20th International Business and Economy Conference

January 4-8, 2021

CONFERENCE PROCEEDINGS

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IONA College

LaPenta School of Business

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Introductory Remarks

Only double-blind peer-reviewed extended abstracts and full papers are included in the proceedings. Invited papers and the keynote were not subject to the peer-review process and are not included in the proceedings.

Compliance with submission and formatting guidelines as well as language, grammar and spelling are responsibility of authors. Factual omissions are responsibility of authors.

Conference Program

All times EST (Eastern Standard Time, New York)

Everyone is encouraged to participate in all sessions.

Monday, 4th January 2021

11:00 – 12:00 **Meet & Greet Session**

Wine and Cheese – bring your own to the screen

– Pavel Štrach, PhD, IBEC 2021 Conference Chair, ŠKODA AUTO University

– John Manley, PhD, IBEC 2021 Iona College Host Representative

– Everyone welcome to attend, meet & network

12:00 – 12:15 *Coffee break – BYO to your own desk*

12:15 – 13:30 Conference Opening and Keynote

Welcome remarks

– Richard Highfield, Dean, IONA College, LaPenta School of Business

– Pavel Štrach, PhD, IBEC 2021 Conference Chair, ŠKODA AUTO University

Keynote

- Aleksandr V. Gevorkyan, St. Johns University: **The Incorporation of Post-Socialist Economics in Business Courses**

13:30 – 14:30 **Technical Training Session for Presenters and Session Chairs**

IONA Conference and College representative to discuss presentation protocols and processes.

Tuesday, 5th January 2021

11:00 – 12:30 **Session 1: Consumer Behavior and Online Marketing**

Session Chair: Sharon V. Thach, Tennessee State University

- Luis Raúl Rodríguez-Reyes & Mireya Pasillas, ITESO, Universidad Jesuita de Guadalajara: **Food delivery apps and COVID-19: An industry analysis for the State of Jalisco, Mexico**
- Carlos Osorio, Universidad de Manizales, Stefania Pareti, Universidad del Desarrollo: **Online strategies used by Latin American Certified B- Corporations: What They Say and How They Say It**
- Vanessa Isabel Flores Plata & Erika Lourdes Gonzales Rosas, Universidad de Guanajuato: **Green Consumer Buying Behavior and Their Buying Decision Related to Electric Vehicles**

12:30 – 12:45 *Coffee break – BYO to your own desk*

12:45 – 13:45 **Session 2: Invited Presentations**

Session Chair: Wei He, IONA College

- Fadi Fawaz, Tennessee State University: **A Refinement of the Relationship between Central Bank's Independence, Inflation and Income Inequality in Developing Countries**
- Jootae Kim, Dankook University: **Global Leadership of Korean Chaebols: Samsung in Smartphone Industry**

Wednesday, 6th January 2021

11:00 – 12:30 **Session 3: Learning, Teaching, and Students-Related Issues**

Session Chair: Tomáš Kincl, Prague University of Economics

- Marty Ludlum & Burle Steelman, University of Central Oklahoma, Linn Hongell & Christa Tigerstedt, Arcada University of Applied Science, Helsinki, Josue Carreno & Ashley Wiltz, University of Central Oklahoma: **Finnish College**

Students and Academic Dishonesty: An Examination of Gender, Year in School, and Employment

- Vladimir Pashkevich, St. Francis College: **Integrating Two Active Learning Approaches into a Principles of Marketing course: The Role of Experiential Learning Styles in Shaping and Influencing Student Outcomes**
- Alison Munsch & Eleni Mariola, IONA College: **Approaching Student Loan Crisis: Managing Adverse Effects**

12:30 – 12:45 *Coffee break – BYO to your own desk*

12:45 – 14:15 **Session 4: SOEs & Public Administration**

Session Chair: Peter Cincinelli, University of Bergamo

- Weian Li & Qiankun Meng, China Academy of Corporate Governance: **State Control, Excess credit and Corporate Innovation: Some empirical evidence from Chinese SOEs**
- Mahmood Hussain & Christina Wong, San Francisco State University: **Priming Ethnic Self-awareness and Response to Public Service Announcement During Period of Uncertainty**
- Wei He & Shaomeng Jia, IONA College: **Exploring Multigenerational Co-residence in America**
- James R. Barth & Jiayi Xu, Auburn University: **U.S. Minority Banks: Why So Few - After 150 Years?**

14:15 – 14:30 *Coffee break – BYO to your own desk*

14:30 – 15:30 **Session 5: Invited Presentations**

Session Chair: Jeffry Haber, IONA College

- Carlos Trejo-Pech, University of Tennessee at Knoxville, NyoNyo Kyaw & Wei He, IONA College,: **Capital Structure Adjustment Behavior of Listed Firms on the Mexican Stock Exchange**
- Vincent F. Maher, IONA College: **Nurse on Nurse Bullying: Screening Failures and Hospital Liability**

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11:00 – 13:00 **Session 6: Finance**

Session Chair: John F. Manley, IONA College

- Shant Arzoumanian, Lafayette College: **Can Inflation Targeting Mitigate the Resource Curse? Evidence from Emerging Market Economies**
- Khushboo Aggarwal & Mithilesh Kumar Jha, P.G.D.A.V. College (University of Delhi): **Causality between Growth, Inflation and Economic Policy Uncertainty: Evidence from the India**
- Ning Gao & Arif Qayyum, IONA College: **The Evolution of Firms' Social Responsibility and Financial Performance**
- James P. Murtagh, Siena College: **ROE Decomposition of Surviving vs Failing Commercial Banks**

13:00 – 13:15 *Coffee break – BYO to your own desk*

13:15 – 14:15 **Session 7: Global Issues**

Session Chair: Carlos Trejo-Pech, University of Tennessee at Knoxville

- Unurjargal Nyambuu, New York City College of Technology: **Combating Climate Change: Emission Targets for Developed and Developing Economies (A Comparative Analysis)**
- George De Feis, Stockton University: **National Cultural Attributes Shape Reputation, Loyalty and Commitment: "Harkening Hofstede"**

Friday, 8th January 2021

11:00 – 12:15 **IBEC – Annual General Business Meeting**

– Everyone welcome to attend to learn about our organization, current status and future plans

Conference Closing Remarks

– Pavel Štrach, IBEC 2021 Conference Chair, ŠKODA AUTO University

ABSTRACTS

Food delivery apps and COVID-19: An industry analysis for the State of Jalisco, Mexico

Luis Raúl Rodríguez-Reyes, ITESO, Universidad Jesuita de Guadalajara

Mireya Pasillas ITESO, Universidad Jesuita de Guadalajara

Key Words: COVID-19; Food delivery apps; Lockdowns; Restaurants.

JEL Classification: G01; G33; I18; L11; L66.

Background and problem statement

The lack of effective treatment or a vaccine to fight the emergence of COVID-19 and the rapid spread of the disease stressed health services worldwide, causing thousands of deaths in developed and developing countries at an alarming rate. One of the few options governments had to slow the transmission was the implementation of lockdowns and other measures of social distancing. For instance, (Greenstone & Nigam, 2020) estimate a moderate social distancing policy in the US would save 1.7 million lives in a few months. Moreover, once COVID-19 started to recede in some countries in Asia and Europe and some regions of North America, and under the burden of high unemployment and the early signs of an economic recession, authorities started a slow reopening, easing some restrictions for economic activity but not lifting all of it, fearing a rekindling of the pandemic.

The restaurant industry was particularly hindered as a result of social distancing measures since they were banned for serving patrons at their premises during lockdowns or severely restricted in the number of people they could entertain in the early stages of reopening. Under these circumstances, the ubiquity of prepared food delivery apps in urban areas could be thought of as a key factor to keep restaurants afloat, the solution for a problem. However, at least in the State of Jalisco, it seems that this was not the case, since the high fees charged by such companies to distribute prepared food generated tension between cash-striped businesses and the companies running the apps, to the degree of an organized boycott from the industry during a brief period and the intended development of a restaurant industry own delivery app. The working hypothesis is that the high fees charged by the apps were a source of distress for the restaurant industry instead of the answer during a difficult period for prepared food businesses.

Objective

The main objective of this research project is to analyze how food delivery apps and restaurants interact during a period in which social distancing measures were enforced in the State of Jalisco, Mexico. The expected products of this analysis are lessons and policy recommendations that can be applied to improve the relationship between apps and restaurants in testing times that involve lockdowns and other social distancing measures in other regions and large metropolitan areas.

Methods and procedures

To pursue this objective, the results of two surveys on restaurants conducted by the IIEG (Instituto de Información Estadística y Geográfica de Jalisco) will be used to analyze the interaction between apps and restaurants. The first survey (IIEG, 2020) was conducted in July 2020, amid severe social distancing restrictions. The second survey is expected to be conducted in October 2020 and would give the possibility of some comparative analysis.

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Online strategies used by Latin American certified B- Corporations. What they say and how they say it

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Abstract: B-corporations are companies with a new way of doing business, which is aimed to impact positively in society throughout the collective benefit. The companies certified as B-corporations, follows a set of values and principles that are quite specific, which suppose using marketing strategies that are different to those used by traditional revenue oriented companies. Latin America has seen a rise of businesses with this certification, which arise a question regarding the strategies used by these companies on their social media. We propose a text mining approach in order to prove whether Latin American B-corporations are coherent on what they say and the identity, principles, values and interests of the B program

Background and problem statement

A B-Corporation (Benefit Corporation) is a new way of business in our society, this companies use different business as an instrument to create a collective benefit. This kind of organization give solutions to a lot of social and environmental issues, given the overexploitation of natural resources that the human being has been responsible for. B-Companies combine the generation of a positive impact in the community or society but without leaving costs effectiveness aside. That's why they have a mixed up nature of ONG and a conventional company (Vargas, 2014).

This type of companies can be characterized in three main principles, called threefold impact; i) purpose; creating social and environmentally a positive impact ii) responsibility; consider interest of workers, community and environment, and iii) transparency; the company has to generate an annual report with its social and environmental performance (Battistel, 2013).

To become a B-Corporation the original corporation has to obtain a certification; there's a long process where five particular areas of the companies have to be analysed; governance, workers, environment, clients and community. The company has to commit to reporting its social and environmental impacts to the public, plus accomplishing a minimum of standards of performance (Malec, 2017). This certificate has to be renewed every two years (Vargas, 2014).

Battistel (2013) describes the main objective of a B-Corporation as *[…]* "*through the power of private companies public benefits are achieved (decrease poverty, rebuild communities, preserve the environment, create new places where to work)" […].* Create value for stakeholders and for the society as well, improve work quality for a better life-quality of the community and promoting its growth are some of the followed objectives. Along facing environmental and social problems that may arise, and being responsible about future generations are part of the main guidelines. The B-Companies aspire being the best company to the world and of the world (Sistema B, 2020).

The B-Companies workers are people with non-conventional abilities and capacities. And what creates an intangible benefit is their moral value, which makes them proud of being part of the company. There is a strong organizational culture (Mottillo *et al*, 2014).

The company B model is an emerging factual model that seeks for coverage and a proper legal insertion (Etcheverry & de Mello, 2013). For example, in Latin America there's no law enacted which legally recognizes a B Corporation, and there are just a few legal bodies who encourage social responsible business activities. To become a B Company is a way to change the classic economy model and avoid an indiscriminate resource use to maximize utilities (Huerta, 2018).

It is important to inquire into these types of companies since their interests are not only financial, like the other conventional companies. There is a conviction on the part of the B companies that from work and their contribution the world can be improved. The global movement of B-companies is having favourable growth rates. In addition, many companies are going through the certification process to be part of the B companies, this indicates a high potential for growth. It's an opportunity to change towards the direction of a corporate culture in favour of sustainability and change the mentality of future professionals by including this topic in curricular networks of the universities and business administration (Tapia & Zegers, 2014).

Objectives

Considering the growing literature on topic analysis from social networking sites (SNS) such as twitter (Sharma et al., 2020), and given the nature of B-corporations, we hypothesise that the communications and marketing strategies on their SNS should reflect the values and principles promoted by the certification. Thus, the purpose of this research is to investigate the content posted on the social media streams to identify the way these companies use their SNS and whether they are coherent with the narrative expected from a B-corp

Methods and procedures

Following previous research using SNS as source of information (Muntean et al., 2014; Sakamoto et al., 2018; Sharma et al., 2020) we selected twitter to collect the posts made by B-certified businesses that appear on the official website of this initiative in Latin America. The decision of choosing Twitter is due to the high use of SNS in Latin America, as well as the availability of an API that bring the data, which are not available for other SNS such as Facebook. The data will be collected from B-corporations dedicated to e-commerce as we suppose that they are closer to the use of SNS than other companies. Once we get the data, we will analyse it using text mining techniques, such

as topic analysis algorithms, in order to identify the words, trends and patterns from the twits published.

Expected results

The results expected from the analysis proposed are related with identifying the main words and topics used by B-certified companies on their twitter timelines, and in this way contrast whether the SNS strategy is aligned with the way a B-certified company should talk given the altruistic tone of this program. Thus based on the most used words we expect to have a list of words and terms that could help to recognise the way a B-corporation talk, and furthermore, determine whether these words and terms reflect the statements of the certification, as well as the terms they associate with the certification. In addition, the topic analysis will help to identify the topics the business talk about, which should be more related towards the topics that the certification aims to attend such as inequality, responsible resource consumption, circular economy, impact on the community and the environment.

Based on the analysis we can provide suggestions in order to improve the impact of the SNS strategies which can be impact on their sustainability as a business.

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Priming Ethnic Self-awareness and Response to Public Service Announcement During Period of Uncertainty

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Introduction

"Ethnic self-awareness" – a temporary state that encourage a person to be sensitive to information related to her own ethnicity does influence response to targeted marketing communication (Forehand & Déspande, 2001). During times of uncertainties and crises, numerous public service announcements – often developed by the governments and other organizations - (PSAs) are targeted to consumers to prioritize health and well-being. It is important to understand how these PSAs influence consumers' adoption of safety measures.

Objective

In this research we investigate whether such priming has an impact on ethnic self-awareness during a time of uncertainty, for example, during the COVID-19 pandemic.

Research Methodology

We design online experiment to accomplish our objective. The design of the experiment will be a 2 levels of ethnicity (Asian or Caucasian) x 2 levels of ethnic prime (Asian ethnic prime or Caucasian ethnic prime) x 2 levels of PSA target audience (focal PSA targeted to either Asians or Caucasians) between-participants factorial.

Keywords: Priming, ethnicity, ethnic identification, ethnic self-awareness, pandemic.

Approaching Student Loan Crisis: Managing Adverse Effects

Alison Munsch, PhD and Eleni Mariola, Ph.D.

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Background

Aggregate student loans in the U.S. surpassed the $1 trillion mark in 2013 and are at $1.54 trillion as of the second quarter of 2020 (New York Fed HHDC). Student loan debt represents currently 11 % of the overall household debt. There are 44.7 million borrowers with an average student loan debt of $32,731. California, Texas Florida and New York represent over a quarter of the total student loans.

The recent decline (Q2-2020) in student loan delinquencies is only due to CARES ACT administrative forbearances that cover most federal student loans. It is also important to note that actual delinquencies are probably double the ones reported since about half of the loans are in grace period, deferment or forbearance. Student loans are a considerable percent of the overall debt of individuals even those over the age of 50 who have taken on student loans to enroll in schools (following the financial crisis of 2008) and/or to help family members.

Women carry a proportionally high percent of the overall student loan debt (almost two-thirds) with black women completing their undergraduate studies with an average of $37.558 in loans, and Asian women with the lowest average of $25,252. Women also have greater difficulties in repaying the loans since they get paid 75% of what male graduates receive. Cost of college degrees increased by 25% since 2008 while the student debt increased by over 100 percent. While data from the Bureau of Labor Statistics on employment and income of college graduates with a bachelor's degree

do support the benefits of a college education, many students face the dilemma of earning a bachelor's degree while loading on student loans. Recent research demonstrates that the increase in student loans: a. leads to a decrease in the number of small business formation (FRB of Philadelphia), b. prevents graduates from savings for retirement (Boston College); reduces their short-term household wealth (FRB of St. Louis); and affects negatively the housing market as graduates attempt to repay student loans before entering the housing market (Federal Reserve Report). Moreover, student loans force graduates to accept part time jobs or jobs that are unrelated to their studies so as to repay the loans.

Student debt is not forgiven in a bankruptcy. Student debt is offered through government & private programs that don't necessarily correlate to the students 1) earnings potential 2) credit worthiness 3) tuition 4) macro-economic backdrop, etc. In the author's opinion this seems naïve. The earnings power of a history major the day they graduate on average is most likely lower than an engineer, but many of the parameters that allowed students to borrow are identical. While a student the loan access and terms are more functions of policy and law where upon student graduation, students are subject to market and economic forces. It is a complex subject because as a society it is not desired to disadvantage a student while they are a student, but the economic reality post-graduation is based on supply and depend, economic trends, industry trends, geography, demographics, industry trends and more.

Problem Statement and Research Questions

The financial crisis started in the real estate market in 2006 as defaults on subprime mortgages started to rise. At first the damage was contained. However, it ended up severely reducing economic activity as the issues spread through the economy. The

crisis eventually revealed a wave of deflation and liquidation that took all assets lower, including oil and gas. At the same time, unemployment rose as companies reduced output since aggregate demand was falling. Eventually, an aggressive stimulus employed by governments to combat the financial crisis resulted in expectations of increased inflation that led to commodity buying and an improvement in credit conditions. Demand rebounded as the fiscal and monetary stimulus reversed deflationary forces and led to prices climbing higher. However, companies forced to raise capital during this time period suffered higher interest rate expenses for an extended period of time.

With student loan debt higher than most American debt, there is a concern that there will be adverse effects on the economy as the loans become due. This is a particular concern because of the soft economy and high unemployment rates that have been caused by the COVID pandemic. This research seeks to explore how this student debt will impact the U.S. economy and investigate ways that the adverse of effects of crushing student loan debt can be mitigated. As such, the research questions that will be explored is this study are as follows:

Research Question 1: The student debt crisis is here. What does this mean for the long-term health of the United States Economy and the financial security for United States Citizens? (With the housing crisis we saw job loss, banks fail, and homes foreclose. What will be seen with the student loan crisis?)

Research Question 2: What are the adverse effects that can be anticipated because of the student loan crisis?

Research Question 3: What can be done to mitigate and/or prevent the adverse effects of the student debt crisis?

Research Question 4: Can we learn from other countries to mitigate and/or prevent the adverse effects of the student debt crisis?

Methodology

A descriptive research design will used for this research to address the research questions. The data collection tool will be administered to respondents as an online survey delivered via email addresses through the Qualtrics XM platform. An availability sampling (locating participants through the researcher's personal and professional network) will be used to select participants for the study. Within the data collection tool, the purpose of the research will be explained including potential benefits and any risks to the participant. Permission to proceed with the survey will be acquired from each respondent although voluntary participation is implied in the research. The survey took will take respondents approximately 7 minutes on average to complete and will be offered on PCs, laptops, tablets and mobile phones will include validated questions including closed response choice and interval 10- point rating scales to facilitate quantitative analysis. Open-ended questions to facilitate qualitative diagnostic analysis of survey responses will also be administered. The open-ended questions will be placed in specific points in the survey to provide qualitative insights into the quantitative data provided by the closed response choice questions.

The research will be conducted among self-identified current college students that have student loan debt. Demographic information will be collected from respondents such as race, gender and college rank to facilitate contrasts and comparisons in the survey responses. An ending sample of at least 50 students will be attempted.

Specific question areas for this research will be as follows:

-Gender;

-Race/Ethnicity;

-College rank;

-Awareness of the implications of student loan debt;

-Assessment of student loan debt;

-Reasons for student loan debt;

-Views on how anticipated future plans post-graduation and how this will be impacted because student loan debt;

-Views on ability to repay student loans.

The data that will be captured through the descriptive research design (survey) will be analyzed in conjunction with data derived from databases providing student loan levels, defaults on student loans, trends on post-graduation life-stage milestones such as home ownership and starting a family in an effort to obtain a comprehensive view of the impact of student loan debt.

Expected Findings

The authors expect that the research will indicate that students are blindly taking on debt and the reality of that debt will have adverse effects on their anticipated future plans post-graduation that will ultimately impact the health of the United States economy. The research will serve to educate students on the post-graduation realities as an incoming freshman as well as inform parents, to make sure they have some idea as to what their students will face once graduated with student loan debt. The research is expected to provide information and insights to parents and students to help them to better consider the implications of taking on student loan debt. Finally, the expected outcome of the research is to uncover insight into the potential long-term adverse effects of student loan debt on the economy and provide suggestions to mitigate the potential adverse effects. An exploration of international trends on student loan debt is expected to yield information of potential approaches that can be drawn on, in the

United States, to provide potential ideas toward the mitigation of the adverse effects of U.S. student loan debt.

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The Evolution of Firms' Social Responsibility and Financial Performance

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Introduction

We investigate the relationship between firms' evolving social responsibility and their financial performances. Existing literatures use countries' or firms' social capital scores during one point in time and do not account for the changes of the social effort over time. It is our intention to fill in the gap by investigating the relationship between firms' evolving social efforts and the changes of their financial performances. By employing Media Corporate Responsibility Magazine's 100 best corporate citizens ranking for a 10-year period from 2009 to 2018, we find that socially responsible firms tend to perform better. In addition, improvement in a company's social responsibility rank is associated with better stock performance. Our approach helps understand not only the relationship between level of social responsibility on performance but also the relationship between changes in firms' social responsibility and financial performances over time.

Data Resources

Our social capital rankings are obtained from 3BL Media Corporate Responsibility Magazine's 100 best corporate citizens ranking (CRO scores) for a 10-

year period from 2009 to 2018. The magazine ranks top 100 corporate citizens out of Russell 1000 firms, based on seven criteria including environment, climate change, human rights, employee relations, corporate governance, philanthropy and financial. The financial information for sample firms are obtained from Thomson's Datastream, which is a database for Financial and Economic research data from Thomson Reuters.

Table 1 gives us a description of our sample over the 10-year period.

	Mean	Standard Deviation
Excess Returns	0.0259608	0.2923462
Total Assets	107661.9	313255.5
Debt Equity	1.754634	8.518355
Rank	50.69694	28.73482
CRO Score	125.8129	41.56052

Table 1 presents mean values for our variables. We use two control variables, total assets to control for size white debt to equity ratio to control for leverage and risk. Our variable of interest in this case are firm rank and CRO Score.

Methodology

We use random effect GLS model to further analyze our data. Our model is simple.

$$R_t = Leverage + \log of\ Total\ Assets + Interest\ variable$$

Where R_t is excess return i.e. company annual return minus S&P 500 annual returns. leverage is debt to equity ratio while log of total assets is to control for size. Our interest variables are CRO Score, Firm rank, change in rank and dummy variable for Rank and no rank. Our dummy variable is one if the firm is ranked and zero otherwise. We run separate regressions for our interest variables to avoid multi-collinearity. We run three models, model 1 with change rank, model 2 with CRO score while model 3 has two interest variables i.e. Rank and dummy variable for rank and no rank. The results are presented in table 2.

Table 2:

Variables	Model 1	Model 2	Model 3
CRO Score		0.0005756*	
Rank			0.0004401
Change in Rank	-0.0007089**		
Rank norank			0.0103624
Debt to equity	-.0001613	0.0008251	-0.0000496
Log of assets	-0.0246162**	-0.0286139**	-0.030686**
Constant	0.26735**	2406316**	0.3036988**

** Significant at 1% level of significance.
* Significant at 5% level of significance.

In model 1, Change in rank is the difference between current rank and previous year rank. If rank move up from 35 to 30 then there is a change of negative 5 and we expect company's excess return to go up if rank improves so, based on that notion we expect the coefficient to be negative. In our result for model 1 shows a negative coefficient indicating that abnormal returns go up when company rank improves. Model 2, we find a positive and significant relationship between CRO score and excess returns. These results indicate that companies with higher social responsibility is expected to have higher returns. In model 3, our results are not statistically significant for rank and dummy variable for rank and no rank.

Conclusion

Our results indicate that socially responsible firms tend to perform better as indicated by the relationship between CRO score and excess stock returns. In addition, improvement in a company's social responsibility rank is related to better stock performance. In our further analysis we are going to examine different aspects of social responsibility and their relationship with firm performance.

Combating Climate Change: Emissions targets for developed and developing economies - a comparative analysis

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Abstract: Many worry that the impact of global warming due to greenhouse gasses (GHG) emissions may be far greater than previously anticipated. Worse, there is now growing concern that these climatic effects may arrive much sooner than anticipated. This paper focuses on the importance of phasing in renewable resources and phasing out fossil fuel as quickly as possible. Thus, we propose an extended model for the study of sustainable growth on the way to a low-carbon economy. For this, both renewable and non-renewable resources are used in the production function. As is specifically evident in the empirical data that will be discussed in this paper, demand for these resources has been growing in tandem with the development of economies. We present dynamic paths for fossil fuel stocks and extraction, capital stock, and carbon dioxide (CO_2) and GHG emissions. We analyze trends and patterns of these constraints and examine their impact on sustainable economic growth and the welfare of society. Our numerical results illustrate the possibility of limiting the negative externality from fossil fuel while building a sustainable economy. Furthermore, we explore various targets for carbon emissions for developed and developing countries. For this, our simulations incorporate a country-specific approach while highlighting the importance of the transition from fossil fuel to renewable energy.

Many studies suggest constraining CO_2 and GHG emissions to cope with climate change. The International Energy Agency (IEA) provides historical data on how 4 key factors – population, GDP per capita, energy intensity, and carbon intensity measured by CO_2/Primary Energy Consumption ratio - have been affecting CO_2 emisisons. For carbon intensity, we stress coal: according to the Intergovernmental Panel on Climate Change (IPCC) Guidelines (2006), the carbon emission factor for primary coal is 25.8-29.1 tC/TJ, whereas oil is only 15.7-26.6 tC/TJ and natural gas is 15.3 tC/TJ. World CO_2 emissions in 2018, primarily from power generation, accounted for around 44%, which was followed by transport at 26%, industry at 19%, and buildings at 9% (see IEA, 2020). We should note that CO_2 accounts for almost two-thirds of world GHG (see data from CAIT Climate Data Explorer). To reach a sustainable level of development, renewable energy, particularly wind and solar energy, play an important role. We have observed a lower consumption of coal and higher usage of renewable energy most notably in European Union countries, which in turn led to a declining trend in CO_2 emissions from coal combustion. In global electricity generation, share of renewables has surged from 18% in 2000 to around 27% in 2019 (See IEA, 2019a).

According to historical data from international organizations, CO_2 emissions in developed countries have been much higher when compared to less developed countries. Due to industrial development and the openness of the economy owing to increased international trade in 1970-1980, CO_2 emissions had risen more rapidly in developing countries. Based on IEA (2019b) data, we computed the share of advanced country's CO_2 emissions in world emissions. For example, the U.S.'s 31% and Germany's 7% in 1971 dropped significantly in 2017 to 14% and 2% respectively. During the same period, some developing country's emissions that had accounted very little, e.g., India 1% and China 6% in 1971, increased substantially to 7%, and 28% respectively. However, when we adjust for population, while the U.S. has 14.6 tonnes of CO_2 emissions per capita in 2017, China comes in at 6.7 tonnes and India 1.6 tonnes (see IEA, 2020).

In the short run, based on financial constraints, studies suggest a differentiated responsibility and a slower reduction of emission for low income developing countries; poverty alleviation and the availability of advanced technology are both factors here (Fleurbaey et al. 2014; Kolstad et al. 2014; Knopf et al. 2012; Stern 2014). According to Paris Agreement's (2015) mitigation effort suggestions, "developed countries should continue to take the lead by undertaking absolute economy-wide reduction targets, while developing countries should continue enhancing their mitigation efforts, and are encouraged to move toward economy-wide targets over time in the light of different national circumstances." (see UNFCCC). In this context, Carbon Pricing Leadership Coalition (2017) discusses how the CO_2 and GHGs emission targets would depend on the industrialization level of the country since the Industrial Revolution and the country's share of CO_2 and GHG emissions. Thus, in our research we specify different carbon budget targets for developed and developing countries.

This research focuses on renewable resources in addition to exhaustible resources used in production process, and GHG and CO_2 emissions caused by the carbon-intensive energy sources. Our goal is to analyze the impact of these activities on a nation's development. Thus, we present a dynamic optimization model that incorporates renewable resources, non-renewable resources, and capital as production inputs into growth. We assume that clean energy is generated using a renewable energy capital stock with given efficiency. In addition to consumption, a welfare function for households includes damages arising from GHG and CO_2 emissions. This modeling approach is based on extensions of theories which were proposed by Hoel and Kverndokk (1996), Byrne (1997), van der Ploeg and Withagen (2011), and Greiner et al. (2014). We further modified the model by incorporating discovery, extraction rates, and costs of non-renewable resources, and assess their impact on the evolution of emissions caused by these same resources. Thus, the model maximizes the welfare of a representative household, where the discounted utility that takes into account environmental damages is constrained by the stock of fossil fuel that depends, in turn,

on discovery as well as extraction flows of fossil fuel, accumulated fossil fuel extraction in the past, and capital stock. Another important state variable represents damages arising from cumulative CO_2 and other GHG emissions that depends, in turn, on the use of fossil fuel, the fraction of GHG not absorbed by the ocean, GHGs' atmospheric lifetime, and stabilization of the GHGs.

We solve different scenarios of our model numerically using Nonlinear Model Predictive Control (NMPC). The NMPC method has been applied to other problems in economics (see, for example, Grüne (2013) and Nyambuu and Semmler (2014, 2017)). As shown in Grüne, Semmler, and Stieler (2015), NMPC can approximate the infinite time horizon solution well if there is a very long decision horizon. Optimal movements of the state variables presented in our model are examined. NMPC results show the interactions between economic growth and the extent of environmental damage based on different initial conditions of the state variables, as well as different country-specific parameters. We focus on optimal paths of the state variables for developing countries and developed countries, and how they respond to different emissions target levels. The results indicate that cumulative CO_2 emissions critically depend on the initial level of available non-renewable resources. As we expected, the optimal path of fossil fuels show that it reaches a constant low level when renewable resources are phased in. This result depends on the amount of the discovered fossil resources and initially available reserves. They are consistent with the fact that the phasing-in of a renewable energy source contributes to the reduction of CO_2 emissions and slows down the global warming trend. *In conclusion, our results indicate that increased use of renewable resources and reduced use of non-renewable resources, together with country-specific GHG emission targets, would contribute to the mitigation of climate change effects and promote sustainable development.*

Keywords: CLIMATE CHANGE, GHG and CO_2 EMISSIONS, GROWTH, RESOURCES

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National Cultural Attributes Shape Reputation, Loyalty and Commitment: "Harkening Hofstede"

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Abstract

Reputations garner loyalty and commitment to many things, but these humanistic feelings may only be short-lived, for once they achieve and use what has been built up, or in a sense has been "stockpiled" – thereby converting potential energy (pent-up built reputation) into kinetic energy (using reputation, i.e., using chits) -- so that no utility remains. This author contends their short-lived nature is a way to consider reputation (Deephouse, Newburry and Soleimani, 2016), loyalty (Oliver, 1999), and commitment (Gilliand and Bello, 2002). In other words, reputation, loyalty and commitment may ebb and flow or build and dissipate over time. In a sense, is there ever 100% confirmed reputation, loyalty or commitment or is it fleeting, albeit for good cause? What about other national differences between people, which could influence their attitudes towards reputation, loyalty and commitment? These differences include: ethnicity, upbringing, attitudes toward risk, attitudes of individualism and collectivism, temporal concerns, masculinity and femininity, all related to how a person builds and uses a reputation; builds and uses loyalty; and builds and uses commitment. In other words, these cultural differences, *"Harken us back to Hofstede"* (Hofstede 1984).

Introduction

Reputation, loyalty and commitment are constructs that have been written about by many marketing and management researchers, as well sociologists and psychologists (Pritchard, Havitz, and Howard, 1999; Dick and Basu, 1994). What is questioned here is the steadfastness of the constructs (reputation, loyalty and commitment), for if all are transient in nature, are reputation, loyalty or commitment constants or variables?

As one example, people are committed and loyal, and thus they believe the reputation of their frequent flyer programs until they build up an immense number of miles (potential), which are then converted to airline tickets for a flight (kinetic). Once the tank is emptied, people are no longer loyal, committed, or believe the repute. This author stockpiled 250,000 OnePass Miles (frequent flyer program of Continental Airlines); converted all of these miles to five economy class roundtrip tickets (at 50,000 per ticket) from New York to Alaska for he and his family; then traveled to Alaska. With his OnePass Miles balance at zero, he never flew Continental again, as he had miles already accumulated on other airlines with other frequent flyer programs. Hence, when the airline tickets are used, thus reducing their "stockpile" of miles on one particular frequent flyer program, their loyalty and commitment to that particular airline, and its reputation, vanishes. This phenomenon is much like diminishing returns on things seemingly in great demand, until that demand is partially-satisfied and then fully-satisfied, after which demand is no more. The first slice of pizza to a starving individual provides much utility, but the eighth is sickening.

Albeit, with the mergers taken place in the airline industry, and the combination of frequent flyer programs, one may be loyal, then un-loyal, then loyal once again, for the loyalty that "vanished" with the depletion of miles may have gotten a second life through the combination of frequent flyer programs due to a merger. For example, when the balance in Continental's OnePass program reduced to zero, and loyalty ended, the loyalty was renewed when Continental Airlines and United Airlines merged, as OnePass (Continental's) with zero miles joined MileagePlus (United's) with substantial miles accumulated, the loyalty was renewed from the "merged" OnePass/MileagePlus program, since traveling on the merged carrier would increase the miles accumulated.

But when their actual frequent flyer account balance drops to "zero" (no more potential) and they have other frequent flyer programs nearing awards (almost kinetic), their loyalty and commitment will basically shift to these other airlines, whose reputations suddenly increase. Thus, were they ever loyal or committed to these unique and valuable programs, or are these programs just accumulated commodities, whose conversion from potential to kinetic energy resembles their degree of loyalty and commitment?

Another example of "fleeting" loyalty and commitment would be a "lifetime money-back guarantee" policy. Is a person really loyal and committed to a product or a service when they have the benefit of a lifetime money-back guarantee? Knowing they have this guarantee might they be less loyal and committed to their purchase?

Finally, what about the universality of this concept? Perhaps the levels and degrees of reputation (Deephouse, Newburry and Soleimani, 2016), loyalty (Oliver, 1999) and commitment (Gilliand and Bello, 2002) differ according to one's culture, one's sex, one's modus operandi, one's feeling of individualism (or collectivism), one's attitude toward risk (uncertainty avoidance), and one's temporal attitude (long-term or short-term), and other differences. Also, are there differences in the nature of loyalty and commitment to a service (intangible) or a product (tangible) (Evanschitzky, et al., 2006; Pritchard, et al., 1999)? Indeed, it harkens us back to Hofstede. This conceptual study will result in propositions about the Hofstede's dimensions relative to reputation, loyalty and commitment, with the goal, after more research, of determining hypotheses for empirical testing.

Reputation, Loyalty and Commitment

These three words -- reputation, loyalty and commitment -- have been a source of problems, debates and confusion for time immemorial (Deephouse, Newburry and Soleimani, 2016; Oliver, 1999; Gilliand and Bello, 2002; Dimitriades, 2006). If one uses dictionary meanings, *"reputation"* means a widespread belief that someone has a particular characteristic. *"Commitment"* means making a promise and keeping it, for example, a husband is committed to his wife. This term commitment also means a willingness to pledge your heart, soul, and work hard in a job to achieve what is intended. On word *"loyalty"* means faithfulness to an individual or a company or a cause. One can be committed and loyal to a job, but the situation becomes tricky when one is committed to someone and has divided loyalties.

International Perspective: Hofstede's Cultural Dimensions

When Geert Hofstede (Hofstede, 1996; 1984) conducted his magnum opus in the 1960s, he envisioned five cultural dimensions, as follows:

Individualism vs. Collectivism

Those people that ascribe to individualism are more concerned with their individual rights versus the collective rights, for example, people of individualistic nations, for example the United States or the United Kingdom) and people of collectivist nations, for example, Sweden or Japan. One might think of how personal needs, goals, desires are prioritized versus the collectivist mindset, when the needs, goals, desires of the group or organization are prioritized.

Uncertainty Avoidance

Uncertainty avoidance has to do with either being risk-prone or risk-averse, albeit knowing that you could display both tendencies at different periods in your life. For example, when one is younger, you might be aggressive, more risk-prone, enjoy the gamble, bet on a long-shot -- low uncertainty avoidance -- but as you age, this attitude toward risk may change, as you have more responsibility, understand what is at stake, refrain from betting on a long-shot -- high uncertainty avoidance. Uncertainty avoidance reflects the degree of comfort and normalcy in ambiguous situations, and the extent to which they try to minimize or avoid these situations.

Masculinity vs. Femininity

Masculine societies will have very different rules and attitudes for men and women, which disappear in more feminine cultures. Countries in the Middle East, for instance, are very masculine, and a woman will not even attempt to express the same attitudes of a man. Other countries are more "sexually-balanced," e.g., Australia.

