competitive strategy. Business schools typically offer a stand-alone course on game theory only at the graduate level.

In the sequel, we shall consider the relevance of the prisoners’ dilemma and other games for oligopolistic markets. Some comments will also be given relating to an intermediate course in game theory for students of economics.

THE PRISONER’S DILEMMA

The standard set up for the prisoner’s is due to Albert Tucker (Poundstone, 1992). Two partners in crime are arrested and held in solitary confinement with no means of communicating one with the other. The prosecutor lacks sufficient evidence to convict them on the principle charge. But they could be sentenced to one year in prison on a lesser charge. The prosecutor makes a separate bargain with each prisoner.

- If prisoners A and B both confess to the principle crime, they will serve three years in prison.
- If A confesses to the principle crime and B remains
mum, A will be set free for turning state’s evidence, and B will receive seven years prison time (and vice versa).

• If A and B stay mum, both will serve only one year in prison (the result of the lesser charge).

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<th>Mum</th>
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<td>Confess</td>
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Key:

(x, y) = (Prisoner A’s jail time, Prisoner B’s jail time)

Figure 1. Payoff matrix for the prisoner’s dilemma game.

An example of an on-going prisoner’s dilemma is the cola wars of Coca Cola and Pepsi (Yoffie and Kim, 2011). During a period that lasted several decades, Coke and Pepsi were engaged in an advertising struggle where the strategies were “high level of advertising” and “low level of advertising.” Figure 3 is a payoff matrix for a prisoner’s dilemma in generalized form. Coke and Pepsi can maintain their respective market shares if both engage in low advertising expenditures or if both engage in high advertising expenditures. When they have simultaneously high advertising budgets, their profits are reduced compared to low levels of advertising. One firm can gain market share and increase profit at the expense of the other firm when it has a high level of advertising and the other one does not.

The firms would fair best with a reduced level of advertising expenditure (cooperate). But high advertising expenditure (defect) is a dominant strategy. This explains why Coke and Pepsi spent large sums on advertising expenditure.
campaigns without moving their market shares. Yoffie and Kim (2011) describe how Coke and Pepsi have gone from one game to another in the carbonated soft drink industry, each of which resulted in a prisoner’s dilemma. At the time of this writing, Coke and Pepsi are in a price war where they are attempting to hold on to a declining market for carbonated soft drinks.

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<th>Low</th>
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<td>Coke</td>
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<td>Pepsi</td>
<td>(4, 1)</td>
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Key:

\( (x, y) = (\text{Coke’s outcome, Pepsi’s outcome}) \)

4 = best; 3 = next best; 2 = next worst; 1 = worst

Students should understand that many oligopolies—particularly local competition such as fast-food restaurants and dry cleaning establishments—can be described well enough by perfect competition. This point should be made in the freshman microeconomics course.

Greenwald and Kahn (2005) explain that firms can fall into a prisoner’s dilemma when one or more firms in a market have a competitive advantage and there is no single dominant firm.¹ Both conditions are necessary and together sufficient.

Finally, there are ways to escape a prisoner’s dilemma. Fisher (2008) identifies three ways to resolve a prisoner’s dilemma: Players may change their attitude about competition; players may seek a benevolent authority to enforce cooperation; and players may rely on self-enforcing strategies. Each of these approaches is a means for moving the players’ strategy to “cooperation.” See Figure 2 above.

In Pennsylvania it is illegal for a car dealer to sell a car on

¹ According to Greenwald and Kahn (2005) there are only three types of competitive advantage: Supply, demand, and economies of scale. Coke and Pepsi, for example, have both achieved an impressive demand advantage with their loyal customers over other producers of carbonated soft drinks.
Sundays. If there were no laws preventing the sale of cars on Sundays (commonly called a “blue laws”), nearly all car dealers would be open for business on Sunday which is something they apparently do not want to do. Since car dealers are organized through industry associations, they could petition the legislature to change the law should they ever think the change would be mutually beneficial.

Price signaling by some retailers is an example of a self-reinforcing strategy. A retailer announces that they will meet or beat any competitor’s price. “Just bring in the competitor’s advertisement or sales receipt.” The effect is to maintain higher prices by threatening a price war. My students are always surprised to learn that a meet-or-beat price policy is a means for keeping prices higher than they would otherwise be.

The case of a single dominant firm in an industry can be analyzed using game theory. Case (2007) shows that the game theoretic assessment of this situation is not difficult and within the reach of freshman students.

THE INTERMEDIATE COURSE IN GAME THEORY

Advances in decision making under uncertainty, the theory of games, and mathematical programming are among the most significant developments for economic theory and practice in the second half of the twentieth century. It is not just a convenient coincidence that the three developments are related. Undergraduate students who want to further their education in economics should have an exposure to decision making under uncertainty, game theory, and mathematical programming.

An intermediate course should accomplish several things. The foundation of the course, in my opinion, should be decision making under uncertainty which is a type of game played by one person against “nature.” One objective would be to show how decision making under uncertainty leads to game theory. Another objective would be to present other canonical games and their applications to economics. Fortunately, there are several very good texts for an intermediate course that accomplish these objectives.

An intermediate course is nourished by applications of game theory and case studies. Most of the applications depend only on elementary mathematics. The mathematical intricacies of the subject can and should wait.

Constrained optimization (mathematical programming) is a general procedure for finding mixed strategies in zero sum games. The familiar game of rock, paper, and scissors is a zero sum game, and every player knows it requires a mixed strategy where choices are randomized. Students of economics may learn something about mathematical programming in simple instances where mixed strategies are needed. But a respectable treatment of mathematical programming should not be attempted in the intermediate course on game theory. The subject would be better placed in a course on the mathematical methods of economics or as elective course of its own.

CONCLUSION

Game theory shows up in the undergraduate economics curriculum in two places: In an introductory microeconomics course as a tool for assessing oligopoly and as an intermediate course at a slightly more elevated mathematical level. The prisoner’s dilemma is the preferred model for oligopoly in the introductory course. But the prisoner’s dilemma is not suitable for describing all oligopolies. The prisoner’s dilemma emerges when firms have a competitive advantage and there is no single dominant firm. Students should also learn that other games, such as the location game, are needed to understand the competitive behavior of firms. The case of an industry with a single dominant firm can be treated in the context of game theory, but it is not the prisoner’s dilemma.

In an introductory course, students should see that the competitive market structure (perfect competition) is a good enough explanation of some oligopolistic industries and much of local competition.
The intermediate course for students of economics should be built up from decision making concepts. Key components of the course would be applications and case studies. Only elementary mathematics, used with a moderate level of sophistication, is required of students at this point in their studies.

REFERENCES


INFLATION DYNAMICS IN THE GAMBIA

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ABSTRACT

Gambia inflation rate has picked-up in recent years. This paper investigates the inflation dynamics in The Gambia using monthly time series data for the period 2005-2014. Several econometrics models are applied including single equation model, Structural Vector Autoregression (SVAR) model and Vector Error Correction Model (VECM). The empirical results confirm the existence of stable relation between money supply and inflation, and exchange rate and inflation. We found that the depreciation of the exchange rate has a much more immediate impact on inflation. In addition, the exchange rate pass-through for GMD/ US dollar exchange rate is much stronger as compared to GMD/ British Pound Sterling and the GMD/Euro exchange rate. The study shows that current inflation is affected significantly by past inflation. The results also reveal that inflation in neighboring country, Senegal, significantly influences inflation in the Gambia in all specifications. Furthermore, the empirical findings reveal that the artificial fixing of the exchange rate or fear of float in recent years further exerts inflation pressure. In the short-run external shocks of money supply, exchange rate and prices in Senegal account for significant variations of inflation. However, in the medium term prices in Senegal and world prices account for larger variations in inflation.

INTRODUCTION

Inflation is one of the macroeconomic variables that the Central Bank of The Gambia (CBG) keeps close attention to and continuously monitors its movements. Over the past couple of years, inflation in The Gambia has been relatively moderate (in single digits) but the sudden surge in world commodities and fuel prices pose a challenge to The Gambia as they do to other low-income and small open economies.

In recent years, there has been a proliferation of studies on inflation dynamics on some Sub-Saharan African countries and some industrialized countries. Many of these studies investigated the linkages in money demand, money supply, exchange rate and inflation. For example, Moriyama (2008) investigated inflation dynamics in Sudan using single, vector-auto regression and Vector Error Correction Models (VECM). The empirical findings revealed that money supply growth and nominal exchange rate changes affect inflation with 18 to 24 months’ time lag. McCarthy (2007) examined the pass-through of external factors - exchange rate and import prices - to domestic inflation for several industrialized economies using a VAR model. Blavy (2004) and Nassar (2005) used a co-integrating and error correction model, confirmed the long-run relationship between inflation and money supply in Guinea and Madagascar, respectively. Sacerdoti and Xiao (2001) analyzed the dynamics of inflation in Madagascar in the period 1971 – 2000 using co-integration analysis and error correction modeling. They found long run stable money demand relationship as well as a purchasing power relationship. Almounser (2010) investigated inflation dynamics in Yemen using quarterly data from 2005- 2007 applying single, structural vector-auto regression and Vector Error Correction Models (VECM). The empirical findings revealed that international prices and exchange rate depreciation significantly affect domestic prices. Williams and Adedeji (2004) investigated the determinants of inflation in the Dominican Republic from 1991 to 2002, a period
characterized by remarkable macroeconomic stability and growth. Using a quarterly data, they found inflation is explained by changes in monetary aggregates, real output, foreign inflation and the exchange rate.

Caceres Poplawski-Riberio and Tartari (2011) examined inflation dynamics in the Central African Economic and Monetary Community using a constructed dataset country-specific commodity price indices and panel cointegrated vector autoregressive (VAR) model. They found imported commodity price shocks are significant in explaining inflation in the region. In addition, governments through price control and capital expenditures, contributed to inflation in the region. Osorio and Unsal (2011) presented a quantitative analysis of inflation dynamics in Asia using a Global VAR (GVAR) model, which incorporated the role of regional and global spillovers in driving Asia’s inflation. They found the main drivers of inflation are mainly on monetary and supply shocks although the contribution of these shocks have declined. However, demand-side pressure has picked up in recent years. Barnett, Bersh and Ojima (2012) examined inflation in Mongolia to assess the sharp rise and steep drops in inflation. They found that the key drivers from the supply side are food prices, determined by local supply, which is highly seasonal, mainly weather related. On the demand side, their empirical findings revealed that price movement is to a larger extent influenced by government wages. There have been few studies on the Gambian inflation dynamics largely because of lack of accurate time series; the data are also likely to contain structural breaks.

To the best of our knowledge, there is no study that examined artificial fixing of the exchange rate on domestic prices. This paper contributes to the literature on inflation dynamics and studies the impact of artificial fixing or fear of float in the foreign exchange market on domestic prices. It builds on the work of Carlos Fernandez-Voldovinos (2008). It examines the impact of money supply, nominal exchange rate developments, imported prices, artificial fixing of the exchange, and drought periods on domestic prices using a single equation model, structural vector auto regression (SVAR), and vector error correction model (VECM). These different methods helped assess the dynamics of inflation in the Gambia. This paper is organized as follows: Section 2 provides an overview of inflation in The Gambia. Section 3 discusses the model and the estimation methods used. Section 4 presents the data sources and empirical results. Conclusions and policy implications are discussed in section 5.

OVERVIEW OF THE GAMBIA’S INFLATION EXPERIENCE

Inflation developments since The Gambia’s attainment of independence in 1965 may be divided into three distinct stages as illustrated in figure 1.

Firstly, in the first one and a half decades after independence, inflation remained low (single digits). Secondly, it started to climb steadily from 6.7 percent in 1980 to 8.6 percent in mid-1983. From mid-1983, inflation accelerated and reached a peak rate in August 1986. This period coincided with a number of developments. The Central Bank of The Gambia (CBG) moved away from the fixed exchange rate to a floating exchange rate regime. On the political front, the country was implementing political reforms following the failed coup in 1981. After August 1986, inflation dropped sharply and remained relatively low although in double digits until end 1988. It continued to fall and returned to single digits in 1989 but thereafter inflationary pressures started to build up. The Gambia met one of the Optimum Currency Area (OCA) criteria for West African Monetary Zone (WAMZ), registering inflation rate below 5 percent as of end December 2009 before the postponement of launching of WAMZ to 2015 (See Cham 2010).

It should be noted that inflation remained relatively high from November 2001 to November 2004 registering double digits for the most part. The highest rate occurred in August 2003. As of December 2004, inflation remained in a single digit although sometimes exceeded WAMZ inflation benchmark of 5 percent. From January 2013 to date, inflation year on year exceeded the 5 percent benchmark (see figure 2).

Food inflation, which accounts for 55 percent of the consumer price index, jumped to 8¼ percent in December
2010 from 2¾ percent in December 2009. The upward pressure on food prices reflected increases in international food prices and the depreciation of the dalasi against the US dollar and other major currencies in quarter 2 of 2010.

Thus, external and domestic factors, such as the high international food prices, exchange rate of the dalasi against international currencies, transport cost, access to retail markets, and rainfall of which agricultural output greatly hinges on, explain the volatility of food inflation.

**MODEL**

Modeling inflation dynamics can be challenging because of limitations in capturing all the variables that influence inflation. The Gambia as a small and most open economy in the sub-region2 has its domestic prices influenced not only by domestic factors but also to a greater extent by international factors. Changes in the exchange rate of the local currency of a country against international currencies particularly her major trading partners affect domestic prices. Similarly, increases in international prices for commodities, including oil products, could affect domestic prices. On the domestic front, monetary policy for example, an expansionary money supply could affect inflation. Therefore, inflation in The Gambia is affected by both domestic and external factors.3 Considering these varying multiple sources for inflation, it is thus a daunting task for The Gambian authorities to control inflation using monetary policy instrument alone.

In the short-run, inflation is affected by monetary and exchange rate developments, aggregate output, foreign prices and international factors4. An expansionary monetary policy, keeping other things constant, will lead to an increase in prices. The depreciation of the dalasi makes domestic prices relatively more expensive. Similarly higher imported goods prices will lead to an increase in domestic prices. World Commodity and oil prices could (given The Gambia’s imports) impact domestic prices. Domestic prices are also likely to be affected by The Gambia’s neighboring country. Senegal is the immediate neighbor to The Gambia. The two countries do a lot of trade (formal and informal). They share a common border and speak common local language(s). The Gambia and Senegal are re-export hubs to the neighboring countries such as Guinea-Bissau, Guinea-Conakry and Mali.

We develop a hybrid model by borrowing from an earlier work by Valdovinos (2008) and Moriyama (2008) with few modifications. The Model is based on the following: the composition of inflation and the quantity theory of money (QTM). Firstly, an overall country’s consumer price index consists of domestic price (Pd), foreign (P *) prices, and exchange rate (E) factors given by:

\[ P = P_d^\alpha (E P_*)^{1-\alpha} \]  

(1)

From equation (1), the consumer price index is influenced by domestic price, foreign prices, and the exchange rates. From the quantity theorem of money, domestic inflation follows the former given by the equation:

\[ MV = P_d Y \]  

(2)

\[ P_d = MV/Y \]

Where \( M \) denotes the money supply, \( V \) is the velocity of money (the rate at which money changes hands), and \( Y \) is the level of output of the economy. Taking the natural logarithm of equations (1) and (2) yield:

\[ p = \alpha p_d + (1-\alpha) [e + p_*] \]  

(3)

\[ p_d = m - y + \mu t + \lambda \]  

(4)

The lower case letters present the natural logarithm values and the term \((\mu t + \lambda)\) presents the velocity component of equation (2). Putting equation (4) into equation (3) gives:
\[ P = F(e, m, y, p_*, \mathcal{X}) = Z\beta + X\gamma + \varepsilon \] (5)

Where \( Z = F(e, m, y, p_*) \), \( X \) is a vector of other variables and \( \varepsilon \) is the disturbance term. The coefficients of the exchange rate and money supply capture the effects of exchange rate and monetary developments on inflation respectively. Other things equal, the depreciation of the country’s currency and an increase in money supply will lead to an increase in inflation. Also an increase in foreign prices will be transmitted to domestic prices and subsequently lead to an increase in domestic prices. Other variables such as neighboring country’s inflation (if the two countries are trading partners) may affect domestic prices too. An increase in prices of world commodity and oil products may positively affect domestic prices given that The Gambia is a major importer of these commodities. Lastly, domestic interest and foreign interest rates may also affect the rate of inflation. We use three approaches to estimate the determinants of inflation using equation (5). Firstly, we use the single-equation model. In the second approach, we use the vector auto regression (VAR). Finally, we use vector error correction (VECM) to examine whether there is any long run relationship among variables.

DATA ISSUES AND RESULTS

Data

The empirical analysis is conducted using monthly data from 2005M1 to 2014M12.\(^5\) While data on money supply, consumer price index, exchange rates, interest rates, are sourced from International Money Fund (IMF), IFS database, imported value are sourced from IMF, DOT database. All variables are in logarithms, except interest rates, which are in percentages. For money supply, we used money and quasi-money. The CPI variable used is the composite CPI index.

Figure 3 plots the inflation rate and money growth. For foreign price, we used world consumer price index (WCPI).

Figure 4 shows the series of the nominal effective exchange rate, the domestic CPI, and foreign prices. The exchange rate is the nominal effective exchange rate, which is defined as foreign currency per unit of local currency.

We used nominal exchange rate of Gambia dalasi per US dollar. Since Gross Domestic Product is available only on annual frequency, we used volume of imports as proxy of the economic activity. For foreign prices, we use world consumer price index.

In order to capture the opportunity cost of holding money, we used deposit interest rate percent per annum and three months Treasury bill rates for The Gambia and the United States for domestic and foreign interest rates, respectively.\(^6\) Interest rates are plotted in Figure 5. We used Senegal inflation rate as neighboring country inflation.

Unit Root Tests

Standard Augmented Dickey-Fuller (ADF) unit root test suggests that all variables, with the exception of inflation, money, and real income, are non-stationary in levels but stationary at first differences, so they are integrated of order I(1). Appendix A, Table A1 contain the unit root tests results.

Single Equation Model

In order to derive a single equation from equation (5), we need its linear transformation and use the first difference of the variables\(^7\) which is given as:

\[
\Delta P_t = \alpha + b_1 \sum \Delta MS_t + b_2 \sum \Delta USD_t + b_3 \sum \Delta WCPI_t + b_4 \sum \Delta Real_t + b_5 \sum \Delta INT_t + b_6 \sum \Delta USINT_t + b_7 \sum \Delta SECP_t + b_8 \sum \Delta DUMDIR_t + b_9 \sum \Delta DUMDRU_t + \varepsilon_t
\] (6)
Where,

\( \Delta P_t \) is the monthly inflation rate at time \( t \);
\( \Delta MS_t \) is the monthly money and quasi growth at time \( t \);
\( \Delta USD_t \) the dalasi per US dollar exchange rate at time \( t \);
\( \Delta WCPI_t \) is the monthly world consumer price index at time \( t \);
\( \Delta Real_t \) is the monthly growth in real economic activity at time \( t \);
\( \Delta INT_t \) is the deposit interest rate at time \( t \);
\( \Delta USINT_t \) is the yield (during the last 3 months) on 3 months United States treasury bills at time \( t \);
\( \Delta SECPI_t \) is the monthly inflation for the neighboring country - Senegal - at time \( t \);
\( DUMDIR \) is dummy variable for artificial fixing of the exchange rate periods;
\( DUMDRU \) is a dummy variable for drought periods;
And \( \varepsilon_t \) is the disturbance term.

From equation (6) inflation depends on money supply growth, real GDP growth, nominal exchange rate, world prices, domestic interest rate, foreign interest rates, neighboring country (Senegal) inflation rate, dummies for the artificial fixing of Gambia dalasi (GMD) against major international currencies but mainly the US dollar and drought periods respectively.

The estimated result of equation (6) is summarized in Table 2. The coefficients represent elasticities and the standard deviation are in parenthesis.

Several robustness checks were performed to strengthen our assessment. First, on stability diagnostics of the estimated coefficients in the estimated models using the tests of Brown et al. (1975), known as the cumulative sum of squares (CUSUMSQ). The results are presented in Appendix B, figure B1. As seen from the figures, all the plots of statistics CUSUM and CUSUMSQ are inside the critical bound at 5 percent level of significance, which entails that all the coefficients are constant. Second, on coefficient diagnostics, we performed a Wald test to test whether the coefficient are different from zero. The Wald joint test indicates that the coefficients are jointly significant and are different from zero.

The outcome of the single equation model reveal that Gambia inflation is determined mainly by exchange rate. Nominal depreciation/appreciation of the dalasi vis-à-vis the US dollar affect inflation in all specifications suggesting the existence of the pass-through on inflation. Similarly, money supply growth also affect inflation in all the specifications suggesting monetary policy impact inflation. Inflation in neighboring country (Senegal) is significant in all the specifications where it is included suggesting imported inflation from the neighboring country. Lag (previous period) inflation positively affect current inflation suggesting that inflation exhibits inflation initial. While the coefficient for World consumer price index is significant in only one specification, the imported value variable used as a proxy for economic activity is negative and statistically insignificant in all the specifications.

The coefficient for DUMDIR dummy for the artificial fixing of the US dollar against Gambia dalasi to a “natural rate” is positive and statistically significant in all the specifications. This suggests a significant existence of “black market” activity where the US dollar could be traded above the “fixed rates”. These costs are passed to consumers in the form of price increases. However, the coefficient for drought dummy (DUMDRU) is negative and statistically insignificant. The elasticities of inflation to money supply, exchange rate, Senegal inflation and artificial fixing of the exchange rate based on specification 1 of the single equation suggested that, a one percentage increase in money supply, depreciation of the dalasi against US dollar, artificial fixing of exchange rate, and Senegal inflation would raise inflation by 0.04, 4.87, 0.04, 0.36 percent respectively. In addition, increased in previous period inflation by one percentage point will increase inflation in the current period by 0.36 percent. Empirically, a one percent increase in real GDP (using imported value as a proxy) adds -0.48 percent to inflation but
statistically insignificant. The negative responses of inflation to imported value suggests that demand-pull inflation is weak in The Gambia.

Although the results are appealing economically, they may be subjected to measurement bias. Regression of a single equation failed in taking into account the interrelation among variables. To address this measurement bias in the estimation, we use the structural vector auto regression (SVAR).

**Structural Vector Autoregression Model (SVAR)**

In order to understand the short-term dynamics of the Gambia inflation, we use structural VAR (SVAR) model with recursive structure. The short term dynamic can be explained using a linear system of equations. We follow Almounsor (2010), Moriyama (2008), and McCarthy (2000) by assuming the recursive structure of the economy: (i) foreign inflation is exogenous to the system and therefore affects all disturbances to real GDP growth, money supply growth, exchange rate, and domestic inflation; (ii) demand shocks to GDP (\(y\)) affects all variables in the system except foreign inflation; (iii) money demand shocks affect the disturbances of exchange rate and inflation, and (iv) exchange rate shocks does affect money supply taking into account that the central bank sets money growth as a policy variable. The above assumptions can be presented in the following linear system of equations:

\[
\dot{p}_t = E_{t-1} \dot{p}_t + \mu_1 \varepsilon_{t}^{p} + \mu_5 \varepsilon_{t}^{y} + \mu_9 \varepsilon_{t}^{m} + \mu_{10} \varepsilon_{t}^{e} + \varepsilon_{t}^p \\
(11)
\]

Where \(\dot{\cdot}\) indicates the first difference and the data are in logs. \(E_{t-1}\) represents the conditional expectation operator, and \(\mu\) is the impulse response coefficients. The conditional expectation is represented by linear projections of lags for the five variables and the choice of lag is based on the Schwarz Information Criterion. Hence, the inflation dynamics in this model will be explained by shocks of foreign prices, money supply, domestic demand, and exchange rate would result to the following recursive structural VAR.

\[
y_t = A(L)y_{t-1} + B \varepsilon_t, \\
(12)
\]

Where \(y=(\dot{p}^*, \dot{m}, \dot{y}, \dot{e}, \dot{p})\),

\[
\varepsilon = (\varepsilon^p, \varepsilon^m, \varepsilon^y, \varepsilon^e, \varepsilon^p), \quad \text{and} \\
B = \begin{bmatrix}
1 & 0 & 0 & 0 & 0 \\
\mu_1 & 1 & 0 & 0 & 0 \\
\mu_2 & \mu_3 & 1 & 0 & 0 \\
\mu_4 & \mu_5 & \mu_6 & 1 & 0 \\
\mu_7 & \mu_8 & \mu_9 & \mu_{10} & 1
\end{bmatrix}
\]

Inflation dynamic is examined by impulse responses to various shocks, short-term elasticities, and various decompositions. Impulse response trace the impact of shock coming from the endogenous variable to other variables including inflation through the structural VAR. From SVAR model, depreciation of the GMD vis-à-vis the US dollar , increase in money supply growth, increase in prices in Senegal, and increase in world prices would result in higher inflation. Most of the adjustment of inflation will be over within 15 to 18 months (see Appendix C, Figure C1).
Results from Variance decomposition provide the percentage of the forecast variance of inflation that is attributed to various shocks in the system. The impulse responses are presented in Appendix C, Figure C1, followed by the derived inflation elasticities in Table 3.

We followed Almounsor (2010) and Moriyama (2008) to compute the short and medium term elasticities by dividing the cumulative impulse response of CPI inflation after q months by cumulative responses of other variables in the systems in the same corresponding period. The variance decomposition of inflation are presented in Figure 7 and Table 4. The residuals are presented in Appendix C, Figure C3.

Empirically, a one percent increase in foreign prices will result in a 5.81 percent increase in domestic inflation in the first six months. This implies a positive relation between world prices and prices in The Gambia. Food is one of the major determinants of international commodity prices and hence world CPI. In the Gambia, food constituted a great weight in the CPI basket 55 percent of which is mainly imported. In the short to medium term, the Gambia will continue to import food to meet the increasing local demand. On the domestic front, The Gambia is challenged continuously with recurrent droughts that makes it much more difficult for adequate food production to meet the demand. Therefore, imported inflation will have an impact on prices in The Gambia. Prices in Senegal, a close neighboring country positively affects prices in the Gambia both in the short and medium term. A one percent raise in prices in Senegal, will increase prices in The Gambia by 3.17 percent in the first 6 months.

A graphical presentation of Senegal consumer price index and domestic consumer price index shows a positive relationship between the two. This correlation disappeared during the periods of the financial crisis and intermittent border closure between the two countries.

Money supply shocks have an increasing impact on domestic inflation. A one percent increase in money supply will result in 4.47 percent pick-up in inflation after the first 6 months. This positive relationship between money and domestic prices conforms to the quantity theory of money. The magnitude of the relationship between domestic prices and money declined in one year (twelfth month) after monetary innovations. This demonstrates that Central Bank’s monetary policy to curb any inflationary pressure emanating from money expansion. Similarly, a one percent depreciation of the dalasi vis-à-vis the US dollar yields 10.96 percent increase in domestic inflation. By the end of the three years, the elasticity of the pass-through declined to 3.65 percent but remained substantial. This implies that the Gambia domestic prices are vulnerable to exchange rate movements particularly the US dollar.

Domestic inflation shocks also impact by inflation in the previous periods which resulted to further inflationary pressure. Hence, the second round impact of increase in prices due to change in prices. This is illustrated in the impulse response charts in Appendix C, Figure C1. Taking into account the recursive nature of the system, these price shocks include other shocks in the system ranging from monetary expansion, exchange depreciation, imported inflation etc. which multiply the effect of inflation shocks. In addition, taking into account prices are sticky upward, retailers passed any upward changes in prices to consumers. Furthermore, many merchants took the recent introduction of value added tax (VAT) in The Gambia as an opportunity to increase domestic prices.

According to the variance, decomposition of inflation revealed that short-term dynamics in inflation is explained largely by its own fluctuation, money supply and imported inflation. Money supply shocks account for about 9 percent of variation in inflation within the first 12 months. While Senegal inflation and world CPI account for 9 percent each, exchange rate changes explain 1.2 percent of inflation variation. In the medium term, while shocks to world consumer price index, money supply, exchange rate, domestic demand and Senegal inflation explains about 41 percent, fluctuations of inflation by itself explains about 59 percent of inflation dynamics in The Gambia.

The results of Johansen tests suggest a co-integrating vector in the data. The results of the test is presented in Appendix A,
Table A2. We therefore proceed with vector error correction model which is discussed in the next section.

**Vector Error Correction Model (VECM)**

To estimate Vector Error Correction Model (VECM), we follow Almounsor (2010), Moriyama (2008) and McCarthy (2007), and expressed the model in this form:

$$\Delta x_t = \mu + \sum_{i=1}^{k} \Gamma_i \Delta x_{t-i} + \alpha \beta' x_{t-i} + \epsilon_t$$  \hspace{1cm} (13)

The above equation differs from the simple VAR model in the first difference in $\beta' x_{t-i}$ term which is the error correction model to approximate the deviation from the equilibrium and estimates the short-run response necessary for the system to return to equilibrium.

The results of the impulse response to shocks based on VECM analysis are tabulated in Figure 8. The impulse response from the analysis exhibits parallel behavior between inflation and the related variables but different elasticities to some extent. Interestingly, the shocks of exchange rate (depreciation) and value of imports negatively affect inflation after 20 and 5 months respectively. Furthermore, the elasticities associated with exchange rate and value of imports are very small. This unusual pattern of these variables questioned the validity of VECM analysis.

From the VECM variance decomposition of inflation, shocks to World Consumer Price Index, Senegal inflation and domestic money supply are the major dominants of variations of inflation in the short and medium term. As indicated in the previous results, inflation itself accounts for much of the inflation dynamics. In a 3 year interval, shocks to money supply, exchange rate, world Consumer Price Index, domestic demand and Senegal inflation explains about 45 percent of variations in inflation as compared to 41 percent in SVAR analysis. In addition, fluctuations in inflation itself explains 55 percent of variation in inflation as compared to 59 in the SVAR analysis. Taking into account small elasticities for money supply and exchange rate in VECM, the stationarity of variables in their first difference and short-term relation between inflation and other variables, we are of the view that the single equation and structural VAR models are the most appropriate for the study.

**CONCLUSIONS AND POLICY RECOMMENDATIONS**

The empirical findings support the positive relationship between money, exchange rate and inflation. The results are robust. The relationship between exchange rate and inflation is statistically significant. In addition, the relationship between money and inflation is positive and statistically significant. The exchange rate pass-through for GMD/ US dollar exchange rate is positive and immediate as compared to GMD/ British Pound Sterling or GMD/Euro. Furthermore, prices in Senegal positively impact prices in The Gambia. The implication is that monetary authorities should pay a much closer attention to money growth and exchange rate movements particularly (Gambia dalasi vis-à-vis US dollar). In addition, the authorities need to pay closer attention to the price developments in the neighboring countries, Senegal in particular, in conducting monetary policy framework. The results reveal that inflation in The Gambia has inflation initial. Hence, current inflation is influenced to a greater degree by past inflation. It may take some time for inflation to decline once there is an uptick. The findings urged the authorities to limit artificial fixing of the exchange rate or the fear of float as this measure does not only exert further depreciation on the dalasi due to limited foreign exchange (which could be due to hoarding), increase imperfect competition in the foreign exchange market, but also could further amplify inflation pressure.

The results are in line with recent inflation developments in The Gambia. An uptick in food prices contributed to the overall inflation despite CBG contractionary monetary policy. The nominal depreciation of the GMD/USD coupled with high import prices exerts inflationary pressures. The high elasticity of inflation to the nominal exchange rate is in line with authorities’ view on the relationship between nominal exchange rate and macroeconomic stability in The
Gambia. Although imported prices are exogenous determinants on the inflation dynamics of The Gambia, the authorities could curb the impact of such shocks on domestic prices. Apparently, during the second half of 2010, the CBG intervened in the foreign exchange market by selling foreign exchange in order to stabilize the nominal exchange rate. Although such interventions could lead to decline in reserves and capital outflow, CBG’s goal in attaining macroeconomic stability led to the smoothing of exchange rate volatility. Therefore limiting exchange rate depreciation of the GMD vis-à-vis the US dollar stabilizes prices in the short-term. In the long-run however, loss of international reserves as a results of debt service payments, low expected groundnut exports receipts due to delay in rains or drought, and Ebola impact on the tourism industry will make it much more difficult to maintain exchange rate stability.

Inflation harm the poor most. The depreciation of the dalasi vis-à-vis US dollar which could be due to the macroeconomic fundamentals or the artificial fixing of exchange rate will harm the poor most as they are the most vulnerable. The depreciation pressures are passed to the consumers in the form of price increase. In addition, the number of people living below 1.25 USD per day (UN poverty measure) will likely increase as more dalasi will be needed to meet this USD beach mark.

Major shortcomings of the paper includes data quality particularly where we used proxies and failure to account for impact of government subsidies on oil prices. There was no complete pass-through of the international oil prices on domestic pump prices when oil prices were high. In addition, the study did not look into the impact of festivities such as “Magal”, “Tobaski”, “Ramadan” and Groundnut Trade Season (when farmers move their nuts across both sides of the divide depending on which country offers a more competitive price for their nuts) on domestic prices. Future research could account for these on domestic prices. Notwithstanding these limitations, the estimated relationship between inflation and its determinants particularly money supply, exchange rate, and foreign prices could help to a certain extent CBG construct and implement its monetary policy framework.
FIGURES AND TABLES

Figure 1: The Gambia: Consumer Price Index, 1985-2014 (Annual percent change)

Source: Gambia Bureau of Statistics (GBoS)

Figure 2: Gambia: Consumer Price Index, 2005-2014 (y-o-y, in percent)
Figure 3: Inflation and Money Growth, 2005-2014

Figure 4: CPI, Exchange Rate, and Foreign Price, 2005-2014
Figure 5: Domestic and Foreign Interest Rates, 2005-2014

Figure 6: Gambia consumer price index and Senegal consumer price index
Figure 7: Variance Structural Decomposition of Inflation: SVAR Analysis
Figure 8: Variance Decomposition of Inflation: VECM Analysis
Table 1. The Gambia: Consumer Price Index Market in Basket (In percent)

<table>
<thead>
<tr>
<th>Commodity</th>
<th>CPI Weights</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>55</td>
</tr>
<tr>
<td>Nonfood</td>
<td>45</td>
</tr>
<tr>
<td>Clothing</td>
<td>11</td>
</tr>
<tr>
<td>Health</td>
<td>1</td>
</tr>
<tr>
<td>Housing, Electricity and Water</td>
<td>3</td>
</tr>
<tr>
<td>Transport</td>
<td>4</td>
</tr>
<tr>
<td>Recreation and Culture</td>
<td>2</td>
</tr>
<tr>
<td>All items</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Gambia Bureau of Statistics

Table 2: Single Equation Model Regressions

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
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<tbody>
<tr>
<td>INTERCEPT</td>
<td>0.091</td>
<td>-0.132</td>
<td>-0.126</td>
<td>0.041</td>
</tr>
<tr>
<td></td>
<td>(0.081)</td>
<td>(0.069)</td>
<td>(0.068)</td>
<td>(0.046)</td>
</tr>
<tr>
<td>D(WCPI)</td>
<td>0.156</td>
<td>0.085</td>
<td>0.118</td>
<td>0.284*</td>
</tr>
<tr>
<td>Variable</td>
<td>Coefficient 1</td>
<td>Coefficient 2</td>
<td>Coefficient 3</td>
<td>Coefficient 4</td>
</tr>
<tr>
<td>-------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td>D(LIMP)</td>
<td>-0.479</td>
<td>-0.518</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.356)</td>
<td>(0.364)</td>
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<tr>
<td>D(MS)</td>
<td>0.040**</td>
<td>0.041**</td>
<td>0.044**</td>
<td>0.061***</td>
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<td></td>
<td>(0.017)</td>
<td>(0.018)</td>
<td>(0.018)</td>
<td>(0.018)</td>
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<tr>
<td>D(INT)</td>
<td>0.129**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.057)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>D(USINT)</td>
<td>0.152</td>
<td></td>
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<tr>
<td></td>
<td>(0.213)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D(LUSD)</td>
<td>4.873**</td>
<td>3.251**</td>
<td>3.707**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.857)</td>
<td>(1.540)</td>
<td>(1.566)</td>
<td></td>
</tr>
<tr>
<td>D(LEURO)</td>
<td>-0.017</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>(0.053)</td>
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<td></td>
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<tr>
<td>D(LGBP)</td>
<td>-0.012</td>
<td></td>
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<tr>
<td></td>
<td>(0.049)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D(SECPI)</td>
<td>0.043**</td>
<td>0.044*</td>
<td>0.044**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.020)</td>
<td>(0.020)</td>
<td>(0.02)</td>
<td></td>
</tr>
<tr>
<td>DUMDIR</td>
<td>0.362*</td>
<td>0.467**</td>
<td>0.419*</td>
<td>0.242*</td>
</tr>
<tr>
<td></td>
<td>(0.232)</td>
<td>(0.232)</td>
<td>(0.233)</td>
<td>(0.135)</td>
</tr>
<tr>
<td>DUMDRU</td>
<td>-0.017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.123)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D(CPI(-2))</td>
<td>0.329***</td>
<td>0.318</td>
<td>0.326***</td>
<td>0.247**</td>
</tr>
<tr>
<td></td>
<td>(0.082)</td>
<td>(0.082)</td>
<td>(0.082)</td>
<td>(0.110)</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.27</td>
<td>0.22</td>
<td>0.23</td>
<td>0.29</td>
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<tr>
<td>F- Stats</td>
<td>4.33</td>
<td>6.63</td>
<td>6.03</td>
<td>5.77</td>
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<tr>
<td>DW</td>
<td>2.14</td>
<td>2.16</td>
<td>2.16</td>
<td>1.93</td>
</tr>
</tbody>
</table>
The coefficients of the variables are listed and standard errors are in parentheses. *** 1% significance level, ** 5% significance level, and * 10% significance level.

