

Credit Markets and Economic Activity: Evidence from Exogenous Variation in Legal Jurisdiction

J. Anthony Cookson and Rawley Z. Heimer¹

Does the provision of credit to households and enterprises matter for the development of economic activity? Cross-country studies present a positive relationship between credit markets and growth (Rajan and Zingales (1998), Beck et al. (2012), among others), but it is difficult to discount the possibility that unobservable factors simultaneously drive the expansion of credit and the economic opportunity set or that the empirical relationship is driven by reverse causality. Hence, the literature would benefit from individual-level evidence and additional efforts to identify a causal mechanism.

To study this question, our research utilizes a plausibly exogenous source of variation in the formation of credit markets: the implementation of Public Law 280 (PL280) on Native American reservations in the United States. This Congressional legislation quasi-experimentally assigned state courts to adjudicate disputes on a subset of reservations without approval or consent from tribes (Parker (2014)). Despite not being the impetus behind the targeted passage of PL280, civil courts play a critical role in enforcing long-term agreements such as debt contracts. In particular, the court system interprets when a debt contract has been defaulted upon, and in the event of default, provides a mechanism for the lender to enforce the terms of the agreement. Through this legal channel, lenders will be more reluctant to extend credit in jurisdictions where the nature of contract enforcement is uncertain to the lender. In the context of PL280, contract enforcement by state courts is better understood by lenders. Thus, we expect credit markets to be more robust on reservations under state jurisdiction.

Our preliminary empirical analysis exploits the precise geographic detail provided by the Equifax Consumer Credit Panel to show that credit market activity is stunted on Native American reservations that are not under the jurisdiction of the state's legal system. The average Equifax risk score is approximately twenty points lower in areas under tribal jurisdiction, which suggests that the cost of lending is higher on reservations that settle disputes in tribal court rather than state court. Individuals on reservations under tribal jurisdiction are also less likely to have their credit inquiries result in new credit lines, even after controlling for risk scores. Suggesting a difference in access to credit, a larger fraction of individuals have no active lines of credit and the average length of credit history is shorter. Furthermore, individuals also have a higher credit utilization ratio implying that many households are credit constrained.

¹ Cookson is an Assistant Professor of Finance at the University of Colorado at Boulder, Leeds School of Business. Heimer is a recent doctoral recipient and a Research Economist at the Federal Reserve Bank of Cleveland.

Turning to the role of credit markets in promoting broader economic activity, the second stage of our preliminary analysis evaluates the implications of these differences in credit and court jurisdiction on local reservation area and sector-specific income measures produced by the BEA. We find robust evidence that personal and proprietor incomes within reservation counties are higher in areas under state jurisdiction. The effect is large, amounting to 65 to 70 percent of the gap in personal income between reservations and their adjacent counties, or 6.6 to 8.4 percent of per capita personal income. To understand the role of credit markets in generating this gap, we construct sector-specific measures of external finance dependence among young firms (as in Rajan and Zingales 1998), and evaluate the interaction of financial dependence with state jurisdiction. We find the effect of state courts is strongest in industries where young firms exhibit greater reliance on external finance. Consistent with the notion that more robust credit markets generate economic opportunities, the effect of state courts on income in these finance-sensitive industries are concentrated in counties that host a reservation headquarters, while diminishing beyond ten miles from the reservation center. According to these findings, state court jurisdiction has played an important role in expanding economic opportunity with effects that are tightly linked to credit market activity, and are most pronounced among businesses that are particularly reliant on credit.

The goal of this grant application is to further explore the dependence of households on credit markets to finance the creation and continued success of the businesses they operate on Native American reservations. Considering the institutional environment we study, it seems reasonable to suggest that firm financing can be closely linked to household financial decisions. In fact, recent evidence suggests that household collateral is important for the development of small businesses (Andelino, Schoar, and Severino (2014)); however, establishing this channel within our setting is essential to identifying a mechanism through which credit markets help households. As an initial step, we plan to compare the Survey of Small Business Finances to the Equifax Consumer Credit Panel to estimate the extent to which small business and household credit correlates over time within geographical regions of the U.S. We also plan to use new data obtained by the Federal Reserve Bank of Cleveland linking credit records to individual characteristics, such as area of employment. This unexplored data will allow us to track how household balance sheets evolve as a function of the level of external finance dependence of the industry in which the household earns their income.