Some countries and areas of the world are gradually changing their cultural attitudes on masculinity and femininity. In Japan, for example, more women are becoming business executives and higher government officials due in part to the marriage of the crown prince to a woman, who graduated from Harvard and served in the diplomatic service before her marriage, and her subsequent activities favoring an increase in the role of women in Japanese society, since she became a member of the royal family. In Saudi Arabia, women are beginning to become more assertive by demanding the right to drive a car, thus narrowing the limits on the role of women in society.

Power Distance

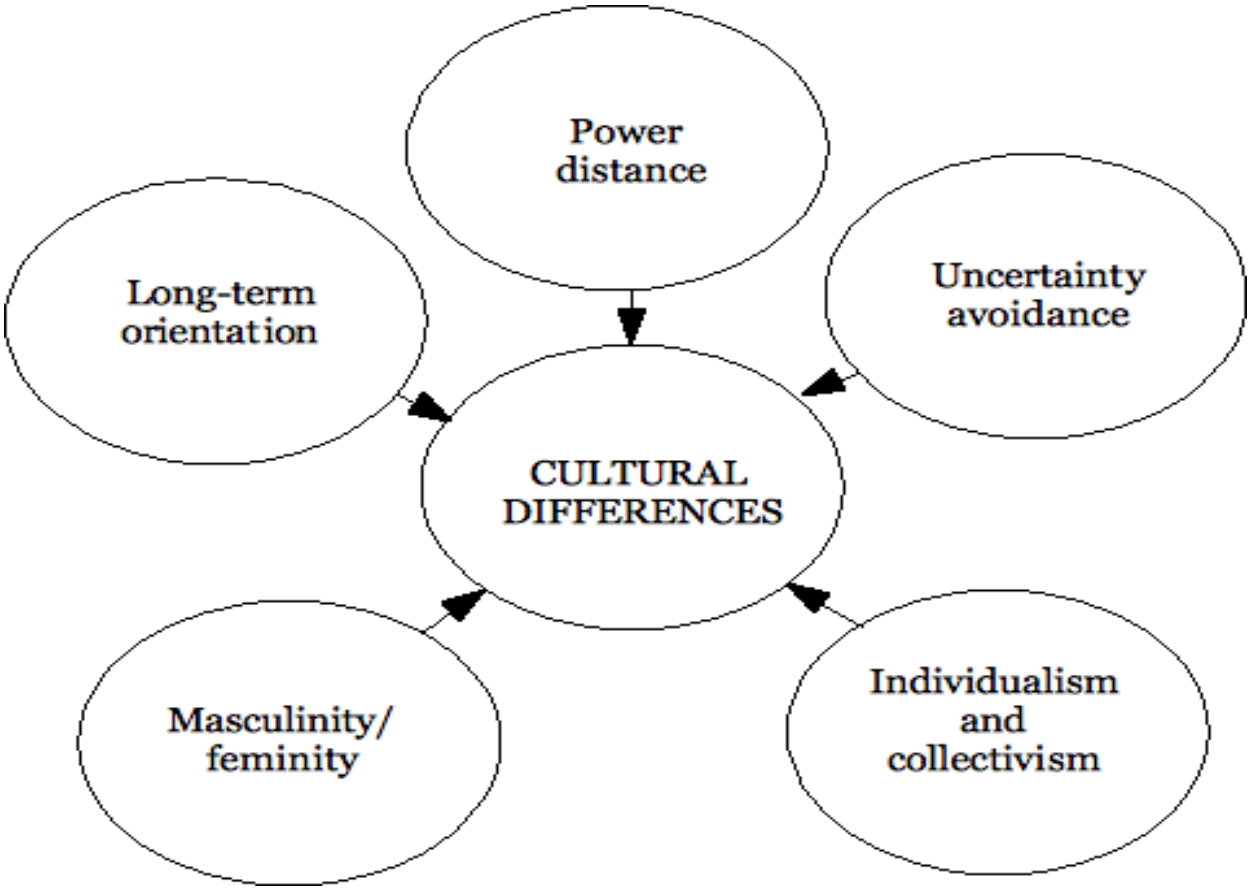
Power distance reflects to degree to which a hierarchy (superior-subordinate) and unequal distribution of power are accepted by the masses. High power distance

results in the overall acceptance of large status differences between superiors and subordinates. With high power distance, managers can be autocratic (one-way control) and paternalistic (father-like), and employees will do as they are told. With low power distance, there is more team orientation, with group goals, democratic approaches and attitude.

Long-term vs. Short-term

This cultural dimension reflects people's primary concern for the short-term or the long-term, i.e., will they accept short-term pain for long-term gain. If a person is only concerned with the short-term they may not invest time and effort to produce long-term gains. Such individuals are short-term oriented. On the other hand, if a person is only concerned with the long-term, they may not achieve any rewards until it is too late.

Pictorially, below shows Hofstede's five cultural dimensions influencing cultural attribute differences:



Propositions

Proposition 1:

If a person has *individualistic* tendencies, the person will be less likely to be loyal and committed to a product or service, all other things being equal.

Proposition 2:

If a person has *collectivist* tendencies, the person will be more likely to be loyal and committed to a product or service, all other things being equal.

Proposition 3:

If a person exhibits *low uncertainty avoidance* tendencies, the person will be less likely to be loyal and committed to a product or service, all other things being equal.

Proposition 4:

If a person exhibits *high uncertainty avoidance* tendencies, the person will be more likely to be loyal and committed to a product or service, all other things being equal.

Proposition 5:

If a person exhibits *masculine* tendencies, the person will be less likely to be loyal and committed to a product or service, all other things being equal.

Proposition 6:

If a person exhibits *feminine* tendencies, the person will be more likely to be loyal and committed to a product or service, all other things being equal.

Proposition 7:

If a person exhibits *high power distance* tendencies, the person will be less likely to be loyal and committed to a product or service, all other things being equal.

Proposition 8:

If a person exhibits *low power* distance tendencies, the person will be more likely to be loyal and committed to a product or service, all other things being equal.

Proposition 9:

If a person exhibits *short-term orientation* tendencies, the person will be less likely to be loyal and committed to a product or service, all other things being equal.

Proposition 10

If a person exhibits *long-term orientation* tendencies, the person will be more likely to be loyal and committed to a product or service, all other things being equal.

Proposition 11

If a person or organization exudes or exhibits a positive reputation, they will garner more loyalty towards themselves, all other things being equal.

Proposition 12

If a person or organization exudes or exhibits a positive reputation, they will garner more commitment towards themselves, all other things being equal.

Summary

Reputation, loyalty and commitment are three constructs used to assess the personal (consumer-to-business) and organizational (business-to-business) connection that a buyer (consumer or business) has for a seller (business or organization). These three constructs, however, could be considered on a universal level. Hence, there are differences to consider vis-à-vis the various cultural dimensions, as researched well by Hofstede and others.

Furthermore, while this paper only considers Hofstede's five cultural dimensions relative to some propositions, and since subsequent research broadened and proposed different dimensions -- for example, the GLOBE Studies and Trompenaars work (Minkov, 2012; Smith, et al., 1996, 1995) -- which exist, this additional research should be considered as well. A well-rounded and universally-accepted determination of reputation, loyalty and commitment could result. Twelve (12) propositions -- two for each category of Hofstede's cultural dimensions and the concept of reputation -- are proposed in this conceptual work. This work is just the beginning of research to come.

Conclusion

Much can be learned about the nature of reputation, loyalty and commitment in studying the universality of these concepts. Hofstede may have started the work, but others have followed and continue to do so. Much more work needs to be done, though, relative to newer cultural dimensions which separate us, including for instance, the ability to process information at the "speed of thought." For some cultures are methodical and other cultures are more "knee-jerk." With the world becoming increasingly smaller, this conceptual study is at the forefront of what promises to be a long-term and lasting research agenda.

Research also needs to be done on changes in some of these cultural differences over time. Some of the ten propositions may have to be further studied or revised as a result of these changes. For example, the narrowing of differences in some societies between individualist tendencies and collectivist tendencies may affect the propositions in these areas. Denmark and China seem to be becoming more

influenced by capitalism and the ideas of Adam Smith and others for more individual freedom while some western societies such as the USA seem to be adopting more ideas from collectivism and socialist ideologies.

Change in ideas on masculinity and feminism have been fairly rapid in some countries and areas of the world. The woman's liberation movement in some countries and changes in the cultural ideas of the role of men and the role of women have occurred starting with women gaining the right to vote and have increased participation in politics and government beginning in the nineteenth century. The glass ceiling on salaries and the discrimination against women in jobs are being reduced in many countries. In the USA, more women are now completing their college or university educations than men and more women are achieving success as executives in business and in government and in other areas of society. The same changes are taking place in many other countries.

The narrowing differences between men and women in some countries are demonstrated by changes in fashion where more women wear pants or pantsuits and more men wear more colorful shirts. Casual dress among women and men has become more similar. The changing sexual orientation and even the change of sex through chemistry and surgery are becoming more acceptable in some countries.

These narrowing differences need to be studied to see whether the propositions need to be revised in the future. The cultural definitions introduced by Geert Hofstede and his followers still are helpful to many in understating cultural dimensions but may need revision over time as cultural attitudes change over time.

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FULL PAPERS

ROE Decomposition of Surviving vs Failing Commercial Banks

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ABSTRACT

The US banking system has undergone significant contraction and consolidation in the past two decades. In this study, we apply Dupont analysis to evaluate the operating metrics of surviving banks compared to banks that were acquired or failed. We investigate the differences in means and variances for each group before, during and after the financial crisis. The results indicate significant differences in the operating performance between these groups of banks.

NOTE: This paper is being updated with data through 2019. Updated analysis and results will be presented in the conference.

Keywords: bank failures, bank ratios, capital adequacy

INTRODUCTION

The US banking system has undergone significant consolidation since 2000. The number of commercial banks declined 40% from 8,315 in 2000 to 4,981 at the end of 2017. The number of new reporters peaked in 2000 after passage of the Financial Services Modernization Act of 1999 and has steadily declined since that period. Bank failures peaked during and after the financial crisis in 2009-11. While the determinants of bank failure have gained considerable attention in the literature, the characteristics of acquired banks have attracted less research interest.

Table 1: Changes in Number of Commercial Banks, 2000-17

Reporting Year	Commercial Banks	New Reporters	Mergers	Failed
2000	8,315	190	452	7
2001	8,080	126	354	4
2002	7,887	91	276	11
2003	7,767	110	224	3
2004	7,628	122	261	4
2005	7,523	166	269	0
2006	7,397	178	305	0
2007	7,279	164	282	3

2008	7,076	89	261	25
2009	6,829	25	152	140
2010	6,519	9	184	157
2011	6,275	3	165	92
2012	6,072	0	172	51
2013	5,847	1	203	24
2014	5,607	0	238	18
2015	5,338	1	264	8
2016	5,112	0	221	5
2017	4,918	5	196	8
	Total	1,280	4,479	560

Source: FDIC Statistics at a Glance, accessed July 2018

LITERATURE REVIEW

In their textbook *Financial Markets and Institutions*, Saunders and Cornet outline a systematic approach to analyze the financial performance of banks using a return on equity (ROE) decomposition framework similar to DuPont analysis. Starting with ROE as a broad measure of bank profitability, this method evaluates the component parts of ROE to further explain differences in bank performance. Many factors have been suggested as causes, or at least as indicators, that a depository institution may be headed for trouble. Among the determinants, ratio analysis, as noted below, has been shown to be a promising indicator of troubled banks.

Cole and White (2012) found several contributing factors that caused banks to fail. They discovered that one of the most significant influences on a bank's failure is the asset types the bank held. Banks with higher concentrations in real estate construction and development loans, multi-family mortgages, and commercial mortgages consistently had a higher likelihood of failure in the future as compared to banks with larger holdings of residential, single-family mortgage loans or consumer loans.[1] Cole and White also found that failed banks often had lower capital ratios, particularly referring to the ratio of equity to assets. Lower liquidity, measured by cash and due to assets, investment securities to assets, and brokered deposits to assets, also contributed to bank failures. Lastly, Cole and White found that lower earnings, as measured by return on assets, indicated banks that were more likely to have failed.

Kyle's (2012) commentary notes that bank managers who believed that housing prices would never fall, looking at the historical record,[2] decided to loosen underwriting standards. This lead to loans being issued to less creditworthy parties. When the Great Recession took hold, these borrowers defaulted on their loans.

[1] Note, however, that Kyle's (2012) commentary points out that the banks which failed due to these asset types were smaller banks–the larger banks often failed due to sub-prime mortgage loan exposures.

[2] Although it is, at first glance, seemingly reasonable to look at historical housing price behavior and therefore deduce that housing prices would not fall, this misses the point of risk management. Managing risk should be proactive–one should be anticipating what *might* happen.

Samad (2011) found four specific capital adequacy ratios[3] that were all significantly different between banks that survived the financial crisis and those that failed, with the failed banks having lower ratios in all four cases.

On the government and regulatory side, the Office of the Inspector General (OIG) (2011) found that management can be complicit in an institution's failure, particularly due to strategic decisions made to grow the firm's asset base, the bank's compensation structure, or funding choices. Some management teams' compensation structures helped encourage the offering of additional loans and loosening of underwriting standards, as some firms tied compensation to increases in the bank's loan portfolio. When compensation is tied strictly to the size of the loan portfolio, rather than the quality of the loans therein, management works its way down the credit quality ladder, loaning to less creditworthy parties, and thereby increasing the bank's risk level. The OIG study also found that additional efforts to increase a bank's business, such as expanding into new activities or markets or performing mergers and acquisitions, sometimes conducted without due diligence, also led to bank failures.

Tied to efforts to increase a bank's asset base, some depository institutions used what the OIG study terms "non-core funding," generally meaning funds from securities such as mortgages rather than deposits, to provide the liquidity necessary for the bank to function. When the real estate market dried up, these banks were left with insufficient capital to meet their daily requirements, and often had to sell the mortgage assets at fire sale prices, thus forcing the banks to absorb heavy losses.

The OIG study also noted that by expanding the bank's asset base so rapidly and with lower-quality loans, a bank's risk management team had a hard time keeping pace. It takes time for the loan portfolio to "normalize" so that the bank can determine the overall riskiness of the portfolio and make corresponding adjustments to its provision for loan losses. Such being the case, some banks suffered from having inadequate internal controls and risk management processes, which allowed the banks to take on more risk than they could actually handle.

Similarly to Cole and White, the OIG's study also found that asset type is a significant influence on the likelihood of bank failure. Specifically, construction, land, and land development, or CLD, loans and commercial real estate, or CRE loans, were contributors to bank failures. The OIG study, however, specifically found that the cause of bank failures was not so much the exposure to commercial mortgages, but the real estate construction and development loans. Banks that failed also often had higher ratios of non-performing assets (NPAs), and hence lower asset quality overall.

The OIG study also had similar findings to Samad, where a bank's failure to maintain sufficient capital to protect against potential losses was found to be a critical determinant of banks that survived versus those that failed. The level of capital adequacy is particularly important insofar as many of those that failed, since they were making riskier CRE and CLD loans, as noted above, should have had even more capital set aside for potential losses than a bank might "normally" have.

DeYoung and Torna (2013) evaluate whether income from nontraditional banking activities contributed to bank failures during the crisis. They apply a multi-period logit model and find that the probability of distressed bank failure declined with fee-based activities like securities brokerage and insurance sales. In contrast, they find that venture capital activities, investment banking and asset securitization increased the probability of failure.

METHODOLOGY

The data in this study includes annual operating results for all commercial banks for the period 12/31/1999 through 12/31/2017. These banks are categorized as survivors, acquired, or failed based on their final status at the end of 2017. The data was obtained from the Federal Financial Institutions Examination Council website. Banks are designated as "failing" up to three reporting periods prior to its

[3] The four ratios are equity capital to assets, Tier One capital to risk-weighted assets, Tier One risk-based
capital to average total assets, and total risk-based capital to risk-weighted assets.

failure date. “Acquired” banks are identified in a similar manner. Financial ratios, loan portfolio ratios and capital adequacy measures were calculated for all banks in the sample. Following the example of Saunders and Cornet, we applied a ROE decomposition approach to compare operating performance for surviving, failing and acquired banks. The figure below highlights the relationships between the ratios used. We calculate the differences between the means for failed banks relative to surviving banks and acquired banks relative to surviving. The general null hypothesis is that for each variable, there is no significant difference between the mean ratios for surviving versus failing or acquired banks. If the null hypothesis is rejected, the quality of the values for these failed (acquired) bank performance ratios are expected to be consistently poorer than those of the survivor banks.

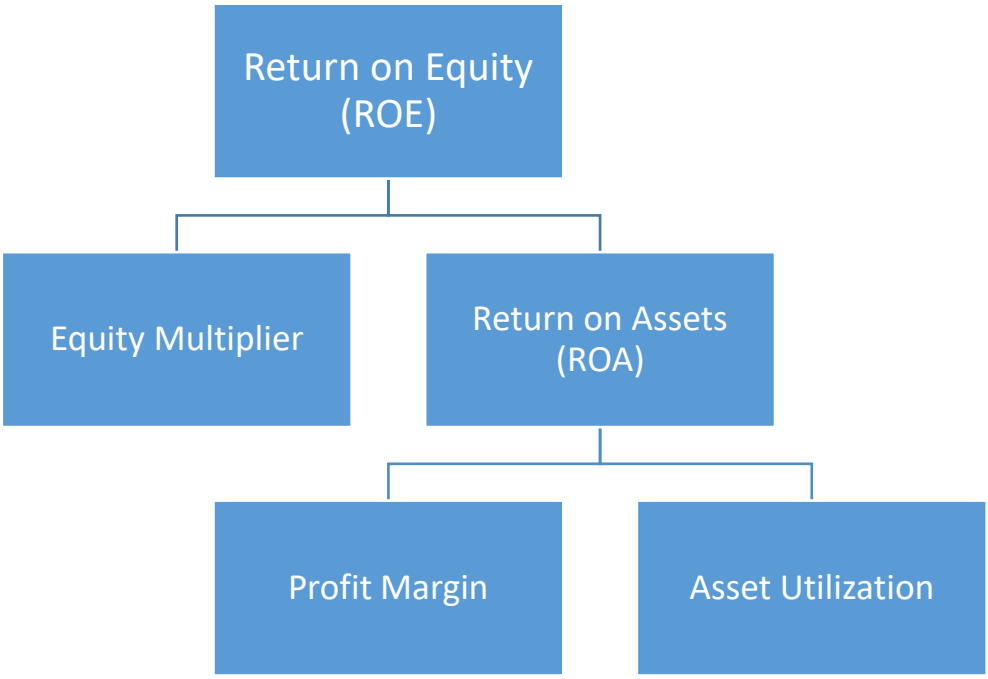

Figure 1Return on Equity Decomposition

Bank profitability can be summarized by the spread between the average yield on earning assets and the average cost of interest bearing liabilities. Banks may generate greater spreads by making riskier loans and earning greater risk premiums for these loans. However, these banks should also maintain higher capital ratios and may exhibit a higher incidence of loan losses. In this study, we use the spread as a measure of profitability and also evaluate the loan loss allowance as a percent of total assets and Tier 1 capital as a percent of total assets to understand loan risk and capital adequacy. Overhead efficiency measures the banks’ ability to generate noninterest income to cover noninterest expense. The null hypothesis is that there is no significant difference between the overhead efficiency of surviving or failing/acquired banks. If a significant difference exists, we would expect higher levels of overhead efficiency for the surviving banks.

As mentioned above, Samad analyzed capital adequacy as a potential cause of bank failures within the U.S. One such ratio is Tier One capital as a percentage of average total assets. We examined this ratio in this study, with a general null-hypothesis that there is no significant difference between the mean ratios for surviving versus failing or acquired banks. If the null hypothesis fails, we expected that the failing or acquired banks will have lower capital ratios.

FINDINGS

Bank Performance Ratios

The descriptive statistics, differences between means, and significance are shown in the tables below.

INSERT TABLE 2 HERE

CONCLUSIONS

Our analyses show statistically-significant differences between the Return on Equity (ROE), ROE components, spreads, and capital adequacy of banks that failed or were acquired compared to banks that survived. Surviving banks exhibit more stable ROE, Profit Margins, Asset Utilization and slightly lower leverage than acquired or failed banks. Surviving banks tended to have larger spreads between lending and borrowing yields indicating greater profitability. These banks also showed greater efficiency and more stable capital adequacy before, during and after the financial crisis. One possible use of this study is to identify possible warning signs that a bank is in trouble. These warning signals may be used to establish more prompt corrective action to possibly save banks from failing.

AUTHOR INFORMATION

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Table 2 Means and difference between means										
Surviving, Failing, and Acquired Banks										
					Difference				Difference	
	Surviving		Failing		Survive -		Acquired		Survive -	
Report date	N	Mean	N	Mean	Fail		N	Mean	Acquired	
Panel A: Return on Equity (ROE)										
12/31/1999	7,402	0.1089	18	-0.4127	0.5216	**	267	0.0964	0.0125	
12/31/2000	7,370	0.1065	15	-0.5149	0.6214	**	496	0.0883	0.0182	**
12/31/2001	7,236	0.0956	13	25.2274	-25.1318		754	0.0719	0.0237	***
12/31/2002	7,062	0.1013	5	-0.4500	0.5513		756	0.0932	0.0082	
12/31/2003	6,872	0.1031	3	-1.4921	1.5951		827	0.0642	0.0389	*
12/31/2004	6,717	0.1044	1	0.3187	-0.2143	**	848	0.0844	0.0200	***
12/31/2005	6,605	0.1079	20	0.0885	0.0194		833	0.0961	0.0119	**
12/31/2006	6,505	0.1022	136	0.0815	0.0207		687	0.0896	0.0126	***
12/31/2007	6,352	0.0867	269	-0.0064	0.0931	***	596	0.0527	0.0339	***
12/31/2008	6,203	0.0468	335	-0.5786	0.6255	***	503	-0.0306	0.0774	***
12/31/2009	6,006	0.0054	256	-4.4375	4.4429		537	-0.1377	0.1431	***
12/31/2010	5,786	0.0253	147	-2.6204	2.6457	***	561	-0.0533	0.0785	***
12/31/2011	5,549	0.0457	77	-1.8630	1.9086	***	634	-0.0059	0.0516	***
12/31/2012	5,295	0.0719	45	-4.6302	4.7021		727	0.0304	0.0415	***
12/31/2013	5,075	0.0834	27	-1.6182	1.7015	*	748	0.0394	0.0440	***
12/31/2014	4,889	0.0838	19	-0.7978	0.8816	**	709	0.1148	-0.0310	
12/31/2015	4,861	0.0856	11	-1.0265	1.1120	**	484	0.0700	0.0155	***
12/31/2016	4,872	0.0867	6	0.2451	-0.1585		251	0.0802	0.0065	
12/31/2017	4,882	0.0834					48	-0.0314	0.1148	
Panel B: Profit Margin										
12/31/1999	7,401	0.0820	18	-0.2460	0.3280	***	267	0.0341	0.0479	
12/31/2000	7,369	0.0818	15	-0.2044	0.2862	**	495	0.0776	0.0042	
12/31/2001	7,235	0.0411	13	-0.2584	0.2995	**	754	0.0813	-0.0403	**
12/31/2002	7,062	0.0812	5	-0.2884	0.3696		756	0.1211	-0.0399	**
12/31/2003	6,872	0.0758	3	-0.8870	0.9628		827	0.0982	-0.0225	
12/31/2004	6,716	0.0924	1	0.5109	-0.4185		847	0.1253	-0.0329	
12/31/2005	6,605	0.1107	20	-0.0484	0.1591		832	0.1390	-0.0282	*
12/31/2006	6,504	0.0895	136	0.0313	0.0582		687	0.1260	-0.0364	***
12/31/2007	6,352	0.0682	269	0.0007	0.0674	***	594	0.0740	-0.0059	
12/31/2008	6,203	0.0205	335	-0.4718	0.4922	***	499	-0.0870	0.1074	***
12/31/2009	6,006	-0.0232	256	-1.0526	1.0295	***	537	-0.1605	0.1374	***
12/31/2010	5,783	0.0607	147	-1.1483	1.2090	***	561	-0.0733	0.1339	***
12/31/2011	5,549	0.1157	77	-1.0190	1.1347	***	634	0.0347	0.0810	***
12/31/2012	5,294	0.1671	45	-1.0108	1.1779	***	725	0.0453	0.1217	**
12/31/2013	5,075	0.1671	27	-0.6442	0.8113	***	746	0.1152	0.0519	**
12/31/2014	4,889	0.2005	19	-0.5207	0.7212	***	709	0.1487	0.0518	***
12/31/2015	4,861	0.2042	11	-0.4891	0.6934	***	483	0.1860	0.0182	*
12/31/2016	4,872	0.2083	6	-1.1254	1.3337	**	251	0.1939	0.0144	
12/31/2017	4,882	0.3312					48	0.1350	0.1963	
Panel C: Asset Utilitization										
12/31/1999	7,402	0.0791	18	0.0835	-0.0044		267	0.0786	0.0005	
12/31/2000	7,370	0.0837	15	0.1134	-0.0297	**	496	0.0889	-0.0053	
12/31/2001	7,236	0.0774	13	0.1118	-0.0343	**	754	0.0875	-0.0101	*
12/31/2002	7,062	0.0682	5	0.0778	-0.0096		756	0.0810	-0.0128	*
12/31/2003	6,872	0.0622	3	0.0609	0.0013		827	0.0645	-0.0023	
12/31/2004	6,717	0.0595	1	0.0638	-0.0042		848	0.0589	0.0006	
12/31/2005	6,605	0.0631	20	0.0607	0.0024		833	0.0633	-0.0002	
12/31/2006	6,505	0.0693	136	0.0714	-0.0020		687	0.0686	0.0007	
12/31/2007	6,352	0.0719	269	0.0780	-0.0061	***	596	0.0696	0.0024	
12/31/2008	6,203	0.0645	335	0.0639	0.0006		504	0.0661	-0.0016	
12/31/2009	6,006	0.0585	256	0.0524	0.0061	***	537	0.0619	-0.0034	
12/31/2010	5,786	0.0549	147	0.0483	0.0066	***	561	0.0588	-0.0039	
12/31/2011	5,549	0.0514	77	0.0460	0.0053	***	634	0.0554	-0.0041	
12/31/2012	5,295	0.0486	45	0.0473	0.0014		727	0.0516	-0.0030	
12/31/2013	5,075	0.0471	27	0.0526	-0.0055		748	0.0471	0.0000	
12/31/2014	4,889	0.0458	19	0.0674	-0.0216		709	0.0446	0.0012	*
12/31/2015	4,861	0.0459	11	0.0724	-0.0264		484	0.0441	0.0019	*
12/31/2016	4,872	0.0463	6	0.0555	-0.0091		251	0.0440	0.0023	*
12/31/2017	4,882	0.0468					48	0.0499	-0.0031	

Table 2 Means and difference between means										
Surviving, Failing, and Acquired Banks										
					Difference				Difference	
	Surviving		Failing		Survive -		Acquired		Survive -	
Report date	N	Mean	N	Mean	Fail		N	Mean	Acquired	
Panel D: Equity Multiplier										
12/31/1999	7,402	10.7512	18	14.7126	-3.9615	*	267	11.6089	-0.8578	***
12/31/2000	7,370	10.3744	15	15.0510	-4.6766		496	10.9148	-0.5404	***
12/31/2001	7,236	10.4215	13	-95.8616	106.2831		754	11.0480	-0.6265	***
12/31/2002	7,062	10.1929	5	15.6991	-5.5062		756	10.7261	-0.5332	***
12/31/2003	6,872	10.1833	3	23.9376	-13.7544		827	11.0075	-0.8242	***
12/31/2004	6,717	10.1079	1	9.7855	0.3224		848	10.3487	-0.2407	**
12/31/2005	6,605	10.0949	20	9.3760	0.7190		833	10.4461	-0.3512	***
12/31/2006	6,505	9.8117	136	10.3035	-0.4918	*	687	9.0565	0.7552	
12/31/2007	6,352	9.5575	269	11.0300	-1.4726	***	596	10.0417	-0.4842	**
12/31/2008	6,203	9.8723	335	16.5412	-6.6689	***	503	10.1259	-0.2536	*
12/31/2009	6,006	10.1341	256	67.0770	-56.9430		537	10.7332	-0.5991	***
12/31/2010	5,786	10.2501	147	45.2823	-35.0322	***	561	10.2853	-0.0352	
12/31/2011	5,549	9.9006	77	48.3883	-38.4876	***	634	10.3440	-0.4434	**
12/31/2012	5,295	9.7909	45	62.0729	-52.2819		727	10.2415	-0.4506	**
12/31/2013	5,075	10.0970	27	37.9559	-27.8590	***	748	10.6068	-0.5099	**
12/31/2014	4,889	9.5790	19	34.2241	-24.6451	**	709	8.7008	0.8781	
12/31/2015	4,861	9.4714	11	26.6913	-17.2198	**	484	9.4162	0.0553	
12/31/2016	4,872	9.5486	6	19.2387	-9.6900		251	9.0789	0.4698	**
12/31/2017	4,882	9.3711					48	9.5870	-0.2159	
Panel E: Spread										
12/31/1999	7,394	0.0359	18	0.0402	-0.0042		267	0.0362	-0.0003	
12/31/2000	7,362	0.0350	15	0.0429	-0.0079	**	496	0.0597	-0.0247	
12/31/2001	7,231	0.0336	13	0.0515	-0.0179		754	0.0345	-0.0009	*
12/31/2002	7,055	0.0369	5	0.0455	-0.0085		755	0.1308	-0.0939	
12/31/2003	6,868	0.0368	3	0.0364	0.0004		827	0.0360	0.0007	
12/31/2004	6,714	0.0371	1	0.0387	-0.0017		846	0.0361	0.0009	**
12/31/2005	6,602	0.0364	20	0.0358	0.0005		831	0.0362	0.0001	
12/31/2006	6,502	0.0347	136	0.0356	-0.0009		687	0.0343	0.0004	
12/31/2007	6,349	0.0327	269	0.0349	-0.0021	***	595	0.0319	0.0008	*
12/31/2008	6,198	0.0354	335	0.0296	0.0058	**	502	0.0311	0.0043	*
12/31/2009	6,003	0.0341	256	0.0278	0.0063	***	536	0.0343	-0.0002	
12/31/2010	5,782	0.0362	147	0.0328	0.0035	***	560	0.0356	0.0006	
12/31/2011	5,545	0.0366	77	0.0369	-0.0003		633	0.0357	0.0009	***
12/31/2012	5,291	0.0356	45	0.0373	-0.0016		727	0.0343	0.0013	***
12/31/2013	5,070	0.0355	27	0.0343	0.0011		748	0.0344	0.0010	***
12/31/2014	4,885	0.0353	19	0.0393	-0.0040	*	709	0.0346	0.0006	*
12/31/2015	4,855	0.0353	11	0.0377	-0.0024		484	0.0343	0.0009	**
12/31/2016	4,868	0.0354	6	0.0369	-0.0015		251	0.0343	0.0011	*
12/31/2017	4,878	0.0356					48	0.0365	-0.0009	
Panel F: Loan Loss Allowance (% of Total Assets)										
12/31/1999	7,402	0.0087	18	0.0201	-0.0114	***	267	0.0091	-0.0005	
12/31/2000	7,370	0.0088	15	0.0205	-0.0117	***	496	0.0092	-0.0004	
12/31/2001	7,236	0.0089	13	0.0301	-0.0212	**	754	0.0099	-0.0010	***
12/31/2002	7,062	0.0091	5	0.0256	-0.0165	*	756	0.0099	-0.0009	***
12/31/2003	6,872	0.0091	3	0.0242	-0.0151	***	827	0.0101	-0.0010	***
12/31/2004	6,717	0.0089	1	0.0034	0.0055		848	0.0094	-0.0005	**
12/31/2005	6,605	0.0087	20	0.0081	0.0007		833	0.0089	-0.0002	
12/31/2006	6,505	0.0086	136	0.0095	-0.0009	**	687	0.0088	-0.0002	
12/31/2007	6,352	0.0085	269	0.0137	-0.0051	***	596	0.0090	-0.0005	**
12/31/2008	6,203	0.0095	335	0.0213	-0.0118	***	504	0.0114	-0.0019	***
12/31/2009	6,006	0.0110	256	0.0285	-0.0175	***	537	0.0139	-0.0029	***
12/31/2010	5,786	0.0116	147	0.0313	-0.0197	***	561	0.0135	-0.0019	***
12/31/2011	5,549	0.0113	77	0.0303	-0.0190	***	634	0.0124	-0.0011	***
12/31/2012	5,295	0.0105	45	0.0255	-0.0149	***	727	0.0115	-0.0009	***
12/31/2013	5,075	0.0099	27	0.0253	-0.0154	***	748	0.0108	-0.0009	***
12/31/2014	4,889	0.0093	19	0.0210	-0.0117	***	709	0.0098	-0.0006	**
12/31/2015	4,861	0.0089	11	0.0218	-0.0128	**	484	0.0088	0.0001	
12/31/2016	4,872	0.0088	6	0.0355	-0.0267	*	251	0.0085	0.0004	
12/31/2017	4,882	0.0086					48	0.0078	0.0009	*

Table 2 Means and difference between means Surviving, Failing, and Acquired Banks										
	Surviving		Failing		Difference Survive -		Acquired		Difference Survive -	
Report date	N	Mean	N	Mean	Fail		N	Mean	Acquired	
Panel G: Tier 1 Capital (% of Total Assets)										
12/31/1999	7,402	0.1080	18	0.0767	0.0313	***	267	0.0988	0.0092	**
12/31/2000	7,370	0.1071	15	0.0851	0.0220		496	0.0987	0.0084	***
12/31/2001	7,236	0.1036	13	0.0693	0.0343	***	754	0.0954	0.0082	***
12/31/2002	7,062	0.1027	5	0.0660	0.0367	**	756	0.0950	0.0078	***
12/31/2003	6,872	0.1045	3	0.0496	0.0549	*	827	0.0946	0.0099	***
12/31/2004	6,717	0.1071	1	0.1022	0.0049		848	0.0967	0.0105	***
12/31/2005	6,605	0.1118	20	0.1332	-0.0214		833	0.0979	0.0139	***
12/31/2006	6,505	0.1147	136	0.1031	0.0116	**	687	0.1014	0.0132	***
12/31/2007	6,352	0.1164	269	0.0940	0.0223	***	596	0.1031	0.0132	***
12/31/2008	6,203	0.1085	335	0.0721	0.0365	***	504	0.1035	0.0050	
12/31/2009	6,006	0.1026	256	0.0468	0.0557	***	537	0.1000	0.0025	
12/31/2010	5,786	0.1022	147	0.0337	0.0685	***	561	0.1060	-0.0039	
12/31/2011	5,549	0.1029	77	0.0304	0.0725	***	634	0.1008	0.0021	
12/31/2012	5,295	0.1025	45	0.0385	0.0640	***	727	0.1008	0.0017	
12/31/2013	5,075	0.1058	27	0.0411	0.0648	***	748	0.1028	0.0030	**
12/31/2014	4,889	0.1065	19	0.0510	0.0555	***	709	0.1065	0.0000	
12/31/2015	4,861	0.1082	11	0.0461	0.0621	***	484	0.1083	-0.0001	
12/31/2016	4,872	0.1094	6	0.0130	0.0963	***	251	0.1085	0.0009	
12/31/2017	4,882	0.1107					48	0.1061	0.0045	
Panel H: Overhead Efficiency										
12/31/1999	7,401	0.2466	18	0.2359	0.0108		267	0.2539	-0.0073	
12/31/2000	7,369	0.2478	15	0.3585	-0.1108		495	0.2724	-0.0246	*
12/31/2001	7,235	0.2608	13	0.2635	-0.0027		754	0.2815	-0.0207	**
12/31/2002	7,061	0.2667	5	0.1827	0.0840		756	0.2955	-0.0288	***
12/31/2003	6,872	0.2821	3	0.1393	0.1428		827	0.2968	-0.0147	
12/31/2004	6,717	0.2652	1	0.4077	-0.1425		847	0.2771	-0.0119	
12/31/2005	6,605	0.2641	20	0.1949	0.0692	**	832	0.2716	-0.0075	
12/31/2006	6,503	0.2515	136	0.1939	0.0576	***	687	0.2617	-0.0103	
12/31/2007	6,352	0.2419	269	0.1857	0.0562	***	594	0.2604	-0.0185	
12/31/2008	6,203	0.2327	335	0.1376	0.0952	***	500	0.2365	-0.0037	
12/31/2009	6,006	0.2287	256	0.0707	0.1580	***	537	0.2131	0.0156	
12/31/2010	5,783	0.2274	147	0.0362	0.1912	***	561	0.2383	-0.0109	
12/31/2011	5,549	0.2240	77	-0.0143	0.2383	***	634	0.1959	0.0280	
12/31/2012	5,294	0.2465	45	0.0422	0.2043	***	725	0.2082	0.0382	***
12/31/2013	5,075	0.2431	27	0.1417	0.1013	**	746	0.2075	0.0355	***
12/31/2014	4,889	0.2397	19	0.1740	0.0656		709	0.2053	0.0344	***
12/31/2015	4,861	0.2426	11	0.1720	0.0706		483	0.2111	0.0315	***
12/31/2016	4,872	0.2440	6	0.1144	0.1296	**	251	0.2208	0.0232	
12/31/2017	4,881	0.2386					48	0.2261	0.0125	

*** significant at 1% level, ** significant at 5% level, * significant at 10% level.

Green Consumer Buying Behavior and Their Buying Decision Related to Electric Vehicles

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Abstract: This research aims to present the current situation of the electric automotive sector in the Bajio region in order to analyze the consequences that the introduction of new vehicle types with electric batteries (EVS) in the Mexican market might generate, as well as assess the stakes of betting on clean energy vehicles. It is also important to know the consumer behavior, particularly those aspects that will allow us to deduce the motives, reasons and barriers that Mexican consumers encounter in the process of purchasing electric vehicles. For this reason the model of green consumer purchasing of W. Young et al. (2009) was used. Likewise it was an exploratory qualitative research where there was a deep interview. The main results showed that Guanajuato's green consumer behavior it is not only due to its environmental concern but also the main reasons to buy an electric car in the State are liking and peer recognition.