Table 3: Inflation Elasticities to Various Shocks

<table>
<thead>
<tr>
<th>Period</th>
<th>WCPI</th>
<th>MS</th>
<th>LUSD</th>
<th>SECPI</th>
<th>LIMP</th>
</tr>
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<tbody>
<tr>
<td>3</td>
<td>17.61</td>
<td>11.27</td>
<td>-74.12</td>
<td>5.44</td>
<td>38.57</td>
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<tr>
<td>6</td>
<td>5.81</td>
<td>4.47</td>
<td>-10.96</td>
<td>3.17</td>
<td>11.33</td>
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<tr>
<td>12</td>
<td>2.05</td>
<td>2.15</td>
<td>-10.96</td>
<td>2.76</td>
<td>2.53</td>
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<tr>
<td>18</td>
<td>1.77</td>
<td>2.33</td>
<td>35.93</td>
<td>4.10</td>
<td>1.61</td>
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<tr>
<td>24</td>
<td>2.28</td>
<td>3.15</td>
<td>10.65</td>
<td>5.27</td>
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<tr>
<td>30</td>
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<td>5.92</td>
<td>5.90</td>
<td>1.45</td>
</tr>
<tr>
<td>36</td>
<td>1.91</td>
<td>3.87</td>
<td>3.65</td>
<td>7.89</td>
<td>1.26</td>
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Table 4: Variance Decomposition of Inflation: SVAR Analysis
<table>
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<tr>
<th>Period</th>
<th>CPI</th>
<th>WCPI</th>
<th>MS</th>
<th>LUSD</th>
<th>SECPI</th>
<th>LIMP</th>
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</thead>
<tbody>
<tr>
<td>3</td>
<td>92.09</td>
<td>0.64</td>
<td>1.89</td>
<td>0.04</td>
<td>5.24</td>
<td>0.10</td>
</tr>
<tr>
<td>6</td>
<td>78.69</td>
<td>3.52</td>
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<td>1.12</td>
<td>9.81</td>
<td>1.13</td>
</tr>
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<td>12</td>
<td>63.81</td>
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<td>18</td>
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<td>1.96</td>
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<td>9.26</td>
<td>2.23</td>
<td>9.43</td>
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<td>2.65</td>
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<td>9.38</td>
</tr>
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</table>

**Table 5: Variance Decomposition of Inflation: VECM Analysis**
ENDNOTES

1Initial work on the project was done while the author was with the International Monetary Fund (IMF). For constructive ideas, comments, and suggestions, I am grateful to Slavi Slavov, David Dunn, Meshack Tjirongo (all IMF), Abdoulie Sireh Jallow, Bachir Soubou, Bambo B. Samateh, Cheikh Diop (all IsDB) and participants in the 2016 Pennsylvania Economic Association (PEA), USA. All errors or interpretations remain mine.

2See Cham (2009).
3See Valdovinos, 2008.
4See Moriyama (2008).

5The data is sourced from International Monetary Fund’s International Financial Statistics.

6The rate of return on Gambia treasury bills is an important component looking at the current domestic debt situation of the country.

7The Unit root test indicated that all the variables are non-stationary at level but stationary at first difference. See table 1 for unit root results.

8Real economic activity was approximated by the monthly volume of imports.

9The intervention in the exchange rate started in 2010 where directives been issued to trade the GMD vis-à-vis the US dollar within a “range” or “natural rate”.

10When we used Gambia dalasi per Great Britain pound Sterling or Gambia dalasi per Euro currency, the coefficient is negative and statistically insignificant reflecting the fact that the Gambian authorities follow more closely the movement of the US dollar compared to other international currencies.

APPENDIX A: TABLES

Table A1: Augmented Dicky-Fuller Unit Root Test 1/ 2 / 3 /

<table>
<thead>
<tr>
<th>Variable</th>
<th>Level</th>
<th>1st difference</th>
<th>2nd difference</th>
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<td>0.000</td>
<td>Not needed</td>
</tr>
<tr>
<td>WOIL</td>
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<td>0.000</td>
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</tr>
<tr>
<td>LIMP</td>
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<td>0.000</td>
<td>Not needed</td>
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<tr>
<td></td>
<td>Eigenvalue</td>
<td>Trace Statistics</td>
<td>5%</td>
</tr>
<tr>
<td>-------</td>
<td>------------</td>
<td>------------------</td>
<td>-----</td>
</tr>
<tr>
<td># of Co-integration(s)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None*</td>
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<tr>
<td>At most 5</td>
<td>0.005706</td>
<td>0.686708</td>
<td>3.841466</td>
</tr>
</tbody>
</table>

1/ All variables are in natural logarithm.
2/ P-values are reported for the Null hypothesis: Ho: series have a unit root.
3/ All tests include intercept and the number of lags is based on Schwartz Information Criterion.

Table A2: Johansen Co-Integration Test 1/

Unrestricted Co-integration Rank Test (Trace)
Trace test indicates 1 co-integrating eqn(s) at the 0.05 level

* denote rejection of the hypothesis at the 0.05 level

** Mackinnon-Haug-Michelis (1999) p- values

Unrestricted Co-integration Rank Test (Maximum Eigenvalue)

<table>
<thead>
<tr>
<th>Hypothesized # of Co-integration(s)</th>
<th>Eigenvalue</th>
<th>Max-Eigen Statistic</th>
<th>5% Critical value</th>
<th>P-value</th>
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<td>3.841466</td>
<td>0.4073</td>
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</tbody>
</table>

Max-eigenvalue test indicates 1 co-integrating eqn(s) at the 0.05 level

* denote rejection of the hypothesis at the 0.05 level

** Mackinnon-Haug-Michelis (1999) p- values

1/* indicates 5 percent significance
APPENDIX B

Figure B1: Cumulative Sum and cumulative Sum Squares
Figure B2: OLS Regressions and Residuals and Fitted Values
APPENDIX C

Figure C1: Impulse Response of Inflation to Structural Shocks: SVAR Analysis
Accumulated Response to Cholesky One S.D. Innovations ± 2 S.E.

Accumulated Response of CPI to CPI

Accumulated Response of CPI to WCPI

Accumulated Response of CPI to MS

Accumulated Response of CPI to LUSD

Accumulated Response of CPI to SECPI

Accumulated Response of CPI to LIMP
Figure C2: Impulse Response of Inflation to Shocks: VECM Analysis

Response to Cholesky One S.D. Innovations

Response of CPI to CPI

Response of CPI to WCPI

Response of CPI to MS

Response of CPI to LUSD

Response of CPI to SECPI

Response of CPI to LIMP
Figure C3: Structural VAR Model Residuals


Cham, Tamsir. 2009. Is WAMZ an optimum currency area (OCA)? West African Journal of Monetary and Economic Integration. 9(2), 89-113.


BROADBAND AGGREGATION PROJECTS FOR PENNSYLVANIA AND NEW JERSEY 2015-2016

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Dellicker Strategies
Mechanicsburg, PA 17050

ABSTRACT

School access to affordable and faster high speed broadband is critical to educational development and human capital acquisition by students when aligned with new educational learning models. A market failure exists where public and private schools typically purchase internet services individually leading to higher prices and less bandwidth than if the schools purchased bandwidth as an aggregate consortium. Five recent broadband aggregation projects in Pennsylvania and New Jersey provide evidence that consortium purchases lead to greater bandwidth and lower aggregate prices in megabits per second.

I. INTRODUCTION

Broadband is an enabling platform with significantly improved speeds to enhance existing and to develop new services for business and individuals. The benefits of broadband can serve as a technological innovative input aligned with other inputs or business activities in economic sectors including the education sector where new learning models such as blended or hybrid learning combined with broadband can lead to greater human capital of students evidenced by higher test scores (Katz and Avila, 2010; Katz, April 2012; Kelly and Rossotto, 2012; Dellicker Strategies, 2016).

Market failures exist, such as poor information on management and technology, information bottleneck complexity and insufficient entrepreneurial support result in resources are not being used in an efficient growth-promoting means leading to economic under-performance (Bartik, July 1, 1996; Katz, April 2012). Historically, school districts exhibit an information market failure where schools have bought internet services separately district-by-district in relatively small amounts. The result is lower bandwidth purchased at relatively higher prices per megabit per second (mbps) for these districts (Dellicker Strategies, June 15, 2015).

To overcome this market failure for school districts, districts could aggregate their buying opportunities by purchasing internet in bulk. The purchase process can be facilitated by third-party technology infrastructure service consultants to overcome existing barriers for bulk purchasing supplied by competing service vendors. The expectation is to accomplish scale procurement for both Internet access and wide area network services resulting in volume discounts price for higher speed and volume shared services bandwidth.

This paper will briefly discuss the broadband network infrastructure with a focus upon school districts. Afterwards, four recent broadband aggregation projects with school districts are described: New Jersey Digital Readiness for Learning and Assessment Project - Years 1 and 2, Pennsylvania Luzerne Intermediate Unit 18 & Northeastern Educational Intermediate Unit 19, Pennsylvania Berks County Intermediate Unit...
II. BROADBAND NETWORK INFRASTRUCTURE

From Dellicker Strategies (June 15, 2015), “technological advances are driving innovations in education that enable administrators to be more efficient, help teachers deliver more personalized instruction, and motivate students to succeed. All of these innovations require access to quality, high-speed internet service at school.” Public school districts, public charters, and private/non-public schools typically meet this demand by purchasing internet services from an Internet Service Provider (ISP) independently from each other. The result is higher prices for less bandwidth relative to schools purchasing services in the aggregate and then distributing to each school.

Kelly and Rossotto (2012) define broadband as multiple aspects of network and devices including the following:

- Infrastructure or “pipes” used to deliver services to users.
- High-speed access to the Internet, which is the traditional definition in terms of data transmission speed or the amount of data that can be transmitted across a network connection in a given period of time. Speeds above certain thresholds are required for desirable applications such as video viewing, education applications or gaming. The speed is generally measured in megabits per second (mbps), known as the data transfer rate or throughput.¹
- Services and applications available via broadband networks that may be bundled in a “triple-play” package with broadband Internet access, telephone access (wireline or mobile) and television.

The basic technologies to construct a broadband supply chain are discussed briefly. Satellites are used primarily for international connectivity and some domestic backbones, especially serving remote or sparsely populated areas. Satellites usually have between 24 and 72 transponders with a single transponder capable of handling 155 mbps. The next generation of satellites will offer speed in excess of 100 several gigabits per second (gbps).²

Microwave systems provide point-to-point broadband transmission are short distances, generally 40 to 70 kilometers that can support up to 500 mbps. As fiber technology improve and costs fall, fiber cable is replacing microwaves. Microwave technology is used almost extensively for point-to-point backhaul and last-mile line of sight communications.

Internet content tends to travel through fiber optic cables, especially for long-haul transmissions. Fiber optic cable operates at the frequencies of light allowing large volumes of traffic at a rate of several gbps or even at terabits per second (tbps). Due to the high expense of installing cable, not all individual fibers will be used. Carriers can activate “light” individual strands as demand grows. Installed but unused “dark” fiber can be activated later as required (Kelly and Rossotto, 2012).

Copper wire offers significantly less channel capacity and slower transmission speeds than other media and is being replaced by fiber optic cable. Copper wire tends to be in areas of last mile connections with residential homes.

The broadband supply chain has four main infrastructure components:
(1) International connectivity provides links to broadband networks in other counties usually via satellite and fiber optic cable.

(2) National backbone network provides pathways for transmitting Internet data across a country, typically via microwave, satellite, and fiber optic links. This also includes traffic management, exchange, and routing as well as issues related to enhancing efficiency and quality of Internet Protocol networks and Internet exchanges, metropolitan rings, and next-generation networks. An example is the current backbone network through the Northeast Corridor between New York City and the Washington DC Metro area along Route 1, Interstate Highway 95 and the Amtrak lines.

(3) Metropolitan, middle-mile or backhaul links provide the connection between local areas and the backbone network, usually via fiber optic and microwave and, to a lesser extent, satellite. In a wireless network, these links are used to bring traffic from cell sites back to a switching center known as the backhaul.

(4) A network wireline and wireless infrastructure connection that end users utilize to connect to the broadband network, the so-called “last mile” through an Internet Service Provider (ISP). The connection can be the following: typically, a separate connection by school to an ISP, a Local Access Network (LAN) connection by many subscribers in a large school building that connect directly to fiber or Ethernet backbone where broadband access is distributed through the LAN, or a relatively larger combination of subscribers or schools connect to fiber or the Ethernet backbone where broadband access is distributed through a Regional Wide Area Network (RWAN).

Many schools connect separately to an Internet Service Provider (ISP) for Internet access. Schools purchase Internet services independently from each other without coordination. With each school buying its own Internet access, few had enough buying power to get volume discounts or impact the market. As a result, schools were ineffective in influencing the price of broadband service.

Figure 1 shows a school connecting to an Internet Service Provider (ISP) for Internet access through a LAN or RWAN (Dellicker, 2012). A RWAN is a voluntary network of schools that connect together with high-speed broadband. While a LAN provides Internet access to many subscribers, a RWAN would secure an Internet connection serving all combination of school districts and schools and eliminating the need for separate Internet connections and a single LAN to an ISP. The increased coordination among schools within a school district enables greater broadband purchase typically at a lower price.
After the LAN or RWAN is established, schools do not need to use the Internet in order to exchange information with other regional schools. Instead, data traffic stays local and secure on its own private network. In addition, LANs or RWANs can provide shared access to other educational networks (ENs).³

Since the school district can now purchase a single high-speed connection to its LAN or RWAN, it can distribute Internet and other educational content to its outlying school buildings through separate connections from the school hub-site or intermediate unit to high schools, middle schools and elementary schools. Often districts are encouraged to “piggyback” on the LAN or RWAN procurements so they could secure these building-to-building connections more cost-effectively as part of a larger bid process.

Several wireline and wireless broadband technologies are used to support the LAN and RWAN: wireline-Digital Subscriber Line (DSL), cable modem, and fiber; and wireless-third (3G) and fourth (4G) mobile telecommunications systems and Wi-Fi.⁴

DSL technologies enables broadband Internet access over a public switched telephone line running copper wire already installed to homes and businesses. Subscribers must have a modem installed between their computer and the copper wire. Symmetric DSL is commonly used by local telephone companies to provide high-speed data services intended to provide equal speed for receiving and sending data.

Asymmetric DSL, used primarily by residential consumers, typically provides a faster download speed for receiving data than upstream speed for sending data with a maximum downstream of 6 mbps and upstream of 640 kbps. DSL technology continues to provide increasing data speed but bandwidth deterioration occurs as the distance for the exchange increases (Kelly and Rossotto, 2012).

Cable modems provide subscribers with access
to broadband services over cable television networks (CATV) coaxial lines. Internet access using CATV networks requires a cable modem and broadband access where television content is separated from Internet traffic. Users can access the Internet without disrupting cable TV service. The current available capacity of a cable modem connection is about 100 mbps, and this bandwidth is shared with the surrounding community.

A fiber-optic-based broadband network or fiber-to-premises is a fiber path linking the operator’s switching equipment to a subscriber’s home or business. Fiber optics uses flexible glass enclosed by cables connecting directly to a home or building by converting electrical signals carrying data to light and then signals the light through transparent glass fibers about a diameter of a human hair. Fiber generally replaces existing copper wire or coaxial cable but is increasing used for new housing or business developments where no copper or cable exists. Fiber has the capacity to transmit data at speeds surpassing any other broadband technology. Most fiber implementations offer point-to-multipoint typologies serving multiple premises.

Wireless technologies are developed around the International Mobile Telecommunications (IMT) family of five standards. Wireless converts mobile networks to broadband readiness in spectrum and equipment. Wireless requires wide spectrum bands to be able to provide broadband access at quality levels, which is primarily an issue of download speeds. A fixed wireless connection can be as fast as 1 gbps requiring a direct-line-of-sight between the provider’s transmission towers and transceiver equipment at school sites.

One example of a mobile wireless technology is Wi-Fi (Wireless Fidelity). Wi-Fi refers to the IEEE 802.11 standards specifying wireless local areas networking over 2.4 and 5 GHz frequency bands. Wi-Fi is generally used to redistribute broadband connection to a wider group of users in homes, offices, and “hotspots.” Wi-Fi’s success (1 in 10 people around the world uses Wi-Fi) is attributed to embedding Wi-Fi chips in computers and smartphones, operates on an unlicensed basis, ease of installation, and upgrade costs are with the consumer.

The broadband infrastructure connection through a LAN and particularly RWAN allows schools to buy Internet in bulk and save money on volume contracts. The result of broadband aggregation projects allows for greater bandwidth for schools to have greater information exchange, which provides better resources for teaching and learning.

III. BROADBAND AGGREGATION PROJECTS

Dellicker (2012) states that collaborative purchasing provides access to consortium services otherwise not available to individual schools. It also allows schools to negotiate volume discounts by aggregating their collective buying power thereby stimulating greater competition among vendors to provide internet services to schools at a higher volume demand (Katz, April 2012; Executive Office of the President, January 2015).

When schools also develop a shared infrastructure for distributing educational applications, they create a culture of cooperation that maximizes school resources across district boundaries. Working with Dellicker Strategies, this section summarizes recently completed 2015-2016 collaborative purchasing power arrangements:

- The New Jersey Digital Readiness for Learning and Assessment Project-Broadband Component-Year 1
- The New Jersey Digital Readiness for Learning and Assessment Project-Broadband Component-Year 2
- Pennsylvania Luzerne Intermediate Unit 18 & Northeastern Educational Intermediate Unit 19-Broadband Project
Each of the five broadband projects have collaboratively estimated of the amount of bandwidth required for various educational and administrative applications. To help understand future network upgrade considerations, Education Superhighway (February 2015) provided guidance for schools (see Figure 2).

Education Superhighway (November 2015) reports that the Federal Communication Commission’s (FCC) connectivity goals similar to the Technology Model are the following:

- Every school should have a broadband connection capable of scaling to 10 gbps. Today only fiber optic connections are capable of meeting that goal. When fiber optic connections are too costly, other technologies such as fixed wireless can be used as an interim substitute for smaller schools.
- The FCC provides every school district with a $150 per student total “Category 2” budget from 2015-2019 to put Wi-Fi in its classrooms. This goal is aligned with ConnectED’s (June 2013) goal of high-speed Wi-Fi of supporting 1:1 learning in every classroom (Education Superhighway, April 2014).
- $3 per mbps represents a price at which the E-rate program can support all school districts meeting the FCC’s 2018 goal of 1 mbps per student on Internet access. (Note: The current FCC’s minimum access goal is 100 kbps per student.) This price is achieved by school districts in the United States purchasing 1 gbps or more of internet access.  

The California Broadcast Task Force (2008) report upstream and downstream speeds needed...
for various services and applications. From the education section of the Task Force report, 10-100 mbps is needed for education services, broadcast video (standard definition and some high definition, HD), Internet Protocol television (IPTV) HD, telecommuting (high quality video); 100 mbps-1 gbps: multiple educational services, broadcast video full HD, full IPTV channel support, video on demand; and 1-10 gbps: live event digital cinema streaming and interactive remote visualization and virtual reality.

As stated buying higher bandwidth connections usually results in drastically lower prices per megabit. For example, from Education Superhighway (February 2015) and excluding the E-rate subsidy, the monthly costs for Internet access (2013 lit fiber averages) are:

- 10 mbps purchased -- $120/mbps
- 100 mbps purchased -- $25/mbps
- 1 gbps purchased -- $7/mbps

As previously mentioned, fiber allows for faster connections and lower cost per mbps as compared to legacy technologies. For example, Education Superhighway’s (April 2014) study of the for school districts’ Funding Year 2013 Form 471 submissions to the Universal Service Administration Company (USAC), Item 21 data on services submitted for reimbursement, Internet access over legacy technologies such as T1 costs on average $324 mbps and DSL costs $18 mbps that are significantly greater than the $7 mbps with lit fiber and greater bandwidth volume.6

For Internet access, fixed wireless connection ranging from 10-200 mbps have an average cost of $73 mbps per month relative to lit fiber connections with the same range with an average cost of $29 mbps per month. For a district WAN, fixed wireless connection of up to 1 gbps has an average cost of $22,283 per month relative to lit fiber connections with the same equivalent capacity of $1,099 per month. Fiber in schools permits a cost effective scale for speeds to allow for education curriculum models with digital learning capacities such as blended learning.

The E-rate program was created by the Telecommunications Act of 1996 to provide discounts to assist schools, public and private, and public libraries to obtain affordable telecommunications and Internet access. The level of discount ranges from 20 to 90 percent, depending on whether the school is located in an urban or rural area, on the percentage of its students eligible for the National School Lunch Program, and on the Category.7

Eligible services for discounts fall in Categories One and Two. Category One eligible services include data transmission services, Internet access and voice services. Category Two eligible services include internal connections, managed internal broadband services and basic maintenance of internal connections.8 Digital Learning Now (July 2013) report about 83 percent of public schools and 14 percent of private schools participate in the Program. The E-rate Modernization Order released on July 23, 2014 provides a focus for the E-rate Program on services necessary to support broadband to and within schools and libraries which began on July 1, 2015. For the first four broadband aggregation projects discussed below, schools will seek E-rate subsidies to support Internet access.9

The New Jersey Digital Readiness for Learning and Assessment Project-Broadband Component-Year 1

The New Jersey Digital Readiness for Learning and Assessment Project (NJDRSAP)-Broadband Component was conceived by the New Jersey Department of Education (NJDOE) in 2013, which supported the Middlesex Regional Educational Services Commission (MRESC) and Bergen County Technical Schools in creating the consortium. To facilitate the project, NJDOE contracted with Dellicker Strategies to use the procurement process to aggregate demand for internet access while cutting costs.10

After the issuance of a Request for Proposals (RFP) in 2014, a team of educators evaluated submissions, and the MRESC awarded service to seven different providers. As of June 2015, 145 school organizations signed up for $20.6 million in new consortium service contracts and started receiving Internet access on July 1, 2015.

From the Dellicker (June 15, 2015) report, the key program results are the following:

- The capacity of educational networks was enhanced significantly where Internet bandwidth increased 152
percent from 284 to 718 mbps for participating school organizations—a 2.5 times increase from their current Internet capacity.

- The value of K-12 Internet service contracts has increased substantially where the average monthly Internet prices declined from $26.77 to $6.40 per mbps for participating schools. The 76 percent price decrease saved schools an average of $20.37 per mbps each month totaling $89 million in cost savings.

- The quality of school technology infrastructure has improved where 25 participating school organizations upgraded to Ethernet fiber from cable modems or DSL. The statewide ratio of schools choosing fiber over copper increased from 71 to 79 percent. Furthermore, 69 K-12 organizations will now have access to regional wide area networks for enhanced service.

Given the success of the consortium purchase, MRESC have issued a second RFP to continue the work of reducing bandwidth costs for New Jersey schools in partnership with Bergen County Technical Schools and supported by the NJDOE and Dellicker Strategies.

**The New Jersey Digital Readiness for Learning and Assessment Project-Broadband Component-Year 2**

The purpose of the NJDRLAP-Broadband Component Year Two RFP is to help more New Jersey school organizations, including Newark School District, Newark charter schools and other Newark schools which were not captured in last year’s RFP to take advantage of the program for Internet access and use the upgraded infrastructure for promising educational and administrative applications.

Issuance of the RFP occurred on December 17, 2015. The target to execute master service agreement was on January 22, 2016. The service delivery start date was on July 1, 2016.

Based on the RFP, providers may propose services in three categories. Broadband Group A includes schools that prefer to receive their Internet Access as an asymmetrical service delivered on a best-effort basis directly from an ISP. Examples include cable modems, DSL service, Verizon FiOS® or other residential/small business services. In some cases, providers may be able to offer symmetrical bandwidth to schools in this category. Group A contains 13 New Jersey schools. The bandwidth submission increments are as follows:

- 50 to 100 mbps download (specify associated upload speed)
- 101 to 200 mbps download (specify associated upload speed)
- 201 to 500 mbps download (specify associated upload speed)
- 501 to 1,000 mbps download (specify associated upload speed)

Intra-District WAN Group B is for districts with multiple campus locations such as outlying elementary schools or middle schools that need to be connected together. The requested bandwidth increments are 100 mbps, 101 to 1,000 mbps, and 1,001 to 10,000 mbps. Group B contains 27 New Jersey schools.

The final is Category D that seek to consider dedicated Internet access to the school Hub-Site locations where there are 13 New Jersey schools. The bandwidth submission is the same as in Group A. No award information was available at the time of submission of this publication. Given school buyers would not accept the submission offers unless bandwidth has increased with a lowering of price per mbps relative to the current agreements, the expectation is an increase Internet bandwidth with a corresponding decline in average monthly Internet prices per mbps for participating schools.

*Pennsylvania Luzerne Intermediate Unit 18 & Northeastern Educational Intermediate Unit 19 and Pennsylvania Becks County Intermediate Unit*
**Unit 14-Broadband Projects**

Luzerne Intermediate Unit 18 (LIU) and Northeastern Educational Intermediate Unit 19 (NEIU) proposed to reauthorize the Northeastern Pennsylvania Regional Wide Area Network (NEPA RWAN) for schools across the region. The objective is to secure quality high-speed telecommunications transport and Internet access at competitive rates for 33 school districts and K-12 organizations and 44 school buildings within the service territories of LIU and NEIU. The Broadband Project is the third consortium project for LIU and NEIU together where previous contracts were awarded in 2006 and 2011.

The Berks County Intermediate Unit 14 (BCIU) proposed to reauthorize the Berks County Regional Wide Area Network (Berks RWAN) for schools across Berks County. The objectives of the consortium are to purchase Internet access in bulk, which is distributed to public school districts and career and technical schools across the county, and extend the network to additional schools where desired. The Broadband Project is the third consortium project for BCIU where previous contracts were awarded in 2006 and 2011.

For both Broadband projects, issuance of the RFP occurred on October 1, 2015. The target date for executed contracts was February 26, 2016. The service delivery start date was on July 1, 2016. The RFP provides three Categories for submission by Internet service providers.

Schools in the Regional Wide Area Network (WAN) Group A seek to connect a designated school Hub-Site to the regional WAN for the distribution of Internet port and other network-delivered applications. The bandwidth increments per hub-site are 100 mbps, 500 mbps, 1,000 mbps, and 10,000 mbps. For the LIU/NEIU Project, bulk Internet access from an Internet Service Provider maybe received at one or two different Network Operations Center while for the BCIU Project bulk Internet access is to be received at two different Network Operations Center. Group A contains 33 schools for the LIU/NEIU Project and 20 schools for the BCIU Project.

Intra-District WAN Group B is for districts with multiple campus locations that need to be connected together through a district-wide network. The bandwidth increments are the same as in Group A. Group B contains 11 schools in six districts for LIU/NEIU and 14 schools for BCIU.

Category C is bulk dedicated Internet access for the schools in Group A. They will receive Internet access through their respective regional WANs up to the maximum bandwidth of their individual transport connections. The bulk Internet access to be distributed through to the schools via respective regional WANs with a total Internet sought is from 1,000 mbps with different increments up to 50 gbps for LIU/NEIU and 40 gbps for BCIU Projects.

No award information was available for a comparison analysis at the time of submission of this publication. Similar outcomes are expected as in the New Jersey Project Year 2 where there will be an increase Internet bandwidth with a corresponding decline in average monthly Internet prices per mbps for participating schools.

**Pennsylvania Gigabit Revolution-High Speed Internet Access Project**

By the end of 2016, United Fiber & Data (UFD) is completing an ultrahigh speed, high-capacity fiber system from New York City, New York to Ashburn, Virginia, the DC Metro area, passing through the counties of Bucks, Montgomery, Berks, Lancaster, York and Adams in Pennsylvania. Once completed, this 367-mile backbone network will provide an alternative to the current Northeast Corridor backbone network (Untied Fiber & Data Network, 2016).
The Pennsylvania Gigabit Revolution is a project focused on enhancing the positive impacts in each of the six counties to foster retail and wholesale telecommunications market adjacent to the fiber route. The Gigabit project is funded in part by a grant from Pennsylvania Department of Community & Economic Development through the Broadband Outreach and Aggregation Fund and UFD.

The RFP was issued on April 4, 2016 organized into three different regional aggregation projects: Doylestown/Pottstown, Ephrata/Lancaster/Reading, and Gettysburg/Hanover/York. The RFP listed 196 buyer organizations where Internet service providers can submit responses in three categories:

- Category A: Fast Internet Access (Broadband Service)
- Category B: Super-Fast Internet Access (Dedicated Ethernet- 100 mbps)
- Category C: Ultra-Fast Internet Access (Dedicated Ethernet- 1,000 mbps)

From Dellicker Strategies (April 30, 2016), the United Fiber and Data-Broadband Aggregation Final Report state that there were 112 service providers that were informed of RFP where 19% or 21 out of the 112 requested RFP solicitation. Five of the 21 Internet service providers responded to the RFP with proposals within the target regions. Each buyer received at least one Internet service provider response.

The Final Report (April 30, 2016) provided positive preliminary results based on Internet service providers’ responses where at the time of the Report, contracts have not been concluded between buyers and providers. Four providers offered high speed Internet services to prospective buyers in the Doylestown/Pottstown region and five providers in the Ephrata/Lancaster/Reading region with an average proposed cost of $2.97 per mbps. Four providers offered high speed Internet services to prospective buyers in the Gettysburg/Hanover/York region with and an average proposed cost of $2.89 per mbps. The Final Report (April 30, 2016) state that users in the three aggregation regions will experience preliminary monthly recurring costs of at least 69 percent less costly mbps on average.

IV. CONCLUSION

Consortium purchases by school districts have led to expanded capacity (greater bandwidth), improved infrastructure (more fiber optic cables), and higher valued services (lower aggregate prices in mbps) for the four school broadband projects of two located in New Jersey and two in Pennsylvania. This result has occurred due to enhanced market place competition by service vendors bidding on volume consortium school district purchases using a third party consultant to overcome market failures. This procurement model can be replicated for other school districts and with similar positive expectations leading to advancing educational development associated with enhanced educational learning models. Furthermore, expanding upon this bidding process, consortium bidding for communities including schools and non-schools can provide higher values services as the preliminary evidenced for the fifth broadband project, the Pennsylvania Gigabit Revolution.

ENDNOTES

* The author would like to thank Kevin Dellicker and discussant for their assistance and comments. All possible errors are the author’s.
1. Bandwidth describes the capacity of a telecommunications circuit to transport information from one place to another. The higher the bandwidth, the faster the rate of transfer. Mbps measures the rate that one million bits of information can flow from point A to point B over a telecommunications circuit.

2. Satellites require several hundred million dollars in investment, have a limited usable life of about 20 years, latency issues, and less transmission capacity than fiber optic cables. Included in the costly investment, a user must have a two or three foot dish or base station, a satellite Internet modem, and a clear line of sight to the provider’s satellite.

3. An example of another EN is the Pennsylvania PAIUnet. PAIUnet emerged in 2008 after each IU successfully launched its own regional WAN. Leaders from the Pennsylvania Association of Intermediate Units (PAIU) decided to connect regional WANS to a statewide backbone for secure, high-quality and high-speed data exchange. PAIUnet is Pennsylvania’s first statewide network for K-12 education.

4. Another wireline technology is the use of an electric power line or broadband over power lines, where this technology provides broadband using power lines connected to a consumer’s residence. Consumers use special modems provided by the power company in order to access broadband Internet services.

5. A typical school district averages about 3,000 students will require 3 gbps of internet access under the goals of the FTC and ConneEd (Education Superhighway, April 2014). Affordable 10 gbps fiber connections are already in use in many school districts. Legacy technologies, such as copper T3s, DSL or cable modems are currently limited to speeds of 100 mbps and could only support 45-100 students.

6. Education Superhighway (April 2014) report an average of $9 mbps for lit fiber and $7 mbps for cable in the Funding Year 2013, Item 21 data. An example from the study concerning beneficial procurement scale economies is the average reported cost of a 100 mbps WAN circuit is $899, but with a 1 gbps circuit, 900% times faster with an averaged reported costs of $1,242-only 40% increase in cost.

7. The Universal Service Administration manages the collection of revenues from certain service providers and distribution through the four programs from the United Service Fund (USF). One of the four USF programs is the E-rate program. One of the reasons for providing subsidization to schools and libraries for services to support Internet access and broadband is similar to providing subsidization to rural telephone companies in low density high cost rural areas (Armstrong and Fuhr, January/February 1993).

8. Each year before the Federal Communications Commission (FCC) Form 471 application filing window opens, the FCC releases an Eligible Services List for the upcoming funding year. The list contains a description of the products and services that will be eligible for discounts, along with additional helpful information such as eligibility conditions for each category of service for each specified funding year (see the Universal Service Administrative Company website for greater details at http://usac.org/sl/applicants/beforeyoubegin/eligible-services/default.aspx).

9. Education Superhighway (April 2014) report that for school districts’ Funding Year 2013 Form 471 submissions to the Universal Service Administration Company (USAC), Item 21 data on services submitted for reimbursement, only 54% of E-rate reimbursements go for Internet access and district WAN connections with rest
for non-broadband services such as telephony, mobile and other services.

10. Dellicker Strategies is a Lehigh Valley, Pa., consulting firm specializing in broadband infrastructure, information applications and blended learning (http://www.dellicker.com/)

11. Dellicker Strategies is the Procurement Consultant for the Business Information Group that issued a Request for Proposal (RFP) on April 4, 2016. The RFP is for six Pennsylvania communities interested in purchasing upgraded Internet access via “off ramps” from the United Fiber and Data backbone fiber line previously mentioned in this paper (United Fiber & Data Network, 2016).