Our efforts linking household and business credit will result in new metrics of credit market conditions that we plan to share with the research community. These metrics will be derived using a match between micro-level data available only within the Federal Reserve System and publicly available data-sources. We plan to make available our methodology and forecast data upon completion. We envision our study to be an important stepping stone towards the construction of useful metrics of local area financial development.

To facilitate our research agenda linking credit to economic outcomes, we seek funding to assist in the maintenance of these new data sources and ultimately in the construction of a working paper which will present our findings.

Budget:

Travel, \$8,000: co-P.I. Cookson requires funding for travel to the Federal Reserve Bank of Cleveland and the Board of Governors of the Federal Reserve System to access and work with restricted-access data used in the production of this project. This travel will occur on a semi-regular basis until the completion of the project with each round-trip expected to total between \$1,000 and \$1,500 including airfare and accommodations.

Research assistance, \$8,000: co-P.I. Cookson will fund student research assistance at the graduate and undergraduate levels at the University of Colorado. The cost is estimated using an average of \$25 per hour, for 32 ten-hour work weeks.

Hardware, \$3,000: co-P.I. Cookson requires a laptop computer with a level of computing power capable of analyzing the individual-level credit data available only at the Federal Reserve Banks. He will use this laptop during his visits to the Federal Reserve Bank of Cleveland.

Miscellaneous, \$1,000: The P.I.s require additional funding for expenses such as copy-editing, journal subscription fees, conference submission fees, and all other administrative fees associated with the production of this research agenda.

Total, \$20,000.

ACADEMIC APPOINTMENT

University of Colorado at Boulder Boulder, CO August 2013 – Present
Assistant Professor of Finance, Leeds School of Business

EDUCATION

University of Chicago Chicago, IL August 2008 – June 2013
Ph.D. Economics (2013), **M.A. Economics** (2011)
Montana State University Bozeman, MT August 2001 – May 2008
M.S. Statistics (2008), **M.S. Applied Economics** (2006), **B.S. Economics** (2004)

RESEARCH INTERESTS

Industrial Organization, Law and Economics, Corporate Finance, Banking and Credit, Applied Econometrics, Property Rights.

REFEREED JOURNAL ARTICLES

1. Institutions and Casinos: An Empirical Analysis of the Location of Indian Casinos. *The Journal of Law and Economics*. Vol. 53, No. 4 (November 2010), pp. 651-687.

WORKING PAPERS

- Anticipated Entry and Entry Deterrence: Evidence from the American Casino Industry. Jan 2014.
- The Determinants of Bank Mergers: A Revealed Preference Analysis. (with Oktay Akkus and Ali Hortacsu). Jan 2014.
- Leverage and Strategic Preemption: Lessons from Entry Plans and Incumbent Investments. Nov 2013.
- Economic Consequences of Judicial Institutions: Evidence from a Natural Experiment. Dec 2013.
- Endogeneous Matching, Underwriter Reputation, and the Underpricing of Initial Public Offerings. (with Oktay Akkus and Ali Hortacsu). Dec 2013. Under Review.

SELECTED WORKS IN PROGRESS

- The Role of Innovation in Hot Issue Markets (with Roberto Pinheiro).
- Credit Markets and Economic Activity: Evidence from Exogenous Variation in Legal Institutions (with James R. Brown and Rawley Z Heimer).

LECTURING EXPERIENCE

University of Colorado at Boulder. Investments and Portfolio Management (3 Sections, Spring 2014).
University of Chicago. Econometrics B (Spring 2013), Honors Econometrics (Spring 2011, Winter 2012).
Montana State University. Intermediate Microeconomics (7 Sections, 2007-2008), Introductory Statistics (2 Sections, 2006-2007), and Intermediate Statistics (1 Section, Summer 2007)

PRESENTATIONS

Conference and Workshop Presentations

European Finance Association (Lugano, 2014; scheduled), Western Finance Association (Monterey Bay, 2014; scheduled), the 2nd Institutions, Trade and Development (InsTED) Workshop (Eugene, 2014; scheduled), International Industrial Organization Conference (Chicago 2014). Institute for the Study of New Institutional Economics Conference (Durham, NC, 2014; scheduled), Midwest Economics Association Conference (Evanston, 2014; scheduled), International Industrial

Organization Conference (Boston, 2013; *Rising Stars* Session), Ronald Coase Institute Workshop: Los Baños, Philippines (2008).