Keywords: GREEN CONSUMER BEHAVIOR, BUYING DECISION, GREEN

VALUES, GREEN CRITERIA, ELECTRIC VEHICLES

INTRODUCTION

At present, a lot is being said about environmentally friendly products, yet little is known about the consumer's specific thoughts related to these products; notably in the automotive sector, since the green car version is something relatively new. It is because of this that the following research question must be answered. What is the relationship between green consumer buying behavior and the decision of green purchasing? By answering this question, it will allow us to deduce some of the motives, reasons and barriers that Mexican consumers encounter in their process of buying electric vehicles.

The documentary analysis at an international level is a first step to enable us to learn from and appreciate the current situation of leading countries in the electrical automotive industry. Consequently, changing from the general to the particular through the literature review can show us the Mexican panorama (how electric cars have entered the Mexican market). Since it is a recent product, much is still unknown about the Mexican market. It is

also important to learn about the needs, reasons, concerns and intentions of the Mexican consumer when purchasing an electric car; this, in order to make a comparison between Mexico and the state of Guanajuato. Therefore, consumer buying behavior was the main variable.

LITERATURE REVIEW

International Context

Electric car deployment has been rapidly growing over the last ten years, with the global stock of electric passenger cars surpassing 5 million in 2018, an increase of 63% from the previous year. Around 45% of electric cars on the road in 2018 were made in China – 2.3 million – compared to 39% of electric cars produced in 2017. In comparison, Europe accounted for 24% of the global manufacturing, to only 22% to that of the United States (IEA, 2019)

Mexican Context

Based on data from INEGI, shown in table one, the electric automotive sector in Mexico is growing. However, this growth has not been constant, with a weak 2018 compared to 2016, 2017 and 2019 respectively. One of the factors that have led to the increase in sales of hybrid and electric vehicles is the increase in pollution that has taken place in recent years, especially in Mexico City and in the state of Mexico. These are entities that incidentally, concentrate the highest proportion of cars of this type sold in the national territory, with 34.1% and 18.3%, respectively, according to AMIA.

Table 1

Number of electric car sales in Mexico

Electric car sales in Mexico					
TOTAL:	2016	2017	2018	2019	**2020**
1062	254	237	135	305	**129**

Source: INEGI, 2020

Guanajuato Context

Guanajuato has a population of 5,853,677 inhabitants, which represents 4.9% of the country's total, and 1.56% of the national territory. The commercial sector is the one that contributes the most GDP to the State, and at a national level Guanajuato contributes 4.2% (Instituto Nacional de Estadistica y Geografía, 2015).

According to the Mexican Association of the Automotive Industry, the states where electric and hybrid cars have been sold during the period from January to June 2018 were in Mexico City, the State of Mexico and Jalisco. And in a smaller proportion it has been possible to sell these in the state of Guanajuato by 2.4%.

Performance and growth of the automotive industry in Guanajuato give rise to the most dynamic Automotive Cluster in Latin America (Cluster Automotriz de Guanajuato [CLAUGTO], 2019). It is important to see if the cluster is prepared for the automotive industry changes, since the main automotive companies located in the state of Guanajuato come from the United States, Japan and Germany. Countries where the development of electric vehicles is constantly growing and where it is believed that in the near future most of the vehicles will be free of fossil fuels; mainly in the European Union where the objective of reducing emissions by 80-95% by 2050 has been set. (COMISIÓN EUROPEA, 2018)

In table one, it can be seen that there are around 1,060 people, who have purchased an electric vehicle in Mexico, from 2016 to date. With 2019 being the year where there have been more sales of electric vehicles. In contrast to the data in table 2, the State of Guanajuato has only sold 42 vehicles sold, with 2019 also being the year with the highest sales in the State.

Overall, sale numbers have been stable, with at least one car sold within a year. No year has registered a high number of units sold. It should be noted that in table 2, there are months where the sale numbers for light electric vehicles increase. This usually occurs between the last and first months of each year, except for 2018, where less than 30 units were sold each month.

Table 2

Electric car sales in Guanajuato

Electric car sales in Guanajuato					
TOTAL	2016	2017	2018	2019	**2020**
42	3	7	4	20	**8**

Source: INEGI, 2020

Sales in the state of Guanajuato began to increase for the first time in 2019. Since the sale of electric vehicles first became available in the Bajio market, less than 10 units were sold each year from 2016 and 2018. This was mostly due to the unavailability to acquire this type of vehicle, as it primarily depended on the installed concessionaires within the State.

Currently, nine dealerships offer completely electric cars in the country, seven of which are found within the state of Guanajuato.

Table 3

Dealerships that sell electric vehicles in Mexico

Dealers	Models	Does it have presence in Guanajuato?	Do they sell electric cars in Guanajuato?
Renault	Twizy	Yes (4)	**Yes**
JAC	Sei 1/Sei 2	Yes (1)	**Yes**
Nissan	Leaf	Yes	**Yes**
Tesla	X, S, 3	No	**No**
Porsche	Taycan	Yes (1)	**No until 2021**
Zacua	Mx2, Mx3	No	**No**
Chevrolet	Bolt EV	Yes (5)	**No**
BMW	I3	Yes (2-3)	**Yes**
Audi	e-tron	Yes (3)	**Yes**

Green purchasing behavior

Green consumption behavior refers to consumption behaviors that are perceived by people to have either a nil, minimal or reduced impact on the environment, such as purchasing environmentally friendly products, recycling, protecting waterways and so on (Johnstone & Tan, 2014). It is important to mention that a Green consumer behavior is not determined by the characteristics of consumer alone (Rex & Baumann, 2007). An alternative approach to understanding green consumer behavior or at least the purchasing stage of it is reflected in two key variables that affect the likelihood of any purchaser (whatever the intensity of their environmental concern – or 'shade' of green) being influenced by environmentally related criteria when considering a purchase. The degree of compromise involved and the degree of confidence generated in the environmental benefits of a particular choice (Peattie, 2001).

Green Consumption

Peattie (2010) stated that green consumption is a problematic concept since it is an apparent oxymoron. Green implies the conservation of environmental resources, while consumption generally involves their destruction. Another potentially helpful approach to understanding green consumption is to separate the consumption process into stages, and to consider the environmental orientation of consumers at different points in the process (Peattie, 2001).

Green Consumers

Green consumers are considered as the crux for preventing environmental degradation as well as the substantial consumption of nonrenewable energy (Tung Lin & Han-Jen, 2018).

Once the socially conscious consumer can be defined as a consumer who takes into account the public consequences of his or her private consumption or who attempts to use his or her purchasing power to bring about social change (Webster & Frederick, 1975).At the other end of the scale the 'consistent ecologists', whose lifestyle, purchasing and consumption are all influenced and informed by environmental concerns. In between will lie different shades of green and grey, reflecting different levels of environmental orientation throughout the consumption process (Peattie, 2001).

Although also being concerned about general environmental issues, ethical consumers can be distinguished from green consumers by their additional concern for more wide-ranging issues, such as fair trade and armament manufacture (Shaw & Shiu, 2002).

Green consumption preferences

Until we have more notorious environmental problems, human beings react to everything that happens around them, on earth. A general deterioration in the physical environment is driving individuals and organizations to implement changes for improving the current state of the environment (Ishaswini & Saroj Kumar, 2011).

It could be said that environmental concern can actually influence the relative attitudes toward behavior (Anastasios Pagiaslis, 2014) At the same time concern for the environment manifests itself in consumers' purchasing behaviors (Hae-Kyong Bang and Alexander E. Ellinger, 2000).

However the reasons and objectives for the actions and practices that ecologically oriented consumers engage in when selecting, purchasing and using products and services are multitudinous and there is hardly an agreement upon the appropriate consumption strategies for 'green consumerism' (Moisander, 2007).

In the case of consumer preference for hybrid and electric cars, the main driver has been the growing concern for the environment and the commitment of societies to reduce polluting emissions (Expansión, 2020).

Research Model: Green consumer purchasing model

The model of W. Young et al. (2009) summarizes each micro-purchase process for a green consumer of tech products in Britain. This model consists of five elements which are focused on the socio-economic and infrastructure. Although the cultural context of the purchase is important, it was not explored in this study.

The first element of the model talks about green values, as the context which frames the purchase in terms of motivation to persuade green criteria. The second element mentions that the individual has to choose his/her own green criteria in the purchase, as well as make his/her own investigation of the product. The next point discusses the barriers that

explain the attitude-behavior gap. Along with these barriers, there are factors that influence the green criteria at the time of a purchase. Finally, the purchase made by the green consumer is different each time, since each purchase experience and knowledge generated from each purchase process becomes a sort of feedback on the values and knowledge of the consumer, which influences their next purchase.

METHODOLOGY

Objective and research question

The aim of this research was to analyze the context of the automotive market in the Bajio region and the introduction of electric cars and to define Guanajuato's green consumer buying behavior. All this in order to learn about consumer's purchase decisions with the goal to create a profile. The study was made using the model of green consumer purchasing of W. Young et al. (2009).

The design of the research was qualitative and narrative one. Information about consumer behavior was obtained by a deep interview. After conducting the interview, the discourse analysis proceeded which provided us with a detailed immersion in the data analysis. No speculation was done and narrative analysis was used to analyze data.

The consumer profile from the state of Guanajuato who bought an electric vehicle is that of a middle age man who owns and works a shoe company in the city of Leon along with his family. He lives in Leon, Guanajuato, five hours driving from Mexico City.

DATA ANALYSIS

The interview was recorded and transcribed verbatim. A general reading was conducted as well as an analysis based directly on the speech without speculation (Creswell, 2012) using a codification and based on the model of green consumer purchasing (Young, Hwang, McDonald, & Oates, 2009) responses were interpreted considering the closeness or the importance to these categories. To end, a table was created to summarize all the categories, which are then succeeded by a narrative analysis presented by categories followed by the codes.

RESULTS

Results indicate a differential set of green buying behaviors from the perspective of one of the first electric vehicle consumers within the state of Guanajuato. Some examples of

narrative speech illustrate how the interviewee refers to each green consumer behavior competence (Table 4).

Table 4

Narrative speech of green consumer buying behavior variable

Green consumer buying behavior category	Speech
Green values and knowledge	"My green values are: well, I no longer want to pollute, yes this, I do not longer consume a lot of gasoline because now if you realize now every track of gasoline is gasoline"
	"What I do, for example is that I don't use the vehicle to go and come to my work, I also have an electric bicycle, which is the one I use to go to my work and come and I use the car for longer stretches because my work is three blocks away and then I use my electric bike too"
	"Once you try it, for example if you test the electric vehicle you no longer get stressed when driving, you hear the noise of everyone wherever you go in your car you are without the noise of that engine"
	"If you go to the field wherever you stop and want to hear the noise of a bird, you will hear it, you will not have noise from anything other than your surroundings, what's around you"
Green criteria for purchase	"My reasoning for buying my vehicle is that once I saw it, I really liked it"
	"At first sight, I really liked that car, as I said before, I have three children and the three of them are in different schools, so my routes is coming and going and it was a huge expense"
	"So with this little car I use it right now, I take one and bring the other one and it is very cheap"

Barriers	“In other cars it was where to charge them, because there are no stations though there are very few and the car that I have is a Twizzy, that you can charge it wherever you want, sort of like a cell phone"
	“If you went out you could not say, and how do I charge this thing, but also the time that it takes”
	“Another one that I had was a Twizzy car. We are talking about a Twizzy, windows, windows that did not have, for example with a heavy rain the back passenger gets wet, if you see it, it has holes, yes that is just the problem”
Facilitators	“Facilities given to me were credit, I bought it on credit"
	"At the time of the decision as I said this, I liked it since I saw it and that wherever I want I can charge it and wherever I want I can park it”
	”The day that you try it out you will say purely with the sights is paid, because everybody looks at it, everybody turns to see that little car”
Product Purchase	"Look, I came asking, when I asked for that car I came to the seller and told him that I liked this little electric car, right"
	“I told him in December I will come for the car but he looked at me like saying no you won’t ... I do not think that he will buy it, well then I arrived in December, I did the paperwork for the purchase and I already, I tried the little car and said not to me, I even took my son to try it out and we liked the car a lot”
	"We arrived and I told him you know I want the car and he started doing all the paperwork, this the credit, everything ... and no just because he
	asked me for bank accounts, everything they ask and no longer the next one he told me was you know that ... your credit is already authorized"
	“I have seen that car before on the internet, in Colombia they use it a lot”
	"The Twizzy, that is widely used in Colombia and there are even videos, then since I saw it in the videos I got informed that ... how much it lasted, everything about the car"
	“In October I was seeing the little car but I had already seen it on the street the day before, I had seen it in the Renault

because I, I wanted to buy a Smart, I wanted… I said a Smart for two people but when I saw it ,I said there is gasoline well, gasoline my truck and gasoline this well of course not"

Feedback "I wish all the people would have for an electric, so that there would be less noise in the city"

“Because sometimes you are parked between fifty cars, imagine that they were all electric, it would take away even the stress of driving wherever you came from”

“For example sometimes you already leave work tired or bored and still have to hear the noise of the trucks out here, another car there and it is annoying and on the other hand if you had an electric car there would be a total silence"

"They need to go down in price, right now they are quite expensive, maybe in ten years prices will go down"

“Then hopefully everyone starts to have that awareness"

Table 5 presents a summary of the green consumer buying behavior categories and the different codes found for each variable.

Table 5

Variable code by each consumer buying behavior category

Green consumer buying behavior category	Variable code
Green values and knowledge	Concern for the environment Environmental pollution Avoiding stress Avoiding noise pollution
Green criteria for purchase	Liking Car´s image Economic
Barriers	Charging points Charging time Car windows
Facilitators	Credit acquisition Peer recognition
Product purchase	Decision Liking Internet research Video information Recognition

Feedback	Avoiding noise pollution Avoiding stress Price Awareness

Below, the narrative analyzed for each category is detailed.

Regarding the green values and knowledge category and codification of what consumers know and how they act according to their upbringing; it can be inferred that concern for the environment, environmental pollution and the avoidance of noise pollution are the main factors of this category.

Green criteria in the purchase of an electric vehicle is a subjective category. Research shows that the consumer from Guanajuato made his purchase solely on the car's image, siting his liking for the car and economic reasons as factors.

Barriers that the consumer found in his purchase process or situations that made him doubt his purchase were charging points, charging time and the fact that the car windows did not completely close.

Facilitators promote green purchasing. In this research study, credit acquisition and peer recognition were the buyer's focus.

The consumer's internet research and video information were key in his decision to purchase the vehicle. This aligns with green buying intention and green buying behavior.

The category of feedback is the opinion the consumer had after testing out an electric car. The main codes were the avoidance of noise and stress, awareness and price.

FINDINGS AND CONCLUSION

The aim of this research was to analyze the context of the automotive market in the Bajio region and the introduction of electric cars, as well as define Guanajuato's green consumer buying behavior. All this in order to learn about consumer's purchase decisions with the goal to create a profile. According to the narrative analysis, it can be inferred that a preliminary green consumer buying behaviors profile is as follows:

> "I no longer want to pollute, yes this, I do not longer consume a lot of gasoline because now if you realize now every track of gasoline is gasoline then we are, it is money, well, it goes to the trash … Once you try it, for example if you test the electric vehicle

> you no longer get stressed when driving, you hear the noise of everyone wherever you go in your car you are without the noise of that engine … My reasoning for buying my vehicle is that once I saw it, I really liked it …I have three children and the three of them are in different schools, so my routes is coming and going and it was a huge expense… So with this little car I use it right now, I take one and bring the other one and it is very cheap… Facilities given to me were credit, I bought it on credit … The day that you try it out you will say purely with the sights is paid, because everybody looks at it, everybody turns to see that little car… I have seen that car before on the internet, in Colombia they use it a lot"

This research is valuable because few studies have been made on this particular topic and it is one of the first contributions regarding this subject in the state of Guanajuato. It was an exploratory research where a deep interview with the green consumer purchasing model of W. Young et al. (2009) was made. Since this type of vehicle is quite expensive, most of the consumers in the State of Guanajuato feel unsafe giving their private information so they sign confidentiality clauses with the car agencies because of this it was not possible to get more interviews. Environmental concern, economical reasons, peer recognition, liking and image of the vehicle itself and internet research were all crucial elements for green car consumers in Guanajuato.

For future research, it is necessary to carry out a deeper study of more consumers and to make a quantitative research in order to compare the gained results. It would also be relevant to learn about the green consumer perception, trying to infer the relationship between green consumer buying behaviors.

Furthermore, the study could be extended to analyze the green purchasing decision of electric vehicles in Guanajuato. These results might help automotive companies to understand the green consumer buying behavior and apply sale strategies based on a green consumer profiles.

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Finnish College Students and Academic Dishonesty: An Examination fo Gender, Year in School, and Employment

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ABSTRACT

The current project examines Finnish business students and their views on the academic cheating. Finland is an under examined population on this issue. In the current project, we surveyed students (n=153) in the spring of 2017 on 47 actions of academic dishonesty. We found significant differences between students' attitudes on cheating based on several demographic factors, including gender, age, employment, marital status, and year in school. We conclude by discussing the implications for further research in this area.

Key words: academic ethics, college student, Finland, gender, age, employment

INTRODUCTION

Academic integrity has been an issue since the development of education (McCabe & Trevino, 1996; and Ison, 2018). Dishonesty (cheating) is a global problem, not confined to a single nation (Moyo & Saidi, 2019) which causes harm not just to the individual student, but to integrity of the educational process (Anderman & Koenka, 2017; and Popoola et al., 2017). Yet, despite many changes and academic innovations, the climate of academic dishonesty still exists (Cronan, McHaney, Douglas, & Mullins, 2017).

In the current project, we surveyed an understudied population, Finnish college students in the spring of 2017 on academic ethics. To support this analysis, we will first review the relevant literature. Second, we will examine the methods of the survey. Next, we will discuss the findings and results. We conclude by discussing the implications for further research in this area.

REVIEW OF THE LITERATURE

Perhaps no one has had as much influence in the study of academic cheating as Professor Donald McCabe and his colleagues. Over the past few decades. McCabe and his co-authors have done multi-campus studies (McCabe, Butterfield, & Trevino, 2006; McCabe & Trevino, 1996, 1995, 1993; McCabe, 2005, 2002, 1997, 1992; McCabe, Trevino, & Butterfield, 2001; and McCabe and Bowers, 1994) and have often concluded that cheating on campus is commonplace, especially as students view themselves as consumers of a good rather than scholars. McCabe's text (with Butterfield and Trevino) Cheating in College: Why Students do it and What Educators can do about it (2012) urged academics to take action immediately to restore integrity to the process.

Academic entitlement is not the only concern. Miller, Murdock, & Grotewiel (2017) opined that multiple factors (including social pressure, normalization, and rationalization) combine to encourage a pattern of cheating.

Research on ethics in the Finnish workplace has been well established in the literature (Huhtala, et al., 2013; Kujala, 2001, 2010; Lamsa & Takala, 2000; and Kujala, Lamsa, & Penttila, 2011). However, research on academic ethics cheating with a Finnish sample is at its infancy compared to their heavily studied counterparts in America. Ludlum, Hongell, Tigerstedt, and Teeman (2017) surveyed Finnish business students (n=119) and found while nearly 40% of students have seen another student cheat on an exam, less than 2% have seen exam cheating regularly. Only 46% indicated they would always turn in the wrongdoer. A nearly equal portion (41%) indicated they might turn in a cheater, depending on the circumstances or the identity of the cheater. Interestingly, 8% said they would never turn in another student for cheating. Females, younger students, employed students, and underclassmen reported seeing more students cheat on an exam. Non-business students were more likely to report cheating to their professor than their business counterparts. Finland's academic integrity issues were small but significant.

Ludlum, Hongell, Tigerstedt, and Alsobrook (2016) surveyed the ethical views of Finnish college students on their stakeholders and found the students had strong ethical support for employees, the environment, and their community.

However, the problem of academic cheating is global in scope, not confined to any single country or region (Teixeira & Rocha, 2010, 2008, 2006). McCabe, Butterfield, and Trevino (2006) surveyed graduate business students (n=5,331) from 54 schools in the USA and Canada on 13 specific unethical behaviors. They found 53% of business students admitted one or more cheating incidents.

Teixeira (2013) studied 7,602 undergraduate students from 21 countries (not including Finland), and found that countries with higher levels of corruption showed higher rates of cheating on exams. Qualls, Figgars, & Gibbs (2017) studied American undergraduates (n=193) and found 85% admitted to academic dishonesty in college, but also discovered that academic dishonesty was heavily correlated with harsh physical punishment in childhood, which was assumed to erode moral development.

Ludlum and Gwinner (2016) examined students in Taiwan (n=1,410) and found cheating was common on exams, with 32% seeing cheating a few times, 11% seeing cheating many times,

and 21% seeing cheating regularly. They found 59% of students would never report exam cheating to the instructor. Yu, et al., (2017) surveyed a national sample of college students (n=2,503) and confirmed that cheating is commonplace, however, some demographic differences were important. They found being female, upper income, being younger, and not involved in extracurricular activities made a student less likely to report academic wrongdoing.

Ives, et al., (2017) surveyed Romanian college students (n=1,127) and found 95% of their sample had engaged in academic dishonesty (22 listed behaviors) during college. Importantly, they found students who faced responsibility for his/her academically dishonest actions did not have a different view of dishonesty from those who acted without any consequence. Rettinger & Kramer (2009) surveyed 158 undergraduate students at a religious school in USA on 17 cheating behaviors. They described cheating as "disturbingly common." Most students (73%) engaged in at least one cheating behavior, and 37% reported serious cheating incidents (plagiarism or exam cheating).

Henselee et al., (2017) surveyed freshman engineering students in USA (n=1,074) and found that training on plagiarism reduced students' willingness to participate in those behaviors. Stiles, Wong, & LaBeff (2018) reported on research from the same American institution over four decades (n=506) and found academic entitlement was heavily correlated with college cheating. In addition, they found younger students, international students, underclassmen, and Greek organization members were more likely to cheat. Gender did not make a difference.

Thomas (2017) examined undergraduate students in Thailand (n=207) and found that an individualistic learning climate, a growth mindset, and motivation to study were negatively correlated with academic dishonesty. Nelson, et al., (2017) surveyed American millennial college students (n=256) and found students' support for religiosity and participation in religious activities was negatively related to cheating, but spirituality was not.

Guerrero-Dib, Portales, & Heredia-Escorza (2020) surveyed college students in Mexico (n=1,203) and found that unethical behavior in the classroom is tied to unethical behavior outside the classroom, arguing that cheating creates a normalization of such behaviors which survives after graduation. Elias (2017) examined US college students (n=370) and found while cheating was an epidemic on campus, not all students were equal. Specifically, Elias found males, younger students, and students who felt entitled were more likely to engage in academic misconduct.

Academic dishonesty is not confined to undergraduates. Abdulghani et al., (2018) studied medical students in Saudi Arabia and found that 29% self-reported cheating behaviors, and that males cheated more than females.

International comparisons are difficult. Individual values are influenced by national cultural beliefs (Hofstede, 1983). Hofstede (1983) defined culture into dimensions to allow comparisons. Hofstede (1983, 1991, and 1993) argued cultural differences impact conduct in business behaviors, communication, and decision-making. Socialization and training also shape personal values (Hofstede, 1991). As a result, each nation/culture should be examined individually. The results from one culture may or may not be similar to another.

This study examines an understudied population of college students in Finland. For the current project, we posed five research questions. For each, we started with a null hypothesis.

Research Question 1: Year in school does affect Finnish college student attitudes towards academic ethics.

Research Question 2: Age does affect Finnish college student attitudes towards academic ethics.

Research Question 3: Gender does affect Finnish college student attitudes towards academic ethics.

Research Question 4: Marriage does affect Finnish college student attitudes towards academic ethics.

Research Question 5: Employment does affect Finnish college student attitudes towards academic ethics.

METHOD FOR THE SURVEY

A convenience sample was taken from large business survey classes at Arcada University of Applied Sciences in Helsinki, Finland in the spring of 2017. The college has over 2,700 students and over 200 faculty and staff (Arcada, 2020). There are two divisions of higher education in Finland, universities (research-based education) and polytechnics (universities of applied science) which train professionals for labor market needs (Jääskelä and Nissilä, 2015). Arcada represents the second part of this division.

The survey was conducted in English. The students at Arcada are multilingual (Finnish, Swedish, and English), with several programs taught in English. Finland has a long history of being a multilingual country with two official languages (Anckar, 2000).

Questions were derived and adapted from several previous projects including Brown, Weible, et al (2010); Blau, Kunkle, et al (2017); Carpenter, Harding, et al (2006); Passow, Mayhew et al (2006); Rabi, Patton, et al (2006); O'Rourke, Barnes, et al (2010); MacGregor & Stuebs (2014); and Qualls (2014). In this investigative project we were not attempting to replicate a specific project, but rather exploring some basic findings from this under studied population. A complete text of the questions is provided in the tables.

Students were asked to complete the questionnaire during class time. The survey instrument was voluntary and anonymous. The instructor did not participate in the survey administration process to avoid undue influence. Students were advised they did not have to participate. No inducements were offered to the students to participate.

We were best able to minimize the socially desirability bias common in cheating surveys by using a large group survey, with anonymous results and confidential submissions. A total of 164 surveys resulted. Eleven surveys were rejected because of incomplete answers (>50% blank), leaving 153 completed surveys. However, some questions had fewer than 153 responses.

The participants were all business majors or in related disciplines. The respondents were in the following academic years: first, 64% (n=98); second, 22% (n=33); third, 11% (n=17); and fourth, 3% (n=5). Upperclassmen were underrepresented in our sample.

FINDINGS AND DISCUSSION

In our sample, females outnumbered males 51% to 49%. This is inconsistent with prior research, which found Finnish college students were over 75% female (Jauhiainen, et al 2007). Our group consisted of primarily traditional students (80%, n=122, were aged 18-22). Only ten students (7% of the sample) were married, and only eight students (5.2%) had children. This contradicts prior research, which found a significant number (33%) of Finnish college students were married (Jauhiainen, et al 2007). Most students worked while attending school (59%). This finding is consistent with prior studies, which found the majority (57%) of Finnish college students were employed (Jauhiainen, et al 2007). See table below for additional information on our sample.

Table 1. Descriptive statistics for sample surveyed

Total surveys completed	164	
Samples used for analyses	153	
Year in school	n	Percent
One	98	64.05
Two	33	21.57
Three	17	11.11
Four	5	3.27
Total	153	100.00
Gender		
Males	75	49.02
Females	78	50.98
Total	153	100.00
Employment status		
Not employed	63	41.18
Part-time	83	54.25

Full-time	7	4.58
Total	153	100.00
Marital status		
Married	10	6.54
Not married	143	93.46
Total	153	100.00
Age		
18-23	122	79.74
24+	31	20.26
Total	153	100.00
Number of children		
0	145	94.77
1	4	2.61
2	3	1.96
3	1	.65
Total	153	100.00

Ethical views about academic dishonesty are not binary, yes/no. These attitudes are determined by situation, motives, and behaviors. Some behaviors are considered very dishonest (cheating on an exam) while others may not be important (taking credit for another student's discussion post). We wanted to examine a variety of situations/scenarios with different academic misdeeds. The full list is available in the appendix. We will highlight some of the interesting results.

Incidence of cheating is alarming: 68% had seen exam cheating this semester. However, 86% indicated they would never turn in someone they saw cheating.

Nearly a third of students (30%) self-reported exam cheating, and 12% said they had cheated on an exam this semester.

The attitudes towards cheating were commendable. Students overwhelmingly profess to "always do my own work" 77% to 11%. Students did differentiate between behaviors. For example, 45% disapproved of copying 10% of a paper, but the figure jumped to 87% when the question was copying 100% of a paper. Similarly, more students disapproved of copying answers on an exam (74%) than copying answers from homework (59%). Importantly, students indicated their ethical views were not based on imitating peer behavior (64% disagreed that "it's not cheating if everyone does it").

As for motivations for cheating, the largest factor seemed to be family pressure to succeed (83%), as well as obligations for a current job (68%), and strong competition for jobs upon graduating (66%).

We also wanted to note two interesting asides. Students indicated they were more likely to cheat if they do not like the instructor. Also, students were less likely to cheat in classes in their major because those classes are important.

Next, we wanted to examine demographic subgroups for differences. For all analyses, we used Stata/IC 12.1 for Windows. We conducted ordinal logistic regression for each of the 47 questions. Responses for questions 1-31 used Likert-scale responses 1-5 for strongly agree to strongly disagree with 3 indicating a neutral response. Responses for questions 37-52 used the following Likert-type scale: a) never, b) only once, c) a few times, d) many times, and e) it is a common occurrence. In Table 2, we reported the logistic regression coefficients for each model producing significant results ($p < .05$ or less), with standard errors in parentheses.

Table 2. Ordinal logistic regression for significant statements (1-31)

	Year in School	Gender	Employment Status	Marital Status	Age
Allow others to take credit for homework***	.20 (.19)	1.16*** (.31)	-.51+ (.27)	-.35 (.66)	.03 (.05)
Take credit for others' work for homework**	.02 (.18)	.83** (31)	-.12 (.27)	-2.18** (.78)	.02 (.05)
Allow others to use my answers on exams*	-.24 (.19)	.73* (.30)	-.68* (.28)	-.47 (.70)	.04 (.05)
Take credit for others' work on group projects***	-.63*** (.19)	1.03*** (.31)	-.18 (.27)	-1.31+ (.71)	.05 (.06)
Cheat because I do not want to do the work*	-.38* (.19)	.37 (.31)	.20 (.28)	-.87 (.78)	.11+ (.06)
Cheat because I do not know how to do the work*	-.46* (.19)	-.06 (.30)	.21 (.29)	-1.44 (.89)	.07 (.06)
Would not report another student I saw cheating*	-.07 (.18)	-.09 (.30)	.50+ (.27)	-1.91** (.66)	-.02 (.05)

Note: + p <.10; * p <.05; ** p <.01; *** p <.001

From the results displayed above, we saw the influence of gender on several responses. The positive coefficient indicated female respondents tended to disagree with the statements for which there were significant results. Specifically, we noted females were more likely to disagree with the statements: "I allow other students to take credit for my homework," "I take credit for other students' work for my homework," "I allow other students to use my answers on an exam," and "I take credit for the work of other students when we work on a group project."

Students' year in school produced significant negative coefficients, indicating higher levels of agreement with the statements the longer the student has been in school. For the statement "I take credit for the work of other students when we work on a group project" we noted more senior students tended to agree with the statement than their colleagues. We noted the same directionality and significance for statements "I cheat because I do not want to do the work" and "I cheat because I do not know how to do the work." Both models indicated students tended to agree more with the statements the longer they have been in school.

Students' employment status (not employed, employed part-time, or employed full-time) produced significant negative results for only one of our questions, "I allow other students to use my answers on an exam." Those not employed tended to agree with the statement more than employed students. Unmarried students were more likely to agree with the statement "I take credit for other students' work for my homework" and they would be less likely to report a student they observed cheating.

Table 3. Ordinal logistic regression results from significant statements (37-52)

	Year in School	Gender	Employment Status	Marital Status	Age
I have cheated on a college exam**	.75*** (.20)	.59 (.37)	.17 (.34)	-.62 (.77)	-.02 (.06)
I have taken credit for work completed by other students*	.25 (.19)	-.88** (.32)	.40 (.28)	-.80 (.72)	-.08 (.06)
I have turned in another student for cheating on a group assignment*	.58* (.25)	.51 (.46)	.29 (.42)	-1.35 (.85)	.05 (.06)
I have turned in another student for cheating on an essay copied from the internet**	.53+ (.30)	1.48* (.64)	.42 (.54)	-2.07* (.92)	.003 (.07)

From the table above, we noted significant positive coefficients for year in school related to cheating on an exam and turning in another student for cheating on a group assignment. More senior students were more likely to experience those events more often. Female students were less likely to have taken credit for others' work and more likely to turn in another student for submitting plagiarized essays. Unmarried students reported turning in other students for submitting essays copied from the internet less often that married students.

Our analyses indicated females' responses tended to indicate greater ethical standards that those expressed by their male counterparts. More senior students seemed to have lower ethical standards regarding cheating, according to their responses on several of the statements. Generally, students' age and employment status had little impact on responses. Any attempt to represent/generalize to all Finnish students is inappropriate. Our survey only included one institution and only one branch of Finland's two-tiered educational system. However, this survey provides value by being an insight into an understudied population. The instrument had face validity. In addition, the behaviors we examined were highly correlated. The Cronbach's alpha for our 47 statements was .836 indicating we examined the same construct.

IMPLICATIONS FOR FURTHER RESEARCH & CONCLUSION

One obvious problem with academic ethics research is examining the attitudes towards cheating, and the number of self-reported incidents. We have no way to validate these self-

reports with any objective measure. Students may perceive more cheating or believe they have witnessed cheating when perhaps none existed.

One limitation of this study is that we only examined one higher education institution. This school might or might not be representative of all Finnish applied science colleges and does not represent Finnish universities. Another limitation of this study is the sample size. A larger sample size could result in more detailed analysis of the sub-groups. For example, a larger sample size could define business majors into discipline areas (accounting, tourism, management, etc.) to see if any disciplines had different views. Smaller sub-groups (especially students with children and married students) have too few members in the current sample to do any comparison. Finally, the conclusions are time bound, as attitudes are influenced by the political and cultural climate, which are certainly in flux.

Besides expanding the sample, future projects should include more detailed questions about ethical behaviors. Future research should specifically define the behaviors to distinguish partial or total copying, homework versus exams or large projects, and from individual efforts or group projects, where a few students take the credit for the efforts of others. In addition, future projects should have questions that are time limited (this semester, this year, this course) rather than an all-encompassing "anytime" as used in many projects on academic misconduct (Liebler, 2016).

In addition, we should explore the motivations of who cheats and why. If males are more likely to cheat (as it appears), what motivates them to cheat more (or females cheat less)? Does religion or political affiliation affect the attitudes towards cheating? Clearly, further research on this topic is warranted. In Finland, cheating on campus is significant. Students, even those from a highly ethical society, are tempted to break the rules once they enter a college campus.

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Integrating Two Active Learning Approaches into a Principles of Marketing Course: The Role of Experiential Learning Styles in Shaping and Influencing Student Outcomes

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ABSTRACT

This paper explores and contrasts the student experiences and learning outcomes between two project formats, participative and experiential, in the context of a marketing course. The paper examines whether student learning styles moderate or modify the effectiveness of two project formats. The results indicate that student learning styles affect improvements in perceived learning and project performance scores. In addition, for both formats, student outcomes found to be moderated by student learning styles. Integrating different active learning approaches in the context of a marketing course offers benefits of enhancing the learning and performance of a wider range of students. The merits of integrating various active learning approaches need to be evaluated in different educational contexts.

INTRODUCTION

A dominant trend in professional education in the last three decades has been a focus on individual student learning styles (Kolb, 2015; Kolb and Kolb, 2017) and a concurrent effort to understand how matching learning activities with learning styles can improve learning outcomes in the belief that students with certain learning styles actually learn better in the environment that accommodates their learning preferences (Lawrence L. Garber, 2012; Karns 2006). The effort to accommodate learners of differing learning styles may be particularly pronounced in complex disciplines such as marketing and business, where educators are more deliberately seeking in-class and field learning activities that will aid their students in connecting the conceptual apparatus of the discipline to increasingly complex real world (Xuan Tran et al., 2017; Jacqueline K. Eastman et al. , 2017; Andrew J. Dahl et al., 2018).

Effectiveness of Experiential and Participative Marketing Education Techniques

Experiential learning is associated with positive outcomes such as increased depth of learning (Diamond, Koernig, & Iqbal, 2008), higher intrinsic motivation (Young, 2005), improved performance (Black, Daughtrey, & Lewis, 2014), and attractiveness to potential employers (Levin & Peterson, 2016). Black et al., (2014; 2013) found that experiential learning activities contribute to all phases of Kolb's (2015) learning cycle and are more effective for imparting competencies to students than traditional learning forms. Similarly, Karns (2006) argues that experiential learning accommodates learners of all styles.

Participative learning is also an effective form of active learning as it engages the learner in the learning process (Black, Daughtrey, & Lewis, 2014; Mills-Jones 1999). Participative

learning gives students the opportunity to take an active role in completing projects or assignments. Young (2005) suggested that participative instructional methods help to create more stimulating educational experiences, make students more proactive and engaged in a class which, as a result, helps their learning. An example of the method that can be used in the classroom to assure participative learning is a project in which students have the responsibility to determine for themselves how to learn and apply marketing concepts. By involving students in these decisions, students feel more accountability for completing a project and will take ownership of the immersive learning activity and what it can offer to them (e.g., Jones and Iredale 2010; Martinsuo 2009). The participative projects should allow for enough variation so that students with diverse learning styles will be able to organize their work on the project in the way that will be most beneficial to their learning.