REFERENCES


DYSFUNCTIONAL CONSEQUENCES OF HIGH CORPORATE INCOME TAX RATES

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California University of Pennsylvania
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ABSTRACT
This is a theoretical paper that addresses detrimental consequences of high corporate income tax rates. Topics addressed include effects on rate of return on investment, differences between U. S. corporate income tax rates and other countries, earnings of foreign subsidiaries remaining in the foreign countries and corporate inversions. It is suggested that a reduction in corporate income tax rates may reduce the detrimental effects.

INTRODUCTION
During the 1970s when the Federal top individual income tax rate was 70% and the economy was stagnating, it was said that a high level of taxation can be viewed as capital punishment. It kills investment. A similar inference might be made today with regard to corporate income taxes. This is a theoretical paper that addresses a number of potential adverse consequences of high Federal corporate income tax rates in the United States, particularly considering that other countries have lower corporate income tax rates.

EFFECTS ON RATE OF RETURN
High corporate income tax rates may adversely affect investment by reducing rate of return on investment. Typical accounting and finance textbooks (Miller-Nobles, Mattison and Matsumura, 2016; Ross, Westerfield and Jordan, 2003) calculate rate of return on investment as Net Income / Investment. Net income is calculated as revenue minus expenses, including income tax expense. High corporate income tax rates result in lower rates of return on investment than would result if tax rates were low. It can be inferred that investors have less incentive to invest when corporate income tax rates are high. High corporate income tax rates also means that corporations have less after-tax income to re-invest in the business.

Studies that address the effects of corporate income taxes on economic growth include a study by Mertens and Ravn (2013, page 1213) that suggests that a 1 percentage point cut in the average corporate income tax rate raises real Gross Domestic Product (GDP) per capita on impact by 0.4 percent and by 0.6 percent after one year. Romer and Romer’s (2010, page 799) study suggests that an overall tax increase of one percent of GDP lowers real GDP by almost three percent. In a study of tax cuts and economic growth in Canada, Ferede and Dahlby (2012, page 563) suggest that a 1 percentage point cut in the corporate tax rate is related to a 0.1 – 0.2 percentage point increase in the annual growth rate.

HIGH U.S. CORPORATE TAX RATES COMPARED TO OTHER COUNTRIES
The U. S. corporate income tax rate of 35% is one of the highest amongst developed countries. Deloitte, Touche Tohmatsu, Limited (2015) compiled a list of National Corporate Income tax rates. Some of these rates are as follows:

Australia 30%
Bahamas 0%
Belgium 33%
Bermuda 0%
British Virgin Islands 0%
Bulgaria 10%
Canada 15%
Cayman Islands 0%
China 25%
Denmark 23.5%
Finland 20%
France 33.33%
Germany 15%
Greece 29%
Hong Kong 16.5%
Hungary 19%
Iceland 20%
India 30%
Ireland 12.5%
Isle of Man 0%
Israel 26.5%
Italy 27.5%
Japan 23.9%
Korea (ROK) 22%
Luxembourg 21%
Mexico 30%
Netherlands 25%
New Zealand 28%
Norway 27%
Poland 19%
Portugal 21%
Russia 20%
South Africa 28%
Spain 28%
Sweden 22%
Switzerland 8.5%
Taiwan 17%
Turkey 20%
United Kingdom 20%
United States 35%

It might be noted that some discussions of U. S. corporate income tax rates state that the top marginal rate is 39%. This may be somewhat misleading. The 39% rate is for a relatively narrow bracket that has the effect of offsetting lower rates for lower income brackets. For corporate income above $18,333,333, the corporate income tax rate is a flat 35%. Rupert, Pope and Anderson (2016) provide the following Federal corporate income tax rate schedule for 2015:

Income of more than 0, less than $50,000, tax is 15% of taxable income
Over 50,000, less than 75,000, tax: 7,500 plus 25% of excess over 50,000
Over 75,000, less than 100,000, tax: 13,750 plus 34% of excess over 75,000
Over 100,000, less than 335,000, tax: 22,250 plus 39% of excess over 100,000
Over 335,000, less than 10,000,000, tax: 113,900 plus 34% of excess over 335,000
Over 10,000,000, less than 15,000,000, tax: 3,400,000 plus 35% of excess over 10,000,000
Over 15,000,000, less than 18,333,333, tax: 5,150,000 plus 38% of excess over 15,000,000
Over 18,333,333, tax: 6,416,667 plus 35% of excess over 18,333,333

It might also be noted that various deductions and tax credits, known as tax expenditures, reduce the average tax rate. The United States Government Accountability Office (2013, page 11), and Keightley and Sherlock (2014, Page 5) provide lists of tax expenditures. Examples include accelerated depreciation of machinery and equipment, deferral of income from controlled foreign corporations, credit for increasing research activities, and deferral of gain on like-kind exchanges.

Other taxes that typically increase a corporation’s Federal income tax are income taxes imposed by individual states and municipalities.

These factors make it difficult to compare U. S. corporations and foreign corporations based on a comparison of the 35% U. S. rate and the national corporate income tax rates of other countries. However, it seems reasonable to infer that there are a number of other countries that tax corporate income less than the United States.

WORLDWIDE COMPARED TO TERRITORIAL TAXATION

The significance of differences between corporate income tax rates may be understood by considering the topics of a worldwide taxation system and a territorial taxation system. Mercatus Center (no date provided), and Rao (2015) provide definitions of worldwide and territorial systems. In a worldwide system, a government taxes a domestic corporation on all of the corporation’s earnings, regardless of where the earnings are earned. In a territorial system, a government taxes only the income earned in that country.

The U. S. government has a worldwide system. A U. S. domestic corporation is taxed at the 35% rate on all income, including income earned in other countries. However, income in other countries is not necessarily taxed immediately. A U. S. domestic corporation does not pay tax on foreign earnings until the earnings are repatriated, typically in the form of a dividend to the U. S. domestic corporation. To alleviate possible double taxation, the U. S. government provides a foreign tax credit for income taxes paid to foreign governments. If a U. S. domestic corporation in the 35% bracket were to repatriate some of its foreign income, the corporation would pay tax to the U. S. government equal to 35% of the repatriate income reduced by the foreign income
The taxation of repatriated income appears to give U. S. corporations an incentive to not repatriate income. McIntyre, Phillips and Baxandall (2015, page 1) reported that, as of 2014, Fortune 500 companies were holding more than $2.1 trillion in accumulated profits offshore.

It might be inferred that some corporations may be delaying repatriation of foreign income in hopes of a future drop in the U.S. corporate income tax rate. It creates a dilemma for policy makers. Collection of the full amount of tax on foreign income would provide revenue to pay for government spending. However, it seems unlikely that corporate managers will repatriate foreign income, particularly if they perceive that the U. S. corporate income tax will eventually be reduced.

A practical approach to the dilemma may be to reduce the U. S corporate tax rate to a level that would encourage repatriation of foreign income. The repatriated income could then be available for corporations to invest domestically.

CORPORATE INVERSIONS

Oxfam Media Briefing (2016), Rao (2015), and Patton (2014) address the topic of corporate inversions. A corporate inversion entails change in ownership such that the corporate domicile changes from one country to another. In the case of a U.S Corporation, a corporate inversion typically entails the purchase or creation of a corporation in a low-tax country that has a territorial taxation system, and a transfer of a controlling interest to the foreign corporation. The resulting corporation is not subject to the worldwide taxation system at U. S. Rates. Income earned in the U. S. is subject to the 35% U. S. corporate tax rate. However, income earned in other countries is subject to the corporate income tax rates of those countries. It might be inferred that high U. S. corporate income tax rates and the worldwide taxation system gives U. S. corporations incentives to invert, giving rise to further foregone taxes and shifting of investment away from the U.S.

CONCLUSIONS

This paper is a theoretical paper that addresses possible consequences of high corporate income taxes in the U.S. that may be detrimental to investment and economic growth. Issues include the general effects of high tax rates on after tax rate of return on investment. Lower rates of return makes U. S. corporations less attractive to investors than might be the case if tax rates were lower.

Issues also include the detrimental effects of U.S. corporate income tax rates being one of the highest amongst developed countries. Barry (2014) suggests that in recent years other countries have reduced their corporate income tax rates, while the U. S. has not reduced rates. The uncompetitively high corporate income tax rates may make the U. S. unattractive to international investors.

High corporate income tax rates, combined with a worldwide taxation system used by the U. S., may be responsible for substantial amounts of income earned by foreign subsidiaries remaining in the foreign countries. By remaining in the foreign countries, that income in not available for investment in the U. S.

High corporate income tax rates and the worldwide taxation system may also be responsible for the growing popularity of corporate inversions. The opportunity for tax savings may give corporate managers incentives to invert.

Continuation of uncompetitively high corporate income tax rates may be impractical. U. S. lawmakers may want to consider the possibility that instead of advocating the passage of laws to force repatriation of foreign income and the outlawing of corporate inversions, they might instead reduce the corporate income tax rate so that corporate managers would be more inclined to repatriate foreign income and less inclined to seek corporate inversions.

REFERENCES


ABSTRACT

This study shows the relationship between natural disasters and trade. Countries that have a high number of natural disasters due to their location and geography will find this study especially useful. The countries included in this study are the United States, Japan, and Haiti. This study was performed using time-series data. The natural disaster variable is presented as a dummy variable. Although there was not a significance between trade and natural disasters using dummy variables, the study shows significance using the number of natural disasters instead.

Keywords:
Natural Disasters, Trade, Macro Economy, PTSD

1. Introduction

Globally, natural disasters have increased significantly since 1950 (Table 1 Empirical Results). Knowing what to expect and how to quickly recover is crucial to a trading economy. There are two main types of disasters that need to be defined as separate. Natural disasters consist of flood, hurricanes, tornadoes, tsunamis, droughts and etc. Technological disasters include industrial and transportation accidents (EM-DAT 2011). However, only natural disasters were used in this study.

According to Gassebner (2010), there are two reasons why natural disasters have risen more so recently than in the past. One reason is due to an increase in data collection and communication. Another possibility is due to global warming of the earth. This increase is significant due to the impacts that it could have on trade, especially small coastal countries that have a large number of storms per year.

2. Literature Review: Country Size Matters

When discussing the impact of natural disasters, it is imperative that country size is included. If a country has a large area, it will be very likely that there will be a diversity of natural disasters in one given year. However, that does not necessarily mean the entire economy will experience change. As stated by Rasmussen (2004), small island economies are hit hard by storms because of the geographic location.

With various countries and trade, the geographic and economic size matters. For example, the United States could be hit hard with a large hurricane in the coastal south east region, but not have severe national consequences. It is estimated that in 2005, hurricane Katrina was one of the costliest tropical storms to ever hit the United States. According to the findings of another study, the estimated total cost of the storm was $200 billion and the death toll estimated at 1,200 people (Dolfman, Wasser, Bergman 2007). In the employment sector, there were approximately 95,000 jobs lost during this time. However, the national employment rate actually decreased from 5% to 4.5% between 2005 and 2006 (Bureau of Labor Statistics 2011).

Due to recent and historical events, another country worth noting is Japan. In March 2011, an epic earthquake hit Japan, ranking it fourth out of five temblors since AD 1900 (C.P. Rajendran 2011). The economic damage was estimated at $210 million and killed 20,319 people (World Bank 2011). The same earthquake was followed by a tsunami and is even said to be more devastating than hurricane Katrina (Mahr 2011). Historically, Japan has had many battles with earthquakes due to its size and location. Japan is slightly smaller than the state of California and is surrounded by water, leaving it exposed to future tsunamis.

The third country known for its direct relationship to natural disasters is Haiti. In January 2010, a severe earthquake sparked numerous aftershocks leaving 200,000-250,000 people dead and between $7,200-8,100 million in damage (Cavallo, Powell, and Becerra 2010). Adding insult to injury, briefly after the earthquake that left so many devastated, an outbreak of Cholera plagued the country as well. It was reported that 91,770 cases of Cholera had been reported, killing 2,071 people (Morbidity and Mortality Weekly Report 2010).

3. Methodological Framework and Data Analysis
The natural disaster data in this study is presented using the top ten most expensive disasters in the time period of 1989-2010. This data was extracted from the EM-DAT database. EM-DAT is a database for emergency events. By definition, EM-DAT categorized and listed their top ten disasters with the following qualifications: (i.) 10 or more people were killed (ii.) 100 or more people were reported affected (iii.) a call for international assistance and (iv.) there was a declaration of a state of emergency (EM-DAT 2011). This data was represented by using a dummy variable; “0” represented a year in which no disaster occurred and “1” represented a year in which a disaster did occur.

Using the information given, as well as added data, the model consists of the United States, Japan, and Haiti. For each country, the independent variables are imports and exports. There will be two separate tests for each country to show both imports and exports individually with relation to the other variable. Basically, each country will have two original models:

**Model 1:** \[ \text{Imports} = \beta_0 + \beta_1 \text{Tariff rate} - \beta_2 \text{Inflation} + \beta_3 \text{Natural Disaster} \]

**Model 2:** \[ \text{Exports} = \beta_0 + \beta_1 \text{Tariff rate} - \beta_2 \text{Inflation} + \beta_3 \text{Natural Disaster} \]

Imports of goods and services are presented by taking the natural logarithm of the U.S. dollar value (World Bank 2011). Exports of goods and services are the natural logarithm of the U.S. dollar value as well (Word Bank 2011). The tariff rate for each country was the weighted mean percentage for that country (World Bank 2011). The inflation rate was listed as the yearly inflation rate (World Bank 2011).

Using time-series data, a multiple regression was performed. A correlation matrix was also developed using the data presented. Three hypotheses were assumed before the test was completed:

**Hypothesis A:** An increase in tariff rates will cause a decrease in trade.

**Hypothesis B:** An increase in inflation will cause a decrease in trade.

**Hypothesis C:** An increase in natural disasters will cause a decrease in trade.
Japan Results:

**Japan Imports**

Regression Statistics

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**Japan Exports**

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### Haiti Results:

#### Haiti Imports

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| Natural Disasters(X3) | 0.094815203        | 0.315198841         | 0.712759017 |

#### Haiti Exports

**Regression Statistics**

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Inflation Rate (X2) -0.64601747 0.114567355 1
Natural Disasters(X3) 0.022756021 0.202319744 0.011141198 1

United States Results*

*Due to complete data, the United States’ test was run using the number of natural disasters declared per year from 1989-2010 (FEMA 2011).

United States Imports

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United States Exports

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The empirical results showed that there was not a significant relationship between natural disasters and trade in Japan and Haiti. However, for the United States, there was some significance. By using the total number of natural disaster declarations per year, the test showed clearer results. For imports in the United States, R-square was 88.6% and for exports 84.7%.

4. Conclusion

For further study on this subject, the data needs to be more complete. An increase in the number of years or quarterly data would increase quality. Also, a more precise estimate of the difference in size of each country would help explain why a larger country may or may not be affected by natural events. By adding other variables, such as education variables, technology growth, and exchange rates could also increase the quality of a study involving trade and natural disasters. Also, countries that are continuously struck by natural disasters need to focus their attention on PTSD treatment of the survivors. This will improve the recovery time of the local economies and industries.

Whether it is a large country or a small country, global natural disasters are on an increasing track. Further research will need to be narrowed down to the microeconomics and specific industries that are impacted by natural disasters. However, by being aware of the growing issue, trading economies can prepare for recovery and avoid major destruction to their imports and exports.

References


"Update: Outbreak Of Cholera -- Haiti, 2010."


ABSTRACT

For a large share of households with low and medium-low income, an increase in agricultural commodity prices has the potential to hurt a sizable part of the population through the rise in the cost of the consumption basket. Ex-ante this is the case. A less obvious channel, through changes in labor income would be more beneficial to low-income households. Overall, and assuming a 50% increase in international commodity prices, all households experience losses, around 5.5% of their initial expenditure. In terms of poverty, the increase would be 14%, with that of extreme-poverty even greater, 23%. Also, the results show that households in a situation of indigence and poverty would move in average further away from the thresholds lines. Most of the effects take place in the same quarter the shock occurs, reaching the full impact three quarters later.

1. INTRODUCTION AND MOTIVATION

There has been an increasing interest on the study of how the deepening of international relations may affect social welfare, employment, inequality and poverty, with the aim of being able to provide policy recommendations to minimize undesirable effects. This new interest has adopted mostly a micro perspective eased by the increasing availability of statistics at the household level, especially for developing and less developed countries.

In this paper we concentrate on the case of México, a country with a large share of its population with low and middle-low income, so there is a need to consider potentially negative effects, such as is the impact on poverty that may follow to a rise in the price of commodities that are used as intermediate inputs in the production of staple goods, which explain a large share of total expenditure in poorer households. As an example of the current importance of this issue, UNCTAD (2013) devoted one chapter of its Commodities and Development Report to the topic of the direct effects of the 2003-2011 commodity boom on poverty and food insecurity.

In the next sections we assess the ex-ante impacts on welfare and poverty at the household level, which can arise due to the increase of the international prices of agricultural commodities. In section 2 we review the existing literature on the nexus between trade policy and poverty for Mexico, and show some descriptive statistics. Section 3 develops the empirical framework, and presents the results, to estimate the set of parameters that constitute the main ingredient to the analysis carried out in section 4, where we simulate the welfare and poverty effects of a rise of the international prices of agricultural commodities. Section 5 summarizes our main results.
2. THE TRADE-POVERTY NEXUS: SOME PREVIOUS EVIDENCE

The economic literature on the links between open trade policies and its assumed positive impact on economic growth has reached a consensus when results are measured on average. However, because of the broad set of interrelated factors affecting social welfare outcomes as a result of trade liberalization, when dealing with the potentially beneficial impacts at the level of households, the so-called consensus is under dispute. In fact, trade policies have strong redistributive impacts and in most cases it is possible to identify economic groups that benefit and other that are negatively affected. Given the particular importance of local institutional arrangements and market functioning in determining the transmission of border prices to local levels, if poor individuals are among the ones that lose, the long-run opportunities for the development of a country or region may be compromised.

McCulloch, et al. (2001) and Winters, et al. (2004) have contributed to deepen and clarify the scope of the debate, summarizing that, the empirical evidence, both in the cases of cross-country and country-case studies, has failed to provide homogeneous results, with liberalization episodes in which the living conditions of the poorer declined. A common feature in terms of the choice of methodology to assess the direct impact of trade liberalization on poverty is the preference for partial equilibrium techniques instead of general equilibrium (GE) approaches. Crucial to the choice of the partial equilibrium approach is the possibility of identifying household income and consumption effects. A similar analysis applying GE techniques to quantify distributive effects as a result of price shocks will be limited due to the lack of sufficient disaggregation to fully trace the impact of policies on poverty. Of course, the partial equilibrium approach has the drawback that it leaves aside some second-order effects, and even some direct effects. Our exercise is not free of this problem.

The partial equilibrium approach in the existing literature dealing with the trade liberalization poverty nexus starts with the canonical work of Deaton (1989), and gains impetus with the important methodological contribution in Porto (2006). Porto's methodology allows the identification of two crucial transmission channels: a) the change in relative prices due to a trade reform and b) how these price variations affect households as consumers and income earners. This approach has been eased by the availability of household surveys, especially for developing and less developed countries.

The Mexican case has been widely studied, Nicita (2009) focuses mostly on examining the effects of globalization on Mexico, while the other branch concentrated on the effects of trade liberalization of some specific agricultural products (e.g. corn). In particular, Nicita (2009) studies the effects of the trade liberalization that took place in Mexico during the period of 1990–2000, taking into consideration the diverse effects of trade policies on local markets (domestic prices, wages and welfare), and allowing for different responses among Mexico’s regions. Another important recent contribution is that of Porto (2008), which assess the impacts of trade reforms in agriculture on household behavior in rural Mexico, focusing on consumption (first and second order effects) and income (endogenizing household income to correct for the potential biases in the estimation of own- and cross-price elasticities in consumption) responses. Nicita’s results suggest that Mexican tariff liberalization in the nineties reduced consumers’ prices for both agricultural and manufacturing products and increased the wage gap between skilled and unskilled laborers, with a net positive impact on households, mostly because of the reduction in the cost of the consumption basket, but with not all population benefiting from tariff liberalization, especially those with their income largely dependent on agricultural activities. Porto (2008) finds out, for rural Mexico, that allowing for consumption and income responses is important in order to obtain an accurate empirical assessment of trade policy. According to his results, the proposition that net consumers will be hurt by price increases whereas net producers will benefit is only true in a static scenario (the short term). But when consumers are allowed to adjust quantities, farmers adjust production, and local labor markets react to the changed prices, net consumers can become net producers, thus benefiting from price increases.

Following Porto (2006) our objective is to contribute to the understanding of how the recent increase in the price of agricultural commodities could have affected welfare and poverty at the household level. We assume an urban model, where households consume products, sell labor but do not produce agricultural commodities. Leaving aside this last effect means that our analysis concentrates on about 78% of population. With the recent exception of Moncarz, et al. (2016) for Argentina, there is an absence of studies dealing directly with the implications of increasing agricultural commodity prices on the poor.1
During the first decade of the current century, international commodity prices increased substantially. The case of agricultural commodities was not the exception. In the case of Mexico, a net importer of agricultural commodities, prices increased between 32% and 47% (groundnuts, maize, rice, sorghum, soybeans, and wheat). In Figure 1 we show the evolution of the average price for the basket of commodities considered, with an average increase of 43% when comparing the average for 1992-2001 with that for 2002-2011.

The increase of international prices of agricultural commodities, through a rise in the price of goods that constitute the food basket, has the potential to hurt a sizable proportion of the population in countries where most of households have low and medium-low income. As Table 1 shows clearly, Mexico falls into this last category, with about two-third of households with a level of per capita income lower than the country's mean. Moreover, a large share of households has an income below half the average income of the country.

Due to this pattern of income distribution, it is no surprise that a large share of households spend an important part of their income on food and beverages (see Figure 2), whose prices, as shown in Figure 3, showed an apparently positive relationship with the international prices of agricultural commodities.

Due to this pattern of income distribution, it is no surprise that a large share of households spend an important part of their income on food and beverages (see Figure 2), whose prices, as shown in Figure 3, showed an apparently positive relationship with the international prices of agricultural commodities.

3. COMPUTING LONG-RUN ELASTICITIES OF CONSUMER PRICES AND WAGES WITH RESPECT TO WORLD PRICES

Most of the existing literature on the subject relies on performing an impulse-response analysis to compute the pass-through of international prices to internal ones. For example, Furlong and Ingenito (1996), Krichene (2008), Ferrucci, et al. (2010), Rigobon (2010), and Ianchovichina, et al. (2014), among others fit a Vector Autorregressive (VAR) model and then estimate the corresponding response of internal prices to a given shock in international commodity prices. However, this approach fails to provide an "standard" measure of elasticity: that is, rather than providing the percentage change of a determined internal price to a one-percentage change in the international price (i.e. the elasticity of the internal price with respect to the international price), that "VAR approach" captures the response of the internal price to a "shock" to the international price, with this shock usually defined as one standard deviation.

In our case, instead, we estimate the long-run elasticities by identifying a Vector Error Correction (VEC) model. This allows us to obtain the elasticities according to the usual definition. Additionally, the identification of the cointegrating relationships implies adding theoretical assumptions, which provides an economic content to the analysis of the long run dynamics of the price time series.

Let's consider the VEC representation of a VAR of order 1, given by:

\[ p_t = \rho p_{t-1} + \xi_1 p_{t,1} + \ldots + \xi_r p_{t,r} + \epsilon_t \]

Given that \( p_t \) is a K x 1 vector that contains at least one I(1) variable, \( \epsilon_t \) is a singular K x K matrix with rank equal to r. Further, \( \epsilon_t \) can be written as \( \epsilon_t = \epsilon \xi \), where \( \epsilon \) is the the K x r cointegrating matrix. We are interested in analyzing the r x 1 vector \( \epsilon \xi = \epsilon p_{t,1} \), that contains the cointegration relations between prices. In particular, if the variables included in \( p_t \) are expressed in logarithms, the coefficients in \( \epsilon \) represent the elasticities that measure the response of consumer prices to the international ones. Providing that the cointegrating rank is known, the reduced-rank maximum likelihood estimator \( \hat{\epsilon} = \hat{\epsilon}(k_r) \) is available; however it only estimates consistently the cointegrating space. Therefore, it is necessary to identify K-r variables utilizing prior information. We assume that the first part of \( \hat{\epsilon} \) is an identity matrix, so it takes de form \( \hat{\epsilon} = [I_r \cdot k_r] \), where I_r is an identity matrix of order r, while \( k_r \) is an r x (K-r) matrix with the coefficients to be identified. For identification purposes, our assumption is that consumer prices are driven by the international ones.

As pointed out by Juselius (2006), all the long-run effects are captured in the \( \hat{\epsilon} \) matrix, and the VECM provides a way to distinguish between long- and short-run coefficients. Given that \( \hat{\epsilon}_t p_{t,1} \) represents a stationary linear combination of the variables the coefficients of \( \hat{\epsilon} \) describe the relations of these variables in the steady-state. When these relationships are interpreted according to the economic theory, the concept of cointegration matches the notion of long run equilibrium. In
this section we compute long-run elasticities of consumer prices and salaries.
In particular, we estimate two VEC models, one for domestic consumer prices and another for wages. In the first case, we define the vector \( p = (p_{fb}, p_{clo}, p_{equ}, p_{oth}, e, p_{wa}) \) where \( p_{fb}, p_{clo}, p_{equ}, \) and \( p_{oth} \) are the domestic price indices for food and beverages, clothing, equipment, and other goods respectively, \( e \) is the nominal exchange rate of the Argentinean currency with the US dollar, and \( p_{wa} \) is the international price index for the main agricultural commodities exported by Argentina. For the case of wages, the corresponding vector is \( w = (w_1, w_2, w_3, e, p_{wa}) \) where \( w_1, w_2, \) and \( w_3 \) are the price indices for the average hourly wage for unskilled, semi-skilled and skilled salaried workers respectively.

The estimation strategy is as follows. The optimal lag length for the VAR representation of the vector \( p \) is computed according different criteria. Cointegration tests are run to determine the cointegrating rank associated to \( p \). Finally, the VECM is estimated (after imposing identifying restrictions) to obtain the vector \( \Phi \), which contains the long run elasticities of consumer prices \( (p_{fb}, p_{clo}, p_{equ}, p_{oth}) \) with respect to the exchange rate \( e \) and the international prices of agricultural commodities \( (p_{wa}) \). A similar procedure is applied for the case of wages.

The proposed estimation framework is also capable to test additional hypothesis in an open economy. For instance, in the case of consumer prices, and given the order the variables enter the vector \( p \), if five cointegration relations were found, then two hypotheses could be considered: first, consumer prices are driven by international commodity prices, and second, the exchange rate depends also on international commodity prices. A similar scenario would arise if four cointegration relations were found in the case of wages.

Results

Elasticities of consumer prices were computed using monthly data for the period 2002-2011. The cointegration test did not reject the null hypothesis of 4 cointegrating vectors. Table 2 reports the elasticities for \( p_{fb}, p_{clo}, p_{equ}, \) and \( p_{oth} \). Given that in the cointegration equations all the variables are located in the RHS, the sign of the elasticities need to be inverted in order to be interpreted. The computed estimates are positive, as expected, and significantly different from zero at the usual levels (1% for \( p_{fb}, p_{clo}, \) and \( p_{equ} \), and 5% for \( p_{oth} \)).

For the wage elasticities, we used quarterly data for 2002-2011. In this case, we did not reject the hypothesis that the cointegrating space has rank equal to 4. As reported in Table 3, the estimated elasticity is positive and significantly different from zero for the three types of workers, for unskilled and semi-skilled at a 1% level, while the coefficient of skilled labor is significantly different from zero at the 5%. It also emerges that the pass-through to wages is greater for the case of workers with less education.

4. EFFECTS ON WELFARE AND POVERTY OF AN INCREASE OF THE INTERNATIONAL PRICES OF AGRICULTURAL COMMODITIES

Our primary goal is to simulate the effects on welfare and poverty that may follow an increase of the international prices of agricultural commodities. Once we have obtained the elasticities of consumer prices and wages with respect to the international prices of agricultural commodities, we can simulate the welfare effects that would follow to a given shock in the latter.

In particular, the welfare effect on household \( h \) will be measured by the negative of the compensating variation relative to its initial expenditure:

\[
\frac{d x^c}{x^c} = - \left( \sum_{g \in N, M} s^g \psi_{s, p_{Ag}} \right) d \ln p_{s, h} + \left( \sum_{j} \theta^j \psi_{w, p_{Ag}} \right) d \ln p_{s, h} \tag{2}
\]

where \( s^g \) is the budget share spent on varieties produced by sector \( g \), \( \psi_{s, p_{Ag}} \) is the elasticity with respect to the international price index of agricultural commodities \( p_{Ag} \) of the consumer price index for goods of sector \( g \), \( \theta^j \) is the salaried labor income of member \( j \) as a share of total income of household \( h \), and \( \psi_{w, p_{Ag}} \) is the wage elasticity that captures the
proportional change in the wage rate of household member \( j \) as a response to the change of the international prices of agricultural commodities. The first term in the RHS of (2) is the welfare effect that takes place through consumption, while the second term measures the effect through changes in labor income. Considering the way in which equation (2) is computed, a negative value means a welfare loss, while a positive value means a welfare gain. In equation (2) we do not consider second-order effects that take place through changes in consumption patterns in response to changes in consumer prices, neither changes in the supply of labor. Also, and because of the lack of appropriate data, we do not take into account the effects on non-labor income, neither those due to the consumption of own-produced goods. Finally, as already mentioned above, all the following analysis ignores any impact on the rural population.

Welfare Effects

Using the elasticities obtained in Section 5, and budget shares from the national surveys of household expenditures, and assuming a 50% increase of the international prices of agricultural commodities, applying equation (2) we obtain the effect on welfare for each household. Then, we run non-parametric regressions of the welfare effects as a function of household per capita expenditure.

Before looking at the results of the simulations, in Table 4 we report some descriptive statistics about the consumption patterns and the sources of income, since these together with the elasticities of the previous sections determine the magnitude of the simulated effects. As it emerges clearly, in the case of the expenditure shares, the category of food and beverages has a much greater importance for poorer households. These differences help to explain why in our simulations the poorer households are more negatively affected through the consumption effect. On the other hand, the differences between households are less important when we look at the sources of income, however it still is possible appreciate the lower participation of salaried labor for the poorest households. It is important to highlight a drawback of our analysis, due to the fact that we cannot account for the effects working through other sources of income, which most likely would help to diminish the magnitudes of the aggregate negative effects we obtain.

In the simulation of the welfare effects we need to deal with two sources of randomness. The first comes from the sampling variability of expenditure shares and of the participation of salaried labor in the household income; while the second source emerges because of the error associated to the estimation of the responses of consumer prices and wages to international agricultural commodity prices. To jointly account for these sources of variability, we work as follows. The randomness due to sampling variability of households (and therefore of budget shares and that of the participation of salaried labor in household incomes) is controlled by weighting each observation by the inverse probability of its inclusion into the sample. To deal with the variance of the estimated elasticities, we follow Porto (2006) and resample from their empirical asymptotic distribution. From de VEC models in section 3, we obtain, for each category of consumption goods and for each wage index, an estimate \( \hat{\beta}_j \) of the elasticity with respect to the international price index of agricultural commodities, and also an estimated standard error \( \hat{\sigma}_j \). Under standard assumptions \( \hat{\beta}_j \sim N(\beta_j, \sigma_j) \), where \( \beta_j \) and \( \sigma_j \) are the true parameters values. Then, in each loop a new elasticity is assigned to the formula to calculate the welfare effect. The non-parametric regression is run for each of the 200 replications to deliver new estimates of the average welfare effect. After the 200 replications, we compute the standard error of the estimated regression functions to build the 90% confidence bands.

For the four categories of consumption goods, we obtain positive elasticities of consumer prices with respect to the international price index for agricultural commodities. It is therefore not surprising that all households lose in response to an increase in the prices of agricultural commodities. As Figure 4 shows, households at the lowest end of the expenditure distribution are the most affected through the increase in the price of food and beverages. The opposite effect emerges for non-food and beverage goods, for which the simulated effects are smaller and more homogeneous over the entire distribution. In the aggregate, poorer households are the ones most affected by increases in agricultural commodity prices, with losses of up to almost 9.5% of their initial household expenditures.

To obtain the income labour effects, we use the wage elasticities reported in Table 3. Using the income share of each member of the household, and again assuming an increase of 50% in the price of agricultural commodities, we calculate the effect occurring through changes in wages. As shown in Figure 5, there is a positive effect through an
increase in labour income. The effect decreases continuously as we move upward along the distribution of household expenditure per capita. An explanation for this pattern is that the higher elasticity of wages for those with low and middle levels of education is enough to compensate for the fact that poorest households show a lower share of salaried income. However, for all households, the increase in labour income is not enough to compensate for the welfare loss on the consumption side.

When accounting simultaneously the consumption and income effects, there is a negative effect along the entire distribution of household expenditure, with minor differences amongst households in terms of their level of expenditure per capita. Losses are around 5.5% of the initial expenditures. The results are explained by larger consumption losses for poorer households, due mostly to the larger weight of food and beverages (goods intensive in the use of agricultural commodities), which are then partly compensated because these households are the most benefited by the increase in income from salaried labour.

Effects on Indigence and Poverty

To grasp an approximate idea of the relative importance of the impact of an increase in the international prices of agricultural commodities on poverty, Table 5 reports the indigence and poverty rates that would follow an increase of 50% in the price of agricultural commodities, as along with two additional measures: the gap and severity of indigence and poverty.

Indigence and poverty are measured in absolute terms, comparing the income of the household with the minimum expenditures required not to fall into either of the two categories. The indigence line is defined for an individual of reference, measuring the minimum expenditure necessary to acquire the basic food basket (CBA), which is calculated to guarantee the intake of a certain number of calories. On the other hand, the poverty line is obtained by multiplying the CBA by the Engel's coefficient, which gives us the total basic basket (CBT). Finally, multiplying the CBA and the CBT by the household size, the indigence and poverty baskets are calculated for each household.

To obtain the new value of the CBA for each household, we update the original indigence line for the time each household was surveyed, considering only the effect that works through the increase in the consumer price of food and beverages. Then, the new poverty line is obtained using the Engel's coefficient for the time each household was surveyed. The new household incomes are calculated taking into account only the effect on labour income of salaried household members.

From the results reported in Table 5, indigence increases by 2.9 pp and poverty by 5.7 pp. The relative increase in poverty is about 13.6%, and 22.7% in the case of indigence. Another interesting result is that, if we consider the depth of indigence and poverty instead of using a headcount measure, the gap and severity of both measures, especially in the case of poverty, increase substantially more than the corresponding rates. In other words, in addition to an increase in indigence and poverty in response to the rise in the international price of agricultural commodities, households that were already in those states tend to move further away from the threshold lines, as do new households falling into the two categories. This result means that indigent/poor households tend to become more homogeneous groups, while they become more heterogeneous relative to those with an income above the threshold lines.

The Speed of Adjustment

The models estimated in Section 5 allowed us to analyze the error correction (EC) term given by the deviation between the endogenous variables of the system. That error is a measure that indicates how far the variables are from the long-run equilibrium. We concluded that the "pushing forces" (Juselius et al., 2014) needed to restore the steady state depend on the relationship between the consumer prices and the international commodity prices.