Invited Seminar Presentations

University of Colorado – Economics Department (October, 2013), Simon Fraser University (2013), University of Calgary – Finance Department (2013), Clemson University (2013), University of Minnesota – Carlson Finance (2013), Reed College (2013), Analysis Group – Denver Office (2013), University of Colorado at Boulder – Leeds Finance (2013), Montana State University Economics Seminar Series (2006, 2012).

Informal Seminar Presentations and Miscellaneous

University of Colorado – Leeds Finance Brownbag (December 2013), University of Chicago: Applied Micro Working Group (2012), Industrial Organization Working Group (2012), Industrial Organization Lunch (2010, 2011). Citadel Investment Group (Consulting Presentation, 2011).

PROFESSIONAL ACTIVITIES

Referee for *Journal of Political Economy*, *Journal of Housing Economics*, *B.E. Journal of Economic Analysis and Policy*, *Southern Economic Journal*, *RAND Journal of Economics* (2), *Journal of Economics and Management Science*, *Journal of Comparative Economics* and *Public Choice*. Member of *American Economic Association*.

SERVICE AND COMMITTEES

Finance Ph.D. Program Committee (2013), Junior Faculty Recruiting Committee (2013)

MISCELLANEOUS OTHER WRITING / MEDIA

“*Notes for Honors Econometrics*.” Lulu Publishing. Self-Published Manuscript [7 October 2012].

“*Semiparametric-Trees with an Application to Modeling Daily Wildfire Costs*” (with Patty Gude and Mark Greenwood.

“*Intromediate Microeconomics*.” Lulu Publishing. Self-Published Manuscript [25 August 2008].

“*Intromediate Microeconomics: Online Video Tutorials for Intro-to-Intermediate Microeconomics*.” YouTube Video Series. Available Online: www.youtube.com/intromediateecon [Total Video Views: 1.7 million; 9,000 subscribers]

Rawley Z. Heimer

Division of Banking and Finance | Research Department
Federal Reserve Bank of Cleveland
P.O. Box 6387 | Cleveland, OH 44101-1387
rawley.heimer@researchfed.org | (216) 774 - 2623
<https://sites.google.com/a/brandeis.edu/rheimer/research>

Appointments

Research Economist, Federal Reserve Bank of Cleveland, 2013 - present

Education

Ph.D. International Economics and Finance, International Business School, Brandeis University, 2013
B.A. Economics, University of Rochester, 2005

Research

Interests

Behavioral Finance, Household Finance, Social Networks

Publications

Friends Do Let Friends Buy Stocks Actively (2014)
Journal of Economic Behavior and Organization, Forthcoming

Working Papers

Can Leverage Constraints Make Overconfident Investors Better Off? (2014)
Under Revision for Resubmission, *Review of Financial Studies*, EFA Lugano 2014
Facebook Finance: How Social Interaction Propagates Active Investing (w/ David Simon, 2013)
AFA San Diego 2013
Peer Pressure: Does Social Interaction Explain the Disposition Effect (2014)
Queens Behavioral Finance Conference 2014, NFA 2014

Professional Activities

Invited Presentations and Seminars

Can Leverage Constraints Make Overconfident Investors Better Off?
University of Wyoming, 2014 (scheduled).
EFA Lugano, 2014 (scheduled).
The Ohio State University, Department of Finance, October, 2013.
UC Boulder Consumer Financial Decision Making, May 2013.

Board of Governors of the Federal Reserve System, February, 2013.

Securities Exchange Commission, February, 2013.

The University of Cincinnati, Department of Finance, February, 2013.

Western University, Ivey School of Business, January, 2013.

Baruch College, Zicklin School of Business, January, 2013.

Federal Reserve Bank of Cleveland, January, 2013.

Office of Financial Research, U.S. Treasury, January, 2013.

Federal Reserve Bank of Philadelphia, November, 2012.

Brandeis University, September, 2012.

Facebook Finance: How Social Interaction Propagates Active Investing

UC Boulder Consumer Financial Decision Making, May 2014.

American Financial Association Annual Meetings, San Diego, CA, January, 2013.

Financial Management Association Annual Meetings, Atlanta, GA, October, 2012.

Behavioural Finance Working Group/Mergers and Acquisitions Centre Conference, Cass Business School, June 2012.

Whitebox Advisors Graduate Student Conference, Yale University, May 2012.

Eastern Finance Association Annual Meetings, Boston, MA, April 21, 2012.

The 7th Annual Central Bank Workshop on the Microstructure of Financial Markets, University of Stavanger and the Central Bank of Norway, Stavanger, Norway, August 22-23, 2011.