The challenge then becomes how to use experiential and participative learning activities to provide an engaging and motivating experience for students with different learning styles. Emerging research indicates that experiential learning as well as participatory learning remains underutilized in the typical marketing classroom, primarily because of faculty concerns regarding time constraints, and reluctance to leave the classroom (Levin & Peterson, 2016; Wurdinger & Allison, 2017) but also because research seeking empirically to link learning styles to academic outcomes is limited. Hence, further study needs to be done to confirm and establish the role of learning styles in assuring students learning outcomes. The results of such study will enable to design a most effective classroom that accommodate students with different learning styles.

Therefore, it is the purpose of this research to add to and extend the existing literature on ELT and participative learning by testing effectiveness and comparing of two learning activities, an experiential field study and a participatory project, embedded in a marketing course. Specifically, the present study (1) presents a summary of relevant literature considering the relevance of learning styles, e.g. diverging, converging, assimilating, accommodating and balancing, in marketing education; (2) examines the effect of the type of learning activity, experiential or participative, on student perceived effectiveness of the activity; and (3) examines these outcomes by learning style. Theoretical and pedagogical implications are discussed. This analysis should help to further develop an understanding of the educational value of two types of active learning projects, participatory and experiential, identify dimensions of the learning activities that are particularly conducive to learning, and increase understanding of how to design courses in a manner that recognizes the impact of student learning styles on student outcomes and, thus, assures inclusivity.

Kolb's Experiential Learning Theory (ELT)

The core of Kolb's experiential learning theory (ELT) is a four-stage model, which has simple descriptions of a learning cycle that shows how experience can be translated through reflection into concepts. These include concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE) (Black, Daughtrey & Lewis, 2014). ELT recognizes the importance of experiential activities, such as fieldwork, workshops, laboratories, and hands-on sessions. ELT is a dynamic, holistic theory of the process of learning gathered from experience that takes the student through each stage of the learning cycle.

Within the model there are two primary axes containing an abstract conceptualization-concrete experience (AC-CE) dimension and an active experimentation reflective observation (AE-RO) dimension (Black and Kassaye, 2013). The AC-CE dimension is primarily concerned with how a learner acquires experience or information, while the AE-RO dimension focuses on how students process experience into new meaning and understanding (Kolb & Kolb, 2017).

Four learning styles reside in the spaces between the four learning modes (axes), and, in addition, there is a centrally located balanced style. They are defined as follows:

Divergent Style (CE and RO): Divergers learners prefer concrete experiences and tend to use divergent thinking processes to generate multiple solutions and ideas to problems while processing these trial solutions through reflection (RO). Divergers are often attracted to the creativity-oriented careers. The divergent learning style is associated with valuing skills: being sensitive to people's feelings and to values, listening with an open mind, gathering information, and imagining implications of ambiguous situations. The most recent version of the Kolb model refers to individuals possessing this style as "Imagining Style learners."

Assimilators (RO and AC): Assimilators prefer to assimilate abstract information through reflection. Assimilators enjoy logical problem solving and theory formulation. Assimilation is related to thinking competencies:

organizing information, building conceptual models, testing theories and ideas, designing experiments, and analyzing quantitative data. The most recent version of the Kolb model refers to individuals possessing this style as "Analyzing Style Learners."

Convergers (AC and AE): Convergers are drawn to application of theory through practical taskoriented problem solving. The convergent learning style is associated with decision skills: creating new ways of thinking and doing, experimenting with new ideas, choosing the best solution to problems, setting goals, and making decisions.The most recent version of the Kolb model refers to individuals possessing this style as "Deciding Style Learners."

Accommodators (AE and CE): Accommodators are also interested in practical, hands-on activities that more likely engage their sense of intuition rather than intense analysis or theory. Accommodators are the most flexible and open-minded of the four distinctive styles (Kolb, 2015). According to Kolb (2015), the accommodative learning style encompasses a set of competencies that can best be termed acting skills, committing oneself to objectives, seeking and exploiting opportunities, influencing and leading others, being personally involved, and dealing with people. The most recent version of the Kolb model refers to individuals possessing this style as "Initiating
Style Learners."

Balanced: Learners may also have a balanced or flexible style that allows them to adapt their learning on a situational basis (Kolb and Kolb, 2005a; Kolb, 2015).

Use of Learning Styles in Marketing Education

Some studies found that Assimilators predominated in business schools, other studies of undergraduate business students found that Convergers were most common followed closely by Assimilators and Divergers (Loo, Robert, 2002). Moreover, within various business majors, a particular style might predominate. For example, Loo, Robert (2002) reported on a 1984

study which used Kolb's LSI that the Converging style predominated among accounting majors. Loo, Robert (2002) also reported on a 1987 study that found that over 30 % of finance majors were assimilators. Kolb (2015) described the results of a study investigating learning styles among business professionals which indicated that Convergers and Accommodators are prevalent among marketing and sales professionals. A number of previous studies suggest that typical marketing class rooms are diverse, containing learners of all styles (e.g., Karns 2006; Loo 2002). Thus, while previous studies suggest that marketing and business students have diverse learning styles, the findings on the predominant learning styles of marketing professionals are Accommodating and Converging. The problem is how can one design a course to accommodate learners of some particular style while not excluding those exhibiting other learning styles? A pedagogy that may be adequate or even preferred for teaching marketing students and other business majors must be catered towards students whose learning style is Accommodating or Converging while not ignoring needs of students whose learning style is Diverging, Assimilating, and Balancing. In fact, some scholars suggest classes be designed with a wide range of learning experiences and course designs to appeal to a wider range of learning styles (e.g., Karns 2006). Therefore, a viable approach could be to introduce throughout the course learning activities that are thought to accommodate certain learning styles so that the class accommodates all learners at once. The combination of different projects that accommodate a wide range of learners will allow to create a multifaceted and comprehensive course that "touches all bases" (Kolb and Kolb 2009, p. 298). Since research has indicated a significant impact of learning styles on student performance (Tom and Calvert 1984), there is strong need to investigate the effect of student learning styles on student performance.

HYPOTHESES

Based on the literature review, a moderating impact of learning styles on the effects of the type of learning project on student perceived effectiveness is examined. It is hypothesized that the learning styles of business students are diverse, while being predominantly accommodating and converging, and students' learning style will have an impact on the perceived effectiveness of two types of learning activities – experiential field project and participative project.

METHODOLOGY

To test the hypotheses, the author prepared and delivered two types of learning activities—experiential and participative. Learning activities were weaved into a fundamentals of marketing course while special care was taken to assure that students could differentiate between two types of learning activities and to ensure that each learning activity provided the appropriate type of learning experience.

The participative learning activity was designed to teach fundamental principles of cultural innovation, develop a holistic perspective of brand management, and engage students in activities that provide them with essential professionalization tools for their future careers (Pashkevich, 2017). The project is an alternative to the controlled teaching classroom setting so that students become active learners rather than passive listeners. This approach embodies the principles of Social Constructivist Pedagogy (SCP) and can cultivate critical thinking and creativity in the classroom. The participative project allowed students to be

included in the decisions on how the project would be carried out. The project utilized group work, presentations and in-class group discussions providing opportunities for students to impart information to each other.

The experiential field learning project is an experiential activity that guides students through the holistic learning process (Pashkevich, 2016). It takes place in the field by having students attend a local alternative culinary space and a throwback zone/flea market. Following an observation guide, students conduct participant observation of the consumer behavior, marketing activities, and atmospheric elements that they are exposed to at the commercial space. Qualitative research skills, ethnographic research skills particularly, are emphasized with the development of the written report, which is graded to enhance the learning experience. Students work individually to prepare a report, in which they interpret their experiences and observations in relation to course concepts. Based on their findings, students develop recommendations and ideas for future marketing strategy. Finally, students present their findings in the report. The project relies on cultural innovation theory in selecting the commercial space for the field work. The experiential project gave practical experience and helped them understand how to apply the knowledge they gained during the semester.

Kolb's Learning Style Inventory was used in this study to measure the particular learning style of each student. The author then designed a questionnaire which primarily measured student's perceived effectiveness of two learning activities used in this study. Students were asked to rate two learning activities on a 5-point scale, where -2 equals strongly disagree and =2 equals strongly agree. Projects were hypothesized to correspond to the different learning style orientations. A sample of undergraduate students enrolled in a private urban college located in the north eastern United State was selected. The questionnaire was administered in six introductory marketing classes. One hundred fifty seven completed questionnaires were used for data analysis.

RESULTS

Results from Kolb's Learning Style Inventory indicated that the learning styles of the students were diverse, with the most preferred learning style being Accomodators (38%), followed by Convergers (28%), Assimilators (17%), Divergers (13) and Balancers (11%). The five learning styles were well represented in the study sample indicating a support for hypothesis that students' learning styles were diverse and that undergraduate marketing students tend to have predominantly accommodative or converging learning styles. The most preferred learning style, Accommodating, and the second most preferred learning style, Converging, is consistent with the findings of Holcomb et al. (2009) and Cope and Watts (2000) who noted that the benefits of learning by doing and integrating theory and practice rather than dealing with interpersonal skills are documented well in marketing education literature. Vicarious learning, or the process of benefiting "second hand" from the concrete experiences of others, has also been shown to be useful to marketing practitioners (Holcomb et al., 2009). However, learning from secondary sources is likely somewhat less informative and influential to marketing students than personal "critical experiences" such as major setbacks or successes (Cope and Watts, 2000).

Table 1 provides the mean scores in the different types of assessments for the five learning styles, Diverger (Div), Assimilator (Ass), Converger (Con), Accommodator (Acc) and Balancer (Bal.), type of the project.

For the experiential field project, the results show that Accommodators (concrete, active) scored highest on the questions "Project improves self-confidence in ability to learn" followed by Balancers, Converges and Assimilators, whereas Balancers scored highest on the questions "I thought that the project was not too challenging and difficult to be useful" followed by Accommodators, Assimilators and Convergers. Both Balancers and Accommodators had higher scores on the question "Project develops capacity to think for one's self" , followed by Assimilators (abstract, reflective) and Convergers (abstract, active). An ANOVA carried out to test the differences between the five learning style groups' ratings in each assessment showed significant differences ($p < .1$) for "Project improves self-confidence in ability to learn," "I thought that the project was not too challenging and difficult to be useful," and "Project develops capacity to think for one's self" items. LSD post hoc tests revealed that the "Project improves self-confidence in ability to learn" scores were statistically significant at p , .1, that is, Balancers, Accommodators and Convergers rated project significantly better than Divergers and Assimilators. The "Project develops capacity to think for one's self" scores show significant differences ($p < .1$) between the Divergers' scores and the scores reported by Accommodators, Balancers, Assimilators and Convergers. There were significant differences in scores reported on the item "I thought that the project was not too challenging and difficult to be useful" between Balancers and Accommodators, on the one hand, and Divergers, Convergers and Assimilators. The results suggest that those with a preference for CE and working with practical applications (AE), or those who conceptualize abstractly (AC) and prefer working with practical applications (AE), rated the experiential field project more positively.

For the participative group project, the results show that Assimilators (abstract, reflective) scored highest on the item "The project develops problem-solving skills" followed by Convergers (abstract, active) and Accommodators (Active, Concrete), whereas Balancers and Divergers (Concrete, Reflective) scored lowest on this item. An ANOVA carried out to test the differences between the five learning style groups' rating of the activity showed significant differences (p =

.49) for the "The project develops problem-solving skills" item. LSD post hoc test revealed that the "The project develops problem-solving skills" scores were statistically significant at $p <.05$, that is, Convergers and Assimilators rated project significantly higher than Divergers, Balancers and Accomodators on the item "The project develops problem-solving skills." The results suggest that those with a preference for AC and working with either practical applications (AE) or tasks demanding reflection, or those who conceptualize abstractly (AC), rated the participative group better than experiential field project.

The paired sample statistics are listed in Table 2. None of the perception items were statistically significant among Divergers. Among Assimilators, two items, "Enjoyed working on the project" and "The project gave me a great sense of how brand management actually work," were significant at $P<.05$ level, and three items, "Project was Enjoyable," "This project suggests the instructor cares about me learning marketing" and "Work on the project develops problem solving skills" were significant at 0.1 level. Interestingly, all differences in ratings, except the rating of "This project suggests the instructor cares about me learning

marketing," indicated that assimilators evaluated the participative group project more favorably than the experiential field project.

Among Convergers, three evaluation items are significant at the $p<0.05$: "This project allowed me to apply what I learned to real life situations," "This project develops openness to new ideas" and "Project was not boring." Convergers evaluated the experiential project more favorably than the participative group project.

Among Accommodators, two evaluation items are significant at the $p<0.1$: "I was highly involved with this project" and "This project develops openness to new ideas." Accommodators reported to be more involved with participative group project and believed that the experiential field project was more conducive towards developing openness to new ideas than participative project.

The Balancers reported a greater agreement with the statement "This project promoted better student/teacher relationships" when evaluating the participative group project and a greater agreement with the statement "This project encourages critical thinking" when evaluating an experiential field project. Both evaluation items are significant at the $p<0.1$.

CONCLUSION

One way to increase student engagement is to create opportunities for them to experience how course concepts apply to the real world (Bobbitt, Inks, Kemp, & Mayo, 2000; Karns, 2005). Doing this using active, versus passive, pedagogies can positively impact learning and the development of skills such as enhanced teamwork, communication, critical thinking skills, problem solving skills, and creativity (Karns, 2005). Although numerous studies have examined the association between student learning style preferences and students' perceived effectiveness of learning activities in marketing education, there is comparatively less research in the marketing discipline specifically on the potential interactive effects between student's learning styles and certain active pedagogies in co-producing an effective learning experience. Learning activities play a central role in students' learning (Garber, Hyatt, Boya & Vermunt, 2012), but prior research does not tell us to what extent perceived effectiveness of different forms of active pedagogies are influenced by learning styles (Diamond, Koernig and Iqbal, 2008). Because different active learning pedagogies may suit learners with certain learning styles, it is possible that the link between learning style and students' perceived effectiveness and performance depends on the pedagogical method used.

This study explores the impact of learning styles on perceived effectiveness of two types of active pedagogies: experiential field project and participative group project, in the introductory marketing course. The findings generally confirm those of prior studies in terms of undergraduate marketing and business majors tendency to have accommodative or converging learning styles (Kolb, 2015). This study shows that the marketing students were somewhat diverse, with Accommodators being the largest group followed by Convergers, Assimilators, Diverges and Balancers. Marketing jobs, such as marketing management, that require a strong orientation to task accomplishment and decision making in uncertain emergent circumstances require an accommodative learning style. Analytical jobs, such as marketing research and data analytics, which demands technical and problem-solving skills, require a convergent learning orientation (Kolb, 2015). What these data show is that, most probably, students choose fields that are consistent with their learning styles and are further

shaped to fit the learning norms of their field once they are in it. When there is a mismatch between the field's learning norms and the individual's learning style, students will either change or leave the major.

The reported findings showed that learning styles are associated with students' perceived effectiveness of two active learning pedagogies: an experiential field project and a participative group project. Learning styles influence student learning preferences, for example, whether they work on their own without support from others, seek clarification about the assignment from their teachers or interact with other students or peers to discuss the task. Learners who are in the Balancing, Converging and Accommodating groups, for instance, generally have a preference to move through all four stages of the holistic learning process, namely (1) CE (engaging in a handson activity), (2) RO (thinking, recording, and documenting the experience), (3) AC (thinking at a conceptual level about what is observed), and (4) AE (taking actions and making decisions informed by the patterns that emerge; Kolb, 2015). Learners who are Diverges and Assimilators prefer to use various information resources when they respond to a question, analyze and solve problems. The various learning preferences perhaps explain that.

Results of the study suggest that learning styles do not play much of a role for the participative project. The only result is that the participative group project was rated more favorably than experiential project by Diverges and Assimilators who also thought that participative project improved their problem-solving skills to a greater extent than an experiential project. Learning style made the most difference in the experiential field project. Convergers, Balancers and Accommodators who completed both projects thought that an experiential field project promoted openness to new ideas, ability to think for oneself and improved ability to learn more than a participative group project.

The insights from this study suggest several ways of addressing the issue of students' different learning styles and different pedagogies. The diversity in students' styles means that there is a need for diversity in pedagogies utilized in the classroom to facilitate learning among all students. Students learn more effectively when they are given a variety of ways to learn and to demonstrate what they have learned. On the one hand, Kolb (2015) provides some evidence for the proposed relationship between job demands and learning style. Marketing jobs, such as marketing management, that require a strong orientation to task accomplishment and decision making in uncertain emergent circumstances require professionals to be heavily or primarily accommodative in their learning style. Accommodators and Convergers have the greatest potential for innovation and interdisciplinary solutions to complex professional problems. As Kolb (2015, p. 128) aptly pointed out, 'The traditional nonprofessional collegiate learning environment is highly reflective and develops this orientation in its students." He further stressed that 'managers who majored in basic academic disciplines are far more reflective in their learning styles than are the managers who made early professional career commitments in either business or engineering. As a result, the transition from education to work involves for many a transition from a reflective learning orientation to an active one.' This observation, in conjunction with the fact that an overwhelming number of students in marketing classes have an Accommodative and Converging learning style, suggests that an exposure to different learning tasks that respond to and shape a person's accommodative or converging learning style and adoptive orientation has the potential to enhance the learning and performance of a wider range of marketing students and their preparedness for marketing careers. On the

other hand, because some pedagogies favor some learning styles over others, teaching students entirely by means of a lecture, or a participative group activity only may greatly disadvantage some students. An exposure to different learning tasks has the potential to facilitate the learning of a wider range of students.

Because of the increased emphasis on achieving diversity among student populations, success in diverse classroom may depend on the teaching style that recognizes learning style differences. More research is required in the area of learning styles differences to refine specific recommendations.

Business and marketing majors need to retain innovative and creative problem solvers. More research is needed to make a required marketing course learner-friendly to a variety of marketing and non-marketing majors.

Limitations of the study should be recognized. The data collected from marketing, business and accounting majors at one private college during a six-semester period. Therefore, the findings should be considered exploratory and preliminary and may not generally apply to other colleges, other marketing classrooms, or other groups of undergraduate and graduate students. Subsequent work is needed to confirm the results and develop specific recommendations for teaching practices.

Table 1. Mean Scores for Perceived Effectiveness of Learning Activity by Learning Style

			Learning Styles				
Assessment	Div. (13%)	Ass. (17%)	Con. (28%)	Acc. (30%)	Bal. (11%)	F Stat	pvalue
Panel A: Experiential Field Project							
I thought that the project was not too challenging and difficult to be useful.	.4783	.5517	.4167	.9608	1.4737	2.009	.096**
Improves selfconfidence in ability to learn.	1.0870	1.3103	1.7500	1.8824	1.8421	2.061	.088**
Develops capacity to think for one's self.	1.2174	1.8276	1.7500	2.0784	2.0526	2.068	.087**

Panel B: Participative Project							
Working on the project develops problemsolving skills.	.3333	1.7407	1.1064	1.0000	.6667	2.448	.049*

* p<.05. **p<.01.

Table 2. Results of Paired t-test and Mean Scores for Two Learning Activities by Learning Style

Learning Style	Assessment	Experiential Field project	Participative Project	t Stat	p-value
Div. (13%)					
Ass. (17%)	Project was Enjoyable	1.0000	1.5185	-2.009	.055**
	Enjoyed working on the project	.7692	1.4231	-2.086	.047*
	This project suggests the instructor cares about me learning marketing.	1.8519	1.4074	1.762	.090**
	The project gave me a great sense of how brand management actually work.	1.4815	2.2593	-4.149	.000*
	Work on the project develops problem solving skills	1.2963	1.7407	-2.000	0.056**
Con. (28%)	This project allowed me to apply what I learned to real life situations.	1.8261	1.1957	2.384	.021*
	Develops openness to new ideas	1.9348	1.4348	2.378	0.022*
	Project was not boring	1.5217	1.0000	2.119	.040*
Acc. (30%)	I was highly involved with this project.	1.9773	2.3409	-1.974	.055**

	Develops openness to new ideas	2.0000	1.7556	1.757	.086**

p,.05.

**p, .01.

REFERENCES ARE AVAILABLE UPON REQUEST

State Control, Excess credit and Corporate Innovation: Some empirical evidence from Chinese SOEs

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Abstract For the sake of maintaining national security, economic stability, industrial policy, etc., government controls a certain number of state-owned enterprises (SOEs) through direct or indirect shareholding in most transition economies. However, with the special agency problem of state ownership and the defects of the capital market, it is often proved to be ineffective for SOEs to alleviate the agency problem within the R & D investment arena in the process of Chinese corporation system reform. To improve the innovative governance mechanism of state-owned enterprises, we also need to promote the reform of banks and other financial systems to fully stimulate the efficiency of debt governance of SOEs. This study, using a longitudinal panel dataset consisting of a cross-section of Chinese A-share listed companies in the Shanghai and Shenzhen stock markets from 2012 to 2018, empirically examines the relationship between and mechanism of government holding and corporate innovation investment. The study finds that SOEs tend to experience a serious excess credit problem, thus weakening the debt contract governance function. In addition, the study finds that the mediation effect of SOEs' excess credit is only significant in companies with a low degree of political connection, and whose executives do not have an R & D background. This suggests that, in addition to further deepening financial market reform, we can reduce the innovation loss effect caused by SOEs' excess credit by strengthening the supervision of SOEs and employing executives with a background in R & D.

Key words：State control；Excess credit；SOEs；Innovation

1 Introduction

Over the years, reform of China's state-owned enterprises (SOEs) has been promoted heavily with the goal of establishing a modern enterprise system. Corporate governance is the core of modern enterprise systems(Li (2018);Li, Xu, Niu, & Qiu (2012)). In the context of deepening reform, the government continues to optimize the internal governance structure and to enhance the competitiveness and creativity of SOEs by promoting the reform of the corporate system. On May 3, 2017, the general office of the State Council issued "the guiding opinions on further improving the corporate governance structure of SOEs", clearly defining the company system reform schedule. By the end of 2017, the company system reform process for SOEs will be complete.

With the deepening of the reform of SOEs, the government shareholder gradually follows the principle of separating ownership and controlling right, and switches its role from direct operational management to corporate governance. The reform of the company system helps to clarify the relationship between government shareholders and business operators, to strengthen the autonomy of SOEs and, to a certain extent, to ensure scientific decision-making in companies and reduce loss of innovation efficiency in SOEs. According to the report of the 19th National Congress of the Communist Party of China, the government should deepen the reform of SOEs, develop a mixed ownership economy, and cultivate world-class enterprises with global competitiveness. As the cornerstone of China's economic and social development, stateowned enterprises do play a pivotal role in promoting China's modernization process. Innovation plays an important role in promoting economic growth(Porter ,1992). It is generally believed that SOEs should take the initiative to constantly improve the level of technological innovation and play a key role in building an innovative country.

Against the background of deepening SOEs reform, whether and how state control affects the innovation behavior of SOEs becomes a new subject in deepening the reform of corporate governance of modern SOEs. Many studies have shown that the input and efficiency of R & D investment in SOEs remain significantly lower than those in nonSOEs(Dong, Zhao & Yuan, 2014; Wu,2012) . Bank credit, which is the main source of enterprise financing in China, is also one of the important ways to innovate financing. The traditional research based on the debt contract perspective is often premised on the hypothesis of economic man and efficient markets, ignoring the governance characteristics of China's banking system; it cannot provide a practical framework for the problem of improving the innovation efficiency of China's SOEs. In the process of promoting economic transition, the way and means in which the government dominates economic resources has not completely changed; the government still commands great influence in the allocation of important resources in the market. Encouraged by the goal of promoting local economic development, government officials usually use their formal or potential influence on local financial institutions to direct the allocation of credit resources, and thereby distort the bank credit governance mechanism. In view of this, from the perspective of administrative economic governance, this study considers the Shanghai and Shenzhen listed A-share non-financial institutions from 2012 to 2018 as the research object. This study empirically tests the mediation effect and mechanism of SOEs' excess credit between control of SOEs and corporate innovation investment. It seeks to promote the upgrading of governance systems and governance capability of SOEs, and further enhance the innovation capability of SOEs.

2 Theory and hypotheses

2.1 Agency theory and excess credit

As a basic corporate governance mechanism, debt financing plays an important role in the process of corporate governance and innovation decisions. The debt contract is one important instrument to alleviate the agency problem that affects a company's investment performance(Amore,Schneider,& Žaldokas, 2013a). Since the specification of rights is generally effected through contracting (implicit as well as explicit), individual behavior in organizations, including the behavior of managers, will depend upon the nature of these contracts(Jensen & Meckling,1976) . The manager has incentives to consider the costs imposed on the firm by covenants in the debt agreement which directly affect the future

cash flows of the firm, since they reduce the market value of the firm. Besides, debt may lead to bankruptcy and reorganization costs.

Therefore, to maximize personal benefits, managers must strive to reduce the probability of bankruptcy and reorganization. Jensen (1986) claims that debt financing reduces the agency cost of free cash flow by reducing the discretionary cash flow of the manager. This monitoring role of debt also limits the manager's inappropriate set of decisions about capital expenditure. Grossman & Hart (1983) described the issuing of risky debt by the entrepreneur or manager as a means of 'bonding' his behavior, which is made credible by a personal bankruptcy cost borne by the manager in the event of default.

The threat of bankruptcy and cash flow payment obligations based on debt covenants will help jointly activate a firm's innovation behavior(Choi, Kumar, & Zambuto ,2016). In the R & D sphere, with high investment risks and unobservable managers, the monitoring benefits brought about by bank debt contracts are likely to exceed the cost of the debt itself, which is conducive to promoting firms' innovation(Myers & Majluf ,1984) . This embodies the advantages of closing a few doors. Especially in countries where debt financing predominates, the effect of debt covenants on corporate technological innovation is more significant. Easterbrook (1984) views corporate cash disbursement as a mechanism that mitigates this agency problem by removing from insiders' control 'excess' cash that could be used inefficiently or converted to perquisite consumption ,and by forcing the firm into the capital market for funding, where it must supply information on its activities . Friend and Lang (1988),Kim and Sorensen (1986) and Long and Malitz (1985) also found that debt financing decisions were consistent with the decline of firms' agency costs.

The development of the banking system plays an important role in promoting scientific and technological progress(Schumpeter & Backhaus ,2003). To a certain extent, the supervision services provided by banks can alleviate the problems of asset substitution and underinvestment.(Jensen & Meckling ,1976; Myers ,1977). In other words, banks can become an effective supervisor of the firm, given an appropriate incentive mechanism(Aoki ,1995) . Some empirical studies suggest that firms with high growth potential will tend to rely on private debt financing(Houston & James ,1996) . Compared with public debt, the value of subsequent bank credit supervision with less agency problems even exceeds its cost for companies with less goodwill or great growth potential. A bank's role in monitoring borrowers' behavior has been described in several articles(Houston & James ,1996) . The information that a bank acquires on its borrowers enables the bank to monitor the borrower as well as more directly control relevant borrower decisions. Borrowers thus can be viewed as 'insider' debt—that is, debt financing provided by a party with inside information about the borrower, in contrast to bonds or equity issued to an anonymous capital market(Hoshi, Kashyap, & Scharfstein ,1991). It has been found that the deregulation of interstate bank operations in the United States between the 1980s and 1990s led to a 12.6% increase in the number of patents granted in the United States, and a 10.1% increase in the importance of patents(Amore, Schneider, & Žaldokas ,2013b) .The deregulation of banks reduces the financing constraints of debt-dependent companies, which is an important factor in the effectiveness of bank deregulation. Despite the high debt to asset ratio, the advantage of debt financing in better control of private information will still enable firms to maintain a high debt leverage (Lee &

Lee ,2019) . Besides, compared with other public financing channels, bank credit contracts are more flexible and less expensive(Smith & Warner, 1979; Blackwell & Kidwell , 1988; Krishnaswami, Spindt & Subramaniam ,1998). Huston & James (1996c) argue that high issuance costs hinder public financing of small companies. Empirical support is provided by James (1987), who finds that a firm's announcement of a new bank loan leads to significantly positive abnormal stock returns, while a firm that announces a bond issue or a private placement of debt for the purpose of retiring a bank loan experiences a significantly negative abnormal stock return .

However, the realization of the above debt governance mechanism assumes an incomplete contract and a wealth constraint. While these intermediaries and institutions may possess unique capacities to contain agency conflicts within firms, they are subject to agency frictions of their own. Thus, intermediation—specifically, delegated monitoring—is a double agency problem(Gryglewicz & Mayer ,2018) .

The two moral hazard problems interact. Because the intermediary's monitoring activity is unobservable to investors, moral hazard at the bank level arises. At the bank level, lending is one of the main businesses of banks, and the imperfect governance structure of banks can easily increase credit risk(Li ,2014; Li et al., 2018). Government's

ownership of banks is a worldwide occurrence(La Porta, Lopez-De-Silanes, & Shleifer ,2002); the bank's behavior is inevitably subject to government intervention and influence(Qian, Cao, & Li ,2011) . Jia (2006) studied the prudential behavior of banks and believed that joint-stock banks were more cautious than state-owned banks when making loans. In China, government intervention constitutes an important external environment for business operations. Politicians will control bank resources for political purposes rather than social goals(Shleifer & Vishny ,1994) , which leads to a misallocation of credit resources and ultimately inhibits financial development and economic growth. Research on loan behavior also confirms that government-controlled banks not only charge lower interest rates(Sapienza ,2004), but also expand credit in the year of political elections(Dinc , 2005) .

At the firm level, risk taking essentially reflects the tendency of enterprises to pursue and pay for high profits. The level of enterprise risk-taking reflects the choice of investment projects when enterprises make investment decisions. A rational enterprise should choose all investment projects with a positive expected net present value to maximize the enterprise value and shareholders' wealth. On the one hand, due to the long cycle of technological innovation, high risk and slow effectiveness, operators are generally reluctant to take risks in long-term R & D projects, because such investment often means a high failure rate(Holmström ,1989); managers must face the occupational risks that come with it(Alchian & Demsetz ,1972) . When there is excess credit, the risk-taking willingness of executives will be reduced, which will urge executives to abandon R & D innovation policies to maximize the value of the company and choose a relatively "safe" policy(Yan,Yang,Zhao,& Wang ,2019;Malitz ,1986).

H1：The state-owned equity of enterprises improves the level of excess credit of enterprises, and then reduces the R & D investment of enterprises

2.2 Political connection and the intermediary effect of excess credit

The existing research on the impact of political connections of corporate executives on credit access is mainly carried out from the perspectives of signal effect and resource effect(Huang

& Wei ,2016). From the perspective of signal transmission, political relevance can be used as a signal to reflect the future business performance of enterprises, and politically connected enterprises send good signals of good development prospects and social reputation to banks(He, Wan, & Zhou ,2014). It can reduce the signing cost of creditors and reduce their dependence on enterprise accounting information and help enterprises access more bank loans(Huang & Wei ,2016a, 2016b). From the perspective of resource provision, because the lending decisions of state-owned banks will be dominated by political goals, having political connections can help enterprises obtain credit resources (Luo & Tang ,2009a), acquire contracts(Goldman, Rocholl, & So ,2013), meet entry qualifications by government regulators(Luo & Tang ,2009b), avoid coercive measures and fines of regulators(Correia ,2014), get government assistance(Blau, Brough, & Thomas ,2013), and enjoy other direct or indirect resource advantages. Many studies have shown that politically connected firms can obtain more bank loans and ease their financing constraints(Claessens, Laeven, & Feijen ,2008;Faccio ,2002).

The level of political connection affects the political connection effect of managers. According to the tournament theory(Lazear & Rosen ,1981), managers have a stronger motivation for promotion when they are at a lower administrative level. When executives are at a lower administrative level, they receive less attention and supervision from the government. In the case of strong promotion motivation and weak supervision, managers with political connections are more likely to use their relationship capital to obtain bank credit. Relatively speaking, enterprises with lower administrative levels of political connections are likely to have more excess credit. Thus, hypothesis 2 is proposed:

H2: The lower the political connection level of the enterprise managers, the more government intervention, and the stronger the intermediary effect of excess credit.

2.3 R&D background of managers and the intermediary effect of excess credit

The upper echelon theory holds that a manager's behavior choice should be influenced by their cognitive ability and values. The cognitive ability and values of managers are closely related to their background characteristics(Zhang,, Liu, & Qi ,2013;Bantel & Jackson ,1989;Hambrick & Mason ,1984). Because of the long investment cycle and high failure risks, managers are generally reluctant to take risks in long-term R & D projects(Holmström ,1989). Besides, once the innovation decision is wrong, the operator must face the associated professional risk(Alchian & Demsetz ,1972). Existing research on executive R & D background contends that managers with R & D experience increase firms' expenditure on R & D; this helps provide expertise for the firm, increases management heterogeneity, reduces management short-sightedness, sends incentive signals to inventors within the firm, and facilitates other ways to promote enterprise innovation(Han, Cui, & Wang ,2014;Yu, Zhao, & Ju ,2018). In addition, executives with professional experience in R & D activities have more explicit and tacit knowledge about R & D projects than ordinary executives, which affords them a clearer understanding of the risks of innovation decision-making. Therefore, executives with an R&D background will be more cautious in corporate credit financing decisions, which mitigates the overconfidence of the board of directors that may lead to excess credit problems. Based on this, this study presents the hypothesis:

H3: Managers with an R&D background weaken the intermediary effect of excess credit.

The logic of this paper is shown in the following figure:

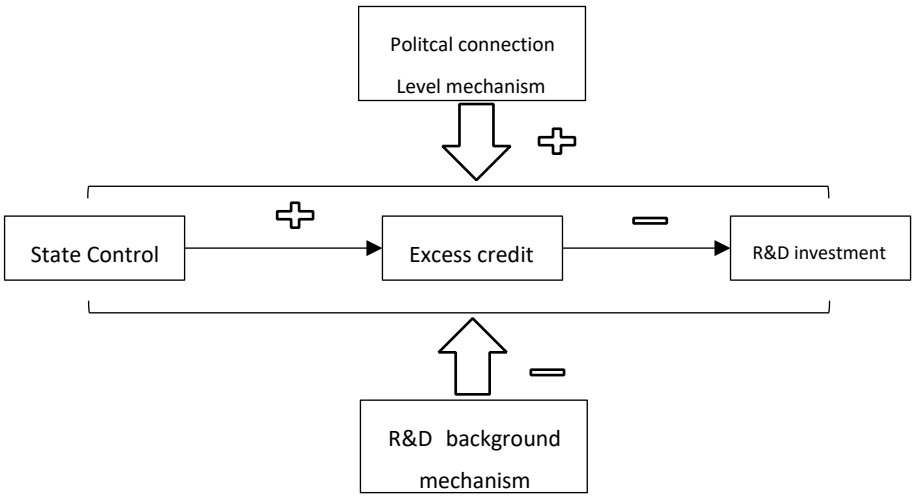

Figure1 Relationship and mechanism between State control and R&D investment

2.Methods

2.1 Data and sampling approach

The sample for this study comprises the listed A-share non-financial companies on the Shanghai and Shenzhen securities exchanges from 2012 to 2018, excluding special treatment companies (those which have made losses for two or three consecutive years) and data outliers. The data mainly comes from CSMAR(China Stock Market & Accounting Research Database) and CNRDS(Chinese Research Data Services) databases. Following data screening, a total of 19822 "sample-year" data were obtained. Of these, 2267 observations fell under 2012, 2311 under 2013, 2426 under 2014, 2613 under 2015, 3266 under 2017, and 3349 under 2018. The data processing for the study was conducted on Stata15.

2.2 Analytical model and Variables

Following the above theoretical analysis, the study first builds a model to calculate the excess credit obtained by a firm and to test the mediation effect of excess credit and the conditions for the occurrence of the mediation effect. Regarding the measurement of excess credit, the study draws on methods from the investment research field and estimates the loan amount for a company's normal demand, and then considers the difference between the company's actual long-term loan and the estimated value as either excess or insufficient credit(Richardson ,2006;. Besides a firm's capital needs and credit conditions, Hu and Zhou (2006) have observed that bank credit policy depends mainly on factors such as firm size, capital structure, operating conditions, and development prospects. In their research on the Chinese bank credit system, Li, Ran, and Huang (2014) found that the main factors in bank credit decision-making were asset-liability ratio, profitability, working capital, and development prospects.