The purpose of this section is to analyze how long it takes for domestic prices, goods and factors, to reach their new equilibrium value after the occurrence of a shock to international prices. From a political economy's point of view it represents a crucial subject. The timing of the compensating policies should be designed according to the length of the time span in which domestic prices fully adjust to an exogenous shock.
In order to study the dynamics of the adjustment, we perform an impulse-response analysis. It would seem that the methodology is straightforward, by inverting the VECM to obtain a moving average representation of the endogenous variables in term of the shocks (Juselius, 2006). The procedure also entails to choose an identification strategy (Juselius, 2006, Lütkepohl, 2004, 2009), given that the estimates obtained from the reduced form cannot provide the corresponding estimates for the structural form (the representation that contains the correct economic relationships). In other words, it remains pretty difficult to grasp the economic reasoning of the reduced form estimates without imposing additional (identifying) restrictions on that (Juselius, 2006).

Formally, the so-called structural VAR analysis implies that the identifying restrictions are set by "decomposing" the observed shocks of the reduced form to define a recursive structure between the shocks and the endogenous variables. The related literature identifies two different approaches to decompose structural shocks: short-run decomposition (Amisano y Gianini, 1997) versus a long-run identification scheme (Blanchard and Quah, 1989). Finally, the response of each endogenous variable with respect to a standardized exogenous shock is obtained. If the impulse-response curve is well behaved the variable of interest (in this case the consumer prices and wages) reach its long-run value after finite number of periods; the time periods needed to attain the steady state are representative of the speed of the adjustment. The aim of this section is to detect differences in the time spent by the different endogenous variables to reach the steady state, and then simulate the timing of the variables we are interested. So in this section we extend the previous analysis to the period when income and prices converge towards the steady state.

To do this, we estimate the impulse-response functions of consumer prices and wages with respect to a shock in the international commodity prices. Then, for each period, we calculate the proportion that the accumulated response accounts for the total (long-run) effect of the shock.

However, some problems arise that need to be handled appropriately. The main issue is that even though the VECM estimated before fit well to describe the long-run behaviour between domestic prices in local currency and international commodity prices, the response of the endogenous shocks is not the expected by the economic theory within a framework of the impulse-response analysis. Probably, the reason is that during the period of analysis the exchange rate followed an upward trend, independent from that followed by world prices, which could distort the representation of the "pushing forces" given by the moving average form of the VECM.

To solve this issue we follow two steps. Firstly, the series that contains (the log of) the consumer prices are adjusted by the (log of) the nominal exchange rate. So in this stage, rather than dealing with consumer prices and exchange rate separately, we obtain a vector that represents the domestic prices measured in dollars. This eliminates the distortion that the exchange rate volatility could cause at the time of estimating the autoregressive system. In the previous analysis, the need to obtain the long term relationship between world prices and domestic prices, with the latter expressed in local currency, came from the fact that the earnings and expenditures associated to households were also indexed in local currency. Now, instead, in order to isolate the time response of domestic prices to shocks in external prices within an impulse-response setting, we quote domestic prices in dollars to eliminate the influence of the variability in the exchange rate. It should be noted also that the previous VECM analysis did not draw an equation that relates the exchange rate and world commodity prices in the long run, which could indicate that domestic prices were affected by world prices of agricultural commodities and the exchange rate through two different trends. As a consequence, it would be a reasonable approximation to measure the domestic prices in dollars to compute the speed of the pass-through form international prices to the domestic prices.5

Secondly, we rely on the well-known method introduced by Sims (1980). We take first differences and estimate an unrestricted Vector Autoregressive (VAR) model. Given that in here we do not need to split between "pulling" and "pushing" forces, we estimate a VAR in first differences. To capture the dynamics of domestic prices caused by exogenous shocks to world prices, we invert this specification to obtain the moving average form. This approach has been broadly applied in the current literature, given that it represents a handy procedure to evaluate aftermath of an external shock by tracing out the dynamics of the variables of interest. The structural error decomposition is made by applying short-run restrictions on the obtained reduced-form VAR. This is done by imposing a recursive structure on the observed residuals of the VAR regression according to some economic reasoning (Lütkepohl, 2004).

Figure 7 shows how consumer prices (pcfb, peclo, pcequ, and pcoth) respond to a one-standard-deviation shock of commodity prices. The response is positive as expected. With regards to how long domestic prices take to reach to its long run level, in the case of food and beverages (pcfb) it is
expected that domestic prices will take 9 months to attain the new long-run value. For the other prices, the time span is a bit longer.

With regards to the dynamics of wages, Figure 8 shows the response of the three types of salaries to a one-standard-deviation shock. The response is positive, as expected. Given that we are dealing with quarterly data, it can be seen that in the second period after the shock occurs, the response of the variables is very close to zero (which means that the accumulated response is close to reaching its steady state value).

Finally, combining the dynamics of consumer prices and wages we simulate the timing of the indigence and poverty rates in response to a permanent 50% increase in agricultural commodity prices. As shown in Figure 9, it takes only four quarters after the shock for indigence and poverty to reach their new long-run levels, with an over-reaction in the quarter the shock occurs due to the fact that prices react more than wages, especially when compared to those of unskilled workers, which has a greater influence on extreme poverty.

5. CONCLUSIONS

In Mexico, with a large share of households with low and medium-low income, the increase in agricultural commodities prices has the potential to hurt a sizable part of the population through a rise in the price of goods that explain an important share of households’ expenditure, those that constitute the food-basket. The ex-ante simulations show that we can expect this to be the case.

A less obvious channel works through changes in factor incomes. In the case of salaried labor income, the magnitude of the positive effect is not large enough to compensate for the losses because of the changes in the prices of consumption goods.

In terms of poverty, there would be an increase of 15.3%, while for indigence the changes would be even greater, around 26.3%. Also, the results show that households in a situation of indigence or poverty would move in average further away from the threshold lines. The long run effects are fully achieved after four quarters the change in international prices occurs, but showing an overreaction in the quarter the shock takes place.

Our results highlight the need for well designed compensatory measures to help those that could be most negatively affected. Finally, the analysis should be interpreted into the context of its limitations, mostly because of the impossibility to account for the effects working through changes in factor rewards other than salaried labor. In this regards, an important element that would have been interesting to account for, is that of non-salaried labor income.7

Figure 1: Average international prices of agricultural commodities (*)


Figure 2: Expenditure share in Food and Beverages

Figure 3: Consumer and agricultural commodity prices

Source: based on Instituto Nacional de Estadística y Geografía (Mexico), www.indexmundi.com (retrieved on November 12, 2012), and WITS of World Bank.

Figure 4: Consumption effect (as a share of initial expenditure) of a 50% increase of the international prices of agricultural commodities
Figure 5: Labor income effect (as a share of initial expenditure) of a 50% increase of the international prices of agricultural commodities

Figure 6: Aggregate effect (as a share of initial expenditure) of a 50% increase of the international prices of agricultural commodities

Figure 7: Response of domestic prices to a shock in the world price of agricultural commodities

Food and Beverages

Equipment

Clothing

Other goods
$x = \text{pcfb}, \text{pcclo}, \text{pcequ}, \text{pccoth}$, where $x = \Delta (x-e)$, as defined previously. The impulse response function was calculated on the basis of a reduced form VAR calculated with 1 Lag and seasonal dummies for the period 2002-2011, using monthly data.

Source: Own calculations. xUS_d1 equals to $\Delta (x-e)$, where $x = \text{pcfb}, \text{pcclo}, \text{pcequ}, \text{pccoth}$ as defined previously. pwa_d1 = $\Delta \text{pwa}$. All the confidence intervals were obtained by bootstrap, according to the method of Hall, see Lütkepohl (2004) for further details. The regressions we run using software J-Multi.
Figure 8: Response of domestic wages to a shock in the world price of agricultural commodities

Unskilled labor

Semi-skilled labor

Skilled labor

Source: Own calculations. wagejUS_d1 equals to □(wj-e), where wj=w1, w2, w3 as defined previously. pwa_d1=□ □pwa. All the confidence intervals were obtained by bootstrap, according to the method of Hall, see Lütkepohl (2004) for further details. The regressions we run using software J-Multi. The impulse-response function was calculated on the basis of a reduced form VAR calculated with 1 Lag and seasonal dummies for the period 2002-2011, using quarterly data.

Figure 9: The dynamics of Indigence and Poverty after a 50% increase in agricultural commodity prices

Indigence

Poverty
Note: q0 refers to the quarter in which the change in commodity prices occurs.
Table 1: Proportion of households with per capita income lower than value of reference

<table>
<thead>
<tr>
<th>Less or equal than:</th>
<th>1/4 of medium income</th>
<th>1/2 of medium income</th>
<th>Medium income</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>26.8</td>
<td>41.8</td>
<td>68.1</td>
</tr>
<tr>
<td>2011</td>
<td>31.5</td>
<td>43.3</td>
<td>66.8</td>
</tr>
</tbody>
</table>

Source: own calculations based on Encuesta Nacional de Ocupación y Empleo.

Table 2: Consumer price elasticities

<table>
<thead>
<tr>
<th>Equation</th>
<th>pcfb&lt;sub&gt;t-1&lt;/sub&gt;</th>
<th>pcclo&lt;sub&gt;t-1&lt;/sub&gt;</th>
<th>pcequ&lt;sub&gt;t-1&lt;/sub&gt;</th>
<th>pcoth&lt;sub&gt;t-1&lt;/sub&gt;</th>
<th>e&lt;sub&gt;t-1&lt;/sub&gt;</th>
<th>pwa&lt;sub&gt;t-1&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>ec&lt;sub&gt;1,t-1&lt;/sub&gt;</td>
<td>1.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.920***</td>
<td>-0.369***</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.227)</td>
<td>(0.081)</td>
</tr>
<tr>
<td>ec&lt;sub&gt;2,t-1&lt;/sub&gt;</td>
<td>0.000</td>
<td>1.000</td>
<td>0.000</td>
<td>0.000</td>
<td>-0.016</td>
<td>-0.142***</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.070)</td>
<td>(0.025)</td>
</tr>
<tr>
<td>ec&lt;sub&gt;3,t-1&lt;/sub&gt;</td>
<td>0.000</td>
<td>0.000</td>
<td>1.000</td>
<td>0.000</td>
<td>0.470**</td>
<td>-0.411***</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.211)</td>
<td>(0.075)</td>
</tr>
<tr>
<td>ec&lt;sub&gt;4,t-1&lt;/sub&gt;</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>1.000</td>
<td>0.152***</td>
<td>-0.034**</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.045)</td>
<td>(0.016)</td>
</tr>
</tbody>
</table>

(Std. Dev.) *** p<0.01, ** p<0.05, * p<0.1.

The Akaike, Hannan-Quinn and Schwarz Criteria indicated that the optimal VAR lag length is equal to 4. The cointegration test was run using Lütkepohl and Saikkonen (L&S) procedure. The null hypothesis $H_0$: rank($\Pi$)=3 cannot be rejected, so that the VECM was specified assuming that the cointegration rank is equal to 3. Remaining VECM’s specification details are as follows: deterministic variables: CONST; endogenous lags (in differences): 3; sample range: [2004 Q3, 2011 Q4]; T=30; estimation procedure: One stage. S2S approach. The estimation was carried out using quarterly data. Further estimation details are available upon request. Source: Own calculations.
Table 3: Wage elasticities

<table>
<thead>
<tr>
<th>Equation</th>
<th>$w_{1,t-1}$</th>
<th>$w_{2,t-1}$</th>
<th>$w_{3,t-1}$</th>
<th>$e_{t-1}$</th>
<th>$pwa_{t-1}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$ec_{1,t-1}$</td>
<td>1.000</td>
<td>0.000</td>
<td>0.000</td>
<td>-0.031</td>
<td>-0.304***</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.157)</td>
<td>(0.032)</td>
</tr>
<tr>
<td>$ec_{2,t-1}$</td>
<td>0.000</td>
<td>1.000</td>
<td>0.000</td>
<td>0.214</td>
<td>-0.250***</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.186)</td>
<td>(0.038)</td>
</tr>
<tr>
<td>$ec_{3,t-1}$</td>
<td>0.000</td>
<td>0.000</td>
<td>1.000</td>
<td>0.724</td>
<td>-0.102**</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.225)</td>
<td>(0.046)</td>
</tr>
</tbody>
</table>

(Std. Dev.) *** p<0.01, ** p<0.05, * p<0.1.

The Akaike, Hannan-Quinn and Schwarz Criteria indicated that the optimal VAR lag length is equal to 4. The cointegration test was run using Lütkepohl and Saikkonen (L&S) procedure. The null hypothesis $H_0: \text{rank}(\Pi)=3$ cannot be rejected, so that the VECM was specified assuming that the cointegration rank is equal to 3. Remaining VECM’s specification details are as follows: deterministic variables: CONST; endogenous lags (in differences): 3; sample range: [2004 Q3, 2011 Q4]; $T=30$; estimation procedure: One stage. S2S approach. The estimation was carried out using quarterly data. Further estimation details are available upon request. Source: Own calculations.
Table 4: Shares in Consumption and Sources of Income Values in % (#)

<table>
<thead>
<tr>
<th>Quintile</th>
<th>FB</th>
<th>CLO</th>
<th>EQU</th>
<th>OTH</th>
<th>Salaried Labor</th>
<th>Labor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>49.2</td>
<td>5.1</td>
<td>6.0</td>
<td>39.6</td>
<td>57.4</td>
<td>74.3</td>
</tr>
<tr>
<td>2</td>
<td>45.2</td>
<td>5.6</td>
<td>5.5</td>
<td>43.7</td>
<td>62.0</td>
<td>78.4</td>
</tr>
<tr>
<td>3</td>
<td>42.5</td>
<td>6.0</td>
<td>5.5</td>
<td>46.0</td>
<td>60.6</td>
<td>77.3</td>
</tr>
<tr>
<td>4</td>
<td>38.0</td>
<td>6.5</td>
<td>6.1</td>
<td>49.4</td>
<td>62.4</td>
<td>77.2</td>
</tr>
<tr>
<td>5</td>
<td>31.1</td>
<td>6.6</td>
<td>5.9</td>
<td>56.3</td>
<td>61.9</td>
<td>73.7</td>
</tr>
</tbody>
</table>

Source: own calculations based on Encuesta Nacional de Ingresos y Gastos en los Hogares 2010. FB: food and beverages; CLO: clothing; EQU: equipment; OTH: other goods and services. Labor: includes self employment. (#) Shares in consumption as a percentage of total household expenditure; sources of income as a percentage of total household income (excluding the imputed rental value for households which own the houses they live in).

Table 5: Indigence and Poverty rates in urban areas

Pre and post a 50% increase in international prices of agricultural commodities

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Std. Error (*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indigence Rate</td>
<td>Pre</td>
<td>12.7</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>15.5</td>
</tr>
<tr>
<td>Indigence Gap</td>
<td>Pre</td>
<td>4.1</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>5.1</td>
</tr>
<tr>
<td>Severity</td>
<td>Pre</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>2.5</td>
</tr>
<tr>
<td>Poverty Rate</td>
<td>Pre</td>
<td>42.3</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>48.0</td>
</tr>
<tr>
<td>Poverty Gap</td>
<td>Pre</td>
<td>15.9</td>
</tr>
</tbody>
</table>

120
The rate, gap and severity of indigence and poverty are measured following Foster et al. (1984):

\[
R = \frac{1}{N} \sum_{h=1}^{N} \left( \frac{z_h - y_h}{z_h} \right)^{\alpha} I^* (y_h < z_h),
\]

where \( N \) is the total number of households, \( z_h \) is the indigence/poverty threshold for household \( h \) (these thresholds are household-specific, depending on the structure of the household in terms of the age and gender of its members), \( y_h \) is total income of household \( h \), and \( I^* (y_h < z_h) \) is a latent variable equal to 1 if \( y_h < z_h \). When \( \alpha = 0 \) we obtain the rates of indigence/poverty, if \( \alpha = 1 \) we have the indigence/poverty gap, and when \( \alpha = 2 \) we have the indigence/poverty severity.

(*) Bootstrapped standard errors.

Note: total household income excludes the imputed rental value for households which own the houses they live in.

Source: own calculations.

<table>
<thead>
<tr>
<th></th>
<th>Post</th>
<th>18.8</th>
<th>0.35</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre</td>
<td>8.2</td>
<td>0.22</td>
<td></td>
</tr>
<tr>
<td>Severity</td>
<td>Post</td>
<td>10.0</td>
<td>0.26</td>
</tr>
</tbody>
</table>
ENDNOTES

1 de Hoyos and Medvedev (2011) analyze the poverty impact of higher food prices from a global perspective. For a recent review on the effects of changes in commodity and other prices on household welfare, see Lederman and Porto (2015).

2 Locations with less than 2500 inhabitants are classified as rural.

3 We are not controlling for the source of randomness stemming from the covariance among the coefficients.

4 In all figures, the solid line is the average effect, while dashed lines are the 90% confidence bands.

5 A similar analysis is carried out for the case of wages.

6 With consumer prices available on a monthly basis and wages on a quarterly basis, for consumer prices we use the accumulated responses every three months. Period 0 correspond to the one when the shock to commodity prices takes place.

7 Non-salaried labor income explains up to 23% of all labor income, with poorest households showing the largest incidence.

REFERENCES


Forthcoming *Journal of Development Economics*. 
THE CTE CRISIS AND THE ETHICS OF COMPENSATING WAGES

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ABSTRACT

The mental cognition, dementia, depression, anger, emotional instability, and inability to appropriately interact with family and friends, have been shown to result from “chronic traumatic encephalopathy” (CTE), a disease especially associated with football and other contact sports. Recent documentations (book, TV documentary, and film) show the extent that the National Football League (NFL), an industry with annual gross-revenue in excess of $11 billion, suppressed information concerning the extent and effects of the problem among former players. This ethical breach is examined here in the context of the neo-classical compensation-wage rationale. The mental problems, however, are shown to be related to the philosophical question of “what it is to be a functioning person” in light of the effects of CTE. It is argued that compensating wage theory is inadequate to explain away the generally accepted positive and negative duty obligations of the NFL and its patrons.

Keywords: Compensating wage theory, CTE dementia.

INTRODUCTION

Recent medical studies document the mental cognition, dementia, depression, and associated emotional instability that result from chronic traumatic encephalopathy (CTE), a disease caused by repetitive concussion and sub-concussive injury especially associated with the American game of football and other contact sports. (See Maese, 2016; Punksy, 2015; Stone, 2015; Chavez, 2015; and Mayo Clinic Staff, 2016, for a definition of the disease and descriptions of the associated symptoms.) The problem became significant national news when the PBS documentary series Frontline broadcasted League of Denial on October 8, 2013. This documentary was based on journalists Steve Fainaru’s and Mark Fainaru-Wada’s (2013) account of the same title published the same year, a more detailed account of the development of the problem than the PBS documentary. Both the documentary and the book clearly presented the evidence of the NFL’s knowing deception concerning the wide extent and effects of CTE, a deception presented to both its players and the general public. Since then, various original publications, both medical and psychological studies at Boston University’s Center for the Study of Traumatic Encephalopathy, and at the Mayo Clinic, and other institutions, further documented the extensive link between CTE and football, and the mental-psychological pathologies caused by the disease.¹

The CTE problem as related to NFL football is another entry in a long-list of workplace-related risk of injury such as arsenic exposure problems in the workplace (see Brinkel, Khan, and Kraemer, 2009), workplace problems related to mercury exposure (see Munger, 2011), lead workplace exposure (see Shaw, 2016), and coal or nuclear waste workplace-exposure (see Shrader-Frechette and Cooke, 2004). The CTE-NFL problem, however, has significant differences with these other workplace risks:

1. Football is the most popular sport in America, and therefore one of the most popular entertainment venues.
2. The salaries of NFL football players are significantly greater than the compensation in other risk-related industries.
3. Players begin football at a young age, while workers in other risky industries usually do not.

I argue below that these differences make the NFL-CTE problem particularly interesting for examining the ethical content of neoclassical wage theory.

The standard neoclassical-economic model of labor markets offers the compensating wage argument for less-desirable occupations. It is apparent that this model can at least partly explain the economic implications of playing a game with high probability of brain injury. These implications are explored in this paper along with explorations of the effects of the NFL’s deceptions on the market for player talent, and also the externalities associated with this head-trauma phenomenon. Most importantly, this exploration is placed in the context of the philosophies of evil and its process of development as offered by Arendt (1963, 2003), Svendsen (2001, 2010), and Bonhoffer (1997). These philosophies offer possible insights as to how these deceptions and externalities developed.

The following sections of this paper review (i) the compensating wage theory as it pertains to debilitating work, (ii) a chronology of the NFL’s deception concerning the CTE problem, and also its humiliation of dissenters, (iii) a review of how the NFL’s actions are consistent with philosophical accounts of the process that leads to evil business actions, (iv) an exploration of how entertainment events that produce CTE fits or does not fit with social maxims, and (v) a conclusion concerning the ethical problems posed.

COMPENSATING WAGE THEORY

The neoclassical-economic model offers a theory of compensation wage, i.e. compensation differentials may exist to reflect the disutility of particularly unpleasant or risky work. In the competitive model, the market demand for labor reflects the marginal revenue product of employment. The market supply of labor is determined by the marginal disutility of labor. The more difficult or unpleasant the particular employment, i.e. the greater the disutility of labor, the smaller the supply offered for that employment, and as a result the higher the wage offered.
The theory is that a higher wage is necessary for some particularly difficult, risky, or otherwise undesirable employment. As long as transactors are knowledgeable about the employment and its difficulties, and the employment is entered into freely without coercion, and there are no negative externalities involved, then it can be argued that a free exchange is generally Pareto-welfare enhancing, at least from a pure utilitarian examination. Some fundamental economic questions therefore concern (i) the knowledgeability of the participants, and (ii) the possible negative externalities involved. The first of these issues concerns whether relevant information is equally available for both employer and potential employee, and both perform due diligence in exploring these risks. The second concerns whether the risks are born entirely by employee and employer, or whether they are born by third parties who might also be unknowledgeable about their extent or nature. Both of these are reviewed below.

There is, however, another question associated with the particular effects of football head injury: To what extent can somebody who suffers from CTE be said to have a functioning life? This question begs the critical issue of whether potential players know (or knew) the actual life-functioning risks associated with play, and also whether the risks of severe brain impairment were hidden by employers, i.e. the NFL.

The seminal literature on the subject of the risk of fatal injury includes Thaler and Rosen (1976) which examined “the demand price for a person’s own safety.” How much will a person pay to reduce the probability of his own death by a small amount? What amount would others (family and friends) be willing to pay to save the life of the other? In the context of football, the question concerns how much knowledgeable family and friends would sacrifice to prevent the individual from playing?

Kniesner and Leeth (1991) document the compensating wage differential associated with fatal injury risk in Australia, Japan, and the US. A small differential is shown to exist. Dole and Kassis (2016) examine the compensating wage differential associated with career-affecting injury associated with football-play on artificial turf, a surface believed to cause injuries at a greater rate. They document that the differential exists. Other recent studies associated with the devastating effects of football-related CTE are reviewed below.

**THE NFL’S ACTIONS**

The case material presented in this section is drawn from the PBS *Frontline* documentary *League of Denial*, and also from the book of the same title by Fainaru and Fainaru-Wada (2013). This material is organized for its relevance to the philosophy of evil reviewed below.

The NFL’s *Monday Night Football* broadcasts began in 1970. Coincidentally the League’s publicity arm, *NFL Films*, began to glorify violence in its publicity in ways beyond its previous efforts. *NFL Films*’ broadcasts highlights of games both for sports news, other rebroadcasts, and also game highlights for both halftime analysis and post-game analysis shows. Much of these film highlights are presented in slow motion, and often with voice overlays such as “huge men performing punishing pirouettes,” and “hand to hand combat,” and “In the pit there is more violence per square foot than anywhere else.” The marketing of the violence of the professional game has been a key to the growth of the NFL, helping it to become the major professional sport it is today.

**Deception**

For 19 years of NFL play, “Iron” Mike Webster was the leading center in the game. He retired in 1991. During this retirement, Webster exhibited all the classic symptoms of the CTE brain disease: emotional instability, inability to sustain concentration during normal interactions such as interviews, inability to maintain relationships with family and friends, fits of unaccountable unexplained rage, inability to manage personal finances, and severe depression. He died from a heart attack at age 50 in year 2002; he had an enlarged heart.

Four years prior to his death, Webster applied to the NFL’s *Retirement Committee* to receive benefits associated with his debilitation. His lawyer argued Webster had brain damage due to head trauma associated with his years of football. A panel of neurologists agreed that his brain debilitation was due to football, and Webster received a fairly minor annual compensation for his debilitation, i.e. $46,000 per year which barely covered his annual medical expenses associated with CTE. The written agreement was explicit as to the cause, i.e. the relation of football to long-term permanent brain damage. The NFL hid this agreement, and its admission that football caused Webster’s debilitation, from the public and other players.

After his death in 2002, an autopsy discovered CTE in the brain of Mike Webster, the first time this particular disease was discovered in a former football player. The disease is marked by tangles of tau-protein, also found in ex boxers, and in dementia-associated senility except that these latter two diseases have other characteristic chemical markers. This CTE was a form of severe dementia developed in contact sports.

**Repeated Deception**

In the mid-1990s, the NFL concussion problem became severe especially among quarterbacks. The problem
became a significant news story. NFL Commissioner Pete Tagliabue called the problem merely one of “pack journalism,” a story created and exaggerated by reporters. This was an initial attempt to humiliate dissenters who were trying to publicize and remedy the problem. The Commissioner did, however, appoint a committee to examine the issue, the Mild Traumatic Brain Injury Committee (MTBI). This Committee then consisted of team physicians and trainers, and equipment managers, headed by Dr. Elliot Pellman, a rheumatologist.

Severe Deception

Starting in 2003, the MTBI Committee published 16 articles in the scientific blind-peer-reviewed journal Neurosurgery. The Editor-in-Chief of this journal was a team physician for the NY Giants, but the Section-Editor for Sports Injury rejected these submissions based on insufficient evidence and unsupported claims. The Editor-in-Chief, however, consistent with his conflict of interest, overruled his Section Editor and the double-blind reviewers, and published the articles. The articles went so far as to claim that there were no long-term effects of concussion and brain damage, that players might be able to reenter the same game after suffering a concussion, and that these conclusions might also apply to high school players. Reviewers complained about these unsubstantiated claims. Members of the MTBI later admitted that publications expressed faulty conclusions. (See Fainaru and Fainaru-Wada, 2013, pp. 215-218.) These publications constituted the most severe of the NFL’s deceptions.

Humiliation

Dr. Bennet Amalu, the neuropathologist who diagnosed Mike Webster’s CTE, discovered the same disease in two other ex NFL players. He also published these findings in Neurosurgery. His coauthors were well-known and well-published neurophysicians and neuropathologists. In a letter to the journal, the MTBI Committee demanded a retraction, stating that the research was faulty, the conclusions were invalid, and that Dr. Amalu, a Nigerian by birth, was practicing “voodoo medicine.” Since Amalu’s article specified findings that were substantiated later, the MTBI’s demands were clear attempts to humiliate the dissenter Amalu, and to hide the CTE evidence. A Pittsburg Steelers team physician, Dr. Joe Moroon, indicated to Amalu that the consequences of his discovery of CTE posed a substantial threat to football: “If currently only 10% of mothers believed that football threatened brain damage, then football would eventually be finished.” (Ibid, pp. 206. This event was also portrayed in the 2016 movie Concussion.)

Deception Again

In September 2006, Roger Goodell replaced Pete Tagliabue as NFL Commissioner. He replaced Elliot Pellman with Dr. Ira Casson, a neurophysician, as head of the MTBI Committee. In an ESPN interview, Casson directly denied any connection between football and long-term brain damage or dementia. At this time, Casson knew that an internal NFL study of 700 retired players indicated that the rates of depression and dementia, symptoms consistent with CTE, were much higher than in the general population. (Ibid, pp. 215-218.) This was another example of NFL deception. This internal study was eventually slipped to a reporter for the NY Times (journalist Alan Schwarz), but the NFL then attacked the authenticity of its own study. (Ibid, pp. 276.)

In the Summer of 2007, Commissioner Goodell organized a large conference in Chicago for the non-NFL-related researchers of CTE, the MTBI, and non-MTBI team physicians and trainers. Led by Ira Casson, the MTBI again humiliated those presenting the evidence of CTE, but the Commissioner, after listening to the evidence, decided that the position of the NFL on this issue must be modified; that the evidence of football-related CTE was too strong. (Ibid, pp. 221-224.) Meanwhile, the list of deceased players diagnosed with CTE increased. In addition, prior to preseason practice, the NFL distributed a pamphlet to all players indicating that there was no evidence of long-term damage provided concussions were properly treated. (Ibid, pp. 227, presents excerpts from this pamphlet.) This was another example of purposeful deception.

Humiliation Again

In 2008, Dr. Ann McKee, a neuropathologist at Boston University, who was a National expert in Alzheimer’s disease, began investigating CTE in former football players. She teamed with a former player, Chris Nowinski, to gather the brains of deceased players for investigation. She was invited by Ira Casson to present here research findings at a conference with the MTBI. She also was humiliated by repeated interruptions, misinterpretations of her presentation, and general dismissive attitudes of those present. (Ibid, pp. 267-269.) Her findings were later found to be accurate. She eventually became the head of the NFL’s preferred brain-bank depository for former players, located at Boston University (BU). By 2010, 19 of the 20 autopsied former players were found to have CTE.

Resulting Revelation

In 2013, the NFL settled a lawsuit (with no admission of liability) for $765 million with over 5,000 former players. In 2016, a BU study found that 93 who played football in college or high school had substantial symptoms of CTE, and a Mayo Clinic study found that 1 in 3 who played
football in high school or college had CTE. (See Maese, 2016; Punsky, 2015; Chavez, 2015; and Stone, 2015, for reviews of this study.)

In an interview with the Washington Post on March 23, 2016, Jerry Jones, owner of the Dallas Cowboys, denied any link between football and degenerative brain disease. Jeff Miller, Senior Vice-President for Health and Safety Policy, in testimony before a Congressional Committee on March 14, 2016, admitted that there was a definite link. (See the YouTube film of the testimony.)

THE PROCESS OF EVIL

Since Hannah Arendt (1963) used the term “banality of evil,” an extensive philosophical literature explored what defines and constitutes evil in the modern sense. (See Neiman, 2002, and Staub, 2009, for extensive reviews of publications on the subject over the last fifty years. Also see Zimbardo, 2007, for reviews of the psychological explorations over the same period.) Few studies, however, focused on the group processes that result in evil. These few studies include Arendt’s, and also Svendsen (2010), and Bonhoeffer (1997). These are utilized below for explorations of the NFL’s actions.

Notions of evil have been well explored in Western philosophy. In Socratic-Platonic philosophy evil is anything that hinders our pursuit of the good (eudaimonia). It has often been interpreted in a narrow sense as purposeful harm to others. Both of these definitions are suboptimal when we seek to explain group processes that result in severe damage to others, whether this damage results from purposeful avoidance or cavalier ignorance of ethical codes. It is the group process of devolution from society’s ethical maxims that we seek to focus on here, not merely an individual’s actions.

Kant (1785) argued that evil is caused by an absence of reflective thought; that this absence results from “stupidity caused by a wicked heart.” (See Arendt, 2003, pp. 164, and also see the Arendt quote below.) This is the form of evil that Hannah Arendt described as “banal.” In particular, although this “stupidity” may be an initial step that leads to resulting evil actions, there is much more to the process. It is more than only an absence of reflective thought that generates a dynamic ethical-process devolution. This devolution contains common elements such as authoritarianism (or its more severe form of totalitarianism), group think, team building, and humiliation of dissenters. These elements can easily be developed within competitive business, and did develop in the NFL.

Svendsen (2010, p. 85-87) indicates four anthropological types of evil:

1) Demonic evil: Evil committed for the sake of evil. This is a classical concept generally based upon religious notions of demonic subversion of individuals.

2) Instrumental evil: This evil is a side result from pursuing some goal that is itself not inherently evil. The evil itself in not intended but is nonetheless a consequence. An example could be the pursuit of wealth where that pursuit causes harm to others.

3) Idealistic evil: This evil is intended, but the pursuit of some other goal that is considered good necessitates it. Social reforms might provide examples where these reforms require the coercion of some subgroups.

4) Stupid evil: This is evil that result from a lack of reflective thought. As shown in this paper, it was particularly present in the CTE-NFL case, and remedying this is the primary purpose of our proposed preventative action.

The second form (instrumental evil) would likely be the form the NFL would argue is perhaps manifested by the CTE crisis, i.e. CTE is “an unintended side result.” The NFL’s publicity, however, has focused on violent hard-hits, even to the head. It can therefore be argued that the third form is a more accurate classification; that the evil is intended in pursuit of sports entertainment. The fourth form (stupid evil) is perhaps even more accurate, i.e. evil that results from a lack of reflective thought, especially in the actions of the MTBI Committee.

Forms (2), (3), and (4) can result in abandoning the well-established ethical norms of either society in general or some organization. They are the forms focused on here as relevant to the problem at hand.

The sports entertainment industry is highly competitive; there is competition among various sports with overlapping seasons, and competition with other forms of entertainment. There are four overlapping inferences of competitive organizations that make them particularly subject to systematic violations of society’s ethical norms:

1) The competitive firm encourages management and employees to abstractly identify with the organization so as to develop an attitude of us-versus-them towards their competitors.

2) Individuals within these organizations usually must participate in team building exercises and efforts so as to develop business efficiency. These team building efforts help exacerbate the us-versus-them tendency.

3) These organizations generally exhibit considerable division of labor in accomplishing important tasks. This allows a division of
responsibility when it comes to enforcement of ethical codes.

4) Competitive firms tend to be authoritarian where each individual’s career depends upon the authority above them.

These inherencies make group-think prevalent and dissent difficult even when the question concerns some moral standard. (These characteristics of the MTBI are reviewed below.) These inherencies allow the elements that make it easier for individuals to accept evil results. The prevention of these results always begins with and relies upon reflective thought as pointed out by Arendt.

After the concussion crisis developed in the mid-1990s, and after Commissioner Tagliabue claimed that the “crisis” was merely an invention of “pack journalism,” he formed the MTBI Committee, a group with little initial neurological expertise, but its formation still shifted responsibility away from the Commissioner’s Office. (See Fainaru and Fainaru-Wada, 2013, pp. 126.) This committee of team physicians, trainers and equipment managers, clearly had a conflict of interest for dealing with the crisis, that is it served ownership and not players, and it developed an us-vs-them attitude.

The reflective thought required for an interruption of a process of evil might be generated by certain characteristics including:

1) Participants must have sympathy in the Humian sense, i.e. they must be capable of envisioning a substitution of themselves into someone potentially hurt by the violation of the ethical norm. This generates a potential for remorse in the actor who might violate the norm. But this is not sufficient.  

2) The actor must also be able to apply logic to envision the potential consequences of their actions, and be willing to apply this logic consistently. This may eliminate a mere application of a-priori ideology to the potential problem at hand, an ideology that poses a bias in analysis of possible results. 

3) Finally, the actor must be willing to spend the time and effort necessary for this reflection. This last requirement might pose the most significant problem necessary to overcome the tendency to abandon normal codes of ethical behavior, i.e. the effort requirement.

The MTBI Committee did not exhibit, or display, sympathy for the suffering of the current and former players in question. Furthermore, it denied the relevance of evidence generated externally (Dr. Omalu’s and Dr. McKee’s research), and even denied its own internal research evidence, as reviewed above. One can point out that it was illogical for the Committee to believe that this evidence would not further develop and surface. 