U.S. Bureau of Labor Statistics, Washington, D.C., August 16, 2011.

Peer Pressure: Does Social Interaction Explain the Disposition Effect

Queens Behavioral Finance Conference 2014

NFA Ottawa 2014

Friends Do Let Friends Buy Stocks Actively

Financial Management Association Annual Meetings, Atlanta, GA, October, 2012.

Consumer Expenditure Survey Workshop, Bureau of Labor Statistics, July, 2012.

Panel Attrition and Unit Nonresponse Adjustment in the Consumer Expenditure Survey

Consumer Expenditure Survey Workshop, Bureau of Labor Statistics, July, 2012.

U.S. Bureau of Labor Statistics, Washington, D.C., September 27, 2011.

Affirmative Action and Private Sector Productivity Capacity: A Natural Experiment

American Agricultural Economics Association Annual Meetings, Milwaukee, WI, July 27, 2009. *Investing in Workforce Diversity in Agricultural Research: Can we Measure the Return?* presented by Matt A. Anderson.

Poster: Regional Economy Graduate Student Association Annual Conference, University of Alberta, Calgary, AB, Canada, November, 2007.

Poster: National Science Foundation Joint Annual Meetings, Washington, DC, August, 2007.

Moderator and Session Organizer: American Agricultural Economics Association Annual Meetings, Long Beach, CA, July 25, 2006. *Investing in Diversity: A Forum for Increased Understanding of the Benefits and Incentives for Enhancing Diversity.*

Other Presentations and Panel Discussions

Science of Success Symposium, Harvard University, May, 2013.

Referee Activity

Review of Financial Studies

Journal of Economic Behavior and Organization

Journal of Cultural Economics

Honors, Awards, & Fellowships

Best T.A. Award, Brandeis University, International Business School, 2011 - 2012 academic year.

Provost Award for Dissertation Expenses, Brandeis University, Spring 2012.

Yale Behavioral Finance Summer School, Summer 2011. Full scholarship.

Doctoral Fellowship, Brandeis University, 2008 - present.

Simon Scholars: Offer of Scholarship from Simon School of Business MBA Program, awarded for achievement in undergraduate business curriculum. University of Rochester, Spring 2005.

Certificate in Finance and Accounting, Simon School of Business, University of Rochester, Spring 2005.

Certificate in International Relations, University of Rochester, Spring 2005.

Teaching**Full Instructor**

Behavioral Finance (MA/MBA), Spring 2013

Applied Econometrics Practicum (Undergraduate), Fall 2012, Spring 2013.

Managerial Economics (MA/MBA), Fall 2012, Spring 2013.

Statistics for Economic Analysis (Undergraduate), Summer 2012.

Intermediate Microeconomics (Undergraduate), Spring 2012.

Scientific Computing (Ph.D.), Summer 2010.

Teaching Assistant

Senior Thesis (Undergraduate), Fall 2011 - Spring 2012.

Advanced Macroeconomics II (Ph.D), Spring 2011.

Advanced Macroeconomics I (Ph.D), Fall 2010.

Fundamentals of Microeconomics (MBA/MA), Fall 2010.

International Trade Policy and Institutions (MBA/MA), Spring 2009.

Economic Regulation and Deregulation (Undergraduate), Fall 2008.

*Montana State University***Teaching Assistant**

Cost/Benefit Analysis (Undergraduate), Spring 2007.

The Economics of Music (Undergraduate), Spring 2006.

Other Research Experience

Research Assistant, Swiss National Bank, Summer, 2012.

Economist, U.S. Bureau of Labor Statistics, Summer, 2011.

Research Associate, U.S. Department of Energy Carbon Sequestration Partnership, Montana State University, 2005 - 2008.

Miscellaneous

Jazz/Funk Guitarist: past member of several semi-professional acts with achievements such as opening for the guitarist Charlie Byrd. Studied under Bob Sneider, Eastman School of Music.

Ice Hockey Player: University of Rochester Ice Hockey and one of the founding members of the T.C. Williams HS Ice Hockey team.

References

Carol L. Osler (Dissertation Chair)

Email: cosler@brandeis.edu

Phone: (781) 736 - 4826

Debarshi K. Nandy

Email: dnandy@brandeis.edu

Phone: (781) 736 - 8364

Daniel B. Bergstresser

Email: dberg@brandeis.edu

Phone: (781) 736 - 2269

Blake LeBaron

Email: blebaron@brandeis.edu

Phone: (781) 736 - 2258