The bank loan estimation model used in this study, together with its variables and their measurement are as follows:

$$\boldsymbol{Loan_{it} = \alpha_0 + \alpha_1 Cash_{it-1} + \alpha_2 Size_{it-1} + \alpha_3 Lev_{it-1} + \alpha_4 Roe_{it-1} +}$$

$$\boldsymbol{\alpha_5 Growth_{it-1} + \alpha_6 Liquid_{it-1} + \alpha_7 ZJ_{it-1} + \alpha_8 Top1_{it-1} +}$$

$$\alpha_9 Herfindahl\_3_{it-1} + \sum Industry + \sum Year + \varepsilon_{it} \quad \text{I}$$

Table1 Variable and Definition in Model I

Variable Type	Variable Name	Definition
Dependent Variable	$Loan_{it}$	long-term bank credit/total assets
Independent variable	$Cash_{it-1}$	cash balance scaled by assets
	$Size_{it-1}$	natural logarithm of total assets
	Lev_{it-1}	debt-to-assets ratio
	Roe_{it-1}	return on equity
	$Growth_{it-1}$	revenue growth rate
	$Liquid_{it-1}$	net value of fixed assets scaled by assets
	ZJ_{it-1}	net value of Construction in process scaled by assets
	$Top1_{it-1}$	the proportion of shares held by the company's largest shareholder
	$Herfindahl\_3_{it-1}$	degree of share concentration, measured by the sum of the squares of the shares held by the company's top three shareholders
Control variable	$Industry$	dummy variable*for industry
	$Year$	dummy variable for year

*According to the China Securities Regulatory Commission "China listed companies Industry Classification guidelines (2012)", excluding the financial industry, the manufacturing industry is subdivided into two-digit categories, and other industries are subdivided into single digit industry categories.

We follow prior studies and use $Loan$ as our dependent variable, which is measured by long-term bank credit scaled by total assets (long-term bank credit/total assets). Our primary independent variables are cash balance scaled by assets, the natural logarithm of total assets , debt-to-assets ratio, return on equity, revenue growth rate, net Value of fixed assets scaled by assets, net value of construction in process scaled by assets, the proportion of shares held by the company's largest shareholder, and the sum of the squares of the shares held by the company's top three shareholders. $Cash$ reflects the level of cash holdings in the business; $Size$ represents the size of the enterprise and is the natural logarithm of total assets; Lev is the debt-to-assets ratio of the enterprise; Roe reflects the profitability of the company, which is the return on equity; $Growth$ is the growth rate of sales revenue; $Liquid$ reflects the collateral value of assets and is measured by the ratio of net fixed assets to total assets; ZJ is the net value of construction in process scaled by total assets; $Top1$ is the proportion of shares held by the company's largest shareholder; $Herfindahl\_3$ reflects degree of share concentration of the enterprise, which is the square sum of the shareholding stakes of the top three shareholders. In addition, given macroeconomic fluctuations and the impact of industrial policies on model setting, we introduced an annual dummy variable ($Year$) and an

industry dummy variable ($\boldsymbol{Industry}$). In anticipation of possible problems with endogenous variables, all explanatory variables were lagged by one year in the regression.

Secondly, we used the following model to test the factors affecting excess credit:

$$\boldsymbol{Overloan_{it} = \eta_0 + \eta_5 Market_{it} + \eta_2 State_{it} + \eta_3 Financeback_{it} + \eta_4 Occupy_{it} + \eta_1 Politic_{it} + \sum Industry + \sum Year + \varepsilon_{it}} \quad \text{II}$$

Previous studies show that in a normal business environment, an enterprise's excess credit is affected by the type of ownership, its financial status, the degree of credit marketization, and other factors. Excess credit reflects inefficient allocation of credit markets, and marketization of credit affects the efficiency of credit allocation. Under the administrative and economic governance model, the bank's credit-granting decision considers not only economic factors, but also political and social factors. Therefore, banks do not treat credit decisions equally, but exercise a degree of discrimination(Gou,Huang, & Liu ,2014). For example, banks are often required to give preferential financial support to specific companies. Previous studies have shown that the excess loans of SOEs are significantly higher than those of non-SOEs, and the difference increases significantly during the period of austerity and financial crisis(Deng, Liu & Liao,2016). On the other hand, due to the dual-agency problem and the imperfect governance of financial institutions, obtaining private income through credit has become an important agency problem. Besides, research shows that irrational social factors, such as political connections and private relationship networks that arise in banks' credit decision-making are important for enterprises to obtain long-term loans in China(Grosman, Okhmatovskiy, & Wright ,2016 ;Peng, Zhang & Zhang,2013).

Summing up the above reasons and by reference to existing research practice, this study chooses the type of ownership, political connections, financial relations, the share holding ratio of major shareholders, and credit marketization as the explanatory variables for corporate excess credit. The main variables in the model II are measured as shown in Table 2.

Table2 Variable and Definition in Model II

Variable Type	Variable Name	Definition
Dependent Variable	$\boldsymbol{Overloan_{it}}$	the positive residual of model I regression
Independent variable	$\boldsymbol{State_{it}}$	Type of ownership, equal to 1 when the company is state-owned, otherwise equal to 0
	$\boldsymbol{Politic_{it}}$	political background, equal to 1 when the chairman of the board of directors or the general manager has administrative levels, otherwise equal to 0
	$\boldsymbol{Occupy_{it}}$	the large shareholders' expropriation, measured by ratio of other receivables to total assets
	$\boldsymbol{Market_{it}}$	The marketization of credit allocation, measured by
		the natural logarithm of the year-end loan balance of local small loan companies
	$\boldsymbol{Financeback_{it}}$	The financial background of top managers, equal to 1 if the chairman or general manager has financial background, otherwise equal to 0

Control variable	$\boldsymbol{Industry}$	dummy variable for industry
	$\boldsymbol{Year}$	dummy variable for year

To verify the mediation effect of excess credit on R & D innovation, this study sets up the following regression model:

$$\mathbf{R\&D\_ratio_{it}} = \sigma_0 + \sigma_1 \mathbf{State_{it}} + \sigma_2 Overloan_{it} + \sigma_3 Governsci_{it} + \sigma_4 Assign_{it} + \sigma_5 Independent_{it} + \sigma_6 Debt\_ratio_{it} + \sigma_7 Stock\_incentive_{it} + \sigma_8 Herfindahl\_3_{it} + \sum Industry + \sum year + \varepsilon_{it} \quad \text{III}$$

R&D_ratio has been used as a crude proxy for risk and innovation, which is measured by the proportion of R&D investment in operating revenues. Following convention, all missing values for R&D are replaced with zero, and the upper bound for R & D intensity is set at 1. $\boldsymbol{State}$、$\boldsymbol{Overloan}$ are the same in definition as in Model **I**. $\boldsymbol{Governsci}$ equals government's scientific and technological expenditure scaled by the final fiscal expenditure. Because of the externality of basic research, the government needs to strengthen its investment in basic research. Thus, $\boldsymbol{Governsci}$ is an indicator variable of basic research. $\boldsymbol{Stock\_incentive}$ is calculated as the share holding ratio of managers. The independence of the board is an important factor in the scientific decisions of the company. Also, $\boldsymbol{Independent}$, measured by proportion of independent directors in the board, is an indicator of board independence. $\boldsymbol{Assign}$ is a binary variable that equals one if the chairman and CEO are one person; or equals zero if they are separate individuals.

The main variables involved in the model are defined as follows:

Table3 Variable and Definition in Model III

Variable Type	Variable Name	Definition
Dependent Variable	$\mathbf{R\&D\_ratio_{it}}$	the proportion of R&D investment in operating revenues
Independent variable	$\mathbf{State_{it}}$	type of ownership, the same with definition in model II
	$Overloan_{it}$	the positive residual of model I regression, the same with definition in model II
	$Governsci_{it}$	basic research input, measured by the government's scientific and technological expenditure scaled by
		the final fiscal expenditure
	$Stock\_incentive$	stock incentive, measured by the share holding ratio of managers
	$Independent_{it}$	proportion of independent directors in the board
	$Assign_{it}$	equal to 1 if the chairman and CEO are one person, otherwise equal to 0
	$Herfindahl\_3_{it}$	degree of share concentration, the same with definition in model **I**

Control variable	$Industry$	dummy variable for industry
	$Year$	dummy variable for year

3.Results

3.1 Descriptive statistics

Table 4 shows the descriptive statistics of the main variables. The average ratio of long-term bank loans to total assets of listed companies is 0.04 and the standard deviation is 0.08. The average proportion of long-term loans to total assets for SOEs is 0.07, whereas the proportion of long-term loans to total assets for non-SOEs is 0.03, significantly lower than that for SOEs.

The average excess credit for listed companies with positive excess credit is 0.06, accounting for 50% of the average loan for the same companies (whose average bank loan is 0.12 of total assets), which is consistent with the results of the studies by Li,

Ran, & Huang(2014), indicating that the excess credit for listed companies is significant.

Besides, the average ratio of excess credit for SOEs is 0.07, while that for non-SOEs is 0.05; SOEs' excess credit is significantly higher than that of non-SOEs.
The average leverage of listed companies is 42%. The above table shows that the average corporate excess credit for the years 2012 through 2018 was 0.0547, 0.0547, 0.0497, 0.0481, 0.0475, 0.0463 and 0.0441 respectively, while the overall excess credit level for Chinese listed companies shows a downward trend. From the annual

descriptive statistics of excess credit, it is clear that enterprises' access to excess credit has been decreasing gradually with the reform of financial marketization and the deleveraging of our financial markets.

Table 6 shows the descriptive statistics for other variables. The average R & D intensity for companies was 4.38%; the figure for SOEs was significantly lower than that for non-SOEs. The proportion of state-owned companies is 35%. The average proportion of independent directors (0.37), the average proportion of dual-position (0.1), and the level of stock incentives (0.0038) for SOEs were significantly lower than those for nonSOEs (0.38, 0.37 and 0.1695 respectively). About 19% of all companies have political connections; for SOEs this figure is lower, as non-SOEs are more inclined to seek political connections. The average administrative level [4] of chairman or general manager is 76.6; for SOEs the figure is much higher.

[4] According to the administrative level classification standard of CSMAR database, 1 indicates national leader , 2 indicates sub-national leader, 3 indicates provincial-ministerial level,4 indicates sub-provincial level,5 indicates bureau-director level,6 indicates deputy-bureau-director level,7 indicates division-head level, 8 indicates deputy-division-head level,9 indicates section-head level, 10 indicates deputy-sectionhead level, 11 indicates inspector level, 12 indicates deputy-inspector level,13 indicates investigator level, 14 indicates deputy-investigator level, 15 indicates section-chief level, 16 indicates deputy-sectionchief level, 17 indicates staff member level, 18 indicates clerk level, 98 means unable to identify the administrative level. Besides, If the political connection is representative of the National People's Congress or the Party, 1 indicates the country level, 3 indicates the provincial level, 5 represents the municipal level, 7 indicates the county level and 9 indicates the town level

For other control variables, the average proportion of science and technology expenditure is 3%, which indicates that the government's expenditure on science and technology needs to be raised. The proportion of companies with a chairman or general manager who has worked in the financial industry is 0.09, whereas for SOEs the proportion is significantly lower. The average shareholding ratio for the largest shareholder in companies was 0.35, whereas for SOEs the figure is 0.4, significantly higher than that for non-SOEs (0.32). The ownership structure of non-SOEs is more dispersed

Table4 descriptive statistics of variables in Model I

Variable	Total sample			SOEs			Non-SOEs			t test
	N	Mean	St.Dev	N	Mean	St.Dev	N	Mean	St.Dev	diff=mean(SOE)-mean（Non-SOE)
Loan	18822	0.04	0.08	6511	0.07	0.10	12311	0.03	0.06	34.31
Overloan	6907	0.05	0.06	2333	0.07	0.07	4564	0.04	0.05	11.32
State	18822	0.35	0.48	-	-	-	-	-	-	-
Cash	18822	0.18	0.13	6511	0.16	0.12	12311	0.19	0.14	-15.71
Size	18822	22.1	1.33	6511	22.81	1.43	12311	21.75	1.11	56.36
Lev	18822	0.42	0.27	6511	0.51	0.20	12311	0.37	0.20	45.07
Liquid	18822	0.22	0.17	6511	0.26	0.20	12311	0.19	0.14	30.71
ZJ	18822	0.04	0.06	6511	0.05	0.07	12311	0.04	0.06	8.72
Roe	18762	0.06	0.37	6481	0.05	0.24	12281	0.07	0.42	-2.65
Growth	17865	8.08	1007.21	6429	21.34	1678.81	11436	0.63	18.66	1.32
Top1	18822	0.35	0.15	6511	0.40	0.15	12311	0.32	.14	33.03
Herfindahl_3	18822	0.16	0.12	6511	0.20	0.13	12311	0.14	0.10	30.19

Table5 yearly descriptive statistics of excess credit

Year	N	mean	sd	p1	p99
2012	780	0.0547	0.0718	0.0003	0.3373
2013	857	0.0547	0.0715	0.0006	0.3453
2014	936	0.0497	0.0657	0.0006	0.3011
2015	970	0.0481	0.0615	0.0005	0.2754
2016	1021	0.0475	0.0640	0.0004	0.3064
2017	1103	0.0463	0.0595	0.0006	0.2959
2018	1240	0.0441	0.0578	0.0004	0.2784

Table6 descriptive statistics of other variables

Variables	Total sample			SOEs			Non-SOEs			Two-sample
	N	Mean	St.Dev	N	Mean	St.Dev	N	Mean	St.Dev	t test
R&D_ratio	18822	3.56	4.20	6511	1.99	3.02	12311	4.39	4.49	-25.70
Governsci	15553	0.03	0.01	-	-	-	-	-	-	-
Independent	18820	0.38	0.05	6510	0.37	0.05	12310	0.38	0.05	-7.11
Assign	18609	0.28	0.45	6383	0.1	0.3	12226	0.37	0.48	-41.51
Stock_incentive	18822	0.11	0.18	6511	0.0038	0.02	12311	0.17	0.20	-66.62
Politic	15590	0.19	0.40	5553	0.16	0.36	10037	0.21	0.41	-8.38
Layer[5]	4588	5.62	3.24	1372	5.90	3.21	3137	5.46	3.22	4.22
Occupy	18822	0.02	0.02	6511	0.02	0.02	12311	0.02	0.02	1.95

[5] Here we only count the companies whose chair of board or general manager has political connection and its administrative level can be identifies.

Market	15553	5.80	0.84	5551	5.53	0.81	10002	5.95	0.82	-30.88
Financeback	12311	0.10	0.30	6511	0.08	0.27	12311	0.1	0.30	-3.42

3.2 Correlation analysis

As can be seen from the correlation coefficient table, proportion of cash to total assets, total assets size, debt to asset ratio, collateral value ratio, net value of construction in process to total assets, profitability, shareholding ratio of the largest shareholder, and share concentration of the enterprise are all significantly related to the proportion of long-term loans. Except for the correlation between the largest shareholder's shareholding and the concentration of share holding, the correlation coefficient for the explanatory variables was less than 0.4.

The variable $\boldsymbol{State}$ is positively correlated with excess credit, which indicates that excess subsidies for SOEs equity is prevalent. Political connection, expropriation of large shareholders, and financial background are positively correlated with excess credit. Financial background and expropriation of large shareholders are significantly correlated with excess credit, which means that companies with expropriation of large shareholders and managers with financial background have higher excess credit levels. Credit marketization is significantly negatively correlated with excess credit; the level of credit marketization is conducive to reducing the excess credit level.

The correlation coefficients of the Model III variables show that type of ownership, excess credit, government's science and technology expenditure, managers' shareholding, proportion of independent directors, dual appointment, and degree of share concentration are all significantly related to the R&D investment. Listed companies with a high level of excess credit have lower investment intensity in R & D. The higher the expenditure on science and technology in the government budget , the higher the intensity in R & D of listed companies. Improving stock incentives and independence of the board are conducive to improving the intensity of R&D investment by listed companies, too. It means that optimizing board structure and improving incentives for managers will raise companies' R&D investment levels.

Table7 correlation analysis of variables in Model Ⅰ

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) $Loan$	1.000									
(2) $Cash$	-0.377*	1.000								
(3) $Size$	0.581*	-0.339*	1.000							
(4) Lev	0.467*	-0.303*	0.375*	1.000						
(5) $Liquid$	0.367*	-0.336*	0.182*	0.141*	1.000					
(6) ZJ	0.256*	-0.147*	0.142*	0.102*	0.194*	1.000				
(7) Roe	-0.094*	0.091*	0.014	-0.140*	-0.081*	-0.003	1.000			
(8) $Growth$	-0.002	-0.008	-0.005	0.008	0.007	0.042*	0.002	1.000		
(9) $Top1$	0.090*	-0.011	0.151*	0.032*	0.118*	0.069*	0.051*	0.013	1.000	
(10) $Herfindahl\_3$	0.100*	0.002	0.186*	0.026*	0.117*	0.071*	0.052*	0.011	0.951*	1.000

* shows significance at the 0.05 level

Table8 correlation analysis of variables in Model Ⅱ

Variables	(1)	(2)	(3)	(4)	(5)	(6)

(1) ***Overloan***	1.000					
(2) ***State***	0.232*	1.000				
(3) ***Politic***	0.023	-0.065*	1.000			
(4) ***Occupy***	0.060*	0.057*	-0.002	1.000		
(5) ***Market***	-0.111*	-0.226*	-0.005	-0.082*	1.000	
(6) ***Financeback***	0.084*	-0.010	0.024*	0.037*	0.006	1.000

* shows significance at the 0.05 level

Table9 correlation analysis of variables in Model III

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) **R&D_ratio**	1.000							
(2) ***State***	-0.290*	1.000						
(3) ***Overloan***	-0.243*	0.232*	1.000					
(4) G***overnsci***	0.179*	-0.105*	-0.100*	1.000				
(5) ***Stock_incentive***	0.280*	-0.438*	-0.212*	0.136*	1.000			
(6) ***Independent***	0.064*	-0.068*	0.013	0.028*	0.083*	1.000		

(7) $\boldsymbol{Assign}$	0.169*	-0.298*	-0.113*	0.099*	0.253*	0.101*	1.000	
(8) $\boldsymbol{Herfindahl\_3}$	-0.146*	0.153*	0.103*	0.045*	-0.052*	0.029*	-0.007	1.000

* shows significance at the .05 level

3.3 Regression Analysis

The empirical test of this study is divided into three steps. The first step is to calculate the yearly excess credit level for each company in daily operation by the residual of Model **I.** Table 10 shows the regression results of Model **I**. The size of the company, the liquidation value, the construction in progress, and the degree of share concentration are all important considerations for enterprises to obtain long-term bank credit. The shareholding proportion by the first shareholder is negative for companies' long-term credit ratio. The share concentration is positive for the proportion of companies' longterm credit. This suggests that shareholding structure is also a consideration for banks in issuing long-term credit. Profitability is positively correlated with long-term bank credit but not significantly, suggesting that profitability is not the most important factor for banks in long-term credit decision-making. The growth rate of revenue is negatively related to the long-term credit of enterprises, which suggests that banks provide insufficient support to promote rapid growth of enterprises. Overall, corporate profitability and development status are not fully considered. In addition, except for revenue growth rate and share concentration ratio, the coefficients of the variables are consistent with expectations.

Table 10 regression results of Model I

Variable	Expected symbol	(1) $Loan$
$Cash_{it-1}$	-	-0.009**
	+	(0.004)
$Size_{it-1}$	+	0.008***
		(0.001)
Lev_{it-1}	+	0.104***
		(0.004)
$Liquid_{it-1}$	+	0.060***
		(0.005)
ZJ_{it-1}	+	0.237***
		(0.013)
Roe_{it-1}	+	0.002
		(0.002)
$Growth_{it-1}$	+	-0.000***
		(0.000)
$Top1_{it-1}$	-	-0.046***
		(0.013)
$Herfindahl\_3_{it-1}$	-	0.048***
		(0.017)
_cons	?	-0.180***
	(0.013) **Obs.**	17948

R-squared	0.402
Year	yes
Industry	yes

Standard errors are in parenthesis

***** p<0.01, ** p<0.05, * p<0.1**

Secondly, according to econometric theory, the residual in Model **I** represents the long-term loan an enterprise obtains that cannot be explained by the normal economic factors; therefore, it can represent excess credit in a sense. Considering the nature of excess credit, only when the residual is greater than zero does excess credit exist; when the residual is less than zero, there is no excess credit.

Third, the casual steps approach(Wen & Ye ,2014) is used to verify the mediating effect of excess credit. Before the intermediary effect test, the continuous variables were centralized. According to the above theoretical analysis, when the enterprise is controlled by the government, the government has the motivation to use its control over banks and other financial institutions to interfere with the allocation of credit resources. Especially in the context of the current administrative economic governance transformation of state-owned commercial banks, SOEs may command higher excess credit, thus affecting their level of innovation investment.

Table 11 the casual steps approach of mediation effect

Variable	Step1	Step2	Step3
	R&D_ratio	*Overloan*	R&D_ratio
State	-0.620***	0.009***	-0.489***
	(0.098)	(0.002)	(0.109)
Governsci	23.921***		20.291***
	(3.567)		(4.030)
Stock_incentive	1.492***		2.417***
	(0.244)		(0.390)
Independent	1.058		1.131
	(0.765)		(0.871)
Assign	0.281***		0.335***
	(0.098)		(0.123)
Herfindahl_3	-1.550***		-1.243***
	(0.304)		(0.350)
Politic		0.003	
		(0.002)	
Occupy		0.060	
		(0.039)	
Market		-0.004***	
		(0.001)	
Financeback		0.010***	

		(0.003)	
$Overloan$			-3.528***
			(0.642)
_cons	-3.163***	0.030***	-2.748***
	(0.208)	(0.011)	(0.243)
Obs.	7638	5658	5619
R-squared	0.452	0.219	0.483
Year	yes	yes	yes
Industry	yes	yes	yes

Standard errors are in parenthesis

*** p<0.01, ** p<0.05, * p<0.1

Table 11 depicts the causal steps approach regression results for the mediation effect of excess credit. The coefficient of $State$ is significantly negative, indicating that the R&D investment intensity for SOEs is significantly lower than that for non-SOEs. In Step2, the coefficient of $State$ is significantly positive, indicating that the excess credit level for SOEs is significantly higher than that of non-SOEs, which is consistent with the previous theoretical analysis. In Step3, the excess credit coefficient of enterprises is significantly negative at the 1% level, indicating that excess credit weakens the motivation for enterprises to gain competitiveness through technological innovation, thus reducing the intensity of R&D investment. From Step1 to Step3, excess credit plays a key mediating role between type of ownership and the investment intensity of R&D. The indirect effect ($\eta_2 * \sigma_2$) through the intermediary channel of excess credit accounts for about 5.12% of the inherent enterprise innovation efficiency loss (the coefficient of $State$ in Step1). This shows that, against the background of the current administrative and economic governance of Chinese banks, excess credit, as one of the important factors of external governance, essentially weakens the innovation ability of the company and is not conducive to its sustainable development.

4.Further discussion

In the context of mixed ownership reform, the role of state shareholding will also be influenced by various internal and external conditions in playing the different role of regulating excess credit as a mediator. Among them, political connection between enterprises and the government, and managers' technology innovation working experience are two important aspects.

（1）Administrative level mechanism

Table 12 group test of managers' level of political connection

Variable	Low	High	Low	High	Low	High
	R&D_ratio	R&D_ratio	$Overloan$	$Overloan$	R&D_ratio	R&D_ratio
$State$	-0.636***	-0.381	0.009***	0.008	-0.513***	-0.171
	(0.101)	(0.729)	(0.002)	(0.008)	(0.113)	(0.814)
$Governsci$	23.948***	48.791			20.080***	41.769
	(3.634)	(31.754)			(4.121)	(33.901)
$Stock\_incentive$	1.470***	6.835**			2.375***	6.470*

	(0.246)	(2.689)			(0.394)	(3.336)
Independent	1.040	-6.535			1.075	-9.765
	(0.776)	(8.470)			(0.885)	(8.917)
Assign	0.271***	1.905**			0.324***	2.298***
	(0.100)	(0.787)			(0.126)	(0.866)
Herfindahl_3	-1.461***	-5.889***			-1.128***	-6.749***
	(0.313)	(2.076)			(0.364)	(2.169)
Politic			0.003	0.005		
			(0.002)	(0.006)		
Occupy			0.061	0.300		
			(0.040)	(0.193)		
Market			-.004***	0.007		
			(0.001)	(0.005)		
Financeback			0.010***	0.050***		
			(0.003)	(0.018)		
Overloan					-3.475***	-13.489**
					(0.647)	(6.223)
_cons	-3.213***	-0.249	0.031***	-0.023*	-2.794***	-0.684
	(0.208)	(0.519)	(0.011)	(0.012)	(0.245)	(0.632)
Obs.	7461	177	5500	158	5464	155
R-squared	0.451	0.658	0.218	0.611	0.481	0.687
Year	Yes	yes	yes	yes	yes	yes
Industry	Yes	yes	yes	yes	yes	yes

Standard errors are in parenthesis

*** p<0.01, ** p<0.05, * p<0.1

The political connection level mechanism test was carried out in the form of group regression. First, the enterprise samples are grouped according to the administrative level of the chairman or general manager of the enterprise. When an enterprise has political connections at or above the provincial level, it is classified as a ***high*** administrative level group; otherwise, it is classified as a ***low*** administrative level group. From the regression results in Table 12, the mediating effect of excess credit is only significant in the low political connection level group. When the local level political connections exist in enterprises, the government is more inclined to support the R&D investment of the enterprises through excessive credit and other ways.

（2）Top managers' R&D background mechanism

Table 13 group test of top managers' R&D background

Variable	No	Yes	No	Yes	No	Yes
	R&D_ratio	R&D_ratio	***Overloan***	***Overloan***	R&D_ratio	R&D_ratio
State_share•	-0.664**	33.196**	0.027***	-0.558	-0.260	-129.612
	(0.301)	(14.817)	(0.010)	(1.004)	(0.371)	(403.319)

Governsci	24.420***	-64.996			20.513***	84.870
	(3.596)	(101.079)			(4.060)	(143.741)
Stock_incentive	1.698***	8.058			2.518***	2.070
	(0.231)	(5.456)			(0.370)	(7.068)
Independent	0.985	14.217			1.061	21.967
	(0.765)	(23.559)			(0.869)	(36.452)
Assign	0.394***	0.340			0.453***	-2.596
	(0.097)	(3.231)			(0.121)	(4.257)
Herfindahl_3	-1.577***	-19.847			-1.324***	-28.585
	(0.315)	(27.141)			(0.361)	(30.644)
Politic			0.002	-0.017		
			(0.002)	(0.012)		
Occupy			0.053	-0.180		
			(0.039)	(0.248)		
Market			-.004***	0.001		
			(0.001)	(0.006)		
Financeback			0.010***	-0.004		
			(0.003)	(0.012)		
Overloan					-3.636***	219.033**
					(0.643)	(84.098)
_cons	-3.233***	-4.846	0.031***	-0.054	-2.853***	-2.563
	(0.204)	(3.577)	(0.011)	(0.037)	(0.239)	(17.568)
Obs.	7589	59	5627	40	5588	40
R-squared	0.448	0.689	0.217	0.943	0.477	0.821
Year	yes	yes	Yes	yes	yes	yes
Industry	yes	yes	Yes	yes	yes	yes

Standard errors are in parenthesis

*** p<0.01, ** p<0.05, * p<0.1

•***State_share*** ,which is the share proportion held by state owned entities, is a replacement for ***State***.. In the background mechanism test of managers' R&D background, due to the collinearity of variable ***State***, its regression coefficient cannot be displayed. In order to ensure the feasibility and rationality of the test, the ***State_share*** is used to replace ***State*** to participate in the regression. Since shareholding is the main form of government equity in SOEs, when the ***State_share*** passes the intermediary effect test, it can prove the existence of intermediary effect of government control to a certain extent.

According to the upper echelons theory, the career background of managers has an important influence on their decision-making behavior. From the different professional backgrounds of managers, we choose the R&D background, which is closely related to enterprise R&D activities. Firstly, when the

chairman or general manager has a background in R&D, the observation is classified as the group with R& D background and marked as "yes"; otherwise, it is classified as the group without R&

D background and marked as "no". Secondly, group regression was run respectively. Table 13 presents the results of the group regression. In columns 1,3 and 5, the chairman or general manager has no R & D background, while in columns 2,4 and 6, the chairman or general manager has R & D background. The results show that excess credit has a mediating effect between state control and R & D investment of enterprises when the chairman or the general manager does not have an R & D background; when the chairman or the general manager has an R & D background, however, the mediating effect of excess credit is not significant. Therefore, enterprises' managers with an R&D background mitigate the negative impact of excess credit on R&D investment.

5. Robustness tests

（1）Variable Replacement test

Using the method of Jiang (2016), we substituted the R&D investment intensity by the proportion of R&D expenses in total assets; the regression results did not change significantly.

Table 14 Variable Replacement test

Variable	Step1	Step2	Step3
	$R\&D/Assets$	$Overloan$	$R\&D/Assets$
$State$	-0.001**	0.009***	0.0002
	(0.001)	(0.002)	(0.001)
$Governsci$	0.174***		0.151***
	(0.016)		(0.018)
$Stock\_incentive$	0.006***		0.004***
	(0.001)		(0.001)
$Independent$	-0.007*		-0.002
	(0.004)		(0.004)
$Assign$	0.001		0.000
	(0.000)		(0.001)
$Herfindahl\_3$	-0.002		-0.003
	(0.002)		(0.002)
$Politic$		0.003	
		(0.002)	
$Occupy$		0.060	

		(0.039)	
Market		-0.004***	
		(0.001)	
Financeback		0.010***	
		(0.003)	
Overloan			-0.039***
			(0.004)
_cons	-0.016***	0.030***	-0.013***
	(0.001)	(0.011)	(0.001)
Obs.	6252	5658	4439
R-squared	0.344	0.219	0.368
Year	yes	yes	yes
Industry	yes	yes	yes

Standard errors are in parenthesis
***** p<0.01, ** p<0.05, * p<0.1**

(2) Winsorizing Test

With reference to Su (2016), we winsorized 5% of the continuous variables instead of 1% and conducted the regression again; the regression results did not change significantly.

Table15 Winsorizing Test

Variable	Step1	Step2	Step3
	R&D_ratio	***Overloan***	R&D_ratio
State	-0.530***	0.009***	-0.408***
	(0.075)	(0.002)	(0.082)
Governsci	18.994***		15.373***
	(2.612)		(2.922)
Stock_incentive	1.561***		2.340***
	(0.184)		(0.275)
Independent	0.811		1.203
	(0.698)		(0.810)

$Assign$	0.266***		0.293***
	(0.071)		(0.087)
$Herfindahl\_3$	-0.904***		-0.666**
	(0.279)		(0.316)
$Politic$		0.003	
		(0.002)	
$Occupy$		0.086*	
		(0.050)	
$Market$		-0.003***	
		(0.001)	
$Financeback$		0.009***	
		(0.002)	
$Overloan$			-4.183***
			(0.624)
_cons	-2.928***	0.023***	-2.598***
	(0.191)	(0.008)	(0.220)
Obs.	7638	5658	5619
R-squared	0.527	0.226	0.560
Year	yes	yes	yes
Industry	yes	yes	yes

Standard errors are in parenthesis

***** p<0.01, ** p<0.05, * p<0.1**

(3) Eliminating the default sample of R&D investment intensity

Due to the omission of statistics, some enterprises' R&D investment may be default. During the previous date adjustment process, the default observations are made to be zero. However, such method may lead to an underestimation of regression parameters, and then affect the unbiased regression results. Therefore, we excluded these samples and carried out the regressions again. Still, the results did not change
significantly.

Table16 Eliminating the default sample of R&D investment intensity

Variable	Step1	Step2	Step3
	R&D_ratio	*Overloan*	R&D_ratio
State	-0.722***	0.015***	-0.535***
	(0.132)	(0.002)	(0.151)
Governsci	23.708***		22.369***
	(4.480)		(5.251)
Stock_incentive	1.041***		1.899***
	(0.267)		(0.422)
Independent	1.808*		1.797
	(0.944)		(1.120)
Assign	0.273**		0.354**
	(0.113)		(0.146)
Herfindahl_3	-2.793***		-2.660***
	(0.412)		(0.500)
Politic		0.002	
		(0.002)	
Occupy		0.054	
		(0.044)	
Market		-0.002*	
		(0.001)	
Financeback		0.006**	
		(0.003)	
Overloan			-3.382***
			(1.053)
_cons	-3.633***	0.039***	-3.167***
	(0.269)	(0.011)	(0.314)
Obs.	6184	4416	4391
R-squared	0.383	0.156	0.408
Year	yes	yes	yes
Industry	yes	yes	yes

Standard errors are in parenthesis
***** p<0.01, ** p<0.05, * p<0.1**

(4) The Sobel-Goodman tests

In recent years, the casual steps approach has been criticized and questioned almost universally(Edwards ,2007;Hayes ,2009). Some scholars call for stopping the casual steps approach and using the Bootstrap method to directly test the significance of the product of coefficients(Zhao, Lynch Jr., & Chen ,2010).

Therefore, with reference to the existing literature, this study conducted a supplementary test on the intermediary effect of excess credit by using the SobelGoodman test method. From the test results, the intermediary effect still passed the significance test.

Table17 Sobel-Goodman Test of Mediation Effect

Statistics	Coef.	Std Err	Z	P>|Z|
Sobel	-0.3000	0.0368	-8.153	<0.001
Goodman-1 (Aroian)	-0.3000	0.0368	-8.142	<0.001
Goodman-2	-0.3000	0.0367	-8.165	<0.001

6. Endogenous problems

In Model Ⅲ of this study, there may be an endogenous problem of mutual cause and effect between the excess credit and the R&D investment intensity. It may be that, because the listed companies with high R&D investment are more recognizable by the capital market, they are more likely to successfully issue public offerings or are more readily subject to mergers and acquisitions, thus becoming non-SOEs.

Besides, the Hausman test for endogeneity shows that there is significant endogeneity in excess credit. To alleviate the endogeneity problem of the Model Ⅲ regressions, we carried out the 2SLS regression. In this study, we considered the industrial mean excess credit as its instrument variable. The industrial mean excess credit is correlated with enterprise excess credit. However, the industrial mean excess credit is unlikely to be affected by the R&D investment intensity of an enterprise, thus the industrial mean excess credit meets the conditions of correlation and exogeneity of an instrument variable.

Table 18 2SLS Regression

Variable	Stage1	Stage2
	$Overloan$	R&D_ratio

$State$	0.00312*	-0.500***
	(0.00178)	(0.172)
$Governsci$	-0.296***	26.58***
	(0.0528)	(5.105)
$Stock\_incentive$	-0.0258***	3.655***
	(0.00469)	(0.464)
$Independent$	0.0365***	5.842***
	(0.0133)	(1.267)
$Assign$	-0.00196	0.433***
	(0.00169)	(0.161)
$Herfindahl\_3$	0.00391	-2.434***
	(0.00644)	(0.615)
$IV2$	0.952***	
	(0.0290)	
$Overloan$		-58.00***
		(2.902)
Constant	-0.00425***	-0.0215
	(0.000741)	(0.0710)
Observations	5,619	5,619
R-squared	0.233	
IV F-stat		1076
Durbin pval		0

Standard errors in parentheses

***** p<0.01, ** p<0.05, * p<0.1**

It can be seen from the above regression results that in the first stage of 2SLS regression, the F statistic is greater than 10, which means that there is no weak instrumental variable problem. The coefficient of the instrumental variable is significantly negative, which indicates that excess credit is indeed an important factor in reducing the R&D investment intensity of enterprises; thus, the result remains valid after controlling for the endogeneity problems.

6. Discussions and conclusion

This study uses the Shanghai and Shenzhen A-share listed non-financial companies from 2012 to 2018 as research samples to empirically test the relationship between state control, excess credit, and R&D investment intensity. It is found that the

R&D investment intensity of SOEs is significantly lower than that of other companies. The resource redundancy effect brought about by excess credit weakens the intensity of corporate innovation investment. Excess credit is an important channel between state control and the low intensity of R & D investment. Therefore, it is necessary to further optimize the ownership structure of mixed ownership enterprises, improve the corporate governance structure, and enhance the technological innovation capability of SOEs.

At present, the path of corporate governance reform in China is from administrative governance to economic governance(Li,2018). In the process of promoting the transformation of corporate governance, the reform of external governance such as financial markets is indispensable. Due to the high cost of equity financing, the cash demand for venture capital, and the risk of losing control rights, bank credit has become an important source of R & D for listed companies in China. Following gradual reform path, our government retains a high degree of discretion in the allocation of resources. Under the influence of administrative governance, government officials tend to interfere with the operation of SOEs through administrative means, directly or indirectly, thus leading to preferential treatment for

SOEs. In the allocation of credit resources that affect the development of enterprises, SOEs can access preferential credit support in the government-led banking system by virtue of their "state-owned enterprise identity". As a result, the excess credit level of

SOEs is significantly higher than that of non-SOEs. The existence of excess credit in SOEs renders the debt governance mechanism ineffective, which is not conducive to the improvement of corporate innovation capacity.

Therefore, in the process of promoting the reform of mixed ownership, it is necessary to further relax the restrictions on the shareholding proportion of commercial SOEs, introduce social capital and promote the diversification of ownership structure of SOEs in accordance with the requirements of the classified reform, reduce the government's direct intervention in corporate innovation, gradually weaken the explicit or recessive influence channels of administrative governance, and strengthen the economic governance mechanism. In addition, the study also found that, to better promote enterprise innovation, the government should discontinue the "preferential treatment" of SOEs, promote credit marketization, and create a more competitive credit market environment. The government should also increase investment in basic research, optimize the environment for scientific research and innovation, and cultivate a good ecosystem conducive to enterprise innovation.