Kant argued that reasoned thought provided the foundation of ethics, and that the reasoning ability of the ordinary average person was sufficient to establish an ethical society. This idea was challenged by Arendt. (See Arendt, 2003, pp. 164.) Her argument begins with the following statement:

If the ability to tell right from wrong should have anything to do with the ability to think we must be able to “demand” its exercise in every sane person no matter how erudite or ignorant, how intelligent or stupid he may appear to be. Kant, in this respect almost alone among the philosophers, was much bothered by the common opinion that philosophy is only for the few precisely because of this opinion’s moral implications. In this vein, he once remarked, “Stupidity is caused by a wicked heart,” a statement which in this form is not true. Inability to think is not stupidity; it can be found in highly intelligent people, and wickedness is hardly its cause, if only because thoughtlessness as well as stupidity are much more frequent phenomena than wickedness. The trouble is precisely that no wicked heart, a relatively rare phenomenon, is necessary to cause great evil. Hence, in Kantian terms, one would need philosophy, the exercise of reason as a faculty of thought, to prevent evil. (Ibid, pp. 164.)

The substance of Arendt’s argument proceeds as follows:

i. It is true, as Kant argued, that thinking is a trait of all people.

ii. When we reach conclusions as a result of our thought processes, we typically have considerable uncertainty as to their validity, especially with respect to our moral thought. As a result, we seek dialogue with others, and perhaps a form of political debate that acts as a filter for our ideas before we accept the conclusions of our own reflective thought.

iii. By its very nature, reflective thought leads to a period of abstraction from the real world, a “paralysis” from other actions.

iv. Because of ii and iii, there is a cultural bias against reflective thought.

v. Because of iv, there is a cultural bias towards following simple rules, or codes of conduct. Because these rules have no basis in our own reflective thought, they are therefore supported by only shallow belief.

vi. Because of v, people are willing to disregard codes of conduct. People are quick to follow others who appear to have a passion for alternative actions that violate the code. These others argue that they have given the new action

This process, resulting in “vi” above, is relevant to the MTBI Committee’s actions. In its deceptions and humiliation of dissenters (see below concerning the humiliation issue), the Committee disregarded any acceptable moral code concerning its responsibilities. It followed its chair’s leadership (Elliot Pellman and Ira Casson) in public denials of the relevant evidence. This is also reviewed below.

Arendt argued that “thinking is a marginal affair” in society, “except in emergencies.” (Ibid, pp. 188) Evil is a violation of rules based on rational thought. As a result, the counter to evil lies in what Plato terms the “noble nature,” defined as the desire to participate in rational thought in a social context. It is not, Arendt argues, the common reasoning person who is responsible for maintaining societal ethical conduct and thereby avoiding evil, but rather it is the person who exhibits the “noble nature” of reflective thought as voiced in the social setting who is necessary to avoid this evil.

With respect to the above mentioned “emergencies,” Arendt writes:

At these moments, thinking ceases to be a marginal affair in political matters. When everybody is swept away unthinkingly by what everybody else does and believes in, those who think are drawn out of hiding because their refusal to join in is conspicuous and thereby becomes a kind of action. The purging element in thinking, Socrates’ midwifery, that brings out the implications of unexamined opinions and thereby destroys them – values, doctrines, theories, and even convictions – is political by implication. For this destruction has a liberating effect on another human faculty, the faculty of judgment, which one may call, with some justification, the most political of man’s mental abilities. (Ibid, pp. 188-189)

Football fans, sports commentators, certainly owners, coaches, and even team physicians are subject to being “swept away unthinkingly” during games, especially when removal of a player due to concussion symptoms is appropriate. But the same is true during Committee examinations of evidence of the concussion crisis. The faculty of “judgment” is impaired under conditions that lack reflective logic as voiced within the group.

The NFL’s judgment concerning the crisis was clearly deficient. It exhibited both the characteristics of Arendt’s devolution process, and the overlapping inheritances mentioned above. The us-vs.-them attitude of the NFL Commissioner and the MTBI Committee was clear, and explained the animosity towards Drs. Omalu and McKee who first documented the CTE problem. In fact, creating the MTBI Committee can be interpreted as an attempt to spread responsibility for the crisis from the Commissioner’s Office to team physicians and personnel, all of whom were among the original Committee members, and who were without the necessary neuro-medical expertise.

Bonhoeffer (1997) identifies the thoughtlessness of Arendt’s lack of reflective thought as foolishness, where the fools become manipulated tools of the leader. This is essentially Arendt’s perception that someone offers an alternative to the established code for which the followers have little commitment. Bonhoeffer points out that under these circumstances, new shallow slogans replace the code as guides to behavior. The noble nature of speaking to defend the code is seen as betrayal of us in favor of them. Individual thought that questions the group think is then seen as betrayal. It follows then that “our most basic moral understanding crumbles in the face of (this) ideological conviction.” (Svendsen, 2010, pp. 127) In addition, perceptions of outside forces and communications become warped in which:

i. The group perceives all external forces and communications as aimed at it personally.
ii. The group focuses on those interpretations of circumstances that reinforce it’s a-priori notions of being threatened, and ignores aspects that contradict.
iii. The group interprets even positive external statements as malicious.

The original MTBI resistance to Drs. Amalu’s and McKee’s research illustrated the process referred to above. Team physicians responded to “group think” as led by Chairs Pellman and Casson. The research facts that contradicted the warped view that concussions posed no long-term effects were merely disbelieved. The authoritarian NFL was therefore changed into a totalitarian organization, the latter exhibited the elimination of individual thought where even the individual doubted his own conscience so that ultimately individuality was eradicated, at least at the critical period of the 1990s and next several years.

There are certain conformity characteristics manifested by a totalitarian organization, i.e. the firm that abandons a logical ethical code.

1. Dissenters, whether internal or external, are humiliated, or at least attempts at humiliation are made.
2. The group manifests contempt for weakness among its members in that any sign indicating anything less than enthusiastic support for its
newly adopted slogan-oriented code is strongly discouraged.

3. To reinforce the new code, leaders speak of what should be considered as evil as being the opposite.

All of these characteristics were manifested with respect to Amalu and McKee, and also the first team physicians to break ranks. As noted, Amalu and McKee were humiliated. Dr. Bill Barr of the NY Jets, the first team physician to break with the MTBI’s slogan-oriented positions (in 2004), was threatened with a law suit, and lost his NFL position through the efforts of Chair Pellman. (See Fainaru and Fainaru-Wada, 2013, pp. 174-180.) Also, consider the statement in one of the MTBI’s published research papers: “In our opinion, it is unlikely that athletes who rise to the level of the NFL are concussion prone.” One of the MTBI members who authored this article, neuroscientist Dr. Mark Lovell, admitted that he knew this statement was untrue, but he was only one of several authors, hence his responsibility was diluted. (Ibid, pp. 178-180.)

Elimination of the old code and adoption of the new slogan-oriented code is just the first step in an organization’s devolution into business evil. Svendsen (2001) indicates four steps capable of resulting in members accepting evil:

1) The wrong doing must be presented in such a way as originally being only a minor first step. For example, a violation of an auditing requirement might be presented as having only a minor impact on the final result, or that it would be only temporary and rectified later.

2) The group members must be distanced from the evil decision. “People at the top decided it this way, so I am not blameworthy even thought I could speak out that this is wrong. It is not I who is committing this wrongdoing.”

3) The wrong doing is broken into a division of tasks where each member is seen as only a small cog in the wheel. Responsibility is therefore spread so that no one need feel guilty about the overall result.

4) An escalation in acceptance of the new immoral values can then occur so that the new values are generally accepted by the organization, while each member can still rationalize themselves as decent because they had little responsibility for the result.

Dr. Ira Casson, the second head of the MTBI Committee, clearly rejected all generally-accepted relevant-to-fraud moral norms in his misleading claims and publications concerning the connection between football and CTE. This included his journal articles, and pamphlet-based communications with players. His attempts to humiliate dissenters are also well documented in Fainaru and Fainaru-Wada (2013), and also by the 2013 PBS Frontline documentary League of Denial. Finally, his absolute denial of the obvious truth in a Nationally televised interview for which he was nicknamed “Dr. No.”, all followed a process described by Arendt (1963), Bonhoffer (1997), and Svendsen (2001, 2010) as a process of evil. This process included:

- Creation of an us-vs.-them atmosphere, and thereby developing an atmosphere of being under attack even when no threat was present, and demonstrating contempt for weakness for anything less than enthusiastic support.
- Dispersal of responsibility so that one can claim, “It wasn’t only me!”
- Humiliation of dissenters.
- Denial of the obvious facts that harm happened to victims.

All of these are documented by the above cited events.

In recent years, experimental psychology has developed theories of psychological disengagement with respect to personal devolution of moral standards. This psychological literature attempts to explain the process of first acceptance of personal immoral actions followed by rationalization and then further immoral actions. This literature powerfully reinforces the organizational process of evil as described by Arendt and Svendsen. Some of this relevant psychology literature is reviewed here.

Aquino and Reed (2002), Bandura (1990), and Bandura et al. (1996) show that unethical behavior elicits self-censure, which provides the principal restraint on this behavior. When ethical beliefs conflict with actual behavior, Elliot and Devine (1994) show that psychological dissonance, a stressful form of discomfort, occurs that motivates a process of attitude change. The actors in question either modify their behavior to align with their ethical values, or they modify their values. It is the latter that has the potential for feeding evil processes. (Also see Baumeister and Heatherton, 1996.)

Bandura (1990), Bandura et al (1996, 1999), and Detert, Trevino and Schweitzer (2008) offer an explanation of the process of realigning ethical beliefs with actions, namely beliefs are modified through moral disengagement, thereby relieving the cognitive dissonance. This disengagement process allows the unethical conduct to become personally acceptable. The disengagement takes any of four possible forms:

1. The unethical conduct is portrayed as serving a moral purpose.
2. The unethical conduct is betrayed as being caused by external forces.
3. The consequences of the conduct are interpreted as being innocuous.
4. The victims of the unethical conduct are dehumanized.

With respect to these devolutionary actions, the economic theory of compensating wage freely reached is utilized to ameliorate, or even dismiss, the obvious CTE injury, i.e. the player freely and knowingly accepted the risk in return for the higher than typical salary. Of course the question of “knowingly accepted” is at issue. It is one of the questions begged by the compensating wage theory. An essential narrative is posed by the argument that the player accepts these risks in return for assuring financial security for his family. It must be noted, however, that numerous examples illustrate that ex-players with CTE usually demonstrate financial failure rather than security, but there are more aspects of a secure life than merely the financial.

**BRAIN BASHING AS ENTERTAINMENT**

If we reflect on the characteristics of what we would consider to be a desirous or fulfilling life, we likely would include (but not exclusively):

a) exercise of reflective reason (a Kantian and Platonist consideration), and creativity,
b) enjoyment of interactions with family, friends, and cohorts,
c) logical management of one’s resources, financial and otherwise,
d) enjoyment of recreational interactions with the natural environment.

The type of dementia caused by CTE destroys all of these characteristics. In all the cases of documented CTE, the ex-player’s resources were squandered. As exhibited in filmed interviews with Mike Webster (see *League of Denial*), any sustained thought appeared impossible; any interactions with family or friends, or even medical personnel, were characterized by belligerence on the part of the ex-player, and frustrating social conflicts; routine enjoyment of recreation of any sort appeared impossible. The individual suffering from the disease appears devoid of what we consider the beneficent characteristics of being a person.

Kant’s (1785, 1797) argument against suicide is one of the five duties he explored as examples of maxims derived from his *categorical imperative*. This maxim is reflected in our society’s laws against suicide. Some interesting moral questions associated with this prohibition are:

1. If one voluntarily destroys what is necessary for one’s life to be meaningful, or enjoyable (as listed above), has one committed a version of suicide?
2. Does this therefore imply a negative duty (a prohibition)?
3. If the answer to the above is affirmative, but our actions only lead to a probability of this version of suicide occurring, then what probability is unacceptable, i.e. one-hundred percent, fifty percent, ten percent?
4. Do we have a duty, either positive or negative, to not support the actions of others that would lead to their life debilitation as indicated by the questions above?

With respect to the second and third questions, we might rephrase to ask, “Would we pay to watch someone commit suicide in a forum setting?” Surely we would not, even if the subject agent was paid a compensating wage, one freely bargained for, that assured financial security for his or her family. Our society’s laws would prohibit this suicide, and our own personal moral maxims would surely prevent us from encouraging such behavior of our purchasing a ticket. We are therefore again confronted by the question of probability, i.e. the probability of debilitation that we would tolerate when we purchase a ticket for a game that inherently has such risks. What probability is tolerable?

The Mayo Clinic’s study, cited above, indicates that approximately one-third of those who played football in high school or college showed signs of dementia. Is this statistic sufficiently high to indicate a required exercise of duty for society? If so, what is this duty?

Although our society has laws against suicide, and it even has occupational safety laws enforced through OSHA that limit threats of physical harm in the work place, we generally leave the sports’ entertainment industry to regulate itself with respect to safety. The NFL recently (for the 2015 season) responded to the CTE crisis with *concussion protocols* and sideline physicians who can enforce the benching of players due to concussion symptoms. The training of coaches on the importance of immediate concussion treatment, and potential long-term brain damage from concussions, is now commonplace.

Football has been popular in high school and college since the 1890s. It has experienced periodic injury crises such as from the flying-wedge formations of the 1890s (outlawed due to numerous broken bones and even deaths), the adoption of leather helmets during the 1920s, the strengthened hard-helmet in the post WWII era, the face mask cage or bars of the late 1950s, and the clear face mask of the 1970s. The current problem is one of using the hard helmet as a tackling and blocking weapon. Helmet-on-helmet contact is likely to cause at least a sub-concussive injury. It is clear that the NFL is searching for at least partial solutions.
One of the problems with the NFL as an industry is the negative externality associated with NFL Films’ glorification of violence, i.e. very hard tackles make the “highlight” films for various sports shows. Junior players in Pop Warner and high school copy that style of play. Since the publicity of 2013, however, high school teams have had considerable reduction in players. In Western New York, high schools who had large teams prior to 2013, now have difficulty meeting the 29 player minimum requirement. For examples, the high schools of Eden, North Collins, and Lakeside have recently joined to form a single team of sufficient size. Also the schools in Fredonia, Brocton and Westfield have similarly joined, and so have teams in the immediate suburbs of Buffalo.

Svendsen (2010) points out that any ex-post remorse for the final result of wrongdoing follows a gradient that begins with “How could I have been so stupid?” If the group dynamic is allowed to progress, then statements such as, “Why did I not resist?” follow. If the dynamic is allowed its full development, then statements such as “What have I let myself become?” follow. The task of prevention is to not allow development of the first stage, or at least to not allow the second stage to occur.

**DUTY, COMPENSATING WAGES, AND CTE**

The median NFL player salary was $860,000 for the 2015 season. The minimum rookie salary was $435,000, and the overall maximum was $22 million. The mean average was $1.9 million. For the 2015 season the majority of players were 26 years of age or less. Are these compensations sufficient for life-debilitating brain injury?

Duty obligations related to the CTE crisis are of two sort:

1) The obligations of the NFL towards its past, present and future players, and general society,
2) The obligations of the patrons towards the NFL and general society.

The obligations of the NFL towards past, current, and future players were abrogated by its deceptions. It knowingly hid its research findings that indicated the severity of the CTE problem; it humiliated dissenters; it lied to its players and the general public with respect to the long-term effects of concussion; in its publicity, it propagated a form of head-related violent contact, and did this for the purpose of expanding its popularity. This latter publicity led to head-on-tackling becoming an accepted style in lower-level football (Pop Warned, high school, and college). These are all violations of negative duty obligations.

The NFL’s current positive duty obligations are obvious. All positive duty has practical limits due to resources, but

NFL football has greater than $11 billion annual gross revenue. It needs to:

(i) counteract its previous abrogations with full support of research on the CTE problem;
(ii) counteract its previous abrogations with support of players previously and currently affected;
(iii) change its rules with respect to head contact;
(iv) change its equipment to lessen the problem;
(v) change its propaganda with respect to glorification of the offending violence.

The NFL has already initiated, but not completed, the first three of these duties (research, support payments, and rules changes). It is currently exploring the fourth obligation. It has not initiated the fifth obligation.

The positive obligations of the NFL patrons are more complex than the obligations of the NFL itself. Patrons have an obligation to recognize the NFL’s previous abrogations of duty, and to demand changes accordingly. Our society has maxims against work-place safety violations. There is an extensive history of boycotts in response to industry workplace-safety problems. A supposed compensating wage does not mollify these obligations. The documentation of the CTE crisis indicates that this sort of work-related injury is in the more severe category. Spectators who sit in stands and encourage brain-related injuries are not behaving consistently with respect to society’s moral maxims.

Free market transactions, i.e. in this instance transactions between NFL teams and players, and also between patrons and teams, might enhance public welfare provided both parties are knowledgeable, and there are no negative externalities. The NFL abrogated both of these conditions. An argument based on “free markets” and “compensating wages” is illegitimate for arguing “welfare enhancement” in this case. Even, however, with externality and knowledge problems resolved, there are still ethical problems with an entertainment industry that causes the CTE problems documented above. Compensation salaries freely negotiated and reached do not abrogate the ethical duties of the public with respect to supporting severe brain debilitation, as explored above.

The NFL’s actions of deception and humiliation of dissenters illustrate the process of evil as reviewed above, and as explored in modern philosophy. These actions were generated through a competitive business atmosphere of *us-vs.-them*, and a rationale that compensating salaries ameliorate the ethical problem. The NFL’s actions were at best paternalistic towards its players, negligent concerning its disclosure responsibilities, and fraudulent with respect to its deceptions.
Finally, it should be pointed out that this CTE ethical problem poses a precedent for other work-related life-debilitating risks. The neoclassical theory of compensating wage does not lead to conclusions of general welfare enhancement when ethical obligations are abridged, and this is true for the case of compensating salary freely negotiated.

ENDNOTES

1 This professional football crisis is one of numerous examples of debilitating work examples in economic history. Historical examples can be found in Pugatch (1998), and McCullough (1972). A recent example can be found in Wessler (2014).

2 “The pit” refers to the area along the line-of-scrimmage where linemen frequently bang helmet-on-helmet with considerable force.

3 Members Richard Ellenbogen, Hunt Batjer, and NFL Vice-President Jeff Miller admitted this in their 2012 reformation of the NFL’s concussion policy. (See Fainaru and Fainaru-Wada, 2013, pp. 290.)

4 See Bernard Goldberg’s interview with Ira Casson in HBO’s Real Sports, Oct. 30, 2009, and currently on YouTube.

5 The formal name of the depository is Boston University’s Center for the Study of Traumatic Encephalopathy.

6 Junior Seau, Mike Webster, and Terry Long are three examples of bankrupt ex-players with CTE as documented by Fainaru and Fainaru-Wada, 2013.

7 Negative duty is an absolute prohibition, such as that against murder or fraud. Positive duty implies positive actions that all have practical limits, and possible tradeoffs with other duties, including those towards oneself. See White (2011) and Sullivan (1997).

8 An interview with Ken Koblitiz, a former linebacker for Ohio State University under coach Woody Hays, indicated that formerly, players were taught to tackle with their heads to the side rather than full-on into the center of the offensive player.

9 See Robinson, 2016, for a full exploration of negative and positive duty with respect towards economic behavior.

10 Robinson, 2016, documents some of these successful boycotts.

11 This reference to welfare arguments cannot be based upon pure utilitarianism, but either a rules-based utilitarianism model, or a Kantian-based model where ethical duty violations (fraud, deception, etc.) imply welfare loss. Also see White (2011) and Robinson (2016).

REFERENCES


Zimbardo, Philip. 2007., The Lucifer Effect: Understanding
How Good People Turn Bad, Random House, New York, NY.

A FOURTH LOOK AT PUBLIC HOUSING IN SWEDEN: THE BUSINESS MODEL

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ABSTRACT

Comparative housing analyses often find that the Swedish public housing model represents a success story. That is, a good class of housing is offered at a reasonable cost to all sections of the population—irrespective of income, ethnicity, age or type of household. This approach has been called the “Swedish public housing model” and the purpose of this paper is to describe and reflect upon its operation. The company utilized in this study as a research case, AB Bostaden, builds and manages housing in the Umeå municipality. With 15,400 apartments, it is the biggest actor in the Umeå housing rental market, with a market share of approximately 45 percent, and controls 27 percent of the Umeå housing market overall. The background section of the paper provides consideration of both the Swedish system of rental housing as well as aspects of business models. A typological-taxonomic approach to understanding business models is used to deconstruct Bostaden’s approach to its housing market. The business model that results through this approach indicates that the organization functions as a tenant-oriented, municipal utility with core values of human equality, transparency, care and a businesslike approach that captures a high return on rental revenue (~ 19.3% PBT) and a modest return on assets (7.9% ROA, including depreciation) within a value network of the kommun + the energy utility + the university by providing value-for-money rentals within the municipality and by helping tenants to turn their flats into homes and neighborhoods. Continued appreciation of its base assets and apparent economies of scale were instrumental in the success of the operations at the tactical level.

INTRODUCTION

A housing program is an important element upon which development policy is built. Without proper housing, other elements in development are difficult, if not impossible, to obtain. That is, inefficiencies in the housing market potentially provide constraints upon labor availability and mobility, thereby having an important bearing on regional and local economic viability (Adair, Berry and McGreal, 1996). Consequently, social programs have tended to have some element of housing in their structure. In this regard, the Swedish system has received attention because of its long-term viability (Turner, 1999). That is, its public housing has a significant position in the overall housing stock, a seventy-year history of relative success, yet functions on a basis that is “different” from other European systems (Turner, 1999) at a significant level of operations.

Interest in Swedish public housing has been a topic of continued academic reflection, and generally speaking, authors tend to be complimentary to the system (Lind and Blomé, 2012; Bengtsson, 1999; Turner, 1999; Priemus and Boelhouwer, 1999). Consensus suggests that, at a time when countries struggle to provide adequate housing, “Housing quality in Sweden is very high by international standards” (Lind and Blomé, 2012). Comparative housing analyses often find that the Swedish housing model represents the premier success story (cf. Nesslein, 2003, p. 1260 ff. for relevant literature). That is, Sweden has had a tradition of a well-developed housing policy that has a “focus of providing everybody² the chance of a good home, at a reasonable price” (Swedish Institute, 2000).

Historically, public housing companies have been a part of the Swedish welfare society that emerged following World War II (SABO, 2007). Their task was to offer a good class of housing at a reasonable cost to all sections of the population—irrespective of income, ethnicity, age or type of household. This development provided support for the conscious adoption of a position that was for integration, and against the separation of the rich and the poor where those who could not succeed in the housing market were allocated welfare housing of the lowest standard. Sweden was unique within Europe, as its public housing policy not only included social housing for the less fortunate members of society, but also increased the quality of life for everyone. This approach has been called the Swedish public housing model (SABO, 2014). In essence, in this study we are trying to understand a situation with the following characteristics:

1. The resultant housing companies are oligopolistic, if not monopolistic. They need not fear competition because there tends to be one company per municipality and they actually set the rent for private competitors.
2. This rent is set by negotiation between the housing company and a tenants’ union (cf. Lindbergh et al, 2006).
3. With perhaps minor exceptions, accommodation is not made on the basis of income, rather the individual’s need for housing. Income accommodation is made through other agencies.
4. Outside of some rural municipalities, there is a waiting list for potential tenants.
5. These organizations are public to the extent that their stock is completely owned by the municipality.
6. Although they are owned by the municipality, they are not run by the municipality, rather as an independent company.
7. They do, however, return payment via interest on the debt that the municipality has developed to support them.

The purpose of this paper thus is to elucidate upon this “Swedish public housing model” and reflect upon its

² “Everybody” is a direct quote, but seems a strong assertion. Murdie and Borgegård (1998) use the phrase “provide a large proportion of the population with good and reasonably inexpensive dwellings,” which may be more suitable.
operation – one that is generally conceded to work. The case
description may therefore be thought of being both a model
of, and perhaps the model for other housing projects and
programs in general. Interest should be generated among
scholars interested in public housing as well as policy makers
who make decisions and choices in its operations.

The paper is organized as follows. First there is a
background sketch of some academic and practical coverage
of business models, followed by a description of public
housing in Sweden, primarily as it exists in municipal public
housing. Subsequently, some background is given of the
organization featured as a case study in this paper, AB
Bostaden. Shaffer et al’s (2005) approach to understanding
business models is then used to deconstruct the AB
Bostaden’s approach to its housing market in Umeå, Sweden.
Discussions of these observations then follows.

BACKGROUND

Business Models

Explicit or implicit, any business venture uses a business
model that crystallizes its understanding of “deep truths”
about customer needs and ability to pay, and describes the
architecture of its value creation, delivery and capture
mechanisms; and which is not abstract, but is rooted in
specific context; (Teece, 2010). Put another way, the business
model is typically seen as a key component of organizational
success (Baden-Fuller, 2010). Casadesus-Masanell and
Ricart (2011) have agreed, suggesting that although strategy
has been the primary building block of competitiveness over
the past three decades, the quest for sustainable advantage in
the future may well begin with the business model. Quoting
the IBM Institute for Business Value biannual Global CEO
study, they (Casadesus-Masanell and Ricart, 2011) indicate
that seven of ten companies are engaging in business-model
innovation and 98 percent of companies are modifying their
business models to some extent. The question naturally
arises, what is a business model, really? Clearly there is
some room for flexibility. Zott and Amit (2010) defined it as
a template of how a firm links factor and product markets to
deliver value to stakeholders, e.g., customers, partners and
suppliers. Casadesus-Masanell and Ricart (2011) utilized
Joan Magretta’s (2002) definition, “the story that explains
how an enterprise works”, or if one is a traditionalist and
wants to go back to Peter Drucker (1954/1986), he asserted a
model answers the questions, “Who is the customer, what
does the customer value, and how do you deliver value at an
appropriate cost?”

It has been suggested that there is a richness in models
(Baden-Fuller and Morgan, 2010). Just as McDonalds is
both a model of - and the model for - business format
franchising. Thus, business models take on the role-
model/exemplar/ideal type mantle. These same authors
indicate business models also act as laboratories themselves,
where academics explore how they work, and managers
experiment with the destiny of their firms - even with the
structure of the model itself. Business models are also
factors in their own field of study, e.g., the notion of the
business model as a recipe, building on tacit managerial skills
to demonstrate or advise these “chefs” about how best to
organize and integrate their ingredients and techniques “so
that the results will come out right”.

Casadesus-Masanell and Ricart’s (2011, 2010) research
indicated that one component of a business model must be
the choices executives make about how the organization
operates. In that regard, organizations make three types of
choices when creating business models:
- Policy choices that determine the actions and
organization takes across all its operations.
- Asset choices pertain to the tangible resources an
organization deploys, and
- Governance choices, which refer to how an organization
arranges decision-making rights over the two.

Consequences can be either flexible or rigid. A flexible
consequence has been explained as one that responds quickly
when a choice is made, e.g., a price change. A rigid
consequence, on the other hand, might deal with some
element of the organization’s culture. Although some
changes might be immediate, it is only over a longer term
that the effect of the choice is felt. “Good” business models,
from Casadesus-Masanell and Ricart’s (2011) perspective,
- align themselves with the organization’s goals, i.e.,
choices should deliver consequences that permit the
organization to achieve its objectives.
- are self-reinforcing, i.e., choices should complement
each other. Put another way, there must be internal
consistency, and
- are robust, i.e., a good business model should sustain
itself over time by fending off threats.

3 The topic of business models was viewed as being
important enough to launch the 10th anniversary of the re-
launch of Long Range Planning in 2010, a number of articles
in that special issue are referenced here.

4 Note that throughout this manuscript the liberty has been
taken to substitute “organizations” for “companies” or
“firms” in the literature. It would be argued that because
performance tends to be cited in terms of value, the use of
profit oriented organizations is unnecessarily restrictive.
Going back to Magretta (2002), it was indicated from her studies that when business models don’t work, it’s either 1.) because they fail either the narrative test (the story doesn’t make sense) or 2.) the numbers’ test (the P&L doesn’t add up).

Shaffer et al. (2005) earlier had likewise assessed the importance of understanding business models. An affinity assessment of the definition of “business model” in twelve papers on models that preceded theirs was conducted. From that assessment, they suggested that a model in common would be composed of 1.) strategic choices, 2.) value network, 3.) create value and 4.) capture value. They thus developed a definition of business model as

an organization’s underlying core logic and strategic choices for creating and capturing value within a value network.

They went on to expand on this definition.

The first key term, core logic, suggests that a properly crafted business model helps articulate and make explicit key assumptions about cause-and-effect relationships and the internal consistency of strategic choices: the second key term. In effect, the business model reflects the strategic choices that have been made; ...

The term creating and capturing value reflects two fundamental functions that all organizations must perform to remain viable over an extended period of time. Successful organizations create substantial value by doing things in ways that differentiate them from the competition. ... In the end though, ... viability is tied both to the value the organizations create and to the way they capture value and resultantly generate (meaningful returns).

Neither value creation nor value capture occurs in a vacuum, however. (It may be argued), both occur within a value network, which can include suppliers, partners, distribution channels, and coalitions that extend the organization’s own resources. The organization may be able to create unique relationships with any of these parties or even with its end customers. The role a firm chooses to play within its value network is an important element of its business model.

It is generally surmised that a business model is not a strategy, in agreement with Teece (2010), Casadesus-Masanell and Ricart (2010) and Magretta (2002) among others, but rather reflects strategic choices and their operating implications (emphasis added). Thus, strategy is an element in a business model. When models incur problems, the problems tend to be of four types:

1. Flawed assumptions underlying the core logic.
2. Limitations in the strategic choices considered.
3. Misunderstandings about value creation and value capture.
4. Flawed assumption about the value network.

Public Housing in Sweden

There are 4.2 million residences on the housing market in Sweden today. In general, this housing market is divided into four main categories (Johnson, 2010)\(^\text{10}\):

- Privately owned, single-family houses (42%)
- Co-operative housing, where the tenant-owner is a member of a co-operative that owns the building, but one owns the right to his/her flat (18%)
- Privately owned houses with rented flats and (17%)
- Municipally owned houses with rented flats, i.e., public housing (22%), e.g., just over a seventh of the Swedish

\(^5\) One way of looking at an affinity assessment is that it is a combination of content identification followed by a factor analysis. From the 12 papers 43 items were identified as existing in the resultant paper’s definition of “business model”. By requiring that an item be mentioned in at least two of the papers, the list was reduced to 20. These, then, were collected into the four factors – strategic choices, value network, create value, and capture value.

\(^6\) Strategic choices includes target market, value proposition, capabilities/competences, revenue/pricing, competitors, output (offering), strategy, branding, differentiation and the mission.

\(^7\) Value network includes suppliers, customer information, customer relationships, information flows and product-service flows.

\(^8\) Value creation includes resources-assets and processes-activities.

\(^9\) Value is considered captured by profit, financial aspects and cost.

\(^10\) This material is available in whole or in part from a number of sources, e.g., SABO, 2014 and Swedish Institute, 2000. Johnson (2010) has been favored here and in cases covered verbatim because of format and coverage.
population lives in rental flats owned by public housing companies (SABO, 2014).

Put another way, more than 3 of 9.5 million Swedes live in rental housing, and of these, over half live in public housing, that is to say municipally owned rental housing (SABO, 2014). Sweden never had a social housing sector in the traditional of the U.S. or southern European sense. That is, it did not have a social rented sector (Priemus and Boelhouwer, 1999). The central distinction is that market housing is allocated according to effective demand, while social housing is allocated according to need (and usually has sub-market rents (Haffner et al., 2009)). Instead, a non-profit rental sector was created in Sweden after the Second World War. Under these circumstances, about one-sixth of all Swedish dwellings are co-operatively owned (Bengtsson, 1999). Most of the non-profit sector is organised by means of municipally owned limited companies or foundations and the municipalities play the biggest role in managing the sector (Turner, 1999; Priemus and Boelhouwer, 1999). The municipal companies, however, are owned by the municipalities and have a moral and political obligation to cater for all types of households (Turner, 1999). Although technically non-profits, these municipally owned companies (allmännytan) tend to be profit driven (Lind, 2014).

A peculiarity of the Swedish system has been the influence tenants have on operations, primarily the setting of rents. These rents are set through negotiations between the company and the tenants’ organization. The first step is taken by the company, which tries to get its actual costs covered. The tenants’ union in turn questions the calculated costs and company effectiveness. If it is not possible to reach an agreement at the local level, rents are agreed upon centrally by SABO and the national tenants’ organisation. Lindbergh et al. (2006) concluded that the system seemed, for all intents and purposes, to work and to work rather well. Well-placed respondents from both sides in the negotiations each told the same story and came to pretty much the same conclusion. In other words, both parties tend to negotiate with the welfare of the system in mind, which has sustained the system in a customer oriented direction.

In the beginning of the public housing practice, the Government financed housing with subsidized loans and new non-profit companies were established, the majority of which came to be owned and managed by the municipalities (SABO, 2014). Traditionally, the development of this sector has continually received national support. The state’s most explicit means of encouraging municipalities has been to provide special state financial support to municipalities and their housing companies. Even when state support began to be offered for all housing construction in 1942, the share extended to public housing companies was always larger than that given to the private companies. In that regard, the entry of Sweden into the EU was a game-changer in the housing sector. Public housing companies have been called into question because the Swedish model of public housing companies differed from practice in other countries. Consequently, subsidies to the housing sector and the special position of municipal housing were abolished in 1992 according to a Parliament resolution, and they were placed on a par with other players on the housing market. In 2002 a separate act on non-profit housing companies was passed. The provision of that act was that the state no longer claimed at its disposal any financial incentives with which to support or encourage municipalities to keep their housing companies. Neither did it provide for stopping the sale of municipal housing companies by cancelling interest subsidies or by withdrawing general government grants to municipalities. Consequently, in some municipalities its public housing company or part of its housing stock already has been sold to private owners.

From 2007 the new national goal for the housing sector in Sweden focused on a “well-functioning housing markets in the long-term perspective, where the demands from the consumers are met by corresponding housing supply”. This goal replaced the goal 1998 of “high quality and affordable housing”. This, in turn, has been replaced by the Public Municipal Housing Companies Act of 2010 that states these Companies (PMHCs) should run their operation on “businesslike principles” (cf. Lindbergh and Wilson 2016, 2015).

Previously, municipalities were not allowed by law to make economic profits from their companies (Kommunallagen 1991: 900, 2 chapter 7 §). Nevertheless, they were also forced by this law (ibid, 8 chapter 2 §) to handle their money prudently, which likewise meant obtaining a reasonable return on equity of the housing companies. The law did not indicate how high this return should be, but the maximum size of dividends was decided by the government (SOU 2001:27 p 56). By law all fees also should reflect all costs for services given to residents of municipalities, following a

11 Material in this section comes from this report.
full cost principle (Kommunallagen 1991: 900, 8 chapter 3b §). This principle did not specifically include rents, (SOU 2001:27 p 57), and did not preclude these considerations in negotiating rents. Today under the Public Municipal Housing Companies Act of 2010 no state sanctions remain for either the sale of municipal housing companies, part of their housing stock, or the payment of excessive dividends to the municipality. It is up to the municipalities themselves to judge whether they find it meaningful to have at their disposal a municipal not-for-profit housing company as an instrument of housing policy.