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Exploring Multigenerational Co-residence in America

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Abstract

Using 2017 American Housing Survey (AHS), this paper investigates the increasing trend of multi-generational co-living in the United States. While Multigenerational co-residence is common in developing countries, it is interesting to find out why American are gradually adapting to this living arrangement. We research the financial and social cultural determinants of such observations and find out household income appears consistently to be a significant determinant of multigenerational co-residence decision across all household compositions. Latino households are most likely to co-reside with multiple generations, followed by Asian and African American households. Immigrants tend to live in multigenerational co-residential housing units, even with smaller size and relatively poorer neighborhoods, but show greater flexibility in making residential arrangements once they gain better education. In addition, older householders or female householders are significantly more likely to co-reside with multiple generations. However, living in metropolitan areas has no impact on co-residence choice, although some evidence suggests that multigenerational co-residential families tend to live in inferior neighborhoods.

Keywords: Multigenerational Co-residence, Intergenerational Living, Housing, America

JEL Codes: J12 (demographic) J14 (elder) R21 (housing demand) R23 (neighborhood characteristics) D64? (Intergenerational Transfers)

1. Introduction

Multigenerational co-living in the U.S. had been declining prior to the end of 1970's. However, it turned to incline since 1980 and has garnered increasingly national attention in recent years. According to Pew Research Center analysis of census data, a record hitting 75-year high with "64 million people, or 20% of the U.S. population, lived with multiple generations under one roof" (Cohn and Passel, 2018). Multigenerational living became more common, due to changing economic and demographic circumstances, increasing immigration and cultural diversity, and the evolving lifestyles of Americans influenced by postponed marriage and parenthood and improved health conditions, etc. Most recently, researchers start to investigate how this co-living pattern could possibly influence fatalities from Covid-19. Fenoll and Grossbard (2020) use aggregate data on Covid-19 deaths from 27 countries in the European Union, the UK, and all US states and find that multigenerational co-residence is positively associated with Covid-19 fatalities, although no direct evidence is found that some deaths could be avoided if older adults and their adult children live in separate households rather than sharing the same residence.[6]

Within the household, individual motivations for choice of multigenerational housing include financial benefits for all individual family members especially the young generation(s), need for built-in childcare, eldercare or disabled care, and psychological and emotional merit from intergenerational companionship and bonds of kinship. Since 1980, the number of Americans living in multigenerational family households have continued to rise, despite the long improvements in the U.S. economy after the Great Recession. A growing number of adult children return to their parents' homes to cut down the high cost of living and to reduce financial stress,

[6] Aparicio and Grossbard's (2020) findings are controlled for population size, date of first death, presence of lockdown, Covid tests per capita, hospital beds per capita, proportion of elderly, GDP per capita, government's political orientation, percentage urban, and rental prices.

due to changes in employment status, postponement in marriage and parenthood etc. Married adult children with healthy live-in grandparents can further benefit from baby sitting and offsetting the costs of childcare. Aging parents and grandparents, in return, can be well taken care off too in this living arrangement. Particularly, the informal and mutual care provided through co-residence is an important substitute in a society where the formal old-age care system is not well-developed (Lei et al., 2015; Li and Wu, 2019). For the generation of nonage, benefits from the strong bonds with their grandparents are observed. A study indicates that children in single-parent households that also include grandparents exhibit improved school performance, and older adults who spend more time with grandchildren live longer. Additionally, the social cultural benefits of such a housing arrangement is obvious as caregiving becomes easier.

In this paper, we investigate the motivations and determinants of the multigenerational co-residence pattern across different income, immigrant, seniority, and racial-ethnic groups. Our empirical results confirm that financial motivation could be a common determinant across households with different socioeconomic and cultural backgrounds. Rooted in the culture of the minorities and immigrants, multigenerational co-residence is more popular among these groups, especially for Latino. But culture background does not play the role as strong as income does in determining the multigenerational arrangement. Although older people tend to multi-generationally co-reside with their children and grandchildren generations, this probability decreases continuously once they are around the age to retire. Proportionally, multigenerational co-residence seems to be more like an economic arrangement which requires the family member with better ability to provide the family to take more responsibility for the ones need help, and this role switches when the financial ability of the older generation declines after or around retirement.

We contribute to the existing literature in several ways. Multigenerational co-residence, their determinants and consequences, are important for understanding a wide variety of family-related research questions, such as inequality and well-being within and across families, caregiving arrangements, intergenerational transfers of wealth, and the effects of family-related policy. With the unprecedented Covid-19 breakouts around the globe, a recent survey by Harvard scholars (Bartik et al., 2020) suggests that at least 16 percent of employees will remain at-home workers long after COVID-19 recedes. New York Times reports more than a quarter of U.S. colleges plan to begin fall instruction fully or mostly online.[7] A dramatic and persistent shift in workplace towards remote work and in universities and schools towards online learning have great implications on multigenerational co-residence choice. This complex household structure is worth more attention as to whether housing multiple generations under the same roof would be a solution to accommodate the needs for increasing remote work and learning without imposing higher risk of virus spread within the family, or alternative living arrangements need to be made.

The research findings can also help the house builders design the appropriate houses to meet the growing demand of households with multi-generations living together. The houses under such arrangement need to be kids friendly, suitable to accommodate working young adults, and with easy access to hospitals and health centers for the elder. Some property features should include multiple master bedrooms with unsuited baths, a separate in-law suite, or having separate entrances and specific space in the kitchen for each adult to reduce conflict. Understanding the reasons for persistent multigenerational co-residence has important consequences for policy makers, from aggregate consumer spending and housing demand, to marriage and fertility rates,

[7] https://www.nytimes.com/2020/08/07/well/family/college-students-coronavirus-parents-back-to-school.html

and household financial stability. The changing household structure has impact on social values and the development of local economy. In particular, a better understanding of the co-residence pattern of immigrants and senior citizens will help inform policy makers to prioritize public resources to address the needs of this rapidly increasing population. This specific group without strong family ties may prefer to rely on formal care rather than informal support from the family when assistance is needed. Policy makers can learn from our findings to design and build public facilities to meet the needs of the changing population, such as the elders' need for hospitals, shopping malls, young adults' needs for gym and coffee shops, and the youth needs for public school, library, movie theaters, and recreational parks.

The paper proceeds as below. Section 2 provides the literature review. Section 3 describes the data and methodology. Section 4 presents empirical findings. Section 5 concludes the paper.

2. Literature Review

Multigenerational co-residence is a common phenomenon in Latin American and Asian countries. Arvate and Zoghbi (2010) document this common family arrangement in Brazil where the elderly co-reside with their adult children and the elderly support the public education expenditure of the young. According to Pew Research Center reports, 9.4 percent of Asian households, 9.5 percent of African American and 10.3 percent of Latino homes were multigenerational in 2009, compared with 3.7 percent of non-Hispanic white households (Cohn and Passel, 2018). Multigenerational family co-living has been growing cross nearly all U.S. racial groups, most age groups and for both genders. The number and share of Americans living in these households increased sharply especially during and immediately after the Great Recession of 2007-2009. Since then, the growth has slowed down a little, yet still more rapid than that prior to the recession.

A large body of multidisciplinary literature examines multigenerational co-residence and explains the phenomenon mainly from both economic and social-cultural perspectives. Multigenerational co-living usually diminishes with industrialization, migration, and economic growth. Ruggles and Heggeness (2008) show that multigenerational co-living increased during the period of 1970–2000 in 10 out of 15 developing countries. Demographic changes, such as the reduction in fertility and mortality rates, tend to favor multigenerational co-living. The inverse relationship between household complexity and economic development was evident during the Great Depression between 2007 and 2009. Nevertheless, multigenerational co-residence rates did not fall as economic conditions improved after the recession. Young adults' decision to live with parents is closely associated with changes in their employment status and the general labor market. Particularly, in a struggling economy such as the recent economic downturn, multigenerational housing becomes an insurance against labor market risk (Engelhardt et al., 2019; Kahn et al., 2013; Kaplan, 2012; Lee and Painter, 2013).

Housing unaffordability due to higher housing prices appears to be the leading reason for an upward trend of intergenerational co-residence in many metropolitan areas. Ohtake and Horioka (1994) find that the probability of older parents co-residing with their children increases as the value of their home increases. Ermisch (1999) reveals that a higher regional housing price encourages young adults to return to their parental home in the U.K. Similarly, Paciorek (2016) finds that higher housing costs depress housing demand of adult children living alone. Li and Wu (2019) document that city-level housing price has a positive effect on parent and adult children co-residence in China. The effect is larger for those who do not own a house, who have lower level of wealth, and who are relatively younger. The stronger the financial capability of husband's parents, who can take relatively more responsibility to provide housing support for the young

couple, the more likely the co-residence. Therefore, multigenerational living can be viewed as a convenient way to receive housing subsidy from parents as young adults living with parents can cut down rental and other living costs and save for their future house purchase. Housing becomes unaffordable when housing price grows faster than that of household income. The mortgage down payments as a percentage of house purchase price requires young adults to accumulate enough savings. Co-residing with their parents becomes a feasible solution to lower living expenses.

The observed relationship between resources and multigenerational co-living is complicated. Research suggests that economically disadvantaged individuals will remain in the home longer because of the scarce resources and family dependency (De Marco and Berzin, 2008). Cohen and Casper (2002) examine the higher income households and find that they are less likely to make multigenerational living arrangements and less likely to be guests, even if they do, regardless of race-ethnicity. Kamo (2000) finds that per capita income is lower in extended households across all racial-ethnic groups possibly due to the large householder size. Goldscheider and DaVanzo (1989, 1985) show that not only children's economic resources but also those of the parents influence parental co-residence of young adults. Aquilino (1990) also finds that parents' education reduces the likelihood that their adult children live with them, but this may be because parents with more education have children with more education, who are more financially independent.

Srinivas (2019) continues to explore the causes behind the rising parental co-residence and shows that rents have far outstripped incomes for young adults and that increasing unaffordability of renting is a significant factor behind the rising proportion of young adults living with their parents. Hughes (2003) shows that lower wage rates and higher rents are associated with more young adults living with their parents. Larrimore et al. (2016) document that more than half of

young renters believe that they cannot afford a down payment and that student loans and credit card debt will increase the time it takes to save enough to own a home. Multigenerational co-residence could also serve as an alternative smoothing mechanism for young adults especially those who are in debt and face high borrowing costs (Dettling and Hsu, 2018). Parental co-residence can substantially reduce expenses by eliminating housing payments to smooth consumption when a young adult has exhausted his ability to borrow.

Multi-generations living together is a tradition for many immigrants, particularly in Latin America and Asia. Older Asian immigrants tend to live almost exclusively with their adult children, regardless of gender or marital status (Hsueh et al., 2008; Kritz et al., 2000). Foreign-born Americans are more likely than native-born Americans to live in a multi-generational household, and the trend continues to grow more rapidly in recent years. The sharpest growth in the multi-generational household population was among Hispanics (17.6%) and Americans of two or more races (24.4%) from 2007 to 2009 (Cohn and Passel, 2018). The success of many immigrant families exemplifies the benefits of such close intergenerational relationships. Older immigrants maintain close relationship with their adult children and rely their life on them due to limited English skills, unfamiliarity with US society, and lack of access to public resources (Glick, 2010). Younger immigrants also benefit from close parent–child relationships by receiving assistance on childcare and household work from their parents (Johnson, 2009). Multigenerational co-living from cultures where extended families are not unusual, are cited as one reason for the growing popularity of this complex housing structure.

Multigenerational co-residence decision varies by race and ethnics group. Cohen and Casper (2002) examine multigenerational living arrangements of white, black, and Latino individuals using survey data for the period of 1998 to 2000 and find that blacks and Latinos are

more likely than whites to live in multigenerational households. Shapiro (2006) claims that illegal discrimination exists in housing and mortgage lending markets, causing a gap in homeownership between Blacks and Whites. Evidence on lending discrimination reveals that minorities are more than twice as likely to be denied a mortgage as whites, although correcting for omitted variables, bias significantly diminishes the impact of race (Munnell et al., 1996). The racial climate on the decision of minority to own homes and mortgage financing can influence their decision on multigenerational co-residence to cut down their housing costs.

Multi-generations living together allows families to help care for the elderly, raise children together and enhance the family bond. Multigenerational housing may be an alternative assisted living plan with a saving in long-term care costs alone and a peace of mind that loved ones are taken cared for by family. Fostering and caring for grand children also relieves the financial burden and time constraints of working children and enriches the elder's life than isolation. Multi-generational co-living arrangements may improve health and longevity through increased psychological, social, and financial capital. Healthy people living in two-generation households have longer survival time than healthy people living on their own. Frequent contact with children may reduce symptoms of depression in older age (Buber and Engelhardt, 2008). Ren and Treiman (2015) find that elderly parents living with children are happier when there are grandchildren in the household than those who live independently. Family members experience the high level of emotional bonding and closeness across generations. Grandparents provide important role models in the socialization of grandchildren. Grandchildren, in turn, learn how to care for their elders. Spending time with children can bring purpose and meaning to the lives of older generations.

Making multi-generational housing work for a family requires planning, flexibility, and respect for all parties. Moving into a new household can be challenging and everyone in the

household needs time to make adjustments. Not all multigenerational families experience high levels of emotional closeness. Despite the financial benefits, living in a multigenerational household may strain family relationships. Some multigenerational families may experience lack of privacy and strain on spouses. Family members may feel stressed with obligations like caring for elderly parents, babysitting, redefining roles, balancing the needs of different generations, space and privacy, and redistributing household responsibilities. Evidence shows that multigenerational co-residence may also increase conflict between children and older parents, and lead to a loss of autonomy and independence in older age (Hughes and Waite, 2002; Lang and Schutze, 2002; Silverstein et al., 1996). This relationship may be crucial to understanding the increasing burden of old-age depression in aging societies.

3. Data and Methodology

To examine the determinants of multigenerational co-residence in the United States, we employ the up-to-date housing data from American Housing Survey (AHS). Started in 1973, U.S. Census Bureau [8] has been conducting the biennial and longitudinal survey that provides comprehensive housing information on quality, structure, size, cost, etc. across the United States. The AHS survey not only includes redesigned questionnaire, but also brings in new samples of households each year due to population mobility and geographic changes over time, etc. Hence, it is not appropriate to combine data over surveys conducted over several years. Our research uses the most recent data available from *AHS 2017 Public Use File* (PUF) to reflect the substantial changes made to the survey variables, participates, and methods etc. after 2015 housing survey.

[8] AHS is sponsored by the U.S. Department of Housing and Urban Development (HUD), and conducted by the U.S. Census Bureau.

The multigenerational co-residence sample in this research focuses on the participants responded to the question on "multigenerational co-residence", which is defined as *if three or more generations co-reside in the same housing unit*, and is accordingly restricted to a total of 48,853 observations (henceforce "*3-gen total*"), about 42.88 percent of the entire *AHS 2017 PUF* sample. Depending on the household composition, "*3-gen total*" multigenerational co-residence has two disintegrated types "*householder with two or more younger generations"* (henceforce "*2-younger gen*") and *"householder with at least one younger generation and at least one older generation"* (henceforce "*1-younger & 1-older gen*")[9]. In addition, this paper also includes two special types of multigenerational co-residence groups, *"grandparent headed households without presence of parent"* (henceforce "*grand only*"), and "households with 1 or more subfamilies" (henceforce "*extended*")[10] respectively.

We adopt logistic regression/logit model to explain multigenerational co-residence as shown in the model specification below. The dependent variable is binary where 1 indicates a "multigenerational co-residence" household, and "0" indicates a "non-multigenerational co-residence" household.

$$ln\frac{P_i}{1-P_i} = \beta_0 + \beta_1 * X'_i + \beta_2 * C'_i + \varepsilon_i$$

$$i = 1, \dots, 48653$$

Where P_i is the probability of a survey participate lives in a multigenerational co-residing household. X'_i is a vector of all the potential determinants and C'_i is a vector of all control

[9] Defined by AHS 2017, the "3-gen total" multigenerational co-residence measure actually includes three types, in addition to the two types mentioned above, there is a third type "*householder and two or more older generations*". As there are only 5 observations falling into this category, it is included in the "3-gen total" measure but not examined separately.

[10] These measures are calculated by authors based on the AHS 2017 data, although they are not referred to as "multigenerational households" in AHS data itself.

variables introduced into the specification. The explanatory variables include household demographic and socioeconomic characteristics such as householder's gender, age, education, ethnicity, immigrant status, or years after migration to the U.S. if born in another country for the immigrants subsample, and income per person of a household. The control variables include two housing unit quality measures - home ownership status and number of bedrooms. Furthermore, a metropolitan dummy variable is created to differentiate metropolitan areas from the rest[11]. Lastly, a subject rating variable of the neighbourhood from the participants is also included to account for the neighbourhood ranking differences. Refer to *Table 1* for more details of variable definitions.

Based on the literature, we test the hypothesis that three factors influence multigenerational co-residence choices using three subsamples. First of all, income is selected as an indicator of financial resources to determine multigenerational co-residence. A subsample with only low-income households is examined in *Table 3*, where "low-income household" refers to families and primary individuals received food stamps in the survey. Second, immigration background of households reflects social cultural influence on Multigenerational co-residence choice. Hence a subsample for immigrants is also tested in *Table 4*. Finally, multigenerational co-residence is a joint family decision that takes into account different needs of all family members for quality school education, easy commute to work, and quick access to medical facilities etc. It is worth investigating the determinants of multigenerational co-residence decision for the householders living in a senior community. By the definition of *AHS 2017 PUF*, a senior community refers to a community with majority of the neighbors aged at 55 years or older. The results of senior community subsample are presented in *Table 5*.

[11] According to AHS, the metro area is defined by the official Office of Management and Budget (OMB).

4. Empirical Results

4.1 Descriptive Statistics

Table 1 summaries the descriptive statistics of the sample. The median household income in our complete sample collected is $55,200, with skewness toward higher income households (skewness equals 14.14), partially due to the fact that the sample has proportionally more responses from the metropolitan areas (56.58 percent from the 15 largest metropolitan areas, and another 34.09 percent from other "smaller" metropolitan areas, as defined by AHS). In terms of house ownership, 60.41 percent of the households in the sample own the housing unit, with the median current housing market value equals $234,557. The median monthly housing cost is $1,099, regardless of owning or renting the housing unit. Broken down by ethnic groups, there are about 75.91 percent White, 14.84 percent African American, 6.24 percent Asian and 15.77 percent Latino[12]. In addition, 19.01 percent are immigrants born in countries other than United States, and 60.69 percent of the householders in sample have above high school education. Lastly, 50.73 percent of householders are male in the sample, slightly more than females.

4.2 Baseline Results

Table 2 investigates the five specifications of multigenerational co-residence pattern and reports the findings based on the full sample in five columns. As defined in the previous section, the five columns respectively present the results of the "*3-gen total*" (*column 1*) with its two disintegrated types "*2-young gen*" (*column 2*) and "*1-younger&1-older gen*" (*column 3*), and the two special types of multigenerational co-residence— "*grand-only*" (*column 4*) and "*extended*" (*column 5*).

[12] Latino or Hispanic can be any race, for example, one can be White and the same time Latino, defined by AHS.

We first present the overall pattern of multigenerational co-residence of the whole sample in column 1. In general, socioeconomic measures such as household income per capita and householder's education attainment matter in determining multigenerational co-residence. Consistent with Cohen and Casper (2002), the households with lower income per capita are significantly more likely to adopt multigenerational co-living than the counterpart, with the likelihood increasing 3.5 percent for one thousand dollars decrease in per capita income. Similarly, female or less educated heads of household with high school education or below are more likely to live in a multigenerational household, compared with male counterparts (44.8 percent more) and householders with some college education attainment (27.7 percent more). The inverse relationship between multigenerational co-residence decision and education level is in line with the findings of Aquilino (1990) that parents with more education are likely to have children with more education, who are more financially independent and therefore choose not to live with parents. The results are consistent for the rest four composited household specifications. Besides, chance of multigenerational co-residence increases as the age of a householder increases, with 1.3 percent increase in co-residence rate for every one year change in householder's age.

While our findings support Cohen and Casper (2002) in that multigenerational co-residence decision varies by race, and minority householders with multiple generations are significantly more likely to co-reside under the same roof than White counterparts, we further find Asian American households actually are in between Latino and African American households in co-residence. Specifically, Latino has the highest likelihood to live with multi-generations (79.3 percentage points higher than that of all the other ethnic groups), followed by Asian (56.7 percentage points higher than that of all the other ethnic groups) and lastly African American (45.9 percentage points higher than that of all the other ethnic groups). Consistent with Kamo (2000),

financial factor, specifically, the household income per capita is a significant determinant that negatively relates to multigenerational co-residence decision. Intuitively, this suggests a multigenerational household chooses to co-reside when its household income per capita is not sufficient to afford other alternative residential arrangements. Once their income constraint is relaxed, an increase in household income would reduce their willingness to co-reside.

When separated by the household composition, the disintegrated types of multigenerational co-residence generally exhibit quite consistent results, except for the differences in magnitude of coefficients. In spite of that, different ethnic groups do display distinct preferences on one or more of the four co-residence types. Latino has the highest co-residential probability—more than twice as much as all the other ethnic groups together in households with two or more younger generations (*2-younger gen, column 2*); very close coefficient is also observed in household type with one or more subfamilies (*extended family, column 5*). For Asian families, the most typical multigenerational pattern is householder co-residing with his/her parent(s) and child(ren) (*1-younger&1-older gen, column 3*), which is about 75.7 percent higher more likely than the average all the other ethnic groups; followed by the extended family pattern, which is about 43.2 percent points higher (*column 5*) that other ethnics. Asian households are not significantly different than the other groups in the *2-younger gen* and *grand-only* patterns. While African American and Latino show almost equal likelihood to adopt the living pattern of grandparent householder with grandchildren only (*grand-only, column 4)*, higher than the average of the other groups together by 77.5 and 76 percentage points, respectively; Asian group, is insignificant about such co-residence arrangement though. Asian households which is about 43 percentage points than the average all the other groups.

Consistent with Glick (2010), Hsueh et al. (2008), and Kritz et al. (2000), immigrant households are also more likely to co-reside with multiple generations than non-immigrants, suggested by all five columns except for the *2-younger gen* families (*column 2*), where there is no significant difference observed. What is worth mentioning is, opposite sign is found in the *1-younger&1-older gen* household (*column 3*), cultural differences of the immigrant as well as financial disadvantage may attribute to the findings here. Especially when contrasting *column 3* (with middle-aged householder) to *column 4* (with grandparent householder), it seems that the current middle-aged American householders are less inclined to co-reside with multiple generations compared to the immigrant counterparts; while the older generation American householders prefer just the opposite, as they are more inclined to co-reside multi-generationally. Of course, it is also possible due to the fact that immigrant families are not very common to migrate with grandparents and grandchildren only but without parents.

Lastly, as our control variables suggest, the evidence of home ownership in relation to multigenerational co-residence is mixed, depending on the multigenerational composition. Living in a metropolitan area generally does not significantly affect co-residence decision, except for the *1-younger&1-older gen* in *column 3*. In addition, multigenerational co-residence households are more common among the neighborhoods with lower subjective ratings. Both of these can be explained by the financial motivation to support multigenerational co-living, if housing are more costly in metropolitans and less costly in poorly rated neighborhoods. Especially, considering the fact that multigenerational co-residence households will choose to live in more spacious housing units, as indicated by the number of bedrooms, the financial constraints on housing budget would push more multigenerational co-residing families to the lower-rated neighborhoods.

4.3 Low-income Subsample

Consistent with the current literature (Cohen and Casper, 2002; Kamo, 2000), we find financial factor continues to be one of the major determinants of multigenerational co-living decision for low-income group as shown in Table 3. As aforementioned, rather than using an arbitrary income threshold, low-income household here refers to as the families and primary individuals received food stamps.

Compared to that in the full sample where households of all income levels are included, household income per capita for the pooled low-income families exhibits a significantly negative but smaller coefficient (*columns 1,2 and 5)*, suggesting that low-income families are also less (or more) inclined to co-reside with multiple generations when their household per capita increases (or decreases), although such willingness is not as strong as the higher income groups. For example, for every one thousand dollars increase in household annual income per person, the likelihood of low-income families rejecting multigenerational co-residence arrangement is 1.9 percent lower than that of other income groups (*column 1*). The explanation for the lower sensitivity of low income group on multigenerational co-living decisions in response to incomes changes could be due to the fact that due to relative higher housing-cost to income ratio, they may still not be able to afford separate living arrangements with the income increases, if such increases are not substantial to improve their financial status. Nevertheless, financial factors still matters for low-income families to adjust their multigenerational co-residence decisions to income changes just with smaller magnitude. However, the specification *grand-only* households (*column 4*) are more sensitive to changes in household income per capita in making multigenerational co-residence decisions than the other types of households. Families with the grandparents in custody

of grand children without parents are more strongly driven by financial reasons, therefore, prefer to adopt multigenerational co-residence to reduce financial distress when possible.

We observe little variation among different ethnic groups except for low-income Latino families, which still present significant but weaker preference in multigenerational co-living across all household types, as compared to the full Latino group. Neither African American nor Asian low-income households are significantly different from the other ethnic groups; although the coefficients are smaller compared with the full sample of all income groups. Our finding suggests that income factor could overrules the social cultural background differences for the low-income group.

4.4 Immigrant Subsample

As confirmed in the current literature and above tables, immigrant households with different social cultural inheritance in general tend to more multi-generationally co-residential than non-immigrants. We inquire that if there exists a "assimilation effect" for the immigrant, who may behave more like their non-immigrant counterparts in terms of preference of multigenerational co-residence. After controlled for "year householder came to the U.S.", this is tested with an immigrant subsample in *Table 4*. Overall, although the positive coefficients suggest that immigrants moved to the U.S. in the later years have higher multigenerational co-residence tendency than those came earlier, none of the coefficients of "year householder came to the U.S." is significant at 0.05 or below level. Therefore, no evidence supporting the "assimilation effect" is found in the immigrant subsample—the multigenerational co-residential preference is persistent in immigrant households. Although, there are few distinct control variables caught our attention.

The first distinction comes from the more noticeable role education attainment plays in making the multigenerational co-residence decision among immigrant householders. A better educated immigrant householder (measured by if a householder has some college or above level of education) exhibits significantly lower probability of heading a multigenerational household compared with the households in the full sample. Depending on the multigenerational composition, the likelihood can differ up to 23.6 percentage points (*column 2*). It is understandable as explained by Aquilino (1990) that parents' education reduces the likelihood that their adult children live with them, possibly due to the financial independence of their children who are likely to receive better education as well. The case is particularly true for the immigrants who immigrated to the U.S. to pursue better education and other opportunities.

The other distinction is that home ownership dummy plays a significant and positive role in affecting the co-residence decision among immigrants, with the coefficient increases sharply from 1.5 percent in the full sample (*Table 2*) to 36.5 percent in the immigrant subsample (*column 1, Table4*). The findings are in support of Glick (2010)'s work in that many successful immigrant families with multiple generations live under the same roof benefit from maintaining close intergenerational relationship with their adult children and grandchildren and resource sharing.

Additionally, compared with those in the full sample, immigrant households co-reside with multiple generations are more likely to live in smaller housing units (as indicated by number of bedrooms measure) and in neighborhoods of poor ratings. This former probably suggests that the immigrant face more financial strain in their housing choice; and the latter indicates that immigrants have to compromise to the constraints from their financial strain and household composition preference, by sacrificing the quality of neighborhoods they choose to co-reside in.

4.5 Senior community subsample

The benefits of co-residing with multiple generations are mutual to all the family members including the seniors. Hence, in Table 5 we continue to investigate a subsample of households living with multiple generations in senior communities, which is defined as the majority of the neighbors over 55 years old. Unlike those in the previous tables, several socioeconomic variables are no longer the determinants of multigenerational co-residence in the senior community subsample except for income, including gender, education, immigrant background, and ethnic group (except for Latino). The overall preference for multigenerational co-residence among Latino households living in the senior community is still significantly higher than that of the other groups by about 68 percentage points, although slightly lower than that in the full sample.

It is worth noting the flipped sign of the coefficient of householder's age in the senior community subsample (*column 1 & column 3)*, as compared to that in the full sample and other two subsamples. The negative coefficient of householder's age suggests that the relatively "younger" householders are more inclined to adopt multigenerational co-living in a senior community (mean age of the householders 66.68 years). Recall that in the full sample when householders of all ages are mixed (*Table 2*), "older" householders are more likely to head a household than the younger householders (mean age of householder 52 years). This contrast seems to suggest that young adults' multigenerational co-residence is more likely to be in their parents' houses, while senior citizens tend to live in their children's houses. Although the current dataset does not provide more information than that, clearly there exists an inverted U-shaped relation between householder's age and multigenerational householder rate—willingness to head a multigenerational household first increase then decrease. Possibly, this transition is related to when a person is retired, along with many other changes around that age.

Finally, households living in the metropolitan areas bear significantly higher housing cost than the counterparts live elsewhere, however the metropolitan control variable in the previous tables do not seem to be involved in influencing multigenerational co-residence decision. As a robustness check, we test the five multigenerational household compositions with a metropolitan subsample, which is restricted to only include the 15 most expensive metro areas in AHS 2017[13]. However, no significantly different results are found for the determinants, as they are highly consistent with those in the full sample across. The findings are available upon request.

5. Conclusions

To summarize, household income appears consistently to be a significant determinant of multigenerational co-residence across all household compositions. Socioeconomic and cultural factors are also determinants, especially reflected by immigrants and minority households, as both have higher likelihood to adopt this complex household structure. Among the three ethnic groups we investigated, Latino households are most likely to co-reside with multiple generations, typically with the co-residential composition of a grandparent householder living with two younger generations. Asian households are the second largest group with strong multigenerational co-residence preference, with a typical household composition of a middle-aged householder living with one younger and one older generation. Although ranked behind Latino and Asian households, African American households still show higher multigenerational co-residential rate than white, and the co-residence arrange is more typical to be a grandparent household living with

13 These metropolitan areas are: New York-Newark-Jersey City, NY-NJ-PA; Los Angeles-Long Beach-Anaheim, CA; Chicago-Naperville-Elgin, IL-IN-WI; Dallas-Fort Worth-Arlington, TX; Philadelphia-Camden-Wilmington, PA-NJ-DE-MD; Houston-The Woodlands-Sugar Land, TX; Washington-Arlington-Alexandria, DC-VA-MD-WV; Miami-Fort Lauderdale-West Palm Beach, FL; Atlanta-Sandy Springs-Roswell, GA; Boston-Cambridge-Newton, MA-NH; San Francisco-Oakland-Hayward, CA; Detroit-Warren-Dearborn, MI; Riverside-San Bernardino-Ontario, CA; Phoenix-Mesa-Scottsdale, AZ; Seattle-Tacoma-Bellevue, WA.

grandchildren. However, the differences in multigenerational co-residence among different ethnic groups disappear in the low-income groups, suggesting that income overrules the cultural factors.

Immigrants tend to live in multigenerational co-residential housing units, even with smaller size and relatively poorer neighborhoods, to some extent, this could be what they have compromised for their persistent and stronger preference over time of living with multiple generations. After controlled for household income and other factors, immigrants do not behavior more like non-immigrants in co-residence preference as they stay in the U.S. longer. With better education, the multigenerational co-residence preference of an immigrant householder will decrease more than a non-immigrant householder does, suggesting the more significant role education plays in determining the one's socioeconomic status, which is reflected in their flexibility to choose residential arrangements. Immigrants in general, also tend to co-reside with multiple generations in the owned housing units, which is not the case for non-immigrants.

Age and gender matters in multigenerational co-residence decision. Older householders or female householders are significantly more likely to co-reside with multiple generations. However, senior citizens with average age of about 66.7 years tend to less likely head a multigenerational household in our sample. This could suggest heading a multigenerational household is likely positively associated with more financial and family responsibilities. Lastly, although living in a metropolitan area does not significantly affect the co-residence decisions, some evidence suggests that multigenerational co-residential families tend to live in inferior neighborhoods, compared with the counterparts.

The study on multigenerational co-residence choice imposes important theoretical and practical implications. Our findings not only contribute to theoretical understanding of immigrant and different ethnic and aging groups in a social science context, but also provides evidence on

how households respond to economic shocks and financial hardships. The unprecedented COVID-19 pandemic provides an ideal research setting to study how households cope with the tremendous uncertainties in the job markets and financial markets. The dramatic and persistent shift in the ways of working and living motivate more research opportunities post COVID-19 on multigenerational co-residence.

Table 1 Descriptive Statistics

Note: * The 2017 AHS National PUF household dataset covers 15 largest metro areas in the U.S., they are New York-Newark-Jersey City, NY-NJ-PA; Los Angeles-Long Beach-Anaheim, CA; Chicago-Naperville-Elgin, IL-IN-WI; Dallas-Fort Worth-Arlington, TX; Philadelphia-Camden-Wilmington, PA-NJ-DE-MD; Houston-The Woodlands-Sugar Land, TX; Washington-Arlington-Alexandria, DC-VA-MD-WV; Miami-Fort Lauderdale-West Palm Beach, FL; Atlanta-Sandy Springs-Roswell, GA; Boston-Cambridge-Newton, MA-NH; San Francisco-Oakland-Hayward, CA; Detroit-Warren-Dearborn, MI; Riverside-San Bernardino-Ontario, CA; Phoenix-Mesa-Scottsdale, AZ; Seattle-Tacoma-Bellevue, WA.

Variables	Explanation	Number of Obs.	Frequency/Percent of 1 if Binary	Mean	Std. Dev.	Min	Max
Dependent Variables: Co-residence Types							
Three or more generation households	Yes: "1"; No: "0"; the sum of the two types below.	55,125	1,979/3.59	0.036	0.186	0	1
Three or more generation households with householder and two or more younger generations	Yes: "1"; No: "0"	55,125	1,285/2.33	0.023	0.151	0	1
Three or more generation households with householder and at least one younger generation and at least one older generation	Yes: "1"; No: "0"	55,125	689/1.25	0.012	0.111	0	1
Grandparent headed household, no parent present	Yes: "1"; No: "0"	55,125	761/1.38	0.014	0.117	0	1
Households with 1 or more subfamilies	Yes: "1"; No: "0"	55,125	1,481/2.69	0.027	0.162	0	1
Determinant Variables:							
Household income per person	In thousand U.S. Dollars	55,125	-	37.944	62.922	-5	5540
Householder's gender	Female: "1"; male: "0"	55,125	27,159/49.27	0.493	0.500	0	1
Householder's age	15-85 years only	55,125	-	52.012	16.715	15	85
Householder's education, if some college or above	High school or below: "0"; some college and above: "1"	55,125	33,456/60.69	0.607	0.488	0	1
African American householder	Yes: "1"; No: "0"	55,125	8,183/14.84	0.148	0.356	0	1
Asian householder	Yes: "1"; No: "0"	55,125	3,441/6.24	0.062	0.242	0	1
Latino householder	Yes: "1"; No: "0"	55,125	8,693/15.77	0.158	0.364	0	1
Non-immigrants/born in the States	Yes: "1"; No: "0"	10,989	44,645/80.99	0.810	0.392	0	1
Year householder came to the U.S.	1932-2017 only	55,125	-	1992.175	15.303	1932	2017
Control Variables:							
Number of bedrooms	Used to control for unit size and structure	55,125	-	2.747	1.079	0	5
Home ownership	Owned: "1"; Rented: "0"	55,125	33,299/60.41	0.604	0.489	0	1
Subjective rating of the neighborhood	Worst: "1"; best: "10"	55,125	-	8.202	1.773	1	10
If metropolitan area	Yes: "1"; No: "0"	55,125	49,982/90.67	0.907	0.291	0	1
If among the 15 largest metro areas in sample*	Yes: "1"; No: "0"	55,125	31,188/56.58	0.566	0.496	0	1

Table 2 Full sample

Note: Variables in the top row are the four variations of the dependent variables. Refer to Table-1 for details of all variables. Standard errors are reported in parentheses, with *** p<0.01, ** p<0.05, * p<0.1.

	(1)	(2)	(3)	(4)	(5)
Dependent Variables	Three Generations Total	Three Generations with Two Younger Generations	Three Generations with One Younger Generation and One Older Generation	Grandparents and Grandchildren, without parents	Extended Family—With One or More Subfamilies
Household income per person	-0.035***	-0.038***	-0.027***	-0.031***	-0.033***
	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)
Householder's gender	0.448***	0.253***	0.749***	0.367***	0.167***
	(0.050)	(0.060)	(0.084)	(0.078)	(0.056)
Householder's age	0.013***	0.041***	-0.044***	0.046***	0.020***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)
Householder's education, if college and above	-0.277***	-0.401***	-0.031	-0.535***	-0.392***
	(0.052)	(0.064)	(0.087)	(0.082)	(0.060)
African American householder	0.459***	0.571***	0.255**	0.775***	0.268***
	(0.065)	(0.078)	(0.114)	(0.092)	(0.079)
Asian householder	0.567***	0.093	0.757***	0.296	0.432***
	(0.103)	(0.158)	(0.140)	(0.230)	(0.123)
Latino householder	0.793***	1.007***	0.385***	0.760***	0.937***
	(0.068)	(0.084)	(0.111)	(0.113)	(0.076)
Non-immigrant householder	-0.264***	-0.008	-0.775***	0.653***	-0.201***
	(0.065)	(0.083)	(0.102)	(0.126)	(0.074)
Number of bedrooms	0.754***	0.836***	0.630***	0.525***	0.747***
	(0.026)	(0.032)	(0.042)	(0.041)	(0.029)
Home Ownership	0.015	-0.157**	0.312***	-0.096	-0.072
	(0.060)	(0.075)	(0.098)	(0.097)	(0.069)
Subjective rating of the neighborhood	-0.039***	-0.052***	-0.021	-0.038*	-0.048***
	(0.013)	(0.016)	(0.022)	(0.020)	(0.015)
Metro areas	0.141	0.079	0.342**	-0.075	0.119
	(0.088)	(0.102)	(0.173)	(0.116)	(0.099)
Constant	-5.437***	-7.502***	-3.969***	-8.063***	-5.816***
	(0.188)	(0.240)	(0.311)	(0.306)	(0.214)
Number of obs.	55125	55125	55125	55125	55125
Pseudo R-sq.	0.139	0.167	0.144	0.132	0.133
Log likelihood	-7341.095	-5081.966	-3170.382	-3486.162	-5910.829
LR Chi-sq.	2372.210	2036.109	1067.145	1057.430	1813.408
Prob. of Chi-sq.	0.000	0.000	0.000	0.000	0.000

Table 3 Low-income Subsample

Note: Variables in the top row are the four variations of the dependent variables. Refer to Table-1 for details of all variables. Standard errors are reported in parentheses, with *** p<0.01, ** p<0.05, * p<0.1.