**AB Bostaden – The Company**

AB Bostaden, the case company utilized in this study, builds and manages housing in the Umeå municipality, and its history dates back to 1953 when it started as a foundation. In 1995 the company became a municipal public utility tasked with contributing to the municipality’s growth by providing its housing. With 15,400 apartments⁰¹, it is the biggest actor on the Umeå housing rental market, with a market share of approximately 45 percent of the rental sector, and 27 percent of the Umeå housing market overall (AB Bostaden, 2013a). It also has a large stock of student housing. According to the latest financial report (2014), the Company has a rental revenue (turnover) of ~ 964 million SEK (~ 95 million Euros), 177 employees and an asset value in excess of 5400 MM SEK (~ 535 million Euros). Company literature suggests that through its growth, Bostaden has helped turn Umeå into a city that in many ways is the capital of Norrland. The company’s business concept is to provide “value-for-money” houses for rent. Its aspiration has been to be the natural choice for people who wish to rent their own homes in Umeå. The company’s business plan for 2014-2016 (AB Bostaden, 2013b) asserts that its core values are 1.) human equality, the focus on ability not background, 2.) transparency, trust in relationships, 3.) care, of people, buildings and the environment and 4.) a businesslike approach, e.g., a holistic treatment of its finances.

**METHODOLOGY**

¹² This puts them in the top two percent of MHCs in Sweden (cf. Turner, 2007).

The study was exploratory in nature; essentially it was set up as a mapping exercise to see if the elements of a common definition of a business model could be fit with definitions of the operations of a municipal public housing company. In that regard, Shafer et al’s (2005) approach to understanding business models was used to deconstruct the organization’s approach to its housing market. Among the models covered in section 2.1. it was the one that appeared most operational in analysis, which in essence followed from its distillation of models used previously in analyses. By Baden-Fuller and Morgan's (2010) assessment, it is a typological, i.e., top-down, approach. Additionally, it is noted that, following directly from Table 1 in the Baden-Fuller and Morgan (2010) paper, it is a reflection of how an organization delivers value to customers an converts payment into profits Teece (2010), but at the same time has some elements of Yunus et al’s (2010) social business model – recall municipal public housing in Sweden comes under the category of social housing in Europe. The model thus appeared to be suitable as a framework in this research.

It is noted that studies such as the determination of a business model require a particularly cooperative partner because they can become intrusive. AB Bostaden in Umeå was selected as an organization to study insofar as it had been a willing participant in previous studies with the University there. Its management seemed to be particularly open in discussions, and in fact, they had been leaders in some areas. Further, not only were there open discussions, but documentation of items was available through open records consisting of annual reports, annual plans and management presentations. Sub-elements in the Shaffer model were thus identified with some meaning in AB Bostaden’s approach to its market.

**AB BOSTADEN’S BUSINESS MODEL**

**The Build-Up**

Although the main elements of the Shafer model are strategic choices, value network, value creation and value captured, these elements can be understood only when they are built up from the sub-elements. For instance, strategic choices include target market, value proposition, capabilities-competences, revenue-pricing, competitors, output (offering), strategy, branding, differentiation and the mission. In turn, the value network includes suppliers, customer information, customer relationships, information flows and product-service flows. Elements truncate as one moves along. Value creation includes resources-assets and processes-activities and value captured by profit, financial aspects and cost. Each of these sub-elements has some meaning in AB Bostaden’s approach to its market. In this manner the model is built up – a taxonomic approach (see Table 1).

The build-up proceeded by attaching company practice with
the specific sub-element. The company’s target market, for instance, consisted of individuals within the Umeå municipality, whether they were domestic residents or students. There were also a number of commercial contracts held by the company. Likewise, the value proposition of the company needed to be identified. In this case, documentation described it as working for long-term sustainability in everything done – socially, ecologically and economically with core values of human equality, transparency, care, with a businesslike approach. Going to the value network, the suppliers included the Umeå kommun, Umeå Energi, and the University. At the other end, the value captured included profit, which can be expressed in a number of ways, but in this case PBT was 186 million Swedish crowns. The items are summarized in Table 1, along with the source of supporting documentation where appropriate and applicable.

Analysis and assessment

In an effective model, the elements are linked. The linkage can be assessed by examining the Shaffer et al’s (2005) definition of a business model.

an organization’s underlying core logic and strategic choices for creating and capturing value within a value network.

Organization = AB Bostaden

Underlying core logic = Functions as a tenant-oriented, municipal utility with core values of human equality, transparency, care and a businesslike approach.

Capturing value = High return on rental revenue (= PBT/RR = 186/964 ~ 19.3%) and Modest return on assets (= [PBT+D]/TA = [186+128]/4000 ~ 7.9%)\(^\text{13}\)

Within a Value Network = Umeå kommun + Umeå Energi + Umeå university

Strategic choices for creating value = 1.) providing value-for-money rentals in Umeå and 2.) helping tenants to turn their flats to homes and neighborhoods.

So, if one were to summarize AB Bostaden’s business model, one might say

It functions as a tenant-oriented, municipal utility with core values of human equality, transparency, care and a businesslike approach that captures a high return on rental revenue and a modest return on assets within a value network of the Umeå kommun + Umeå Energi + Umeå university by providing value-for-money rentals in Umeå and helping tenants to turn their flats to homes and neighborhoods.

REFLECTIONS ON INDIVIDUAL TERMS

Continuing with the deconstruction that led to the statement of the business model, this section takes a brief look at the specific terms that went into the statement.

Underlying core logic

Some of the terms in this item are behavioristic and thus more difficult to document. Nevertheless, human equality and care are bedrocks in the Swedish system, and one could not operate a business in Sweden in violation of these basic tenets of behavior. The idea of transparency can be documented through the organization’s home page; there is ready access to not only its annual report, but its plans for the upcoming years, progress reports on expansion and reports on past projects. Likewise “businesslike approach” is observable – rentals are set through negotiations with a tenants’ union and the resultant figures given for value creation speak for themselves. “Municipal utility” comes from the company’s definition of itself.

The formal conceptualization of “customer-orientation” in services likely started in Sweden with the work of Christian Grönroos (cf. Grönroos, 1983). It is a term commonly used to describe consumer banking (cf. Boström et al, 2015), and Lind et al. (2014, p. 7) have used the term in the description of housing. The extension to tenants is just a little more

\(^{13}\) PBT = profit before taxes; RR = rental revenue; D = depreciation, a non-cash return; TA = total assets.
specific; they are the customers of AB Bostaden.

Strategic choices for creating value

Value-for-money speaks for itself. Were it not for this item, Bostaden would not have a waiting list for potential tenants. In a competition with private suppliers, Bostaden is the organization of choice. “Turning flats to homes and neighborhoods” is another one of those soft concepts, but individuals tend to stay in these flats, so there are indications of comfort and satisfaction.

Value network

The nuances of the network could go underappreciated. First and foremost, the municipality and the university are the sources of tenants. As they grow, the demand for housing grows. The municipality also tends to be the source of the many service firms, such as the construction companies, used by the organization. With 177 employees in the organization servicing 15,400 flats, obviously most services are outsourced. Likewise the university supplies services – the engineer study done in Project Alidhem, for instance, was done by the Institute for Applied Physics and Electronics group at the university. The municipality proves funds for construction and refurbishment through an ongoing loan agreement and also is the source of individuals who make up the organization’s board. Finally, the energy utility supplies not only electricity to the housing units, it is the source of hot water heating through the district heating system – and is the purchaser of excess energy supplied from solar cell banks atop some of the housing units.

Value captured

The finances of the organization to some extent illustrate the social business aspects of the organization. The aggregate cost of debt is ~142 MM SEK (3.57%), which is paid to the municipality. That is actually larger than a straight return on assets (PBT/TA – 3.4%), which normally might raise a flag. Allowances are made, however, because of the municipality (utility) nature of the business – it is in the interest of a growing community to continually support growth in its housing sector and thus to continually make these loans available.

INSIGHTS BETWEEN THE LINES

Casadesus-Masanell and Ricart (2010) have suggested that an organization’s strategy primarily involves choosing its business model. Consequently, once the model is chosen, the residual choices (tactics) open to the organization are crucial in determining its value creation and capture. Put another way, now that there is some understanding of Bostaden’s business model, what is it in terms of tactics that really makes it go? There are two items worth considering:

1. The value of the organization’s rental buildings have tended to appreciate. Due to the solid initial structure, on-going maintenance and periodic refurbishment of the buildings, the organization has been able to negotiate favorable rents for its operations as evidenced by its 19.3% return on rental revenue.

2. There are apparent economies of scale in this business. The organization manages 15,400 units with 177 employees. That produces a revenue per employee of 5.4 MM SEK – not bad for a business with an asset value 5,400 MM SEK. Were the size one-half, or one-tenth, as large the employee base would not be much different, with corresponding reduction in per employee revenue.

CONCLUDING REMARKS

A business model has been formulated for the case of interest from the formalism developed by Shafer et al (2015). The value captured using this model developed a high return on sales and a modest return of assets by basically taking a customer-orientation approach to its operations. Continued appreciation of its base assets and apparent economies of scale were instrumental in the success of the operations at the tactical level. Of course case studies cannot be generalized, but undoubtedly due to restrictions and regulations of operation, this type of operation tends to be replicated throughout the county – producing what has been called “the Swedish housing model”.

### Strategic Choices

| **Target Market (Scope)** | – Focused within the Umeå municipality.  
– Both domestic (residential) and student housing.  
– 200 commercial contracts |
| **Capabilities/Competencies** | – Build new houses & take care of old houses.  
– Take care of our tenants. |
| **Revenue/Pricing** | – Turnover ~ 964 MM SEK (95 MM €).  
– Rent negotiated with union. Two bedroom apartment 60 sq meters = SEK 4675/month. |
| **Competitors** | – The company is (the) municipal, public utility tasked with … providing its housing.  
Individual homes & private rental companies compete generically, but there is no direct competitor in kind. |
| **Output (Offering)** | – Affordable housing for virtually anyone seeking accommodation. |
| **Strategy** | “We want to help our customers turn our flats and residential areas into their own homes and neighborhoods” |
| **Branding** | Strengthens the Umeå brand by providing sustainable housing where the people are always in focus. |
| **Differentiation** | Because of its location, it provides housing for students, which is unusual. Lately it has had a focus on sustainability, which at cutting edge. An initial project won four awards. |
| **Mission** | Provide value-for-money residences as the natural choice for people who wish to rent their own homes in Umeå. |

### Value Network

| **Suppliers** | – Umeå kommun (Umeå municipality)  
– Umeå Energi (Energy Company)  
– Umeå university |
| **Customer Information** | Works through the tenants’ union in rent setting. Policy of meaningful everyday communication. |
| **Customer Relationships** | “We are keen to develop good, long-term relationships with our customers” |
| **Information Flows** | “… and we want this to be felt in the many contacts we have with our customers every day”. |
| **Product/Service Flows** | The nature of the business mandates customer’s come to it. Service, however, flows from a central site. |

### Value Creation

| **Resources/Assets** | – 15,400 apartments (27% of municipal’s housing market)  
– 177 employees |
| **Processes/Activities** | It builds and updates new houses, provides maintenance & refurbishment of old ones & cares for tenants through meaningful administration & activities. |

### Value Captured

| **Profit** | – Profit before Tax ~ 186 MM SEK, EBIT ~ 530 MM SEK. |
| **Financial Aspects** | – Rent Revenue ~ 964 MM SEK  
– Total Asset Value ~ 5,400 MM SEK, Depreciation ~ 128 MM SEK. |
| **Cost** | – Interest Expense ~ 143 MM SEK, Total Debt ~ 4000 MM SEK. |

REFERENCES


Adair, A., Berry, J. and McGreal, S. 1996. The interaction between housing markets, the development process and planning policy in the Belfast urban area. Regional Studies 30-3, 300-304.


Kommunallagen. 1991:900. 2 kap. Kommunernas och landstingens befogenheter, Särskilt om näringsverksamhet m.m. (Municipal law. Chapter 2, The municipals and county councils authority, Specifically regarding business activity etc.).


DISCUSSANT COMMENTS
HOUSING AND HEALTH INSURANCE: EVIDENCE FROM MEDICADE

Timothy L. Wilson
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SE901 87 Umeå, Sweden
The aim of this paper was to explore the potential benefits of Medicaid coverage in families with children who are eligible for Medicaid. In particular, this paper examined whether publicly offered health insurance through the Medicaid program prevents financial strain and helped families make their monthly rent or mortgage payments despite potential medical issues. Using data from the Survey of Income Program Participation, a regression discontinuity (RD) design was used to estimate the causal effect of Medicaid eligibility for children on families’ financial security and ability to make their housing payments.

The author noted that the RD approach used in the analysis exploits multiple thresholds that arise from variations across states in the income eligibility rules for Medicaid. The results suggested that public health insurance has significant financial impacts for families beyond increased access to health care. For instance, it was found that Medicaid eligibility for children helped families make their housing payments by improving their financial well-being, as evidenced by significantly higher family savings.

The impact of Medicaid eligibility for children was also estimated on their health care utilization. It was found Medicaid eligible children were often more likely to utilize health care goods and services. Dental treatment, hospital visitations, as well as use of medical supplies all were affected in the expected direction by the availability of Medicaid eligibility for children.

One concludes that, in general, there are a lot of nice things to say about this paper. Specifically, it was well-written on a topic of timely interest. Further, the treatment was rigorous with an appropriate analysis. One element of particular appreciation was the inclusion of treatment criticisms within the paper. Nevertheless, there are some observations that might be made with regard to the manuscript’s content.

First, it is expected that a discussion section would be included in the manuscript before it is submitted for journal publication. In its present form, it is lacking one and there are things might be discussed. For one, although one intent of Medicaid is to provide support for children’s health (perhaps primary in this case), there appears to be no difference in visitations between those families who are Medicaid eligible and those who are not (Figure 5). There are also some things to be discussed with regard to the Summary statistic table 1. For example, although the paper suggests Medicaid eligibility encourages saving, both groups tend to save at about the same rate (20% v. 19%). Finally, something might also be said with regard to the observation of the higher percentage of single mother families among the Medicaid eligible sector (29.3% v. 22.3%).

Of lesser importance are four other remarks that might be made. They are borderline with respect to author and journal preferences and thus might be considered or not in a final manuscript preparation:

1. Some thought might be given to order of coverage. Because the primary purpose of Medicaid is to provide health coverage, that section might reasonably be placed first in the results section.
2. Results (figures 3 to 8) are shown effectively as continuous lines developed as polynomial estimates. In this regard, figure 2, from McCrary (2008), is used to show how data scatter is reduced for such an estimate. The author might consider using one of her own results as a substitute or compliment for McCrary.
3. Some journals seem to prefer manuscripts that utilize a hypotheses approach for such papers. Consequently, the author might consider what would be involved in structuring this paper utilizing research hypotheses.
4. Finally, the conclusion section comes across as supporting a political position. Because there are transfer payments involved, the author might want to think about how reviewers and eventually final readers might react to these statements.

In summary, there are a few items that might be critiqued in this paper. On balance, however, the paper was a good one. If a “best paper” award was made for our conference, it would be nominated by this reviewer as a candidate for such an award. Certainly, it will be discussed with colleagues upon this reviewer’s return to his home university.

THE COLOMBIAN PESO: COMMODITY CURRENCY OR COCAINE CURRENCY?
ABSTRACT
This paper investigates the determinants of the Colombian peso including commodities prices that represent a major portion of Colombia’s export revenues including crude oil and coffee. While the underground economy is not explicitly included in the measure of GDP, the cocaine trade was a major source of revenue for Colombia, particularly during the 1980s and 1990s. Using quarterly cocaine prices from 1982 to 2007 published by the Office of National Drug Control Policy, this paper uses vector error correction and forecast error variance decomposition methods to look at the relationship between cocaine prices and the peso/$ nominal exchange rate. Cocaine prices are obtained from individuals arrested in the US for dealing the drug at various stages, from wholesale distributor to street level dealer. Wholesale distributor prices for cocaine are used as a proxy for the price of cocaine exported from Colombia. While several empirical papers have investigated commodity currencies, to the authors’ knowledge, this is the first attempt to take into account the underground economy’s relationship with an exchange rate. Our results indicate cocaine prices affect the value of the Colombian peso which leads to some interesting policy implications.

INTRODUCTION
Since the mid 1970’s, Colombia has been a major exporter of cocaine. In the year preceding his death, Colombian cocaine kingpin Pablo Escobar’s net worth was estimated in the billions. Escobar had once offered to pay off Colombia’s $15 billion national debt in exchange for avoiding extradition to the United States on drug trafficking charges (Taylor and Menzel, 2000). The Colombian government declined Escobar’s deal. Colombian production of cocaine peaked in 2000 but has since declined.

Still, cocaine remains an important export for Colombia. Because trade from illegal markets is not included in the official measure of GDP, the effect of illegal exports on the economy is a mystery. Illegal drug trade creates jobs directly through production, distribution, and sale of drugs. The drug trade may create jobs indirectly in various retail and service markets. On the other hand, public resources to combat the drug trade could have been spent on other projects. An increase in violence, if associated with the illegal drug trade, may hurt economic growth.

Another way the cocaine drug trade could affect the economy is through the Colombian peso exchange rate. Assuming a country is main world exporter of a particular commodity, an increase in the world demand of a commodity increases its world price. Demand for that country’s currency increases leading to an appreciation of the currency (Schaling, Ndlovu, and Alagidede, 2014). Evidence of so-called commodity currencies exist for the South African rand (Schaling, Ndlovu, and Alagidede, 2014) the Australian dollar (Simpson, 2002; Bashar and Kabir, 2013), Brazilian real (Hegerty, 2012), and Mexican peso (Hegerty, 2012). Using real exchange rates, Chen and Rogoff (2003) find evidence that the Australian and New Zealand dollars are sensitive to changes in commodity prices. Hatzinikolaou and Polasek (2003) and Chen (2002) find the nominal Australian dollar is a commodity currency.

This paper seeks to determine the effect of cocaine prices on the Colombian peso. While other papers have looked at whether the Colombian peso is a commodity currency, this is the first paper that includes the price of cocaine as a possible commodity affecting the Colombian peso. Previous studies find the Colombian peso is sensitive to commodity prices, particularly coffee prices (Weisner, 1978; Edwards, 1986; Urrutia 1981). To the author’s knowledge, the link between cocaine prices and the peso have not been studied.

As Colombia is a large exporter of cocaine on the world stage, Colombia can directly affect the world supply of cocaine. According to the United Nations Office on Drugs and Crime (UNODC) global cocaine production comes from just three countries; Colombia, Peru, and Bolivia. Since 1997, Colombia has accounted for over half of global cocaine production as shown in Figures 1 and 2. Moreover, the total cocaine production along with Colombian production began to decline after 2000 from 221300 (i.e. 163300 hectares for
Colombia) to 120,800 hectares (48,000 hectares for Colombia) in 2013. This overall decline of the cocaine production might be due to a better policing efforts by Colombia, Bolivia and Peru. More importantly, Figures 3 and 4 display the decline of the cocaine market values in all of North America (US, Canada and Mexico) from $50 billion in 2001 to below $40 for the 2002-2009 period. Additionally, we estimate that for the last two years of our dataset, 2006 and 2007, expressed in constant 2007 dollars, the cocaine percentage of total exports for Colombia (including cocaine revenues) is 43% and 45%, respectively.

In the world market for cocaine, as shown in Figure 5, excess supply (XS) comes from cocaine with excess demand (XD) for cocaine comes from US users. The world price (P) is determined by the intersection of XD and XS. If Colombia were to crack down harder on the Colombian drug cartels, XS would shift to the left increasing the world price of cocaine (P'). In the case where an increase in the world price of the commodity is due to a decrease in excess supply rather than an increase in excess demand, the effect on total cocaine revenues (and subsequently, demand for pesos in the foreign exchange market) depends on the price elasticity of demand for cocaine. If XD for cocaine is price elastic (inelastic), a decrease (increase) in XS raises the price of cocaine, decreases (increases) cocaine revenues, and decreases (increases) demand for pesos. Figure 6 displays the effect of an increase in Colombian policing efforts. The decrease in demand for pesos leads to a depreciation (appreciation) of the peso in the foreign exchange market.

Unfortunately, we do not have quarterly quantity data so we cannot determine the shape of XD or XS curve for cocaine. However, assuming cocaine prices affect the nominal exchange rate, we should be able to conclude whether increases in cocaine prices are due to a demand increase or a supply decrease. An increase in excess demand for cocaine increases its price, increases cocaine revenue, and leads to an appreciation of the peso.

A decrease in excess supply of cocaine increases the world price, increases cocaine revenue, and leads to an appreciation of the peso if demand for cocaine is price inelastic. If demand for cocaine is price elastic, a decrease in excess supply raises price but leads to a decrease in drug revenue and a depreciation of the peso.

The results of this paper could have important policy implications. Our results suggest that the peso is affected by cocaine prices suggesting the peso is a “cocaine currency.” Further our results suggest that an increase in cocaine prices results in a peso depreciation after a two period lag. This result implies increases in cocaine prices are due to supply side shocks (an increase in policing efforts) and world demand for cocaine is price elastic.

The remainder of the paper is organized as follows. The next section discusses the data and the methodology is presented in the third section. The fourth section covers the empirical results and policy implications. Finally, the fifth section concludes.

DATA

Cocaine data comes from the System to Receive Information from Drug Evidence (STRIDE). Our study uses quarterly data running from 1982 Q1 to 2007 Q4. Cocaine prices are obtained from survey data obtained from individuals arrested on cocaine charges. US median (rather than mean) prices are used since median prices are less affected by outlying data. Cocaine price data is available for three different quantities including street level, medium level, and wholesale distributor. In this paper we use the wholesale price data as a proxy for the price Colombian producers receive for a kilo of cocaine.

Nominal interest rates and nominal exchange rates are from the National Bank of Colombia (Banco de Colombia) are included in the study. The focus is on nominal, rather than real exchange rates, as nominal exchange rates affect spot transactions (Schaling, Ndlovu, and Alagidede, 2014). Theory predicts an increase (decrease) in nominal interest rates would appreciate (depreciate) the peso as investors would shift investments to peso (dollar) denominated assets.

The other commodities prices included in the study include crude oil and coffee. Crude oil is Colombia’s main export according to the Observatory of Economic Complexity (OEC) and previous studies found coffee prices affect the value of the peso hence its inclusion. As the commodities prices are expressed per various measures (cocaine $ price per gram, $ per barrel of oil, etc.), price indices are calculated using 2007 as the base year. All variables are expressed in natural logarithms.1

It is important to note that while crude oil is Colombia’s largest export, it faces relatively more competition in the international crude oil market than in the cocaine market. All world cocaine production comes from Colombia, Peru, and Bolivia. If cocaine prices affect the relative value of the peso, the government may use this information to manipulate the peso by affecting the international supply of cocaine.

METHODOLOGY

As quarterly data covers many years, the time series properties of the data must be examined. The adjusted Dickey Fuller test tests for stationarity of differenced variables. A stationary variable converges to its long run equilibrium and is assumed normally distributed. The ADF test follows

\[ \Delta y_t = \beta_0 + \beta_1 y_{t-1} + \beta_2 t + \beta_3 \Delta y_{t-1} + \epsilon_t \]  

(1)
where the difference in the variable $y_t$, $\Delta y_t$, is regressed on its lag and the lag of $y_t$, time trend $t$ with the null hypothesis

$$H_0: \beta_1 + \beta_2 + \beta_3 = 0 \text{ against } H_0: \beta_1 + \beta_2 + \beta_3 \neq 0. \quad (2)$$

Table 2 shows the results of the ADF tests.

Following Schaling, Ndlovu, and Alagidede (2014), the current paper uses vector error correction model (VECM) to determine the relationship between the peso/$ exchange rate and cocaine prices. The VECM takes the following form

$$\Delta X_t = \alpha_0 + \varphi \varepsilon_{t-1} + \sum_{i=0}^{l} \beta_i \Delta X_{t-i} + \sum_{i=0}^{l} \gamma_i \Delta P_{t-i} + \varepsilon_t \quad (3)$$

where each differenced variable is regressed on past values of itself and other differenced explanatory variables and the lag of the error term $\varepsilon_{t-1}$ from the spurious regression. A negative statistically significant $\varphi$ is evidence of cointegration, or convergence to a long run equilibrium. Short run coefficient estimates from VECM are in Table 3. As the relationship between cocaine prices and the nominal exchange rate is of main interest only those two model results are reported. Model 1 includes the first difference of nominal exchange rates as the dependent variable and model 2 includes first differenced cocaine prices as the dependent variable.

This method is appropriate in this study because previous papers find the direction of causality running from exchange rates to commodity prices (Clements and Fry, 2006) rather than commodity prices to exchange rate (Chen, 2002; Belaney, 1996; MacDonald and Ricci, 2002). If exchange rates help explain commodity prices, the commodities are referred to as “currency commodities” (Clements and Fry, 2006).

**EMPIRICAL RESULTS AND POLICY IMPLICATIONS**

Figures 7 and 8 shows commodity price, interest rates, and nominal exchange rate plots over the years included in the study. While commodity prices have fluctuated, in general, cocaine and coffee trended downwards and oil trended upwards (since 1982). Nominal interest rates have fallen. Figure 8 depicting nominal exchange rates show that the peso upwards (since 1982). No cocaine and coffee trended downwards and oil trended statistically significant in Model 1 we ts indicate that of the commodity prices, only efficient, $\beta = \beta_0 + \delta$, $\beta_0 + \delta \neq \beta_1 + \beta_2 + \beta_3$ correction term in Model 1 is statistically significant in the long run. As the relationship between cocaine prices and the nominal exchange rate is of main interest only those two model results are reported. Model 1 includes the first difference of nominal exchange rates as the dependent variable and model 2 includes first differenced cocaine prices as the dependent variable.

This method is appropriate in this study because previous papers find the direction of causality running from exchange rates to commodity prices (Clements and Fry, 2006) rather than commodity prices to exchange rate (Chen, 2002; Belaney, 1996; MacDonald and Ricci, 2002). If exchange rates help explain commodity prices, the commodities are referred to as “currency commodities” (Clements and Fry, 2006).

The effects of a shock from one endogenous variable to the other variables are provided by the Impulse Response Functions (IRF) in a vector autoregression (VAR) model. Following Sims (1980) and Stock and Watson (2001), the variance decomposition divides the variation in an
endogenous variable into the component shocks to the VAR. This will provide information about the relative significance of each random shock influencing the variables in the VAR. As a result, a variance decomposition determines how much of the forecast error variance of each of the variables can be explained by exogenous shocks to the other variables.

Figure 9 shows the IRF to various external shocks. On one hand, if a shock occurs in cocaine, the IRF of cocaine starts to converge to the mean value after five quarters while oil and exchange rates begin divergence from mean value after three and five quarters respectively. In addition, coffee and interest rates show convergence toward mean almost every two quarters after an external shock in cocaine prices. On the other hand, a shock in exchange rate to exchange rates displays convergence toward mean at quarter 6 and then starts diverge from mean value at quarter 9 and to finally converge again at quarter 21. Moreover, an external shock to the exchange rates from cocaine shows convergence toward mean value at quarter 3 and begins divergence from mean value at quarter 10 and to converge again at quarter 15. An external shock from coffee, interest rates and oil to the exchange rates shows convergence toward mean value at quarter 3, quarter 4 and quarter 5 respectively. However, shock from interest rates to the exchange rates goes up after quarter 11 and then shows divergence away from mean value continually.

Results of the forecast error variance decomposition, shown in Tables 5 and 6, generally support the results from the VECM. For the cocaine prices, interestingly, the percentage errors that is attributable to own shocks is 100% in the first quarter. However, this proportion decreases to 93% in the second quarter and further decreases gradually to below 80% after the eighth quarter as displayed in Table 5. The contribution in explaining the variation in cocaine is about 5%, for coffee from the fourth quarter to the last quarter. Moreover, the exchange rates explain about 11% of the variation in cocaine between the ninth and twelfth quarter. Colombia is a small country and thus a price taker. Its terms of trade will depend on world supply and demand conditions which Colombia will have no influence over. In general, other commodities begin to account for variations in cocaine prices after a few lags, suggesting Colombians face decisions on how best to use limited availability of land. This result is consistent with the VECM results.

Table 6 displays that the percentage errors for the exchange rates that are attributable to own shocks are 98.75% in the first quarter with the remaining 1.25% attributable to cocaine. More importantly, the percentage errors that for the exchange rates that are attributable to own shocks fall below 70% the fourth and twelfth quarter, while the contribution from cocaine to a shock on the exchange rates increases to over 24% during the same period. Moreover, coffee prices explain less than 2% of the variation in the exchange rates over all the twelve quarters while the contribution from crude oil to a shock on the exchange rates is than 1% for the first three quarters. This proportion increases only to over 5% over the five quarters. The contribution for interest rates in explaining the variation in the exchange rates stays at 6% for the second and third quarter and then falls below 3% starting with the seventh quarter. These findings reveal that cocaine, and oil prices at some degree matter significantly in the fluctuations of the exchange rates in Colombia.

CONCLUSION

Results indicate that cocaine prices affect the value of the peso in the long run, suggesting that the peso is a “cocaine commodity.” Further, Colombia’s other major commodity exports do not seem to affect the peso. Our results suggest cocaine price increases are due to supply shocks (most likely from policing efforts). An increase in cocaine prices leads to a depreciation of the peso which could improve the trade balance assuming exports in general are price elastic. Hence, if the Colombian government wants to depreciate the peso they could crack down on drug cartels. Lax police efforts would appreciate the peso, resulting in cheap imports, which may be desirable as Colombia continues to develop economically.
Sources: UNODC, World Drug Report 2013
Sources: UNODC, World Drug Report and Annual Reports Questionnaire Data
**Figure 5: World Market for Cocaine**

[Diagram showing world prices and imports/exports of cocaine]

**Figure 6: Foreign Exchange Market**

*The Effect of an increase in Colombian Policing Efforts*

[Diagram showing supply and demand for pesos in the foreign exchange market]

**Figure 7: Commodity Prices and Interest Rates**
Figure 8: Nominal Exchange Rates

Figure 9: Various Impulse Response Functions
Table 1: Descriptive Statistics
### Table 2: Augmented Dickey-Fuller (ADF) Test

<table>
<thead>
<tr>
<th>Variables</th>
<th>Level w/ intercept</th>
<th>Level w/ intercept &amp; trend</th>
<th>First difference w/ intercept</th>
<th>First difference w/ intercept &amp; trend</th>
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</thead>
<tbody>
<tr>
<td>Cocaine</td>
<td>-4.1958*</td>
<td>-4.2155*</td>
<td>-16.5999***</td>
<td>-7.4011***</td>
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<tr>
<td>XR</td>
<td>-0.8738</td>
<td>-1.2558</td>
<td>-6.5165***</td>
<td>-6.5105***</td>
</tr>
<tr>
<td>Oil</td>
<td>-0.5341</td>
<td>-0.2549</td>
<td>-7.7949***</td>
<td>-8.7671***</td>
</tr>
<tr>
<td>IR</td>
<td>-1.4119</td>
<td>-3.2597</td>
<td>-6.7694***</td>
<td>-6.7356***</td>
</tr>
</tbody>
</table>

**Critical Values**

- **1% level *****: -3.4957
- **5% level **: -2.8900
- **10% level ***: -2.5820

### Table 3: Johansen Cointegration Test

<table>
<thead>
<tr>
<th>Maximum rank</th>
<th>Test statistic</th>
<th>Critical value</th>
</tr>
</thead>
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<td>0</td>
<td>81.69</td>
<td>68.52</td>
</tr>
<tr>
<td>1</td>
<td>41.24*</td>
<td>47.21</td>
</tr>
<tr>
<td>2</td>
<td>22.45</td>
<td>29.68</td>
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</table>

### Table 4: VECM Results Exchange Rates and Cocaine Prices

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>Lags (quarters)</th>
<th>Independent Variables</th>
</tr>
</thead>
</table>

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160
<table>
<thead>
<tr>
<th></th>
<th>Lnxr</th>
<th>Incocaine</th>
<th>Incoffee</th>
<th>Inoil</th>
<th>Inir</th>
<th>lnxr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lnxr</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>L1</td>
<td>0.41***</td>
<td>0.005</td>
<td>5.9e-4</td>
<td>5.7e-3</td>
<td>-0.15***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.13)</td>
<td>(0.04)</td>
<td>(0.03)</td>
<td>(0.04)</td>
<td>(0.05)</td>
<td>(0.13)</td>
</tr>
<tr>
<td>L2</td>
<td>0.26**</td>
<td>0.09**</td>
<td>-5.0e-3</td>
<td>-0.03</td>
<td>0.1</td>
<td>0.01</td>
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<tr>
<td></td>
<td>(0.14)</td>
<td>(0.04)</td>
<td>(0.03)</td>
<td>(0.03)</td>
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<td></td>
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<tr>
<td>L3</td>
<td>-0.13</td>
<td>0.13***</td>
<td>1.3e-3</td>
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<td></td>
<td>(0.16)</td>
<td>(0.04)</td>
<td>(0.03)</td>
<td>(0.04)</td>
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<tr>
<td>L4</td>
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<tr>
<td></td>
<td>(0.16)</td>
<td>(0.04)</td>
<td>(0.03)</td>
<td>(0.03)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incocaine</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1</td>
<td>0.28</td>
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<td>-0.11</td>
<td>-0.11</td>
<td>-0.23</td>
<td></td>
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<tr>
<td></td>
<td>(0.48)</td>
<td>(0.14)</td>
<td>(0.10)</td>
<td>(0.12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2</td>
<td>-0.22</td>
<td>-0.18</td>
<td>-4.2e-3</td>
<td>0.20</td>
<td>0.51**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.50)</td>
<td>(0.15)</td>
<td>(0.10)</td>
<td>(0.12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L3</td>
<td>-1.54***</td>
<td>0.21</td>
<td>-0.25**</td>
<td>0.01</td>
<td>-0.08</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.59)</td>
<td>(0.16)</td>
<td>(0.11)</td>
<td>(0.13)</td>
<td></td>
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</tr>
<tr>
<td>L4</td>
<td>1.25**</td>
<td>-0.22</td>
<td>0.22**</td>
<td>0.19</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.61)</td>
<td>(0.16)</td>
<td>(0.11)</td>
<td>(0.12)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| \( \varphi_1 \) | Model 1: -0.04** (0.02) |
| \( \varphi_2 \) | Model 2: -0.04 (0.07) |

**Table 5: Decomposition of Variance for Series Incocaine**

<table>
<thead>
<tr>
<th>Variance Period</th>
<th>Std Error</th>
<th>Incocaine</th>
<th>Inoil</th>
<th>Incoffee</th>
<th>Inir</th>
<th>lnxr</th>
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<td>1</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
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<tr>
<td>2</td>
<td>0.10</td>
<td>92.82</td>
<td>1.63</td>
<td>0.26</td>
<td>4.76</td>
<td>0.53</td>
</tr>
<tr>
<td>3</td>
<td>0.11</td>
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Table 6: Decomposition of Variance for Series $\ln x_r$

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<th>lnoil</th>
<th>lncoffee</th>
<th>lnir</th>
<th>lnxr</th>
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ENDNOTES

1 lnco = natural log of cocaine prices; lnir = natural log of interest rates; lnx = natural log of nominal exchange rate; lnoil = natural log of crude oil prices; lncoffee = natural log of coffee prices

2 The Akaike Information Criterion (AIC) chose 8 lags (quarters) for optimal lag length. For sake of brevity, only the first four lags are reported.

REFERENCES


THE RECENT EXPERIENCES OF CAPITAL FLOWS AND FISCAL IMBALANCES SINCE THE CREATION OF
ABSTRACT

The objective of this paper is to examine the recent experiences of capital flows and the associated fiscal imbalances since the inception of the Eurozone. We show that the standard explanation for the understanding these fiscal imbalances and capital flows is viable, but is not complete given the unique circumstances surrounding these fiscal imbalances within the Eurozone. That is, the creation of the Eurozone provided some fiscal and monetary stability up until the shock of the 2008 Financial Crisis. After the 2008 Financial Crisis, the interaction between the current account and fiscal imbalances started to spread throughout the Eurozone members and many of these Eurozone members began to engage in policies in an attempt to restore stability and to stem capital outflows by implementing fiscal reforms. In fact, some of the Eurozone members attempted to restore their fiscal viability in response to the 2008 Financial Crisis, but not with much success. Thus, the Eurozone members, collectively, need to reexamine best practices to implement fiscal policies that are resistant to intense financial shocks. Empirically, we examined the following two hypotheses in this paper via the Wald test statistic. First is the examination of the effect of the own country fiscal imbalances within own-country is uniform across all the Eurozone members. Then, the second hypothesis examined the fiscal imbalances of one Eurozone member do not have on other Eurozone members. The Wald test statistic rejected both hypotheses.

INTRODUCTION

This paper examines the causes, consequences, and policy responses of the capital flows in the Eurozone\(^1\) and their impacts on fiscal imbalances. The Eurozone has come under severe pressure after being in existence for a little over a decade. The Eurozone suffered setbacks triggered by adjustments in the fiscal policy of Greece, and then the crisis initially spread to Ireland and eventually to Portugal. However, these negative effects did not stop and Italy and Spain began to experience problems. In each of these countries, this crisis had intertwined public debt and a fragile banking system made worse because of weak economic growth forecasts. In addition, substantial gross and net external liabilities plagued these Eurozone members; net

\(^1\) The Eurozone refers to the 19 countries that have adopted the euro as their currency within the European Union.
external liabilities of close to 100% of GDP existed in Greece, Ireland, Portugal and Spain. Given these fiscal crises that occurred in the Eurozone, global current account imbalances remain under the constant scrutiny for both financial and macroeconomic reasons. Consequently, it becomes critically important for policy-makers to carefully implement changes in the fiscal policy in the Eurozone and to access its impacts on the global financial markets. To this end, this paper examines the consequences of these capital flows and their impacts on fiscal imbalances and the pros and cons of alternative policy responses to remedy the problems of capital flows and fiscal imbalances. More specifically, this paper will assess the interdependencies of fiscal imbalances on the Eurozone members by testing the two hypotheses:

a. Hypothesis 1: the effect of the own country fiscal imbalances within own-country is uniform across all the Eurozone members.

b. Hypothesis 2: the fiscal imbalances of one Eurozone member do not have on other Eurozone members.

**REVIEW OF THE LITERATURE**

Calvo, Leiderman and Reinhart (1996) discussed the impact of capital inflows to Asia and Latin America and the implications for policy. They found that these countries manage their capital flows successfully using comprehensive policy packages rather than relying on one instrument. Lane (2006) examined the effects that the European Monetary Union (EMU) has on member countries. He concluded that one of the major challenges for the various member countries is the macroeconomic divergence within the member area. The creation of the union is more about the politics than about the economics. Further, Lane (2015) explored the Eurozone crisis by illustrating a strong correlation between the pre-crisis level of external imbalances and macroeconomic performance since 2008. He concluded that macro-financial policies should be aimed at managing the risks associated with net international debt flows and a greater convergence among member countries should lead to less financial divergence with respect to external imbalances and asymmetric credit growth.

Wyplosz (1997) investigated the problems facing the launch of the European Monetary Union (EMU). He argued that the collapse of the EMU would cause political crisis within the member countries and illustrated the challenges faced by the EMU to deal with the costs and benefits of the union by highlighting the transaction costs and uncertainty. Schilirò (2014) examined the Eurozone crisis by investigating the real GDP growth rate between 2007 and 2013, inclusive to capture the effects of the crisis. He showed that member states have not taken sufficiently into account the negative spillover from the monetary and financial parts of the EMU over their economic sphere. There is a need for a political union because of a lack of fiscal transfers, lower labor mobility, and wage flexibility.

Gali and Monacelli (2008) developed a model to analyze the optimal monetary and fiscal policies in a monetary union in relation to the European Monetary Union. They found the best model by using a mix of fiscal and monetary policies in the presence of idiosyncratic shocks to productivity. Hetzel (2015) compared Greece and Germany from 1981 to 2015. He concluded that the quantitative easing policy, instituted by the European Central Bank, has encouraged the recovery and has the potential to return inflation to two percent. He hypothesized that this will increase demand for Greek exports and reduce the need for deflation. Gikas, Hyz and Tagkas (2013) discussed the effects Eurozone participation has had on Greece. They argued that participation by a country in a single currency negates the use of national instruments of monetary and exchange rate policy. This participation causes the country to adopt policies better suited for more developed countries under the assumption that the country will reach the same level. Policies that aim at changing the exchange rate, reducing production costs, declining margins and increasing labor productivity and improving structural competitiveness of the economy can effectively solve, or at least alleviate the problems facing Greece.

Lane (2011) studied the risks associated with external imbalances in New Zealand. He suggests that setting a low medium-target for the public debt will limit the scale of capital inflows to the country. The use of fiscal instruments will facilitate external adjustment. In fact, Obstfeld (2012) investigated whether or not current account balances still matter by analyzing the risks to the stability of the global market. He concluded that global imbalances are important to examine and that mismatches of leveraged entities provide the most direct indicators of potential instability. His proposed policy is to form a global cooperation in liquidity facilities and financial regulation of banks.

Uhlig (2002) outlined various issues with respect to interactions between independent fiscal authorities and a single fiscal bank in the EMU. He concluded that issues such as coordination failures led to excessive deficits and thus to fiscal and banking crises. Lane (2010) examined the role of fiscal policy in external imbalances by using data for the 1999-2009 period. His findings revealed that fiscal shocks and imbalances led to the emergence of external imbalances. Moreover, Lane (2012) studied the European crisis using data from 1995 to 2007 and concluded that the crisis was partly attributable to an increase in external imbalances across Europe before the crisis. More importantly, the correlation between growth forecasts and current account balances is consistent with an increased elasticity of capital flows during the period.
Blanchard and Giavazzi (2002) discussed the current account deficits in the Euro area using data from 1985 to 2000. They found that investment and savings rates are highly correlated across time and country. However, this correlation between national saving and national investment has decreased over time and the reduction of current accounts is achieved at the expense of higher public spending. Finally, Gros (2012) explored whether European macroeconomic imbalances were a symptom of the economic crisis or a cause. Using data from 1999 to 2011, he found that the large credit boom experienced by the Euro-area countries caused a sharp decrease in the private capital inflows and an expansion in domestic demand.

**CAPITAL INFLOWS: BASIC STYLIZED FACTS FOR THE EUROPEAN UNION**

European Union rules or the Maastricht Rule state that countries using the Euro are not allowed to have an annual deficit of more than 3% of their Gross Domestic Product (GDP); however, many of the Eurozone members have failed to adhere to this rule especially in recent years as indicated in Table 1. In the past decade, Germany, France and Italy became the first Euro members to break the Maastricht Rule. On the other hand, Spain and Ireland had budget surpluses for periods of several years before the 2008 Financial Crisis or small annual budget deficits.

The 2008 Financial Crisis changed the fiscal patterns for many of the Euro members. Namely, Spain, Greece and Portugal began to accumulate large deficits because their economies slowed down resulting in less tax revenue and the payment of more unemployment benefits to the unemployed workers. Most notable is that Ireland had an enormous deficit of 31% of its GDP in 2010 because the Irish government was bailing out its banks. Italy, however, has done surprisingly well. In fact, if the cost of interest payments on its debts were excluded, the Italian government has consistently run budget surpluses.

Table 2 presents more recent estimates of the budget deficits. From this table, it is obvious that the problems of budget deficits for the Euro members continue to persist and often exceed 3% of their GDP. The government debt securities represent about 16% of GDP from 2012 to 2015 except in the second quarter of 2014 in when it was over 17% as displayed in Table 3. The annual debt service for these securities is about 5% of GDP for the same period with an interest rate of 0.5%.

Table 4 shows the very weak fiscal development of the Euro members the 2011-2015 period. Even though the budget deficit as a % of GDP was below the 3% ceiling in 2014 and 2015, the government debt-to-GDP ratio as a % of GDP was still growing and over 92% during the same period as shown in Table 4. Moreover, the persistent government debt issue for most of the Euro members, in particular for Greece (about 170%), Portugal and Italy (about 130%), is shown in Table 5.

**DATA, METHODOLOGY AND RESULTS**

**The Methodology**

In econometrics, seemingly unrelated regression (SUR) is a technique for analyzing a system of multiple equations with cross-equation parameter restrictions and correlated error terms. Following Green (2012), suppose we have M-equations that are related because the error terms are correlated. Thus, the SUR can be combined into a single equation that is written as

\[ y_i = X_i \beta_i + \varepsilon_i \text{ for } i = 1, 2, \ldots, M \]

where \( y \) is a vector of dependent variables, \( X \) is a \( K \times K \) matrix, \( K \) is number of regressors, and \( M \) is the number of equations. The error vector term is \( \varepsilon = [\varepsilon_1', \varepsilon_2', \ldots, \varepsilon_M'] \).

The assumption is that \( \varepsilon' | x_1, x_2, x_M = 0 \) and

\[ E[\varepsilon \varepsilon'] = \Omega \] where \( \Omega = \Sigma \otimes I \) where \( \Omega \) is the Kronecker product of the \( \Sigma \) is the variance-covariance matrix and the identity matrix.

The error term of each equation is heteroscedastic and contemporaneously correlated. This system of \( M \)-equations becomes one single large equation that is estimated. The combination of these \( M \)-equations into one equation really becomes stacked on top of each other. It appears that each of these equations is seemingly unrelated. However, there is still the possibility that the error terms are correlated across the equations.

More importantly, there are many methods used for the estimation of the seemingly unrelated regression model and these estimation methods include:

- The Ordinary Least Squares (OLS) Method
- The Generalized Least Squares (GLS) Method
- The Feasible Generalized Least Squares (FGLS) Method
- The Maximum Likelihood (ML) Method
The variance-covariance matrix of error terms is jointly applied in these estimation methods in the SUR model. Without the definition of the variance-covariance matrix, it becomes difficult to estimate the parameters for the SUR. This analysis will use Feasible Generalized Least Squares (FGLS) because it is considered to provide a more realistic approach that is taken into account during the application of the mentioned method. It also provides the estimation of the variance-covariance matrix rather than its definition. The general SUR model to be estimated is given by equations (2) to (7):

\[ \text{(2)} \quad NIPP_{t,\text{France}} = \alpha + \beta_{t-1,\text{France}} NIPP_{t-1} + \beta_{1,t,\text{France}} \text{REER}_t + \beta_{2,t,\text{France}} \text{CAB}_t + \beta_{3,t,\text{France}} \text{NDS}_t + \beta_{4,t,\text{France}} \text{GGD}_t + \beta_{5,t,\text{France}} \text{TFSL}_t + \beta_{6,t,\text{France}} \text{URATE}_t + \beta_{7,t,\text{France}} \text{PSCF}_t + \beta_{8,t,\text{France}} \text{NLB}_t + \epsilon_{t,\text{France}} \]

\[ \text{(3)} \quad NIPP_{t,\text{Germany}} = \alpha + \beta_{t-1,\text{Germany}} NIPP_{t-1} + \beta_{1,t,\text{Germany}} \text{REER}_t + \beta_{2,t,\text{Germany}} \text{CAB}_t + \beta_{3,t,\text{Germany}} \text{NDS}_t + \beta_{4,t,\text{Germany}} \text{GGD}_t + \beta_{5,t,\text{Germany}} \text{TFSL}_t + \beta_{6,t,\text{Germany}} \text{URATE}_t + \beta_{7,t,\text{Germany}} \text{PSCF}_t + \beta_{8,t,\text{Germany}} \text{NLB}_t + \epsilon_{t,\text{Germany}} \]

\[ \text{(4)} \quad NIPP_{t,\text{Greece}} = \alpha + \beta_{t-1,\text{Greece}} NIPP_{t-1} + \beta_{1,t,\text{Greece}} \text{REER}_t + \beta_{2,t,\text{Greece}} \text{CAB}_t + \beta_{3,t,\text{Greece}} \text{NDS}_t + \beta_{4,t,\text{Greece}} \text{GGD}_t + \beta_{5,t,\text{Greece}} \text{TFSL}_t + \beta_{6,t,\text{Greece}} \text{URATE}_t + \beta_{7,t,\text{Greece}} \text{PSCF}_t + \beta_{8,t,\text{Greece}} \text{NLB}_t + \epsilon_{t,\text{Greece}} \]

\[ \text{(5)} \quad NIPP_{t,\text{Italy}} = \alpha + \beta_{t-1,\text{Italy}} NIPP_{t-1} + \beta_{1,t,\text{Italy}} \text{REER}_t + \beta_{2,t,\text{Italy}} \text{CAB}_t + \beta_{3,t,\text{Italy}} \text{NDS}_t + \beta_{4,t,\text{Italy}} \text{GGD}_t + \beta_{5,t,\text{Italy}} \text{TFSL}_t + \beta_{6,t,\text{Italy}} \text{URATE}_t + \beta_{7,t,\text{Italy}} \text{PSCF}_t + \beta_{8,t,\text{Italy}} \text{NLB}_t + \epsilon_{t,\text{Italy}} \]

\[ \text{(6)} \quad NIPP_{t,\text{Spain}} = \alpha + \beta_{t-1,\text{Spain}} NIPP_{t-1} + \beta_{1,t,\text{Spain}} \text{REER}_t + \beta_{2,t,\text{Spain}} \text{CAB}_t + \beta_{3,t,\text{Spain}} \text{NDS}_t + \beta_{4,t,\text{Spain}} \text{GGD}_t + \beta_{5,t,\text{Spain}} \text{TFSL}_t + \beta_{6,t,\text{Spain}} \text{URATE}_t + \beta_{7,t,\text{Spain}} \text{PSCF}_t + \beta_{8,t,\text{Spain}} \text{NLB}_t + \epsilon_{t,\text{Spain}} \]

\[ \text{(7)} \quad NIPP_{t,\text{Portugal}} = \alpha + \beta_{t-1,\text{Portugal}} NIPP_{t-1} + \beta_{1,t,\text{Portugal}} \text{REER}_t + \beta_{2,t,\text{Portugal}} \text{CAB}_t + \beta_{3,t,\text{Portugal}} \text{NDS}_t + \beta_{4,t,\text{Portugal}} \text{GGD}_t + \beta_{5,t,\text{Portugal}} \text{TFSL}_t + \beta_{6,t,\text{Portugal}} \text{URATE}_t + \beta_{7,t,\text{Portugal}} \text{PSCF}_t + \beta_{8,t,\text{Portugal}} \text{NLB}_t + \epsilon_{t,\text{Portugal}} \]

Since there could be serial correlation, the Breusch-Godfrey test for AR(q) was applied. The advantage of the Breusch-Godfrey test is that it is a general test for autocorrelation of any order, i.e., residuals may be correlated over more than one period unlike the Durbin-Watson which tests for the presence of serial correlation of order AR(1). In addition, the Breusch-Godfrey test can be applied to time series models with a lagged dependent variable on the right hand side (RHS) of the time series regression. The null hypothesis is that there is no presence of serial correlation and the test statistic is \( n \ast R^2_{\text{auxiliary}} \sim \chi^2_q \).

The Data Sources

The methodology will identify the main determinants of capital inflows to European Union members via econometric analysis from 1997 through 2014. The data sources for the analysis will be the European Commission (Eurostat, Economic and Financial Affairs DG), the European Central Bank (ECB), the Organization for Economic Cooperation and Development (OECD), the International Monetary Fund, Balance of Payments Statistics, and World Economic Outlook databases. Table 4 summarizes the variables used in this analysis.

The Empirical Results

1.1.1 The Descriptive Statistics

The following variables were used in the analysis: Net International Payment Positions used as a proxy for capital inflows (NIPP); the real exchange rate for the European region (REER); the current account balance (CAB); the net domestic savings (NDS); the general government debt (GGD); total financial sector liabilities (TFSL); the unemployment rate (URATE); the private sector credit flow (PSCF); and net lending/borrowing (NLB). The descriptive statistics for each of the variables are summarized in Table 7.

From Table 7, the Net International Payment Positions (NIPP) is provided. A negative NIPP figure indicates that a nation’s foreign liabilities exceed its foreign assets or that it is a debtor nation, while a positive NIPP figure indicates that its foreign assets exceed its liabilities or a creditor. Each country with the exception of Germany has a negative NIPP. What is striking from Table 5 is that Greece, Italy, Spain, and Portugal have very large negative values. The NIPP is an
important measure of a nation’s financial condition and creditworthiness. Another observation is the current account balance (CAB). Recall that the current account balance is a measure of a country’s transactions with the rest of the world. Italy, Spain, and Portugal also have negative current account balances (CAB) that are associated with the negative values of the NIPP with the exception of Greece which has a positive CAB. This positive value in the CAB has largely been attributed to the decrease in imports, rather than a rise in exports. Put in another way, there is a decrease in the lack of demand for their goods due to the imposition of capital controls in recent years. The general government debt (GGD) which is comprised of debt accumulated by the government is the sum of the following liability categories (as applicable): currency and deposits; securities other than shares, except financial derivatives; loans; insurance technical reserves; and other accounts payable. Greece, Italy, and Portugal have the largest GGD within Europe. Due to the economic recession which started in 2008, several members of the European Union namely Portugal, Italy, Greece and Spain experienced substantial instability in their macroeconomics. These countries were in serious financial trouble because of their sovereign debt; the debt obtained from other nations using the lender’s currency. In large part, these countries used sovereign funds to raise funding when their own currencies were weak and unstable. The problem with this type of debt is the risk of defaulting as recently experienced by Greece.

1.1.2 Results from the Seemingly Unrelated Regression (SUR) Model

Before proceeding to the estimation of the SUR model, the time series of the variables must be stationary since a time series has an upward as well as a downward trend. By definition, a stationary series will have a constant mean, variance, and autocovariances over time. None of the series exhibited stationarity, consequently, each of the variables was transformed. Then, the SUR modeling commenced. To add dynamics to the model, the y variable or the NIPP was lagged by one and placed on the right hand side of the SUR model.

Because of the time series nature exhibited in the SUR model, there is a chance that serial correlation could be present. Consequently, after the initial estimation of the SUR, serial correlation was checked for each equation in the SUR using the Breusch-Godfrey test for AR(q). The Breusch-Godfrey test revealed some of the equations in the SUR had a problem with serial correlation. As a result, the SUR was estimated again with an AR (1) term included in each of the equations. The results from the SUR improved, and the problem of serial correlation was corrected. Table 6 summarizes the results from the Breusch-Godfrey test.

After the transformation of the time series data, we estimated the SUR. Because the analysis has seven countries in the SUR, the estimation of SUR only requires six countries. More specifically, the last country is a residual of the remaining countries. Then, the diagnostics were estimated, and the best model estimated was the omission of the United Kingdom. From the estimation of the SUR, the determinant of the residual covariance matrix is calculated. If the determinant of the residual covariance matrix is zero, the estimates from the SUR are efficient. This value determinant of the residual covariance matrix is 9.82E-21 which is quite close to zero and reveals the estimates from the SUR are efficient. Table 7 summarizes the results from the estimation of the SUR model.

For some of the regressors, the test statistics revealed that the regressor was not statistically significant. However, the omission of the statistically insignificant variable would be significant. In each equation, there is a coefficient for NIPP_{t-1} which represents a one-period lag of NIPP. The positive sign indicates that there was an impact of the NIPP one year later while a negative sign would indicate there was a lessened impact after one year. More importantly, the NIPP_{t-1} contributes to the NIPP based on the size of the MEXVAL with the exception of Greece and France. Greece and France had positive signs which indicate there was an impact a year later, but statistically the impact appears not to be important. Consequently, the growth of NIPP from the preceding year could significantly systematically impact the NIPP of the subsequent year for each Eurozone country except for Germany. Germany shows that a one period lagged NIPP is negatively related to NIPP which means that there is a decline in the NIPP in the following year. Now the discussion delves the results obtained from the SUR model.

From the SUR estimation, CAB and NIPP are positively related. That is, a CAB surplus allows a country to attract more foreign capital because the country is not running a huge debt. In other words, a deficit of the CAB provides a country with a weak position to borrow in the foreign capital markets. In this analysis, the NIPP is used as a proxy for capital inflows for each of the Eurozone countries. Portugal and France have negative signs on the CAB which indicates that these nations have a CAB deficit and are not able to attract more foreign capital and are not able to borrow from the capital markets. The main problem among the Eurozone members is that as cross border capital flows remain
unregulated in the euro area, there will be a continuance of imbalances in the CAB. A country that runs a large current account or trade deficit, i.e., importing more than it exports, must ultimately be a net importer of capital. On the other hand, a country that imports more than it exports must either decrease its savings reserves or borrow to pay for those imports. Germany has a large trade surplus as indicated by the large positive coefficient, that it must either increase its savings reserves or be a net exporter of capital, lending money to other countries to buy their goods and services or to pay down its debt which Germany has provided to Greece.

The expected sign of URate (the Unemployment Rate) with NIPP should be negative. This means that a lower unemployment rate provides a country a better position to borrow from the foreign capital markets because the economy is growing, i.e., a rising GDP coupled with a falling unemployment rate. Portugal and France have the expected signs while the remaining countries have positive signs. Those countries with a positive sign, e.g., Germany, Greece, Italy, and Spain, would be in a difficult position to borrow from the capital markets because the economy is not growing and would experience some difficulties with borrowing from the capital markets. As an example, since the ending of the 2008 Financial Crisis, the unemployment rates soared in Greece from 7.5% in September 2008 to a record high of 27.9% in June 2013. In addition, Spain also experienced high unemployment with its maximum of 27% in 2013.

The relationship between the TFSL and the NIPP should have a positive sign because the higher the financial sectors’ liabilities, the higher is the inflow of capital into a country. From the SUR model, Italy and France have negative coefficients which indicate that there is a lower inflow of capital to these countries unlike the remaining countries in this SUR. Though several Eurozone members have been attracting capital inflows in recent years, this attraction is more of bailout to help reduce their government debt and reduce their reliance on bailouts.

Recall that the net lending (NLB) of the total economy is the sum of the net lending or borrowing of the financial institutions in each of the Eurozone countries. More specifically, it corresponds to the net resources the Eurozone member has to supply to the rest of the world. Consequently, the expected sign on NLB should be positive with NIPP. From the SUR, France is the only Eurozone member that has a positive sign. In fact, NLB is significant based on the size of the MEXVAL with the exception of Greece and Italy. For Italy and Greece, the small size of MEXVAL can be attributed to their inability to implement a sound fiscal policy to offset the capital flow imbalances.

For general government debt (GGD) and NIPP, if the government debt is too high then this will not enable the Eurozone countries to obtain capital inflows from other nations. In other words, these capital inflows will allow allows the transfer of technology—particularly in the form of new varieties of capital inputs—that cannot be achieved through financial investments or trade in goods and services. In addition, there will be an impact on human capital formation because capital inflows will train new people to operate new businesses in a Eurozone country. For the countries of France, Germany, and Spain, the coefficient is positive which indicates the GGD will not impact the attraction of capital inflows. However, for Greece, Portugal, and Italy, the negative sign indicates that the general government debt is too high, and they will not be able to attract the necessary capital inflows. Several Eurozone member states which coincides with these empirical results were unable to repay or refinance their government debt or to provide a bailout of their over-indebted banks without the assistance of third parties such as other Eurozone countries, the European Central Bank (ECB), or the International Monetary Fund (IMF). Consequently, these Eurozone members would need the outside funds to repay or refinance its government debt which would harm capital inflows to enable enhanced economic development.

The private sector credit flow (PSCF) would be the amount of the net amount of the liabilities. More specifically, if there is a positive sign, then assets is greater than liabilities or more assets coming into the host country and vice versa for a negative sign. Portugal, Italy, and Germany have a negative sign which indicates that these nations will have more net liabilities which impacts their ability to attract capital inflows. The remaining countries will have a positive coefficient which indicates their ability to attract capital because they have net liabilities with more assets.
As for the net domestic savings (NDS) and NIPP, a positive coefficient would be positive because the host country would have enough savings that it does not need to borrow. From the empirical results, Greece and Spain have a negative sign which indicates that these nations have more disavings and would require borrowing more capital or would require greater capital inflows.

Earlier in the paper, we presented two hypotheses that will be tested based on the SUR model. These two hypotheses are

- Hypothesis 1: the effect of the own country fiscal imbalances within own-country is uniform across all the Eurozone members.
- Hypothesis 2: the fiscal imbalances of one Eurozone member do not have on other Eurozone members.

The results for these hypotheses are presented in Table 10. For the first null hypothesis, it is rejected which indicates that country specific effects of fiscal imbalances. This result would be plausible because the fiscal imbalances by Eurozone impacted the fiscal stability of another Eurozone member. The latter became clearly evident after the 2008 Financial Crisis. As for the second null hypothesis, the joint null hypothesis is rejected for all of the Eurozone members. This implies that the fiscal imbalances of one Eurozone member do have an impact on other Eurozone members.

**POLICY IMPLICATIONS**

Most of the members of the European Union (EU) participate in the Economic and Monetary Union (EMU), based on the Euro currency, but most decisions about taxes and spending remain at the national level. The lack of achieving substantial economic growth by the EU members over several years might explain their macroeconomic imbalances. Moreover, the root causes of the Eurozone imbalances as elegantly mentioned by Baldwin and Gros (2015) include the problems of Non-Performing Loans (NPL) faced by the EU’s banks. The default on these NPL can cause a sharp decrease of the assets of the financial institutions. This will require most of the EU members to be heavily invested in their own nation’s public debt with the risk of being themselves insolvent (bi-directional causality between the government and the financial institutions). In addition, the normalization of interest rates to almost zero for several years makes the borrowers vulnerable across the EMU. Other factors causing the Eurozone imbalances include the easy credit conditions of the globalization of finance from 2002 to 2008 that encouraged high-risk lending and borrowing practices, and the global financial crisis that led to a global recession from 2007 to 2012. Furthermore, this lessens the assets of the banking industries and private bondholders and thus requiring the bail out by the government. Consequently, any solution to the Eurozone fiscal imbalances would require a structural reforms of the EU economies.

More importantly, the EU does not have a fiscal union even though there is a monetary union. The main priority of the EU is to adopt a form of fiscal union and to strictly enforce the Stability and Growth Pact (SGP). The SGP is an agreement among the 28 EU Member States to ensure a fiscal discipline requiring each Member State to implement a fiscal policy aiming to stay within the limits on government deficit (3% of GDP) and debt (60% of GDP). In the case of having a debt level above 60%, it should decline each year at a satisfactory pace towards a level below 60%. Table 4 displays the fiscal developments of the EU from 2011 to the second quarter of 2015. On the one hand, the government deficit of the EU is pretty much under control and has been declining since 2013 from -3.0% to -2.4% in 2015 Q2 with the exception of 2011 and 2012 when it was -4.2% and -3.7%, respectively. On the other hand, the government debt-to-GDP ratio is way above the limit imposed by the SGP with 86.0 %, 89.3% and 91.1% in 2011, 2012 and 2013, respectively, and at least 92% since 2014 to present. This shows a non-commitment of the EU as a whole to a very strict fiscal discipline. A stable and growing EU economy will require a drastic reduction of the government debt-to-GDP ratio to below 60% along with programs clearly laying out the Medium-Term Budgetary Objectives (MTO). If the EU Member State does not comply with both the deficit and the debt limit, a so-called “Excessive Deficit Procedure” (EDP) is initiated with hard deadlines outlining an adjustment path towards reaching the MTO. The EU Member States in fiscal turmoil as measured by the government debt as a percentage of GDP (i.e., as seen in Table 5 are Belgium, Ireland, Greece, Italy and Portugal with Greece being the worst case. The continued deterioration of the government debt-to-GDP ratio can be attributed to a structural (permanent) government budget deficit as opposed to a cyclical (temporary) budget deficit. The Government policy should aim to change the structure of the government expenditures and revenues to seriously address the government budget imbalance.

Within the Eurozone, the main issue is the divergent current accounts that are associated with each of the Eurozone countries. That is, each of these countries has different levels of economic growth or macroeconomics; consequently, the integration of the financial markets within the Eurozone needs to be approach differently. Countries with lower per capita income would be expected to attract domestic and foreign investment because higher productivity and economic growth rates promise to yield higher than expected returns for investors. The latter would mean that the invested capital would ensure that the foreign debt can be repaid. In the Eurozone, the contrasts are stark between the countries in Northern Europe and those in Southern Europe.
investment and lower savings of the countries in Southern Europe indicate that they are best suited to accumulate net foreign liabilities by producing current account deficits while the countries in Northern Europe accumulate current account surpluses or act as a lender/investor to Southern Europe. Since the inception of the Euro, the countries of Southern Europe have been massively borrowing from foreign entities because of the financial liberalization and financial development in Southern Europe (Jaumotte, and Sodsriwiboon, 2010). The latter lopsided differences in the macroeconomics in the Eurozone can be attributed to the lack of care in the development of its monetary union. Arghyrou and Chortareas (2008) and Jaumotte and Sodsriwiboon (2010) believe, as we do in this paper, that the current account balances in the Eurozone pose a concern that requires constant monitoring to make sure that the current account imbalances do not pose a threat to the monetary union and the financial stability of the Eurozone countries.

CONCLUSIONS

In conclusion, the design of the Eurozone had a strong purpose of uniting the heterogeneous countries of Europe economically and politically. In its early years, the creation of the Eurozone was somewhat successful and provided some stability. The stability of the Eurozone was shattered by the propagation of the 2008 Financial Crisis that led to the European sovereign debt crisis. Some policy-makers allege that the latter can be attributed to the flawed design of the monetary union of the Eurozone. This monetary union, though it appeared to be successful at the onset, was quite fragile and it could not withstand a monetary crisis as witnessed in 2008. That is, the monetary system created for the Eurozone proved to be quite vulnerable and the original designers failed to recognize the fragility of this monetary system.

The most significant problem in the development of the Eurozone was the failure to create and implement crisis management responses. Instead, the haphazard remedies created, as apparent from the Greek debt crisis, proved to be somewhat ineffective in dealing with a crisis with a member country and quite destabilizing to the monetary structure of the Eurozone. The members of the Eurozone need to go back to the drawing board to revamp the system to improve its stability. A failure to redesign the monetary system will lead to a scenario of an implosion of the system. As a result, this might lead to an economic or even a political collapse of the Eurozone.
Table 1: Government Deficit (-)/Surplus (+)

(as a percentage of GDP; flows during one-year period and outstanding amounts at end of period)

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Table 2: Government Deficit (-)/Surplus (+)

(as a percentage of GDP; flows during one-year period and outstanding amounts at end of period)

<table>
<thead>
<tr>
<th>Years</th>
<th>Change in debt-to-GDP ratio</th>
<th>Primary deficit (-)/surplus (+)</th>
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</thead>
<tbody>
<tr>
<td>2011</td>
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<td>1.2</td>
</tr>
<tr>
<td>2012</td>
<td>3.4</td>
<td>0.6</td>
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<tr>
<td>2013</td>
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<tr>
<td>2014</td>
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</tr>
<tr>
<td>2014 Q3</td>
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<td>-0.1</td>
</tr>
</tbody>
</table>
Sources: ECB for the annual data; Eurostat for quarterly data.

1Intergovernmental lending in the context of the financial crisis is to consolidate except in the quarterly data on the deficit-debt adjustment.

2Calculated as the difference between the government debt-to-GDP ratios at the end of the reference period and one year later.

Table 3: Government Debt Securities1 (debt service as a percentage of GDP; flows during debt service period)

<table>
<thead>
<tr>
<th>Years</th>
<th>Total</th>
<th>Principal Maturities of up to 3 months</th>
<th>Interest Maturities of up to 3 months</th>
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<td></td>
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<td>2012</td>
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<td>2014</td>
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<tr>
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<td></td>
<td>2014 Q2</td>
<td>16.5</td>
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<td></td>
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<td></td>
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<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
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<tr>
<td></td>
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</table>

Source: European Central Bank (ECB)

1At face value and not consolidated within the general government sector.

2Excludes future payments on debt securities not yet outstanding and early redemptions.
### Table 4: Fiscal Developments

<table>
<thead>
<tr>
<th>Years</th>
<th>Deficit or Surplus (% GDP)</th>
<th>Revenue and Expenditure (% GDP)</th>
<th>Government debt-to-GDP ratio (% GDP)</th>
<th>GDP and Expenditure Components (EUR billions)</th>
<th>Value added by economic activity (EUR billions)</th>
<th>Employment (annual % change)</th>
</tr>
</thead>
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<tr>
<td>2011</td>
<td>-4.2</td>
<td>44.9</td>
<td>86.0</td>
<td>-</td>
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<tr>
<td>2012</td>
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<td>46.1</td>
<td>89.3</td>
<td>9848.1</td>
<td>8854.7</td>
<td>-0.4</td>
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<tr>
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Sources: ECB for annual data; Eurostat for quarterly data.

### Table 5: Government Debt

(as a percentage of GDP; flows during one-year period and outstanding amounts at end of period)

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<tr>
<td>Ireland</td>
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<td>102.0</td>
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<tr>
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<td>132.3</td>
<td>135.3</td>
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<tr>
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<td>107.5</td>
<td>106.8</td>
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<td>Latvia</td>
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<td>22.3</td>
<td>21.9</td>
</tr>
<tr>
<td>-------------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Luxembourg</td>
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<td>67.6</td>
<td>69.6</td>
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<td>72.1</td>
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<td>Malta</td>
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<td>68.3</td>
<td>68.2</td>
<td>69.2</td>
<td>67.4</td>
</tr>
<tr>
<td>Netherlands</td>
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<td>80.7</td>
<td>84.2</td>
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<tr>
<td>Portugal</td>
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<td>126.2</td>
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<td>132.3</td>
<td>130.2</td>
<td>130.4</td>
<td>128.7</td>
</tr>
<tr>
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<td>53.7</td>
<td>70.8</td>
<td>80.8</td>
<td>77.9</td>
<td>80.8</td>
<td>81.8</td>
<td>80.8</td>
</tr>
<tr>
<td>Slovakia</td>
<td>45.3</td>
<td>51.9</td>
<td>54.6</td>
<td>53.5</td>
<td>55.6</td>
<td>53.7</td>
<td>54.2</td>
<td>54.5</td>
</tr>
<tr>
<td>Finland</td>
<td>48.5</td>
<td>52.9</td>
<td>55.6</td>
<td>59.3</td>
<td>57.9</td>
<td>59.3</td>
<td>60.3</td>
<td>62.4</td>
</tr>
</tbody>
</table>

Source: Eurostat.

### Table 6: Definition of the Variables Used in the Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net International Payment Positions</td>
<td>A proxy for the capital inflows within the European Union.</td>
</tr>
<tr>
<td>Real Exchange Rate</td>
<td>A measure of the value of a country’s goods against those of another country.</td>
</tr>
<tr>
<td>Current Account Balance</td>
<td>The current account balance is the difference between a country's savings and its investment.</td>
</tr>
<tr>
<td>General Government Debt</td>
<td>Comprises currency, bills and short-term bonds, other short-term loans and other medium- and long-term loans and bonds.</td>
</tr>
<tr>
<td>Total Financial Sector Liabilities</td>
<td>Measures the evolution of the sum of all liabilities (which includes Currency and Deposits, Debt securities, Loans, Equity and Investment Fund Shares/Units, Insurance, Pensions and Standardized Guarantee Schemes, Financial Derivatives and Employee Stock Options and Other Accounts Payable) of the financial corporations sector.</td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td>Measures the percentage of the total labor force that is unemployed but actively seeking employment and willing to work.</td>
</tr>
<tr>
<td>Private Sector Credit Flow</td>
<td>Measures the private sector credit flow represents the net amount of liabilities to the sectors of Non-Financial corporations and Households and to Non-Profit institutions serving households.</td>
</tr>
</tbody>
</table>
Net Lending/Borrowing

The amount of extra funds that a sector has available to provide for either direct or indirect lending purposes to other similar counterparts. Net lending is used as a balancing item in the capital account.