	(1)	(2)	(3)	(4)	(5)
Dependent Variables	Three Generations Total	Three Generations with Two Younger Generations	Three Generations with One Younger Generation and One Older Generation	Grandparents and Grandchildren, without parents	Extended Family—With One or More Subfamilies
Household income per capita	-0.016***	-0.027***	0.004	-0.058***	-0.017***
	(0.005)	(0.007)	(0.007)	(0.014)	(0.006)
Householder's gender	0.271**	0.115	0.646***	0.535***	0.020
	(0.107)	(0.122)	(0.211)	(0.190)	(0.116)
Householder's age	0.019***	0.044***	-0.054***	0.058***	0.026***
	(0.003)	(0.004)	(0.007)	(0.006)	(0.004)
Householder's education, if college and above	-0.106	-0.248*	0.316*	-0.687***	-0.131
	(0.105)	(0.127)	(0.178)	(0.207)	(0.119)
African American householder	0.063	0.017	0.091	0.023	-0.072
	(0.117)	(0.137)	(0.217)	(0.187)	(0.135)
Asian householder	0.357	0.076	0.558	-0.068	0.277
	(0.256)	(0.343)	(0.362)	(0.567)	(0.298)
Latino householder	0.505***	0.696***	-0.102	0.435**	0.679***
	(0.131)	(0.151)	(0.244)	(0.219)	(0.144)
Non-immigrant householder	-0.250*	0.181	-1.194***	0.562**	-0.027
	(0.131)	(0.159)	(0.221)	(0.249)	(0.148)
Number of bedrooms	0.853***	0.946***	0.583***	0.690***	0.881***
	(0.050)	(0.058)	(0.090)	(0.080)	(0.055)
Home Ownership	0.369***	0.209	0.626***	0.023	0.202
	(0.112)	(0.130)	(0.207)	(0.191)	(0.126)
Subjective rating of the neighborhood	-0.028	-0.042*	0.012	-0.017	-0.027
	(0.022)	(0.025)	(0.040)	(0.036)	(0.025)
Metro areas	0.165	0.040	0.669*	0.010	-0.070
	(0.157)	(0.172)	(0.379)	(0.231)	(0.165)
Constant	-5.625***	-7.456***	-3.612***	-8.687***	-6.079***
	(0.355)	(0.428)	(0.661)	(0.627)	(0.395)
Number of obs.	6261	6261	6261	6261	6261
Pseudo R-sq.	0.128	0.163	0.145	0.143	0.129
Log likelihood	-1636.048	-1253.178	-608.247	-705.162	-1354.865
LR Chi-sq.	481.514	489.465	206.730	236.198	402.487
Prob. of Chi-sq.	0.000	0.000	0.000	0.000	0.000

Table 4 Immigrant Subsample

Note: Low-income households are identified with if they claim using food stamp. Variables in the top row are the four variations of the dependent variables. Refer to Table-1 for details of all variables. Standard errors are reported in parentheses, with *** p<0.01, ** p<0.05, * p<0.1.

	(1)	(2)	(3)	(4)	(5)
Dependent Variables	Three Generations Total	Three Generations with Two Younger Generations	Three Generations with One Younger Generation and One Older Generation	Grandparents and Grandchildren, without parents	Extended Family—With One or More Subfamilies
Household income per person	-0.033***	-0.033***	-0.032***	-0.048***	-0.022***
	(0.003)	(0.005)	(0.004)	(0.010)	(0.003)
Householder's gender	0.319***	-0.005	0.647***	0.674***	-0.141
	(0.085)	(0.115)	(0.123)	(0.204)	(0.097)
Householder's age	0.011***	0.057***	-0.047***	0.059***	0.024***
	(0.004)	(0.005)	(0.006)	(0.008)	(0.004)
Householder's education, if college and above	-0.304***	-0.637***	-0.048	-0.733***	-0.475***
	(0.099)	(0.145)	(0.139)	(0.251)	(0.116)
African American householder	0.294*	0.466*	0.136	0.848***	-0.147
	(0.167)	(0.243)	(0.225)	(0.318)	(0.222)
Asian householder	0.518***	0.642***	0.360*	0.468	0.385**
	(0.148)	(0.237)	(0.187)	(0.332)	(0.179)
Latino householder	0.781***	1.685***	-0.136	0.569**	1.076***
	(0.133)	(0.202)	(0.181)	(0.278)	(0.158)
Year householder came to the U.S.	0.004	0.008	-0.001	0.000	0.008*
	(0.004)	(0.005)	(0.006)	(0.008)	(0.004)
Number of bedrooms	0.579***	0.692***	0.491***	0.535***	0.599***
	(0.045)	(0.062)	(0.065)	(0.102)	(0.051)
Home Ownership	0.365***	0.162	0.627***	-0.031	0.090
	(0.103)	(0.139)	(0.151)	(0.242)	(0.115)
Subjective rating of the neighborhood	-0.060**	-0.078**	-0.032	-0.071	-0.050*
	(0.024)	(0.032)	(0.036)	(0.054)	(0.028)
Metro areas	0.287	-0.069	0.779	-0.276	0.205
	(0.322)	(0.387)	(0.593)	(0.605)	(0.354)
Constant	-12.634	-23.890**	-1.775	-9.144	-22.173**
	(7.934)	(9.998)	(12.757)	(16.160)	(8.811)
Number of obs.	10480	10480	10480	10480	10480
Pseudo R-sq.	0.113	0.193	0.111	0.164	0.113
Log likelihood	-2159.621	-1246.194	-1194.313	-514.136	-1774.109
LR Chi-sq.	548.477	595.459	299.438	202.136	452.173
Prob. of Chi-sq.	0.000	0.000	0.000	0.000	0.000

Table 5 Senior community Subsample

Note: Senior communities are identified with those with majority of the neighbors are 55 years or over. Variables in the top row are the four variations of the dependent variables. Refer to Table-1 for details of all variables. Standard errors are reported in parentheses, with *** p<0.01, ** p<0.05, * p<0.1.

	(1)	(2)	(3)	(4)	(5)
Dependent Variables	Three Generations Total	Three Generations with Two Younger Generations	Three Generations with One Younger Generation and One Older Generation	Grandparents and Grandchildren, without parents	Extended Family—With One or More Subfamilies
Household income per person	-0.031***	-0.024***	-0.043***	-0.037***	-0.028***
	(0.006)	(0.007)	(0.013)	(0.009)	(0.007)
Householder's gender	0.410*	0.186	0.647	-0.270	0.152
	(0.220)	(0.263)	(0.405)	(0.299)	(0.248)
Householder's age	-0.053***	0.011	-0.135***	-0.015	-0.014
	(0.010)	(0.013)	(0.016)	(0.015)	(0.011)
Householder's education, if college and above	-0.399*	-0.492*	-0.127	-0.228	-0.457*
	(0.233)	(0.280)	(0.421)	(0.312)	(0.265)
African American householder	0.295	0.501	0.053	0.494	-0.011
	(0.280)	(0.325)	(0.534)	(0.366)	(0.352)
Asian householder	0.251	-0.009	0.351	-0.245	0.215
	(0.516)	(0.819)	(0.727)	(1.124)	(0.622)
Latino householder	0.681**	0.875**	0.451	0.327	1.147***
	(0.320)	(0.407)	(0.498)	(0.512)	(0.345)
Non-immigrant householder	-0.110	0.496	-0.887*	0.580	0.047
	(0.322)	(0.456)	(0.476)	(0.565)	(0.367)
Number of bedrooms	1.019***	1.057***	0.855***	0.368**	1.039***
	(0.126)	(0.150)	(0.228)	(0.170)	(0.142)
Home Ownership	-0.137	-0.094	-0.052	0.727	-0.132
	(0.295)	(0.383)	(0.485)	(0.454)	(0.346)
Subjective rating of the neighborhood	0.068	0.036	0.169	0.104	-0.011
	(0.071)	(0.090)	(0.115)	(0.104)	(0.079)
Metro areas	0.702	0.753	0.312	-0.056	0.012
	(0.534)	(0.615)	(1.063)	(0.490)	(0.459)
Constant	-3.349***	-8.427***	0.556	-4.876***	-4.924***
	(1.058)	(1.413)	(1.712)	(1.512)	(1.174)
Number of obs.	2761	2761	2761	2761	2761
Pseudo R-sq.	0.206	0.142	0.418	0.085	0.159
Log likelihood	-349.223	-267.436	-114.312	-225.132	-289.707
LR Chi-sq.	181.118	88.386	163.998	41.951	109.410
Prob. of Chi-sq.	0.000	0.000	0.000	0.000	0.000

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U.S. Minority Banks: Why So Few — After 150 Years?

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Abstract

In 1865, the first minority bank in the United States was established. Over time, banks owned or controlled by minorities have grown in number. Yet, one hundred and fifty years later, they still account for only 2.8 percent of all banks. The contribution of this paper is fourfold. First, it provides a comprehensive assessment of the role of different types of MDIs in the banking industry as well as the characteristics of the communities in which they operate. Second, it contributes to the corporate finance literature that focuses on the extent to which the diversity of ownership/control affects the performance and riskiness of firms, but is among the few that does so in terms of majority ownership/control of banks. Third, the paper examines the recent performance of MDIs from the perspective of whether their disproportionately small role in the banking industry is due to their relatively poorer and riskier performance as compared to nonMDIs. Fourth, a check on the robustness of the results is provided, including for the first time using two different databases on MDIs, one from the FDIC and the other from the FRB. It is found the MDIs are in communities in which the largest share of the population is a minority and one in which income and poverty are worse compared to national averages. Importantly, when MDIs are compared to non-MDIs the results indicate the MDIs generally, in contrast to most previous studies, show no sign of underperformance or greater riskiness. The policy issue that arises for future research based on this finding is if it is not performance and risk then what does explain the lack of significant diversity in terms of ownership/control in the US banking industry.

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Introduction

On March 3, 1865, the first minority bank, the Freedmen's Savings Bank and Trust Company (an African American bank), was approved to operate by the US Congress and signed into law by President Lincoln.[14] Over time, banks owned or controlled by minorities, known as minority depository institutions (MDIs), have grown in number. MDIs are owned/controlled by Blacks or African Americans, Asians or

[14] See Baradaran (2017), who points out Freedmen's Savings Bank and Trust Company was the only bank to be chartered by the US Congress, except for the First Bank and Second Bank of the United States.

Pacific Islander Americans, Hispanic Americans, and Native Americans or Alaskan Native Americans.[15] These four types of MDIs account for 100 percent of all MDI offices and total assets, as of December 2018. Although their numbers have grown over time, more than one hundred and fifty years later, they still account for only 2.8 percent of all banks.[16] This is a disproportionately small percentage when compared to the minority shares of the population (38 percent) and business firms (19 percent), and some percentages are even disproportionately smaller for some types of MDIs. In the case of African American banks, there are only 23 of 5,797 banks, or less than one half of one percent of the total.

Importantly, the Financial Institutions Reform, Recovery, and Enforcement Act (FIRREA) of 1989, as amended by the Dodd-Frank Wall Street Reform and Consumer Protection Act (DoddFrank Act) of 2010, requires the Secretary of the Treasury to consult with the Chairman of the Board of Governors of the Federal Reserve System (FRB), the Comptroller of the Currency (OCC), the Chairman of the National Credit Union Administration (NCUA), and the Chairperson of the Board of Directors of the Federal Deposit Insurance Corporation (FDIC) on methods for best achieving the following: (1) preserving the present number of MDIs, and (2) promoting and encouraging the creation of new MDIs.[17] Also, the federal banking agencies are required to file an annual report to the US Congress containing a description of actions taken to carry out FIRREA. The words in the law itself suggest an assessment of MDIs as compared to non-MDIs in the banking sector seems warranted to provide some perspective on the progress made by bank regulators to support the preservation and expansion of MDIs.[18] Despite these requirements and the need to understand better the role of the major racial and ethnic groups in banking, there have been relatively few studies and even fewer studies in recent years examining the importance of MDIs within the banking industry as well as examining potential factors that may explain the relative underrepresentation of the groups owning/controlling MDIs in the population.

The purpose of this paper is to help close this current gap in research and to stimulate further research on the ongoing and potential future contribution of MDIs to the banking industry. Specifically, we make four contributions to the existing literature. First, we are the first to provide a comprehensive and current assessment of the role of different types of MDIs over time in the banking industry as well as the characteristics of the communities in which they typically operate. Second, we contribute to the corporate finance literature that focuses on the extent to which the diversity in the ownership/control of non-financial firms affects performance and riskiness[19], but are among the few that do so in terms of actual majority ownership/control of banks by different minority groups. Third, we examine the

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[15] See the following website for more information on MDIs: https://www.fdic.gov/regulations/resources/minority/mdi.html, accessed June 18, 2019.

[16] The corresponding share of all bank assets is 1.3 percent, as of the fourth quarter of 2018.

[17] See https://www.federalreserve.gov/publications/files/preserving-minority-depository-institutions-2018.pdf, accessed July 26, 2019. In this regard, Ricks and Consumer Financial Protection Bureau (2018, p. 14) state that "The Office of Minority Banks and Section 367 [of the Dodd Frank Act] have been in place for over ten years, the effectiveness of these measures appears at best to be minimal."

[18] In March 1969, the Minority Bank Deposit Program was created in response to an Executive Order by President Nixon, which established a national program supporting minority business enterprise. Section 308 of FIRREA includes provisions supporting the intent of the MDBP. See https://fiscal.treasury.gov/mbdp/about.html, accessed July 26, 2019.

[19] For example, in one of the earliest empirical studies, Carter, Simkins and Simpson (2003) examine the relationship between board diversity and firm value for Fortune 1,000 firms. They find a significant positive relationship between the fraction of women or minorities on the board and firm value. In a related paper, Erhardt, Werbel and Shrader (2003) find that there is a positive relationship between the percentage of women and minorities on boards of directors for 127 large US companies and financial indicators of firm performance.

performance of the MDIs from the perspective of whether their disproportionately small role in the banking industry is due to their relatively poorer and riskier performance as compared to non-MDIs, controlling for various bank variables and taking into account characteristics of the local communities in which the different types of banks operate. Fourth, we check the robustness of or results in various ways, including for the first time using two different databases on MDIs, one from the FDIC and the other from the FRB.

Based on our empirical results, we find that the likelihood of an MDI office being in a particular community is highly dependent upon the percentage of the population in that community that is a minority and a community characterized by a relatively low household income and high poverty rate. We obtain quite similar results for each of the four types of MDIs. For instance, the likelihood of a Black MDI office being in a community is highly associated with the percentage of the population that is African American and one associated with lower income and more poverty than found in other communities without such an MDI. Also, we compare the performance and riskiness of MDIs and non-MDIs operating in the same communities to control for common demographic and economic factors that affect both types of institutions. Our results generally indicate that MDIs in general do not underperform or display greater riskiness than non-MDIs.

This finding is contrary to many previous studies and suggests they may be no less desirable as an investment opportunity. Indeed, one of the earliest important articles on MDIs is by Brimmer (1971), who is the first African American to have served as a governor of the Federal Reserve System. He focuses exclusively on the performance of black-owned banks and finds that they are less profitable than non-black-owned banks. Boorman and Kwast (1974) examine the performance of eight minority-owned banks and find that their loan losses are about twice as high as non-minority banks, with both types of banks located in the same SMSA. As a result, they also find that the large loan losses impair the ability of minority-owned banks to generate operating profits.[20] Kwast and Black (1983) compare black-owned banks with a matched set of non-minorityowned banks at the SMSA level and find that higher loan loss rates appeared to be the single most important factor in explaining the less profitable performance of black banks.[21] Clair (1988) finds that compared with other banks serving the same areas, black-owned banks have no difference in loan losses and operating expenses, but a slightly lower return on assets. Meinster and Elyasiani (1988) also examine the performance of minority-owned banks and find that their aggregate poor profitability as compared to non-minority-owned banks is due to black-owned banks. Price (1990) finds that smaller minority-banks, on average, are less profitable than non-minority-banks of similar size. Lawrence (1997) also finds that black banks generally are less profitable than their non-minority peers competing in the same marketplace, based on a zip-code level analysis. At the same

[20] In a related paper, Henderson (1999) argues that the poor performance of Black MDIs may be attributable to inadequate assessment of risk as measured by adjustments to the provision for loan loss.

[21] An interesting paper, Black, Collins, and Cyree (1997) find that only black-owned banks utilize applicant race in the mortgage credit decision. In addition, they find that black-owned banks are more likely than white-owned banks to reject similarly situated black applicants, but do not attribute this result to discrimination against black borrowers. They suggest that their results indicate that the cultural affinity hypothesis may run from white-owned banks to white applicants and not from black-owned banks to black applicants.

time, he finds that there is no significant difference in profitability in the case of Hispanic and Asian banks.[22]

Several more recent articles are by Breitenstein, et al. (2014), Hoque, et al. (2015), Toussaint-Comeau and Newberger (2017) and Breitenstein, et al. (2019). The article by Breitenstein, et al. (2014) uses annual data from 2001 through 2012 to compare the performance of MDIs and non-MDI community banks. Similar to many previous studies conducting such comparisons, they find that MDIs are significantly less profitable than non-MDI community banks based on t-tests. Toussaint-Comeau and Newberger (2017) perform a census-tract level analysis and document that MDIs significantly underperform their peers in similar markets in terms of profitability. Hoque, et al. (2015) in a study of all banks and approximately 100 minority-owned banks for the period 2002 to 2012 also find that many minority-owned banks tended to be less profitable than other banks.[23] Also, according to Elyasiani and Mehdian (1992, p. 946), "… the profitability shortfall of the MOBs [MDIs] is most probably due to … factors such as clientele profile and neighborhood characteristics, and thus, changes in management will not necessarily solve their profitability and viability problems." In the case of Breitenstein, et al. (2019), they find that MDIs tend to outperform non-MDI community banks in revenue generation, including net interest income and noninterest income. However, despite comparatively better revenue generation, MDIs have much higher noninterest expenses, especially among smaller MDIs, which tend to be predominantly African American and Native American MDIs. As a result, they conclude that MDIs have long underperformed other community and non-community banks when measured by efficiency ratios.[24]

Several reasons one might expect MDIs to underperform non-MDIs is that MDIs tend to locate and operate in minority neighborhoods as well as tend to serve minority customers. Such customers, moreover, tend to have lower incomes and less wealth accumulation. Also, households in minority neighborhoods tend to experience higher levels of poverty and unemployment.

Furthermore, members of minority groups may be less financially literate and therefore experience more difficulties in managing financial products. Over time, these factors may have changed and become less significant in explaining the underperformance of MDIs. Of course, these types of factors may affect different types of MDIs differently, which makes separate analyses of different MDIs important.

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[22] According to the Census Bureau website, "ZIP Code Tabulation Areas (ZCTAs) are generalized areal representations of United States Postal Service (USPS) ZIP Code service areas. The USPS ZIP Codes identify the individual post office or metropolitan area delivery station associated with mailing addresses. USPS ZIP Codes are not areal features but a collection of mail delivery routes." Based on this definition, we decided that a geographic unit with areal features is more appropriate for this study. See https://www.census.gov/geo/reference/zctas.html, accessed July 19, 2019.

[23] In a study of bank efficiency, Iqbal, et al. (1999) find that MDIs are less efficient than comparable non-MDIs in maximizing outputs from a given set of inputs. They further argue that this finding is yet another explanation for poor earnings performance of the MDIs.

[24] Breitenstein, et al. (2014, p. 2) state, "… MDIs appear to underperform non-MDI institutions in terms of standard industry measures of financial performance …." In addition, according to Elyasiani and Mehdian (1992, p. 946), "… the profitability shortfall of the MOBs [MDIs] is most probably due to … factors such as clientele profile and neighborhood characteristics, and thus, changes in management will not necessarily solve their profitability and viability problems."

Overall, we add to the existing banking literature by assessing whether the general finding of these previous studies that MDIs perform worse and are riskier than non-MDIs still holds and find it does not. To the extent that there has been a general distrust and lack of confidence in the management of banks owned and/or controlled by minorities due to the belief that they underperform and are riskier than banks owned and/or controlled by non-minorities, this could help explain the extremely low participation rate of MDIs in the banking industry in recent years. If so, our findings and other similar findings in the future may contribute to more diversity in banking and thereby even more and bigger MDIs that could generate greater benefits for lowerincome communities with higher concentrations of minorities, which could help reduce the wealth gap in the country. Of course, there may be other factors beyond performance and risk that may explain the relatively few MDIs, such as some type of bias against MDIs, but discovering any other factors is beyond the scope of our paper.

An important issue that arises is whether it matters that MDIs play a relatively minor role in the banking industry. In this regard, the FDIC (2017, p. 30) states MDIs "… play a vital role in the U.S. economy by providing responsive banking services to those who might not otherwise have access to a financial institution." They also "… tend to maintain offices in underserved communities that often have a higher concentration of low- or moderate-income (LMI) census tracts… and to minority borrowers compared to non-MDI institutions." It is therefore clear that more and bigger MDIs can contribute to providing more financial services to more individuals, and more individuals in underserved and lower-income communities. In this case, MDIs could also contribute to providing more credit to minority borrowers. Of course, as already stated, an important reason there are so few MDIs may be that they are perceived to be underperformers and riskier than non-MDIs, thereby serving as a disincentive at attempts to increase their numbers and size. This is the focus of our paper.

The remainder of the paper proceeds as follows. Section II provides an overview of the MDI industry. Section III discusses the research questions addressed and describes the data used in the empirical analysis. Section IV introduces the specific models and associated variables used in assessing the determinants of the location of MDI offices as well as the performance and riskiness of MDIs as compared to non-MDIs. Section V reports and discusses the empirical results. Section VI presents the results of robustness tests. Finally, Section VII concludes and provides suggestions for future research.

Overview of the MDI Industry

An issue that immediately arises when focusing on MDIs is exactly how to distinguish these institutions from other depository institutions. In this regard, Section 308 of the FIRREA defines the term "minority depository institution" as any depository institution where "Black Americans, Asian Americans, Hispanic Americans, or Native Americans" own 51 percent or more of the stock. US citizens or permanent legal US residents must own the voting stock, moreover, in determining minority ownership. In addition to institutions that meet the ownership test, institutions are minority depository institutions if a majority of the Board of Directors is minority and the community that the institution serves is predominantly minority. Institutions not already identified as minority depository institutions can request such a designation by certifying that they meet the above definition. The FDIC issued a Policy

Statement that more simply defines a "minority depository institution" as any federally insured depository institution where minority individuals own 51 percent or more of the voting stock. [25]

The FRB, in contrast, identifies MDIs based on the list of institutions participating in the Treasury's Minority Bank Deposit Program (MBDP). According to Price (1990), the list is distributed to public and private organizations to encourage the use of minority-bank services. Under this program, moreover, participating MDIs are entitled to preference as depositories for federal government funds.[26] The potential deposits available to MDIs include federal agency deposits of public money, cash advances to federal contractors and grantees, and certain independent demand deposits such as Postal Service deposits, and certificates of deposit (CDs).[27] This presumably enables MDIs to obtain deposits at a lower cost than having to compete for them in their local banking markets.[28] However, only 49 of the 155 MDIs had federal government deposits at yearend 2017.[29] Nevertheless, 125 of the MDIs did have state and local government deposits.[30] Also, MDIs may benefit from technical assistance, training, and educational programs provided by the banking regulatory agencies that are unavailable to other insured depository institutions. Furthermore, under the Community Reinvestment Act (CRA), non-MDI financial institutions may be encouraged to provide support to MDIs to meet the requirements of the Act concerning the lending, investment, and service tests.[31]

The eligible participants in MBDP include banks that are minority-owned or minoritycontrolled; banks that are owned, controlled, and operated by women; and low-income credit unions designated by the NCUA. The term "minority ownership" refers to banks where members of minority groups own more than 50 percent of the institution's outstanding stock.[32] In 2015, the FRB started including the MDIs identified by the FDIC in its list of MDIs, which resulted in an expansion in the number of MDIs by including those institutions not participating in MBDP.

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[25] See FDIC Definition of Minority Depository Institution, https://www.fdic.gov/regulations/resources/minority/mdidefinition.html, accessed July 19, 2019.

[26] In October 1977, President Carter signed a memorandum for all Heads of Departments and agencies promoting the use of minority-owned enterprises by placing deposits in minority banks. See https://fiscal.treasury.gov/mbdp/about.html , accessed July 29, 2019.

[27] It might be noted that the National Bankers Association, which was incorporated in 1972, is a national trade association for MDIs. According to Price (1990), "[I]t provides a forum for sharing information and resources and also actively solicits deposits from government agencies and major corporations for its members."

[28] However, Price (1994) finds that government deposits are expensive, and that deposits received through the MBDP may have the effect of increasing risk in the asset portfolio. Price (1995, p. 300) in a subsequent paper argues that "… MBDP is a cost ineffective way to simulate BCB [Black Commercial Bank] entry, and should therefore be abandoned." More recently, Kashian, et al. (2017) find that government deposits did not adversely effect efficiency among MDIs, but may have improved survival rates for them after the financial crisis.

[29] In a study of Black MDIs covering the early 1970s, Bates and Bradford (1980) find that such banks hold federal government deposits that are a relatively large proportion of their total deposits.

[30] Federal government deposits as a percentage of total deposits for MDIs (non-MDIs) was 0.11 (0.03), while the corresponding percentage of state and local government deposits for MDIs (non-MDIs) was 8.49 (4.49).

[31] See Breitenstein, et al. (2014).

[32] Minority Bank Deposit Program (MBDP), https://www.fiscal.treasury.gov/fsservices/gov/rvnColl/mnrtyBankDep/rvnColl_mbdp_started.htm, accessed July 19, 2019.

In this study, although we primarily rely on the annual list of MDIs provided by the FDIC, we do compare the number of MDIs on both the FDIC and FRB lists before 2015 in the latter part of the paper.[33] Figure 1A shows that the number of MDIs increased sharply from 2001 to 2008, from 164 to 215, an increase of 25 percent, and then trended downwards over the remaining years. Specifically, the number declined from 215 in 2008 to 149 in 2018, a decline of 33 percent. At the end of the period, there were 15 fewer MDIs than at the beginning of the period. Figure 1A also shows the distribution of the different types of MDIs over the same period. Over the period, all the different types of MDIs increased in number except for Black MDIs. Indeed, the number of Black MDIs continuously decreases from 2001 to 2018, reaching a low of 23 at the end of the period.

[Insert Figure 1A About Here]

Figure 1B shows the distribution of the different types of MDIs offices, including headquarters, over the same period as Figure 1A. The number of Hispanic MDI offices was the largest throughout the entire period and accounted for the largest percentage of all four types of MDI offices. However, their percentage of the total number of MDI offices decreased from 53 percent in 2001 to 46 percent in 2018. The reason was due to the number of Asian MDI offices increasing to 660 in 2018 from 334 in 2001. As a result, their share of all MDI offices increased over the same period from 29 percent to 43 percent. The black share of offices over the period was quite low, always less than 15 percent of the total. Although there was a decline in the number of headquarters from 2001 to 2018, the number of MDI offices increased to 1,524 from 1,191, an increase of 333 offices.

[Insert Figure 1B About Here]

Figure 1C shows the total assets of the different types of MDIs and their shares in the MDI industry over the period from 2001 to 2018. Total assets of Asian MDIs increased substantially, from $19 billion in 2001 to $122 billion in 2018. These MDIs took the lead in total assets in 2016 when they held $102 billion in assets. Hispanic MDIs were the largest in terms of total assets before 2016. At yearend 2018, Asian MDIs accounted for 52 percent of total MDI assets, while Hispanic MDIs ranked second with 45 percent. Total assets of Black MDIs remained relatively small over the entire period with a high of $7 billion in 2008, before declining to $5 billion in 2018. Their share of the assets of all MDIs was 2 percent at the end of the period.

[Insert Figure 1C About Here]

Even though MDIs account for a small percentage of the total number and assets of banks nationwide, their importance is somewhat greater when one takes into account that they are concentrated in relatively limited geographical areas (see Figure 2). In particular, most Hispanic MDI offices tend to be located in Texas, New Mexico, Southern California, and Miami. Native American MDI offices tend to be mainly located in Oklahoma, Minnesota, and North Carolina. Black MDI offices are located almost exclusively east of the Mississippi River, ranging from the southern to the northern coasts

[33] We also perform a robust check on our empirical results using the MDIs on the FRB list.

of the country. Asian MDI offices, in contrast, are the most widely dispersed, being located mainly in the western coastal states, central southern states, and the eastern coastal states, though 51 percent are in California. Interestingly, the different types of MDIs generally tend to have offices not overlapping with one another. This enables one to examine better the presence, performance, and riskiness of such institutions as compared to non-MDIs in the same and more localized geographical areas.

[Insert Figure 2 About Here]

Table 1 provides information on the number of all banks and bank offices as well as the subset of MDIs and MDI offices over the period 2001 to 2017. It shows there is a significant downward trend in the number of banks in the US, from 9,757 in 2001 to 5,797 in 2017. The number of bank offices, which includes bank headquarters and bank branches, generally increased over the period from 86,069 to 89,857 but declined every year after reaching a peak of 99,550 in 2009.[34] It also shows the matching of each of the offices with a specific census tract.[35] The matching procedure was based on the latitude and longitude of each office. In most cases, this locational data was available from the FDIC, while geocoding was used when it was not available to convert the addresses of bank offices into latitude and longitude. One could then combine this locational information with TIGER/Line Shapefiles from the US Census Bureau to identify the census tract for each bank office. Based on the procedures followed, the rate of failure to match offices with a specific census tract is always less than 0.1 percent, as shown by the rate of failure match in the table.

[Insert Table 1 About Here]

The table also shows that the number of census tracts in which there is a bank office. The lowest percentage of census tracts with a bank office is 47 percent in both 2016 and 2017, while the highest percentage is 53 percent in both 2007 and 2008. Of course, the percentage of census tracts with an MDI office is substantially lower than these figures, at no greater than 2 percent. This means there are roughly half of all census tracts without any banking offices and nearly all without any MDI offices. This situation may impose difficulties for individuals, especially poorer and older individuals, who depend on local access to banking offices despite the growing importance of online banking. The situation may be even worse for minorities given the scarcity of census tracts with MDI offices.

Table 1 also provides additional information indicating that the number of census tracts with MDI headquarters reached a low of 140 in 2017 after reaching a high of 180 in both 2007 and 2008. At the same time, the number of census tracts with at least one MDI office increased from a low of 885 in 2001 to a high of 1,345 in 2010, before declining to 1,056 in 2017. The table also shows the number of census tracts with both MDI and non-MDI headquarters. The number of census tracts, in this case, trended downwards over the period to a low of 19 in 2017 from a high of 40 in 2001. Interestingly, every year the number of non-MDI headquarters exceeds the number of MDI headquarters in the same census

[34] Branch data are only available in June of each year. Therefore, the data on the number of banks and bank branches covers the period June 2001 to June 2017.

[35] Census tracts are small, relatively permanent statistical subdivisions of counties designed to be relatively homogeneous units with respect to population characteristics, economic status, and living conditions. They average about 4,000 inhabitants. See https://www.iowadatacenter.org/aboutdata/tracts, accessed June 18, 2019.

tract. The number of MDI headquarters in this situation, moreover, is always one third or less than the total number of MDI headquarters. Stated another way, two-thirds of the MDI headquarters are in census tracts with no other bank headquarters.[36]

Table 2 shows the basis for change of the number of MDIs over time in terms of whether institutions were entering, exiting, or acquired when exiting. As may be seen, the decline in the number of MDIs are from 2001 to 2017 was not due simply to institutions exiting the MDI industry. Indeed, over the period, 132 institutions became MDIs at one time or another. At the same time, 141 institutions exited the MDI industry, 39 of which were acquired when exiting. Over the period, 41 MDIs entered the industry and were still in existence at the end of the period. Interestingly, the oldest MDI, CBW Bank, that still exists was established on January 1, 1892, while the newest, Urban Partnership Bank, was established in August 2010. In short, the table shows there was not simply a steady decline of MDIs by 9 institutions from 2001 to 2017.[37] In the next section, we discuss various studies examining the performance of MDIs as compared to non-MDIs.

[Insert Table 2 About Here]

Research Focus and Dataset

As already indicated, MDIs are supposed to be in minority and lower-income areas. The first thing we therefore do is assess whether this is indeed the case for not only the headquarters of the MDIs but their branches as well using logit (and fractional logit) regressions. Second, the performance and riskiness of MDIs are compared with non-MDIs using regression analysis. Such an examination enables one to determine whether the paucity of MDIs throughout the banking industry is due to their inability to perform well enough in terms of profits and at an appropriate risk level to survive when in competition with non-MDIs in the same geographical areas, which helps control for a difference in customer base between MDIs and non-MDIs.

Regarding the identification of MDIs, the FDIC provides an annual MDI list starting in 2001. All the bank balance sheet and income statement information are from publicly available FDIC quarterly call reports. FDIC also provides the branch office deposits of banks, on an annual basis every June 30. The call reports are available starting in the fourth quarter of 1992 to the first quarter of 2019. The annual deposit data for branch offices are available from 1994 to 2018. Demographic data are available from the 2000 census and the 2009- to 2017- 5-year estimates from the American Community Survey (ACS) provided by US Census Bureau. Linear interpolation allows us to obtain data for the intervening years from 2001 to 2008. Also, we can determine whether a census tract is a low- or moderate-income tract from the Federal Financial Institutions Examination Council (FFIEC) Census Report.[38]

[36] Table 1 also shows that the average number of bank offices for non-MDIs exceeds the average number for MDIs in every year from 2001 to 2017.

[37] See Kashian and Drago (2017) for a study of bank failures for 2009 to 2014. They find that failures among MDIs, compared to a similar sample of community banks, were disproportionately located among Asian MDIs and particularly the Black MDIs. This is consistence with Figure 1A, which shows a decline in these two types of MDIs over the period 2009 to 2014.

[38] See https://www.ffiec.gov/censusapp.htm, accessed July 11, 2019.

To match the demographic data and bank branches to the same census tracts, as already noted, we rely on the TIGER/Line Shapefiles for each year. To elaborate on the earlier discussion, the Shapefiles are available for 1990, 2000, 2010, and each year from 2013 to 2018. While census tracts are relatively permanent statistical geographic units, their geographic area does change occasionally. To ensure the accuracy of matching the location of bank offices with specific census tracts, the office addresses in a year are matched with the latest available file for the same year. That is, the 2000 Shapefile is used to match addresses from 2001 to 2009, the 2010 Shapefile is used to match addresses from 2010 to 2012, and then 2013 to 2017 addresses are matched with each corresponding year's Shapefile. The high success rate of the matching process (up to 99.9 percent, see Table 1) better ensures the completeness of obtaining matches for the 1,593,077 bank offices and census tracts over the seventeen years examined.

Our empirical work relies on a subset of MDIs and non-MDIs in census tracts as shown in Table 3. The primary reason for differences between Tables 1 and 3 is that the latitude and longitude information provided by the FDIC in some cases we believe identified an incorrect county for some bank offices. When this happened, the bank offices were removed from our sample. As a result, the number of MDI headquarters and MDI offices declined, as may be seen when comparing the figures in Table 3 with the comparable figures in Table 1. In a relatively few other cases, necessary demographic information was not available that led to the exclusion of some census tracts. The bottom line is that our sample of MDI headquarters and MDI offices was reduced as a result of these exclusions by an average of 19 MDI headquarters and 168 MDI offices over the period 2001 to 2017. However, over the period 2001 to 2009, the averages were 32 for MDI headquarters and 234 for MDI offices, while over the period 2010 to 2017 the comparable figures were substantially lower at 4 and 93, respectively. As we indicate below, we, therefore, run our regressions for the entire period as well as the latter period with fewer exclusions as a check and find no essential differences in results.[39]

[Insert Table 3 *About Here]*

In our analysis, we also include information as to whether MDI headquarters and MDI offices are located in low- and moderate-income (LMI) census tracts.[40] Table 3 shows that an average of 22 percent of all MDI headquarters are located in low-income census tracts, while an average of 27 percent of all MDI

[39] It is also important to note that the panel regression results in Tables 11 and 12 that we discuss below are based on census tracts with both MDI headquarters and non-MDI headquarters in which case there is no difference in the numbers in Tables 1 and 3.