<table>
<thead>
<tr>
<th>Table 7: Descriptive Statistics for the Financial Variables by European Country</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>France</td>
</tr>
<tr>
<td>Standard Deviation</td>
</tr>
<tr>
<td>Italy</td>
</tr>
<tr>
<td>Country</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Portugal</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>United Kingdom</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Table 8: Breusch-Godfrey Serial Correlation Lagrangian Multiplier (LM) Test**

<table>
<thead>
<tr>
<th>Country</th>
<th>Test Statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>8.242</td>
<td>0.0162</td>
</tr>
<tr>
<td>Germany</td>
<td>5.838</td>
<td>0.054</td>
</tr>
<tr>
<td>Greece</td>
<td>4.815</td>
<td>0.09</td>
</tr>
<tr>
<td>Italy</td>
<td>5.319</td>
<td>0.07</td>
</tr>
<tr>
<td>Spain</td>
<td>0.379</td>
<td>0.8273</td>
</tr>
<tr>
<td>Portugal</td>
<td>9.595</td>
<td>0.0083</td>
</tr>
</tbody>
</table>
Table 9: Results from the Seemingly Unrelated Regression (SUR)

Dependent Variable: NIPP (Net International Payment Position)

(One-step final coefficients consistent with one-step weighting matrix)

<table>
<thead>
<tr>
<th>Country</th>
<th>Constante</th>
<th>NIPP_{t-1}</th>
<th>REER</th>
<th>CAb</th>
<th>NDS</th>
<th>GGD</th>
<th>TFSL</th>
<th>URATE</th>
<th>PSCF</th>
<th>NLB</th>
<th>AR(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>Coefficient</td>
<td>-14.115</td>
<td>0.110</td>
<td>0.452</td>
<td>-1.053</td>
<td>0.382</td>
<td>8.287</td>
<td>-0.242</td>
<td>-2.997</td>
<td>0.332</td>
<td>0.968</td>
</tr>
<tr>
<td></td>
<td>Test Statistic</td>
<td>-1.119</td>
<td>0.472</td>
<td>2.158</td>
<td>-2.455</td>
<td>0.261</td>
<td>3.629</td>
<td>-1.021</td>
<td>-1.255</td>
<td>1.038</td>
<td>2.831</td>
</tr>
<tr>
<td></td>
<td>MEXVAL</td>
<td>2.066</td>
<td>0.371</td>
<td>7.484</td>
<td>9.582</td>
<td>0.113</td>
<td>19.95</td>
<td>6</td>
<td>1.722</td>
<td>2.593</td>
<td>1.779</td>
</tr>
<tr>
<td>Germany</td>
<td>Coefficient</td>
<td>-13.244</td>
<td>-0.406</td>
<td>-1.486</td>
<td>2.398</td>
<td>0.650</td>
<td>5.713</td>
<td>0.125</td>
<td>1.303</td>
<td>-0.240</td>
<td>-1.941</td>
</tr>
<tr>
<td></td>
<td>Test Statistic</td>
<td>-3.302</td>
<td>-1.931</td>
<td>-2.099</td>
<td>5.129</td>
<td>1.615</td>
<td>3.865</td>
<td>0.817</td>
<td>2.496</td>
<td>-2.213</td>
<td>-3.052</td>
</tr>
<tr>
<td>Greece</td>
<td>Coefficient</td>
<td>2.291</td>
<td>0.414</td>
<td>0.253</td>
<td>4.107</td>
<td>-0.278</td>
<td>-1.655</td>
<td>0.643</td>
<td>0.402</td>
<td>0.085</td>
<td>-1.001</td>
</tr>
<tr>
<td></td>
<td>Test Statistic</td>
<td>1.088</td>
<td>0.919</td>
<td>0.703</td>
<td>1.798</td>
<td>-1.873</td>
<td>-1.814</td>
<td>6.691</td>
<td>1.376</td>
<td>0.390</td>
<td>-1.124</td>
</tr>
<tr>
<td></td>
<td>MEXVAL</td>
<td>1.955</td>
<td>1.397</td>
<td>0.820</td>
<td>5.252</td>
<td>5.682</td>
<td>5.342</td>
<td>57.87</td>
<td>4</td>
<td>3.109</td>
<td>0.253</td>
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<tr>
<td>Italy</td>
<td>Coefficient</td>
<td>4.617</td>
<td>1.057</td>
<td>-0.249</td>
<td>0.386</td>
<td>0.117</td>
<td>-3.550</td>
<td>-0.107</td>
<td>2.382</td>
<td>-0.236</td>
<td>-0.011</td>
</tr>
<tr>
<td></td>
<td>MEXVAL</td>
<td>4.539</td>
<td>131.325</td>
<td>51.26</td>
<td>9</td>
<td>9.551</td>
<td>2.177</td>
<td>12.98</td>
<td>4</td>
<td>24.02</td>
<td>5</td>
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<tr>
<td>Spain</td>
<td>Coefficient</td>
<td>-1.891</td>
<td>1.313</td>
<td>1.304</td>
<td>2.711</td>
<td>-0.858</td>
<td>0.795</td>
<td>0.220</td>
<td>2.562</td>
<td>0.266</td>
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<tr>
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<td>Test Statistic</td>
<td>-0.998</td>
<td>41.364</td>
<td>7.948</td>
<td>12.739</td>
<td>-2.312</td>
<td>0.748</td>
<td>1.509</td>
<td>2.225</td>
<td>3.127</td>
<td>-26.615</td>
</tr>
</tbody>
</table>
### Table 10: Results from the Hypothesis Testing

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Wald Test Statistic (p-values)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypothesis 1:</td>
<td>263.673 (.000)</td>
</tr>
<tr>
<td>Hypothesis 2:</td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>138.29 (.000)</td>
</tr>
<tr>
<td>Germany</td>
<td>100.45 (.000)</td>
</tr>
<tr>
<td>Greece</td>
<td>51.325 (.000)</td>
</tr>
<tr>
<td>Italy</td>
<td>91.44 (.000)</td>
</tr>
<tr>
<td>Spain</td>
<td>72.45 (.000)</td>
</tr>
<tr>
<td>Portugal</td>
<td>35.359 (.000)</td>
</tr>
</tbody>
</table>

Note: NIPP t-1 = the lag of 1 time period of Net International Payment Positions; REER = Real Exchange Rate; CAB = Current Account Balance; NDS = Net Domestic Savings; GGD = General Government Debt; TFSL = Total Financial Sector Liabilities; URATE = Unemployment Rate; PSCF = Private Sector Credit Flow; NLB = Net Lending/Borrowing; and AR (1) = Autoregressive of Order 1. The F-statistic and the $R^2$ are not reported. The F-statistic would show that the coefficients other than the constant are all zero and likely show to be statistically significant. Consequently, such results would give us false assurances that the results are astounding but making such conclusions would require an in-depth analysis of the regression diagnostics. As for the $R^2$, the residuals would contain contemporaneous correlations that would provide a distorted view of the goodness of fit of each of these equations, and they can take on values less and greater than unity.
ENDNOTES

1The Durbin-Watson test statistic is not appropriate because the model is not valid with the inclusion of a lagged dependent variable on the right hand side.

2The marginal explanatory variable (MEXVAL) of each variable is the percentage by which the standard error of the estimate (SEE) of a regression is affected if the variable is omitted from the regression and is not replaced by another variable. i.e., the MEXVAL shows the importance of each variable to the fit of the regression model.

3The t-statistic is the ratio of the regression coefficient and the standard error of the regression and the goal of the t-statistic is to show the statistical significance of the variable to the regression. The application of the t-statistic requires the satisfaction of many assumptions which may not be indicative of the significance to the regression. For the analytical details concerning the MEXVAL, the reader should consult Almon (2014).

REFERENCES


DOES REGIONAL VARIATION IN STARTUP CONCENTRATION PREDICT EMPLOYMENT GROWTH?

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ABSTRACT

The paper explored the actions, activities and processes undertaken by the firms and their start-up entrepreneurs. A framework for growth is proposed, supporting the notion of the growth process as a complex, multidimensional construct. More specifically, this paper examines the regional variation in startup concentration be used to predict employment in Pennsylvania, Ohio, and West Virginia by metropolitan statistical area (MSA) for the year 2013. We find significant differences in new firm formation rates from industrial regions to technologically progressive regions using the generalized linear models (GLM). Variations in firm birth rates are explained by industrial size, population growth, the number of startups, human capital variables and establishments.

INTRODUCTION

Why is it that some small businesses grow and others do not? Can growth be predicted by industry sector, entrepreneurial behavior, regional resource munificence or any one of a myriad of other characteristics? In fact, the neoclassical growth theory did not explain either technological change or entrepreneurial activity because scale economies operate at the plant level and in the traditional Solow model; economic growth relied on capital investment in larger plants (Solow, 1956). Despite these investments in capital investment in large plans, this capital accumulation can explain only a small amount of the variation in economic growth across regions (Ciccone and Hall, 1996). Since the advent of the Solow growth model, recent theories of economic growth have espoused the role of externalities in generating regional economic growth. Using data from the Quarterly Workforce Indicators (QWI) from the Longitudinal Employer Household Data (LEHD) from the Census Bureau that tracks all employers in the whole U.S. private sector economy, we examine the impact of these externalities, as measured by entrepreneurial activity, on employment growth. More specifically, the purpose of this paper is to examine the relationship between startup concentration of firms and overall employment growth in Pennsylvania, Ohio, and West Virginia by the metropolitan statistical area (MSA) for the year 2013. More specifically, these states were selected for the analysis because they conduct regional economic activities.

EXISTING RESEARCH

Numerous studies undertaken by researchers and government studies to examine this link between the establishment of new firms and economic growth of a region. In fact, growing firms provide significant benefits to regions, with job generation, knowledge spillovers, economic multipliers, innovation drivers and cluster developments all being cited as potential benefits (Storey, 2000).

One measure of the process of change in economic activity is the rate at which new firms are being established, or what we call the firm birth rate. Presumably a relatively high regional rate of firm births indicates a process of resources concentrating within that region, while a relatively low rate of firm births would indicate the slower economic activity. A plausible implication is that localities would want to do more to attract and support startups. In the literature, there is significant regional variation in new firm formation, and examined a set of regional determinants to explain this variation (Reynolds, 1994; Armington and Acs, 2002; Acs and Mueller, 2008). That is, there are regional variations that occur in the concentration of startups, so not all regions will have the same experiences with startups and its impacts on
employment growth. More important, the effects of the startups on regional employment often have time lags. Fritsch and Mueller (2004) analyzed the impact of new business formation on regional employment, and they identified time lags using the Almon lag model. From their analysis, it was found that new firms can produce a positive and a negative effect on regional employment. In fact, their results indicated that the indirect effects of new business formation, i.e., crowding out of competitors, improvement of supply conditions and improved competitiveness are of greater magnitude than the direct effect, i.e. the jobs created by the new firms. Finally, their empirical assessment concluded that the peak of the positive impact of new businesses on regional development occurs eight years after formation.

There is not a homogeneous growth in the formation of new firms between regions. That is, significant regional variation heterogeneity exists in the new firm formation.

Some of these differences in the formation of new firms can be attributed to the various measures of unemployment, population density, industrial restructuring, and availability of financing (Audretsch and Fritsch, 1994; Davidson, Lindmark, and Olofsson 1994; Guesnier, 1994; and Keebler and Walker, 1994). Most important, the recent change in the United States ‘economy has been accompanied by a regional shift in economic activity away from traditional industrial regions to new regional agglomerations of high technology, that is stimulating entrepreneurial activity leading to the formation of new firms (Acs, Carlsson , and Karlsson, 1999).

Entrepreneurial enables the firm start-ups hire employees, resulting in subsequent decreases in unemployment (Piefifer and Reize, 2000), and increases in entrepreneurial activity may have an influence by increasing a country’s economic activity (van Stel, Carree and Thurik, 2005). For example, entrepreneurs enter markets with new products, services, or improved production services (Acs and Audretsch, 2003). A notable feature of entrepreneurial activity is that it also increases productivity by increasing competition (Geroski, 1989; Nickell, 1996; Nickell, Nicolitsas and Dryden, 1997). More specifically, entrepreneurial may improve our knowledge of what is technically viable; what consumers prefer; and of how to acquire the necessary resources by introducing variations of existing products and services in the market. The resulting learning process speeds up finding the dominant design of product-market combinations and other forms of experimenting and innovation. More important, knowledge spillovers play also an important role in the entrepreneurial activity leading to startup firms in a region (Audretsch and Keilbach, 2004). Finally, entrepreneurs are inclined to work longer hours and more efficiently as their income is closely related to their working effort and there are other positive effects of entrepreneurship on economic growth (Carree and Thurik, 2003).

DATA SOURCES AND THE EMPIRICAL METHODOLOGY

Data Sources

The Quarterly Workforce Indicators (QWI) within the Longitudinal Employer–Household Dynamics (LEHD) is the data source used in this analysis. The LEHD data were created through a partnership between the Census Bureau and U.S. states to provide local labor market information and to improve the Census Bureau’s economic and demographic data programs. The LEHD data are comprised of different administrative sources, primarily Unemployment Insurance (UI) earnings data and the Quarterly Census of Employment and Wages (QCEW), as well as censuses and surveys. Firm and worker information are combined to create job level quarterly earnings history data, data on where workers live and work, and data on firm characteristics such as industry.

Descriptive Analysis Startup Concentration and Overall Employment Growth

We examined regional variation of employment in Pennsylvania, Ohio, and West Virginia by looking at the concentration of startup employment. More specifically, we looked at whether or not these MSAs with the highest concentration of startup employment in 2002 experienced high employment growth. We selected the year 2002 as the starting point of the analysis because this was the first year of economic growth after the national recession of 2001 (March 2001- November 2001). Table 1 summarized the MSAs that showed high concentration of startups that could have correlated with economic growth of the MSA.

Employment in these MSAs grew from 310,742 in 2002 to 342,566 in 2014 and the percentage growth is 10.2% which means that employment in these ten MSAs of Pennsylvania grew by 10.2% from 2002 through 2014. To give this preceding estimate context, we compared this to the total employment for Pennsylvania, and employment in Pennsylvania increased from 5,431,495 in 2002 to 5,598,206 in 2014. Thus, employment in Pennsylvania grew by 3.1% from 2002 to 2014 meaning that employment in these MSAs with the highest concentration of startup firms in 2002 grew much faster than the overall employment growth in Pennsylvania or 10.2% versus 3.1%.

Now we examined the regional variation in West Virginia by looking at the concentration of startup employment. As with Pennsylvania, we looked at whether or not these MSAs with the highest concentration of startup employment in 2002 also experienced high employment growth. Table 2 summarized the results from West Virginia.
Employment in these MSAs of West Virginia grew from 169,050 in 2002 to 192639 in 2014 and the percentage growth is 13.9% which means that employment in these MSAs of Pennsylvania grew by 13.9% from 2002 through 2014. To give this preceding estimate context, we compared this to the total employment for West Virginia, and employment in West Virginia increased from 671,810 in 2002 to 696,574 in 2014. Thus, employment in West Virginia grew by 3.7% from 2002 to 2014 meaning that employment in these MSAs with the highest concentration of startup firms in 2002 grew much faster than the overall employment growth in West Virginia or 13.9% is greater than 3.7%.

Finally, we examined the regional variation in Ohio by looking at the concentration of startup employment. As with Pennsylvania and West Virginia, we looked at whether or not these MSAs in Ohio with the highest concentration of startup employment in 2002 also experienced high employment growth. Table 3 summarized the results from Ohio.

Employment in these MSAs of Ohio declined from 232,463 in 2002 to 217,435 in 2014 and the percentage decline is 6.5% which means that employment in these MSAs of Ohio declined by 6.5% from 2002 through 2014. To give this preceding estimate context, we compared this to the total employment for Ohio, and employment in Ohio also declined from 4,579,828 in 2002 to 4,521,937 in 2014. Thus, employment in Ohio declined by 1.26% from 2002 to 2014 meaning that employment in these MSAs with the highest concentration of startup firms in 2002 declined much faster than the overall employment decline in Ohio or -6.5% is greater than -1.26%.

**Empirical Methodology**

The y variable or the dependent variable for this analysis will emphasize the labor market approach or standardize the number of employed in the startup firms with respect to the size of the labor force (measured in thousands) as suggested by Evans and Jovanovic (1989). The labor market approach implicitly assumes that the entrepreneur starting a new business is in the same labor market within which that new establishment operates.

Once we identified the y variable, we estimated a regression model where the dependent variable is the number employed at startups divided by the labor force (in thousands) which is almost consistent with the approach by Keeble and Walker (1994), Davidsson et al. (1994) and Acs and Armington (2000). As for the regressors used in the analysis, table 4 summarizes the regressors used in the analysis.

The empirical specification for this model will be given in equation (1):

\[
Emp = \beta_0 + \beta_1 \cdot Unem + \beta_2 \cdot Share + \beta_3 \cdot Industry + \beta_4 \cdot EST + \beta_5 \cdot Pop + \beta_6 \cdot HS + \beta_7 \cdot BA + \beta_8 \cdot Start + \beta_9 \cdot DWV + \beta_{10} \cdot DOH + \epsilon_i
\]

where \( Emp \) is employment, \( Unem \) is the unemployment rate, share is the share of the proprietorship, Industry is the industry size, \( Est \) is the size of the establishment, Pop is the population growth between 2012 and 2013, HS is the share of adults with less than high school education, BA is the share of adults with a bachelor’s degree or higher, \( Start \) is the birthrates of new firms, \( DWV \) is a binary variable for West Virginia, and \( DOH \) is the binary variable for Ohio.

In this regression specification, the cross-section will reveal interstate (across) variation, but this type of specification would be problematic because of the omitted variable bias problem. Consequently, this regression specification will focus on intrastate (within) variation, which will be estimated by use of the fixed effects regression. The fixed effects will be captured by the binary variables for Ohio and West Virginia. When doing a fixed effects regression, we omit one of the states which is Pennsylvania. By doing including the fixed effects (group dummies) we are controlling for the average differences across the states in any observable or unobservable predictors. That is, the fixed effects coefficients soak up all the across group action, and the coefficient of each key predictor tells us the average, i.e., the common slope averaged across groups. What is left over is the within group action which is what we are interested in, and the problem of omitted variable bias is greatly reduced. Also there is no binary variable for the time variable because there is no trend in the data.

The estimation of (1) will use the generalized linear models (GLM). In OLS, the linear models assume that the only stochastic part of the data is the normally-distributed noise around the predicted mean. However, the data for each of the variables used in this analysis did not meet the assumption of normality, so the use of OLS would not be appropriate. Consequently, GLM is a broad class of models predicting the outcome of a response as a function of some linear combination of a set of regressors. That is, models use a linear combination of variables to predict the response to predict the response of employment. To define a GLM, we would need to choose (a) a link function relating the linear predictor to the predicted mean of the response; and (b) a function defining the “noise” or “error” probability distribution around that mean.

**Empirical Results**

Before estimation (1), we calculated the correlations among the continuous regressors which are summarized in table 5. These correlations will be discussed as we analyze the results from the cross-sectional regression results. Table 6 shows
the results from the cross-sectional regression on the average annual firm birth rates for all private firms together for Pennsylvania, West Virginia, and Ohio based on the MSAs. The coefficients were estimated as the standardized beta coefficients, so each parameter indicates the sensitivity of birth rate variation to normalized variation in the corresponding independent variable.

Now the results from this analysis of the results from table 6 will be explained. From table 6, the marginal explanatory variable (MEXVAL) of each variable is the percentage by which the standard error of the estimate (SEE) of a regression is affected if the variable is omitted from the regression and is not replaced by another variable. i.e., the MEXVAL shows the importance of each variable to the fit of the regression model rather than relying on the p-values to assess statistical significance (Almon, 2014). From these results, the omission of any of these variables and not replaced, the standard error of the estimate (SEE) would increase. Thus, we can conclude that each of these variables contributes to the explaining of employment in Pennsylvania, Ohio, and West Virginia.

The coefficient for the unemployment rate is negative for all private firms which are consistent with earlier cross-sectional studies (Storey, 1991, and Audretsch and Fritsch, 1994). The intuition is that as workers shift from being employed to unemployed, the overall entry rate in the region tends to go down. We need to interpret with care that there is no evidence that it is necessarily the unemployed who are starting the new firms in Pennsylvania, Ohio, and West Virginia.

The coefficient on the share of proprietors in the region is negative which is what we would expect because the share of proprietors is negatively correlated with establishment size, -0.740. Intuitively, as the average establishment size in a region increases there could be fewer opportunities for establishing new firms, and a smaller proportion of the labor force is made up of owners.

The coefficients for human capital as measured by share of college graduates, is negative. Reynolds (1994) found this coefficient to be negative between the college education and the new firm birth rate in the manufacturing sector which may behave differently than other industries. Intuitively, a positive coefficient would suggest that MSAs that have higher levels of education will have higher start-up rates. The latter would be consistent with Savage et al. (1988) and Anselin, Varga and Acs (1997, 2000) because that the technologically advanced industry individuals with greater skills, knowledge and expertise are more likely to start businesses.

The positive coefficient for the percentage of the population without a high school degree is surprising given that the correlation coefficient is -0.17 as shown in table 5 between those without a high school degree and employment in Pennsylvania, Ohio, and West Virginia, which would be expected. Intuitively, the additional effect of a greater share of less educated workers is to facilitate the start-up process by providing cheap labor for the new firms in these states. That is, even the startups need workers who are less educated to perform the routines work tasks. Finally, it was strongly positively correlated with college education, with a coefficient of 0.67 as revealed in table 5.

As for the regressors industry size and population growth, these variables are both strongly positive and statistically significant, as predicted by the theory of regional spillovers (Krugman, 1991a and 1991b). For industry size, the greater the number of establishments relative to the size of the population, the likelihood of greater spillovers are likely to occur.

For the variable startups, this regressor showed a positive coefficient because the greater the number of startups, the more employment it can generate within an MSA. However, this regressor was not statistically significant at the 5% level. In fact, the omission of the startup that is not replaced, the standard error of the estimate (SEE) would increase, which highlights the importance of this regressor.

CONCLUSIONS

This paper has reexamined the issue of new firm formation in the Quarterly Workforce Indicators (QWI) from the LEHD from the Census Bureau. We constructed annual data on firm births for 2013 for the MSAs in Pennsylvania, Ohio, and West Virginia. From this analysis, we find considerable variation in the new firm formation rate across these MSAs. In fact, these variations in the firm birth rates are substantially explained by regional differences in population growth and other variables that has been the espoused by the new economic geography.

Though we find that most of the signs coincide with our expectations with the exception of the human capital variables, each of the regressors was not statistically significant. As a remedy to assess important of each of the regressors, we estimated the marginal explanatory variable (MEXVAL) for each of the regressors. From these MEXVALS, the omission of these variables increases the standard error quite significantly, so each of these regressors contributes to the explaining of birth rates of new firms in Pennsylvania, Ohio, and West Virginia. In general, people in these MSAS that have a high percentage of college graduates are much more likely to start businesses than those in MSAs with lower, but we saw the opposite which can be attributed to population shifts or those leaving these MSAs for other areas. In fact, the population data showed declines in population in these MSAs. Given the results of this analysis, this research could be expanded to include all of the MSAs in
the United States using the Quarterly Workforce Indicators (QWI) from the Longitudinal Employer Household Data (LEHD) to see what the outcome of the results.

### Table 1: Startup Concentrations and Employment by Metropolitan Statistical Area In Pennsylvania (MSAs), 2002

<table>
<thead>
<tr>
<th>MSA</th>
<th>Employment--All Firm Ages</th>
<th>Employment--The Number of Firms Startup (0-1 Years)</th>
<th>The Share of Firms Startup (0-1 Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York-Northern New Jersey-Long Island, NY-NJ-PA (PA part)</td>
<td>6,768</td>
<td>525</td>
<td>7.8%</td>
</tr>
<tr>
<td>Harrisburg-Carlisle, PA</td>
<td>252,000</td>
<td>13,761</td>
<td>5.5%</td>
</tr>
<tr>
<td>Sunbury, PA</td>
<td>24,818</td>
<td>1,319</td>
<td>5.3%</td>
</tr>
<tr>
<td>Lewistown, PA</td>
<td>12,992</td>
<td>644</td>
<td>5.0%</td>
</tr>
<tr>
<td>Indiana, PA</td>
<td>24,312</td>
<td>1,196</td>
<td>4.8%</td>
</tr>
<tr>
<td>Oil City, PA</td>
<td>17,847</td>
<td>876</td>
<td>4.7%</td>
</tr>
<tr>
<td>East Stroudsburg, PA</td>
<td>39,113</td>
<td>1,884</td>
<td>4.7%</td>
</tr>
<tr>
<td>Selinsgrove, PA</td>
<td>14,556</td>
<td>699</td>
<td>4.6%</td>
</tr>
<tr>
<td>Johnstown, PA</td>
<td>47,894</td>
<td>2,291</td>
<td>4.5%</td>
</tr>
<tr>
<td>Warren, PA</td>
<td>12,758</td>
<td>574</td>
<td>4.5%</td>
</tr>
</tbody>
</table>

### Table 2: Startup Concentrations and Economic Growth by Metropolitan Statistical Area In West Virginia (MSAs), 2002

<table>
<thead>
<tr>
<th>MSA of West Virginia</th>
<th>Employment--All Firm Ages</th>
<th>Employment--The Number of Firms Startup (0-1 Years)</th>
<th>The Share of Firms Startup (0-1 Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winchester VA-WV (WV Part)</td>
<td>2,777</td>
<td>193</td>
<td>6.9%</td>
</tr>
<tr>
<td>Beckley, WV</td>
<td>35,575</td>
<td>2,317</td>
<td>6.5%</td>
</tr>
<tr>
<td>Point Pleasant, WV-OH (WV Part)</td>
<td>5,172</td>
<td>334</td>
<td>6.4%</td>
</tr>
<tr>
<td>Cumberland-MD-WV (WV Part)</td>
<td>5,252</td>
<td>332</td>
<td>6.3%</td>
</tr>
<tr>
<td>Washington-Arlington-Alexandria-MD-DC-WV (WV Part)</td>
<td>10,304</td>
<td>551</td>
<td>5.3%</td>
</tr>
<tr>
<td>Fairmont WV</td>
<td>15779</td>
<td>757</td>
<td>4.8%</td>
</tr>
<tr>
<td>Hagerstown-Martinsburg MD-WV (WV Part)</td>
<td>20,896</td>
<td>945</td>
<td>4.5%</td>
</tr>
<tr>
<td>Morgantown, WV</td>
<td>38,307</td>
<td>1,463</td>
<td>3.8%</td>
</tr>
</tbody>
</table>

### Table 3: Startup Concentrations and Economic Growth by Metropolitan Statistical Area In Ohio (MSAs), 2002

<table>
<thead>
<tr>
<th>MSA of Ohio</th>
<th>Employment--All Firm Ages</th>
<th>Employment--The Number of Firms Startup (0-1 Years)</th>
<th>The Share of Firms Startup (0-1 Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washington Court House-OH</td>
<td>8,531</td>
<td>717</td>
<td>8.4%</td>
</tr>
<tr>
<td>Norwalk-OH</td>
<td>23,959</td>
<td>1,591</td>
<td>6.4%</td>
</tr>
<tr>
<td>Mansfield-OH</td>
<td>50,675</td>
<td>3,365</td>
<td>6.4%</td>
</tr>
<tr>
<td>Regressor</td>
<td>Description</td>
<td>Source</td>
<td></td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Establishment Size</td>
<td>A proxy for the structure of industry in the region. It is measured as 2013 employment divided by the number of establishments in 2013 in the MSA.</td>
<td>Employment Data was obtained from the Bureau of Labor Statistics Establishment data was obtained from the U.S. Census Bureau, Statistics of U.S. Businesses.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>It should be negatively related to regional birth rate since larger average establishment size indicates greater dominance by large firms.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry Size</td>
<td>The number of establishments in the MSAs in 2013 divided by the MSA’s 2013 population.</td>
<td>Establishment data was obtained from the U.S. Census Bureau, Statistics of U.S. Businesses. T The population data by MSA was obtained from the Census Bureau.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This regressor will measure the following: The greater the number of establishments relative to the population, the more spillovers that can occur within the MSA.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population Growth</td>
<td>Measures the average annual rate of increase in the MSA in a previous period. This was calculated by taking the two-year change from the ratio of the 2013 population divided by 2009 population, and using a square root of this ratio to calculate the annual change ratio.</td>
<td>The population data by MSA for 2012 and 2013 was obtained from the Census Bureau.</td>
<td></td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td>This is the average number of unemployed in 2013 divided by 2013 labor force</td>
<td>Bureau of Labor Statistics</td>
<td></td>
</tr>
<tr>
<td>Share of Proprietors</td>
<td>Measures the number of proprietors in 2013 divided by the 2013 labor force. Proprietors are members of the labor force who are also business owners.</td>
<td>Bureau of Labor Statistics</td>
<td></td>
</tr>
<tr>
<td>Share of Adults with High School Education</td>
<td>This is defined as the number of adults without a high school degree in 2013 divided by the number of adults in the labor force. The lack of a high school degree should be a good proxy for the proportion of unskilled and semi-skilled labor, and should be negatively related to dependent variable.</td>
<td>The number of adults in the labor force is from the Bureau of Labor Statistics The number employed without a high school degree is obtained from the Quarterly Workforce Indicators (QWI) from the Census Bureau.</td>
<td></td>
</tr>
<tr>
<td>Share of Adults with A College and Graduate/Professional Education</td>
<td>This is defined as the number of adults with college degrees in 2013 divided by the total number of adults. This would be a proxy measure of both technical skills needed in the economy.</td>
<td>The number of adults in the labor force is from the Bureau of Labor Statistics The number employed without a high school degree is obtained from the Quarterly Workforce Indicators (QWI) from the Census Bureau.</td>
<td></td>
</tr>
</tbody>
</table>
Table 5: Correlations Between the Variables

<table>
<thead>
<tr>
<th></th>
<th>EMPLOY</th>
<th>UNEM</th>
<th>SHARE</th>
<th>INDUSTRY</th>
<th>EST</th>
<th>POP</th>
<th>HS</th>
<th>BA</th>
<th>START</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMPLOY</td>
<td>1.000000</td>
<td>0.036368</td>
<td>1.000000</td>
<td>0.633460</td>
<td>0.704521</td>
<td>-0.117485</td>
<td>0.456956</td>
<td>0.517116</td>
<td>0.012515</td>
</tr>
<tr>
<td>UNEM</td>
<td>-0.036368</td>
<td>1.000000</td>
<td>-0.032649</td>
<td>0.150821</td>
<td>-0.030484</td>
<td>-0.378688</td>
<td>-0.438762</td>
<td>-0.307080</td>
<td></td>
</tr>
<tr>
<td>SHARE</td>
<td>1.000000</td>
<td>0.036368</td>
<td>1.000000</td>
<td>0.633460</td>
<td>0.704521</td>
<td>-0.117485</td>
<td>0.456956</td>
<td>0.517116</td>
<td>0.012515</td>
</tr>
<tr>
<td>INDUSTRY</td>
<td>0.633460</td>
<td>0.032649</td>
<td>0.633460</td>
<td>1.000000</td>
<td>0.027397</td>
<td>-0.212040</td>
<td>0.388554</td>
<td>0.603344</td>
<td>-0.139900</td>
</tr>
<tr>
<td>EST</td>
<td>0.704521</td>
<td>0.150821</td>
<td>0.704521</td>
<td>0.027397</td>
<td>1.000000</td>
<td>-0.070455</td>
<td>0.235870</td>
<td>0.265251</td>
<td>-0.038140</td>
</tr>
<tr>
<td>POP</td>
<td>-0.117485</td>
<td>0.030484</td>
<td>0.117485</td>
<td>-0.212040</td>
<td>0.070455</td>
<td>1.000000</td>
<td>-0.235139</td>
<td>-0.249160</td>
<td>-0.074299</td>
</tr>
<tr>
<td>HS</td>
<td>0.456956</td>
<td>0.378688</td>
<td>0.456956</td>
<td>0.388554</td>
<td>0.235870</td>
<td>-0.235139</td>
<td>1.000000</td>
<td>0.677486</td>
<td>-0.175250</td>
</tr>
<tr>
<td>BA</td>
<td>0.517116</td>
<td>0.438762</td>
<td>0.517116</td>
<td>0.603344</td>
<td>0.265251</td>
<td>-0.249160</td>
<td>0.677486</td>
<td>1.000000</td>
<td>-0.135347</td>
</tr>
<tr>
<td>START</td>
<td>0.012515</td>
<td>0.307080</td>
<td>0.012515</td>
<td>-0.139900</td>
<td>0.038140</td>
<td>-0.074299</td>
<td>-0.175250</td>
<td>-0.135347</td>
<td>1.000000</td>
</tr>
</tbody>
</table>

Note: The correlations were estimated using E-Views 8.0
Table 6: Results from the Fixed Effects Regression

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>SEE</th>
<th>z-Statistic</th>
<th>Prob.</th>
<th>Mexval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-0.359570</td>
<td>0.165251</td>
<td>-2.175903</td>
<td>0.0296</td>
</tr>
<tr>
<td>Unemployment</td>
<td>-0.147055</td>
<td>0.288690</td>
<td>-0.509386</td>
<td>0.6105</td>
</tr>
<tr>
<td>Share</td>
<td>-8.792838</td>
<td>0.727562</td>
<td>-12.08534</td>
<td>0.0000</td>
</tr>
<tr>
<td>Industry</td>
<td>10.65778</td>
<td>5.188539</td>
<td>2.054100</td>
<td>0.0400</td>
</tr>
<tr>
<td>Establishment</td>
<td>0.005367</td>
<td>0.002499</td>
<td>0.557259</td>
<td>0.5774</td>
</tr>
<tr>
<td>Population Growth</td>
<td>0.370255</td>
<td>0.130425</td>
<td>2.838845</td>
<td>0.0045</td>
</tr>
<tr>
<td>High School</td>
<td>0.073888</td>
<td>0.132592</td>
<td>0.557259</td>
<td>0.5774</td>
</tr>
<tr>
<td>At Least BA</td>
<td>-0.121685</td>
<td>0.077918</td>
<td>-1.561702</td>
<td>0.1184</td>
</tr>
<tr>
<td>Startups</td>
<td>0.116738</td>
<td>0.078623</td>
<td>1.484768</td>
<td>0.1376</td>
</tr>
<tr>
<td>Binary West Virginia</td>
<td>0.018480</td>
<td>0.008210</td>
<td>2.250883</td>
<td>0.0244</td>
</tr>
<tr>
<td>Binary- Ohio</td>
<td>0.008036</td>
<td>0.004784</td>
<td>1.679829</td>
<td>0.0930</td>
</tr>
</tbody>
</table>

Mean dependent var | 0.395862 | S.D. dependent var | 0.066751 |
Sum squared resid | 0.000829 | Log likelihood | 140.0795 |
Akaike info criterion | -7.171086 | Schwarz criterion | -6.687233 |
Hannan-Quinn criter. | -7.002208 | Deviance | 0.000829 |
Deviance statistic | 3.31E-05 | Restr. deviance | 0.155950 |
LR statistic | 4679.601 | Prob(LR statistic) | 0.000000 |
Pearson SSR | 0.000829 | Pearson statistic | 3.31E-05 |
Dispersion | 3.31E-05 |

Note: The correlations were estimated using E-Views 8.0. Those p values denoted in italics are significant at the 5% level of significance.

REFERENCES


Regional Studies. 38, 949-59.