[40] A low-income census tract is one for which median family income is > 0% and < 50% of the MSA/MD median family income, while a moderate-income census tract is one for which median family income is >= 50% and < 80% of the MSA/MD median family income. See https://www.ffiec.gov/censusapp.htm, accessed July 10, 2019.

headquarters are located in moderate-income census tracts. In terms of MDI offices, an average of 11 percent of them are in low-income census tracts, while an average of 25 percent of them are located in moderate-income census tracts. More generally, roughly half of all MDI headquarters and slightly more than one-third of all MDI offices are in LMI census tracts. These figures are consistent with the earlier statement by the FDIC that MDIs "… maintain offices in underserved communities which often have a higher concentration of low- or moderate-income (LMI) census tracts".

Models and Variables

We estimate two basic models. The first model is a logit model to assess demographic determinants of the likelihood of an MDI office being in a particular census tract. The specific model estimated is as follows:

$$(1) \qquad \text{MDI Census Tract}_{iiii} = \beta_0 + \sum_{j=1}^{4} \beta_{jj} \text{Demographic Variables}_{j,it} + \varepsilon_{iiii},$$

where an MDI Census Tract$_{it}$ is equal to 1 if there is an MDI office located in census tract i at time t, and 0 otherwise. We also estimate the same model for each of the four types of MDIs using the same strategy. In this case, we consider census tracts with at least one Black, Hispanic, Asian, or Native American MDI office. For example, if at least one bank office in a census tract is a black MDI office, then the variable Black MDI is equal to 1, and 0 otherwise. The other variables, Hispanic MDI, Asian MDI, and Native American MDI, are coded in the same manner. Equation (1) enables us to determine whether MDIs, and the four different types of MDIs, are statistically more likely to operate offices in communities that are predominantly minority. The inclusion of other demographic variables enables us to determine whether such variables also play a role in the choice of location.

The specific demographic variables for each of the census tracts include the following: the fraction of minority population, fraction of each of the four different minorities, fraction of population below the poverty level, log median household income, and whether an LMI tract or not. We generally expect that census tracts with a higher fraction of minority population, greater poverty rate, lower median household income, and an LMI tract are more likely to have MDI offices located in them.

The second model involves a comparison of the performance and risk level of MDIs to non-MDIs. The specific model estimated is as follows:

$$(2) \qquad \text{Bank performance}_{iiii} = \beta_0 + \beta_1 \text{MDI}_{iiii} + \sum_{j=2}^{6} \beta_j \text{Bank Control Variables}_{j,it} +$$

$$\sum_{j=7}^{12} \beta_j \text{Demographic Variables}_{j,it} + \text{Fixed Effects} + \varepsilon_{iiii},$$

$$(3) \qquad \text{Risk level}_{iiii} = \beta_0 + \beta_1 \text{MDI}_{iiii} + \sum_{j=2}^{6} \beta_j \text{Bank Control Variables}_{j,it} + \sum_{j=7}^{12}$$

$$\beta_j \text{Demographic Variables}_{j,it} + \text{Fixed Effects} + \varepsilon_{iiii},$$

where bank performance is measured by return on assets (ROA) and risk level is measured by ln z-score.[41] We follow Yeyati and Micco (2007) to construct the z-score, ZZ_{iiii}, as follows:

$$ZZ_{iiii} = \frac{(\mu\mu_{RRRRRR}{}_{\sigma\sigma RRRRRRiiii} + {}_{ii}{}_{ii}RRiiii}{EEiiii)}, \quad (4)$$

where EE_{iiii}/AA_{iiii} is bank i's equity to total asset ratio in period t, while $\mu\mu_{RRRRRRiiii}$ and $\sigma\sigma_{RRRRRRiiii}$ are the mean

and variance of the distribution of $RRRRAA_{iiii}$, respectively. We use the sample mean and variance of

quarterly ROA over the previous 12 quarters as estimates of $\mu\mu_{RRRRRRiiii}$ and $\sigma\sigma_{RRRRRRiiii}$. The z-score

measures the distance to default and indicates the number of standard deviations ROA would need to decline to wipe out equity. The higher the z-score the lower risk of a bank. MDI_{it} is a dummy variable equal to 1 if institution i is an MDI at time t, and 0 otherwise.

A significantly positive coefficient on this dummy variable indicates that the ROA (ln z-score) of MDIs is higher (less risky) than for non-MDIs. We estimate equations (2) and (3) for all MDIs as well as each type of MDI.

The bank-specific control variables include: (1) log of total assets (Log_TA), (2) loan to total assets (Loan/TA), (3) liquidity to total assets (Liquidity/TA), defined as the sum of cash and due from, Federal Funds purchased and securities purchased under reverse repurchase agreements, and securities held to maturity plus securities available for sale, divided by total assets, (4) nonperforming loans (NPLs), defined as the sum of loans past due 30 - 89 days and still accruing interest, loans past due 90 days or more and still accruing interest, nonaccrual loans, and OREO (other real estate owned), divided by total assets, and (5) equity-to-total assets (Equity/TA).

Demographic variables such as minority population percentages, poverty rates, and median household income as well as the year, quarter, and bank fixed effects are also included, as explanatory variables.

Table 4 contains the correlation matrix for all the demographic variables and the dummy variables for census tracts with MDI offices, as described above. The table indicates that in census tracts in which there are MDI offices those offices are positively correlated with the percentage of the minority

[41] Because actual MDI failures are infrequent, we rely on these two performance measures. For our sample period, 2001 to 2017, only 2 MDIs failed.

population, the percentages of each of the four minority group populations, the poverty rate, and negatively correlated with ln median household income in those same census tracts. All the correlations, moreover, are statistically significant. Correlations among the other variables are also included in the table, all of which have expected signs and are statistically significant.

[Insert Table 4 About Here]

Empirical Results

Of the two main empirical models, Panels A through E in Table 5 presents the results based on the logit regressions assessing the likelihood of MDI offices being in census tracts based on the demographic characteristics of them. The findings in Panel A indicate that MDI offices are more likely to be in census tracts with a higher fraction of minorities, higher fraction of people in poverty, lower median household income, and LMI tracts. Separate regressions for the different demographic variables are presented due to a concern about multi-collinearity. In the table, when all the demographic variables are included, only one of the variables is not significant, the poverty rate. However, this variable is negatively and significantly correlated (-0.78) with ln median household income, as shown in Table 4, which may explain its lack of significance. Also, both state and year fixed effects are included, and standard errors are clustered at the state level.

[Insert Table 5 About Here]

Turning to the results for the different types of MDIs, Panel B shows that census tracts with Black MDI offices are more likely to be located in communities with a higher fraction of African Americans, higher fraction of people in poverty, lower median household income, and LMI tracts.

Panel C shows that census tracts that have a larger share of Asians, higher poverty rate, and are LMI tracts are more likely to have Asian MDI offices. Panel D shows that census tracts that have a greater Hispanic population, higher poverty rate, lower ln median household income, and are LMI tracts are more likely to have Hispanic MDI offices. Lastly, Panel E shows that census tracts that have a greater Native American population, higher poverty rate, and lower ln median household income are more likely to have Native American MDI offices. In the case of Asian and Native American MDI offices, the likelihood of Asian MDI offices being located in a census tract is not significantly related to the ln median household income in that tract, while an LMI tract has no significant relationship as to whether there are Native American MDI offices in that census
tract.

To assess the feasibility of relying on linear interpolation to generate demographic data for each year of the period 2001 to 2008, Table 6 presents the results of the same logit regressions as Table 5 over the period 2009 to 2017, which does not rely on interpolated demographic data. The results are the same as those reported in Table 5, including that the magnitudes of the coefficients are quite similar, confirming that one can rely on the interpolation data.

[Insert Table 6 About Here]

The logit regression results provide information about the likelihood that a census tract with an MDI office, or type of MDI office, is significantly related to demographic characteristics of that tract. Alternatively, the fractional logit regression shows the relationships between the share of total deposits of all bank offices in a census tract accounted for by an MDI office and local demographic variables. The logit results tell us whether census tracts with MDI offices are significantly related to demographic characteristics of those tracts. In contrast, the fractional logit results tell us about the relative importance of MDI offices as compared to non-MDI offices in terms of their share of total deposits of all bank offices in census tracts and the relationship of that share to demographic variables. To elaborate, a census tract with a higher percentage of minority population may be more likely to have MDI offices, but it may not be more likely to have MDI offices with a larger share of total deposits of all bank offices located in that tract. The fractional logit regression results, therefore, tell us about the extent to which the demographic characteristics of the census tracts are related to the MDI office share of deposits in those tracts, and thereby available to provide credit to minority individuals and businesses. Indeed, some of the MDI offices account for 100 percent of all bank office deposits in the communities in which they are located, and hence are a major, if not the only, source of credit to minorities.

Before presenting the fractional logit regression results, Table 7 shows the share of total deposits of all bank offices in a census tract with at least one MDI office, and at least one type of MDI office, accounted for by MDIs or types of MDIs. Panel A shows the average share of total deposit accounted for by MDI offices, or type of MDI offices, while Panel B shows the percentage of census tracts in which MDI offices, or type of MDI offices, accounted for 100 percent of all deposits. In general, the share accounted for by all MDI offices remains relatively stable at roughly 50 percent over the period 2001 to 2017. As regards the different types of MDI offices, the Black share also remains relatively stable at roughly 50 percent, while the Asian share increases over the period from 38 percent to 48 percent. The share accounted for by Hispanics decreases to 42 percent from 64 percent and the share accounted for by Native Americans decreases to 49 percent from 59 percent.

[Insert Table 7 About Here]

In Panel B, one sees that the percentage of census tracts in which share of total deposits accounted for by MDI offices, or types of MDI offices, equals 100 percent differs both by type of MDI offices and over time. Asian MDI offices account for the lowest share of census tracts in which they have 100 percent of all bank office deposits, while Black MDI offices account for the highest share over the entire period. The percentage of Hispanic MDI offices with a 100 percent share remains relatively high until the last few years when it declines to 23 percent in 2017 from 38 percent in 2014. The percentage of Native American MDI offices with 100 percent share shows a fairly dramatic decline over the period to 20 percent in 2017 from 43 percent in 2001.

The fractional logit regression results of relationships between the share of total deposits of all bank offices in census tracts accounted for by MDI offices, or types of MDI offices, and local demographic variables are presented in Table 8. As was the case in Table 5, there are five sets of results reported in Panels A to E. In general, the results are quite similar to those reported in the case of the logit regressions. One exception is that ln median household income is negatively and significantly related to the share of total deposits of all bank offices accounted for by Asian MDI offices. Another

exception is the results for the Native American MDI offices, in which neither the poverty rate nor the ln median household income is a significant explanatory variable.

[Insert Table 8 About Here]

Table 9 presents the panel regression results for the performance (measured by ROA) of the MDIs (headquarters) as well as the four different types of MDIs (headquarters). The regression results for MDIs are in the first column, while those for the four types of MDIs are in the last four columns. All the columns contain results including demographic control variables and fixed effects. The sample includes all MDIs, each of the four types of MDIs, and all other. In the first column, the MDI_dummy variable equals 1 if the institution is an MDI, and 0 otherwise. In the last four columns, the MDI dummy variables equal 1 if the institution is either a Black MDI, Asian MDI, Hispanic MDI, or Native American MDI, and 0 otherwise.

[Insert Table 9 About Here]

Bank control variables show various significance levels for different regressions. For all MDIs, the coefficients of Log_TA, Loan/TA, and Liquidity/TA are positive, while the coefficients of NPLs and Equity/TA are negative. Also, all the variables are statistically significant. Importantly, and given the focus of this study, the coefficient of the MDI dummy variable is positive and significant for all MDIs and Asian MDIs, while insignificant for Black and Hispanic MDIs. In terms of economic significance, an MDI bank as compared to a non-MDI bank has a ROA that is 32 basis points higher. This is mostly due to Asian MDIs, since an Asian MDI as compared to a non-Asian bank has a ROA that is 40 basis points higher. In the case of Native American MDIs, the coefficient is negative and highly significant. As compared to a non-Native American bank, a Native American MDI has a ROA that is 53 basis points lower. This finding and especially the finding that Black MDIs perform no differently than non-black banks are contrary to the results of earlier studies, as noted above.

The regression results with the ln z-score as the measure of the riskiness of a bank are reported in Table 10. All the explanatory variables are the same as in Table 9. The regression for all MDIs indicates that all bank variables are significant. Four variables, Log_TA, Loan/TA, Liquidity/TA, and Equity/TA, have positive coefficients, indicating they are associated with lowering bank risk. However, the coefficient of NPLs is negative and significant, indicating higher NPLs are associated with greater risk. The most notable feature in Table 10 is that four of the MDI dummy variables are not significant, including all MDIs, Black MDIs, Asian MDIs, and Hispanic MDIs. However, the MDI dummy variable for Native American MDIs is negative and significant.

This indicates that three of the four types of MDIs are no riskier than non-MDIs. In the case of Native American MDIs, the results indicate they are riskier than non-MDIs by 0.08 in terms of the natural logarithm of the z-score.

[Insert Table 10 About Here]

Table 11 presents the panel regression results for the performance (measured by ROA) of the MDIs (headquarters) as well as the four different types of MDIs (headquarters). The regression results

for MDIs are in the first column, while those for the four types of MDIs are in the last four columns. All the columns contain results including demographic control variables and fixed effects. The sample for all MDIs includes those MDIs and non-MDIs located in the same census tract, while the sample for each of the four types of MDIs includes only those census tracts with one or more of a specific type of MDI and at least one non-MDI. For example, the sample for Black MDIs consists of census tracts with at least one Black MDI and at least one non-MDI. In the first column, the MDI_dummy variable equals 1 if the institution is an MDI, and 0 otherwise. In the last four columns, the MDI dummy variables equal 1 if the institution is either a Black MDI, Asian MDI, Hispanic MDI, or Native American MDI, and 0 otherwise.

[Insert Table 11 About Here]

Bank control variables show various significance levels for different regressions. For all MDIs, the coefficients of Log_TA and Loan/TA are positive, while the coefficients of Liquidity/TA, NPLs, and Equity/TA are negative. Only Log_TA, Loan/TA, and NPLs are statistically significant for all MDIs, however. Importantly, and given the focus of this study, the coefficient of the MDI dummy variable is not significant for all MDIs. This indicates that there is no difference in the ROAs for MDIs and non-MDIs located in the same census tracts. This finding is contrary to the results of earlier studies, as noted above.

Turning to the different types of MDIs, and focusing on the MDI dummy variable, we find that the coefficients on the Black MDIs, Asian MDIs, Hispanic MDIs, and Native American MDIs are not statistically significant. These results indicate that there is no difference in ROAs between each of the different types of MDIs and the corresponding non-type of banks located in the same census tracts. More generally, these findings are contrary to the results of earlier studies, as noted above.

The regression results with the ln z-score as the measure of the riskiness of a bank are reported in Table 12. All the explanatory variables are the same as in Table 11. The regression for all MDIs indicates that all bank variables are significant, except Liquidity/TA. The three variables, Log_TA, Loan/TA, and Equity/TA, are significant and have positive coefficients, indicating they are associated with lowering bank risk. However, the coefficient of NPLs is negative and significant, indicating higher NPLs are associated with greater risk. The most notable feature in Table 12 is that the MDI dummy variables are insignificant for all MDIs, Black MDIs, and Asian MDIs, but significant for Hispanic MDIs and Native American MDIs. This indicates that two of the four types of MDIs are no riskier than the corresponding non-type of banks. In the case of Hispanic MDIs and Native American MDIs, the results indicate they are less risky than the corresponding non-type of banks located in the same census tracts, with the natural logarithm of z-scores that are higher by 0.38 and 1.38, respectively.

[Insert Table 12 About Here]

Robustness Tests

As a further check on our empirical results, we re-estimate our basic equation for all MDIs using only those MDIs that were in continuous existence throughout the sample period. Seventyfour MDIs satisfied this criterion, so we matched these banks with non-MDIs in the same census tracts. In the case of ROA, Table 13 shows that there is a positive and significant coefficient on the MDI dummy variable. This indicates that the MDIs perform significantly better than the nonMDIs, with a ROA that is, on

average, 565 basis points higher in terms of this performance measure. As regards ln z-score, the results indicate that the MDIs are less risky than non-MDIs, with a natural logarithm z-score that is higher by 4.11.

[Insert Table 13 About Here]

We also have access to a list of MDIs provided by the FRB. Interestingly, this list covers the period from the first quarter of 1960 to the fourth quarter of 2018. As shown in Figure 3, the number of MDIs increase substantially, albeit from a low base, from the early 1960s to the late 1980s. According to Price (1990), "[m]inority institutions experienced significant growth during the 1970s—growth that was assisted, in part, by social legislation."[42] Starting in 1989, the number tended to gradually decline, but still ended the period higher than in any year before the 1990s. The list of MDIs from the FDIC is included in the figure for purpose of comparison. As may be seen, the two lists of MDIs from the two bank regulatory authorities do differ until 2015, when the FRB started including the FDIC list in its list. Given the difference in the number of MDIs over our sample period, we re-estimated our basic results reported for ROA and ln z-score using the FRB list for all MDIs. In this case, we find that the MDIs perform no worse than the non-MDIs in the same census tracts. We also find that they are not riskier.

[Insert Figure 3 About Here]

Also, we compare all MDIs to non-MDIs located in the same zip code as well the same city. The results indicate that MDIs and non-MDIs perform no differently in terms of ROA when both types of banks are operating in either the same zip code or city. As regards the riskiness of banks, we find that there is no difference in ln z-scores between MDIs and non-MDIs operating in the same zip code, but the MDIs are less risky than non-MDIs operating in the same city, with a natural logarithm z-score that is higher by 0.28.

As the last robustness test, we construct pairs of MDIs and non-MDIs generated by propensity score matching (PSM), a commonly used matching method (Rosenbaum and Rubin, 1983). Table 14 provides information on the imbalance measures with and without matching MDIs and non-MDIs based on demographic variables. As may be seen, the imbalance measures are substantially lower when matching MDIs with non-MDIs.

[Insert Table 14 About Here]

Tables 15 and 16 present the panel regression results using this technique and including the same variables as in Tables 9 and 10. We employ a one-to-one without replacement matching method using logit regressions with demographic variables to generate control groups of nonMDIs whose performance and riskiness can then be compared to all MDIs and each type of MDI. As regards the MDI

[42] The social legislation he refers to is the establishment of MBDP mentioned in footnote 4.

dummy variables, which is the focus of our study, they are not significant in four of the five regressions in the table, indicating once again no difference in ROAs between
MDIs, and three types of MDIs, and corresponding non-type of banks. However, in the case of the Native American MDIs, the results indicate they perform better than non-native American banks, with a ROA that is, on average, 337 basis points higher. As regards ln z-score, the findings indicate that all MDIs, Black MDIs, Asian MDIs, and Hispanic MDIs are no riskier than the corresponding non-type of banks. But in the case of Native American MDIs, they are riskier as compared to nonnative-American banks, with a natural logarithm z-score that is lower by 2.57.

[Insert Tables 15 and 16 About Here]

Concluding Remarks

The purpose of our paper is to motivate and contribute to a better understanding of the role and comparative performance of MDIs, and different types of MDIs, to non-MDIs in the US banking industry. Based on our empirical results, we find that the likelihood of an MDI office being located in a particular census tract is significantly and positively associated with the fraction of the population that is a minority, the poverty rate, and the tract being identified as an LMI tract, while significantly and negatively associated with median household income. The results for each of the four types of MDI offices are essentially the same as for all MDI offices. We also find that the share of total deposits in a census tract accounted for by the MDI offices, and each type of MDI offices, are also similarly related to the same demographic variables.

Also, we compare the performance and riskiness of MDIs and non-MDIs. The findings indicate that all MDIs and Asian MDIs perform significantly better but are no riskier than nonMDIs and non-Asian banks, respectively. There is no difference, moreover, between Black and Hispanic MDIs and non-Black and non-Hispanic banks, respectively. In the case of Native American MDIs, they underperform and are riskier than non-Native American banks.

As regards differences between MDIs and non-MDIs whose headquarters are located in the same census tracts, our findings indicate that MDIs, as well as each type of MDI, perform no differently than non-MDIs in terms of ROA and overall riskiness as measured by the z-score, except in the case of Hispanic and Native American MDIs. As a check on these results, several different robustness tests are conducted. We generally confirm the results for all MDIs when comparisons are made with non-MDIs using the FEB data, at a zip-code level of analysis, and a city-level of analysis. Lastly, we match the MDIs with non-MDIs using PSM and find no difference in terms of performance and riskiness.

We hope our study will stimulate further research on the role and performance of MDIs in the financial marketplace. More work could focus on uncovering reasons for the relatively small role that MDIs play in the banking industry and thereby limited diversity in the ownership/control of banks by minorities within the banking industry. Our focus is on reassessing the many earlier studies that find MDIs tend to underperform and/or are riskier than non-MDIs. Contrary to these studies, our findings generally indicate no difference in either performance or riskiness.[43] Indeed, the results indicate that

[43] In a private conversation, Harold Black, Professor Emeritus of Finance at the University of Tennessee, suggests that better personal networks among non-minorities interested in entering banking may have played a role in the establishment of so many non-MDIs.

MDIs provide investors with essentially the same opportunities as nonMDIs. If greater investment in MDIs were to take place, this could lead to increased growth and thereby the ability to provide more credit to individuals and firms located in low- and moderateincome communities and thereby helping reduce the income and wealth gaps in the country.

Furthermore, it is important to examine reasons for the small percentage of federal government deposits at MDIs that we document, given the purpose of the MBDP. More generally, given the importance for the local communities in which MDIs are located, it is also important to consider public policies that would be appropriate to further expand access to the services of banks as well as diversity in banking through the growth and expansion of MDIs.[44]

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[44] In this regard, Barth and Betru (2019) suggest allowing opportunity zone investments in MDIs.

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Figures and Tables

Figure 1A. Number of Minority Depository Institutions by Type

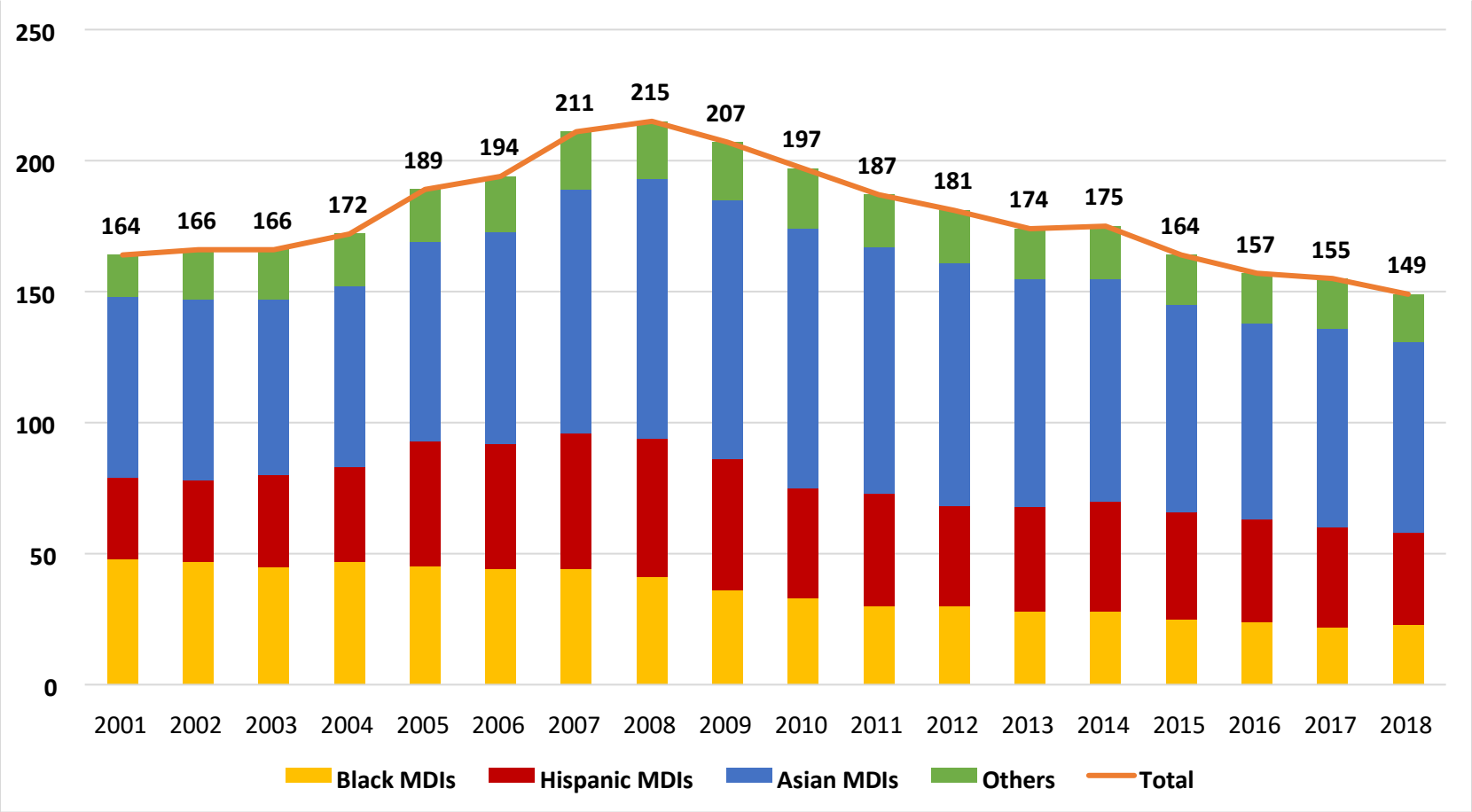

Figure 1B. Bank Offices of Minority Depository Institutions by Type

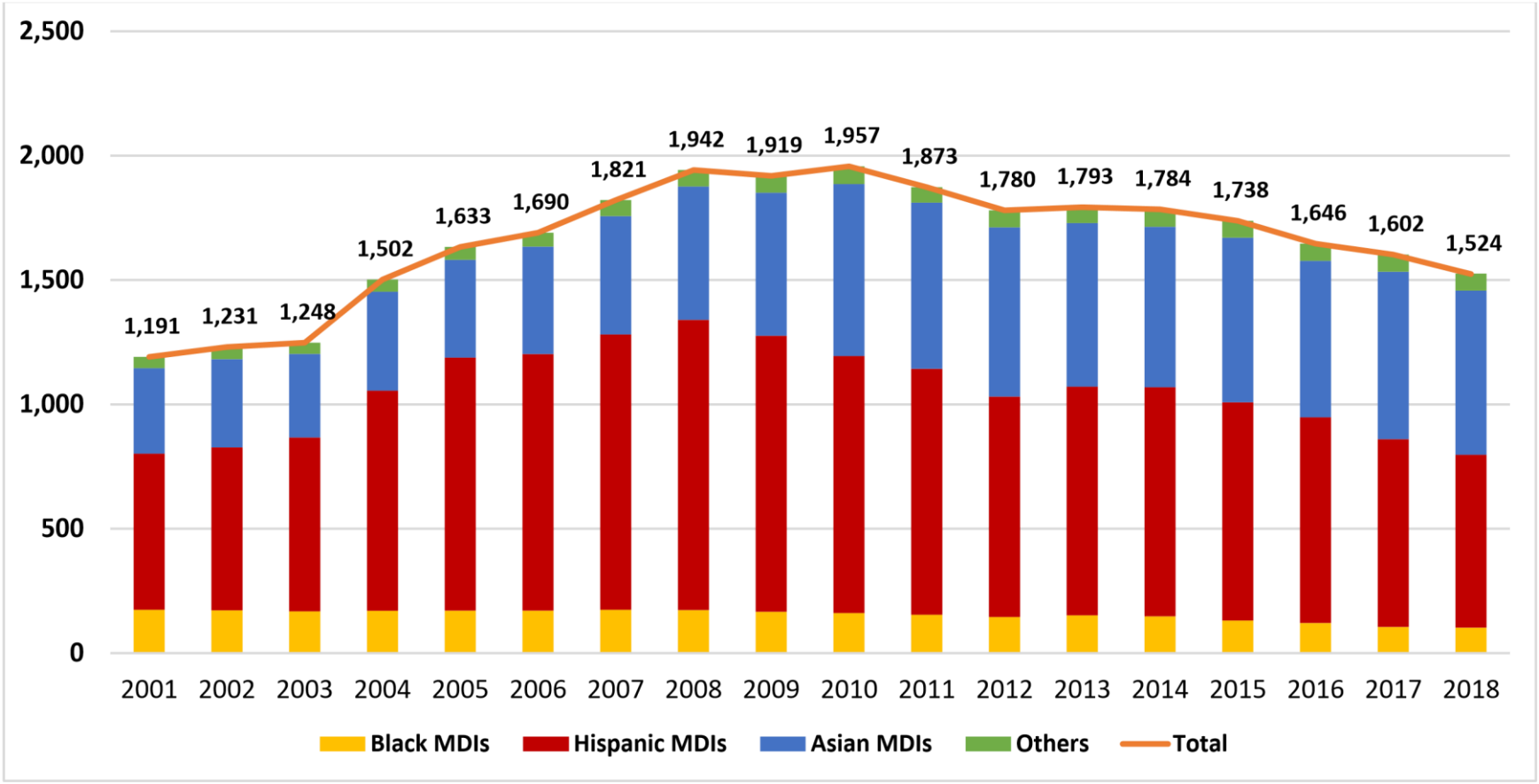

Figure 1C. Total Assets of Minority Depository Institutions by Type ($ Billion)

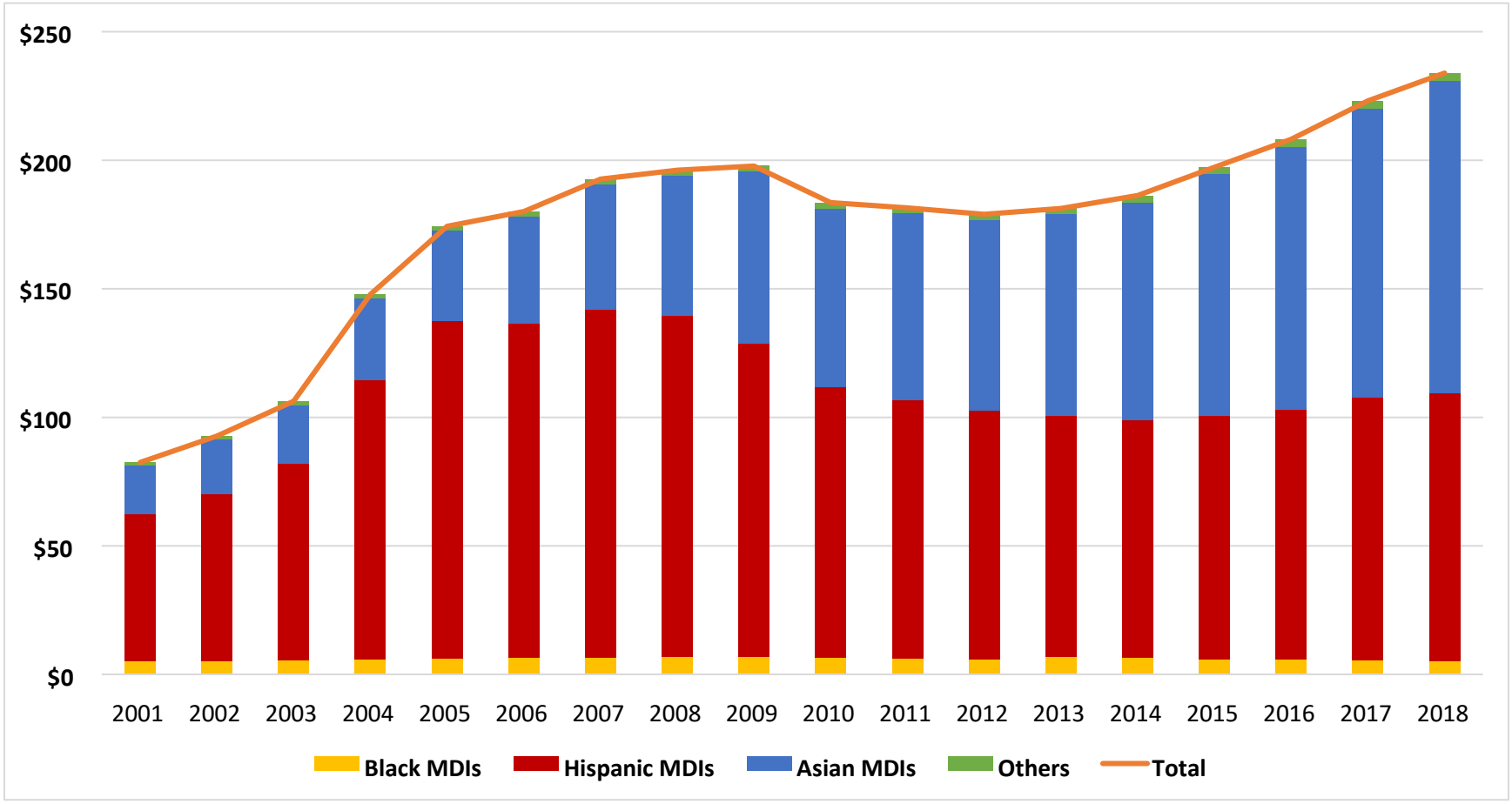

Figure 2. Location of Minority Depository Institution Offices by Type, as of June 30, 2018

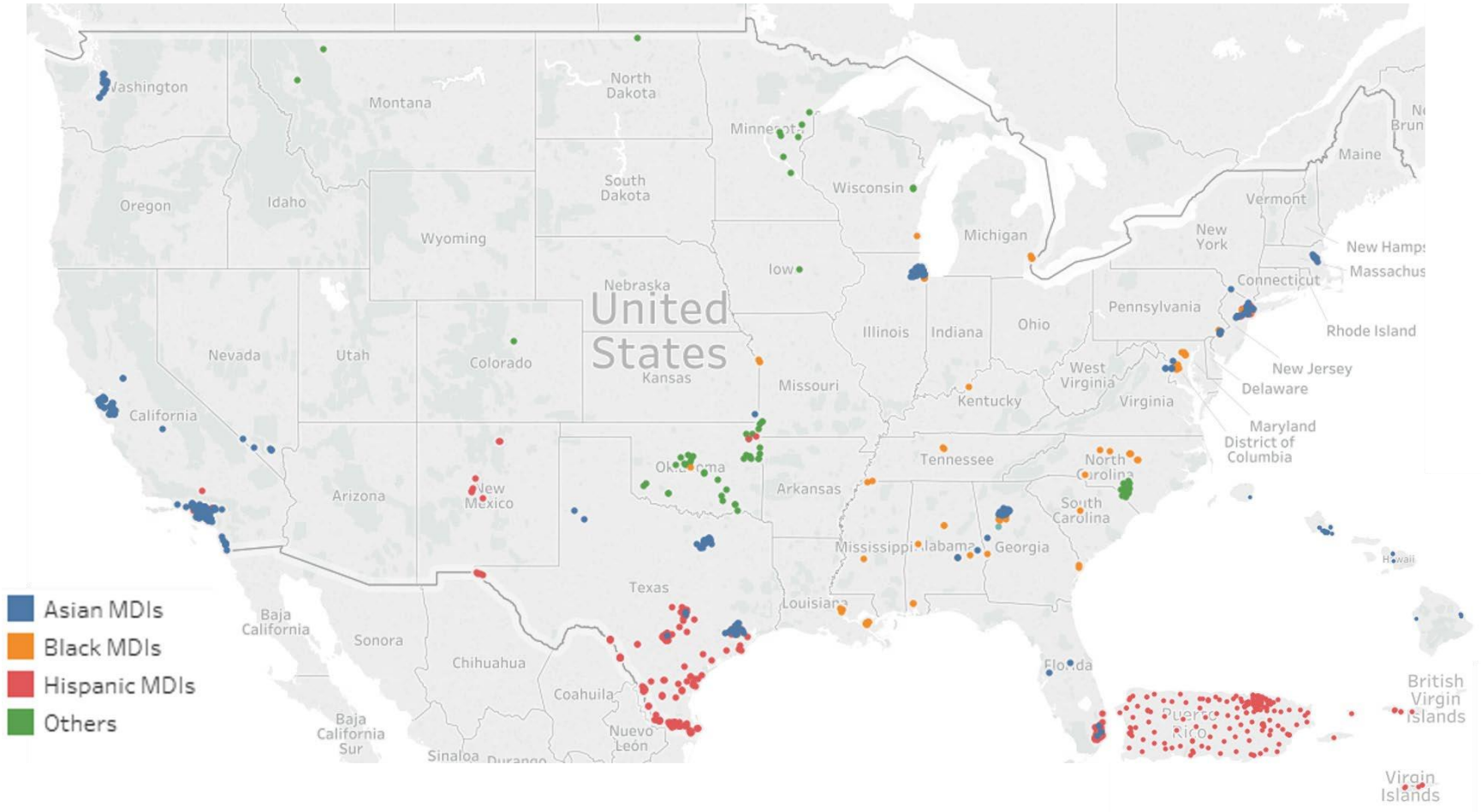

Table 1. Selected Information on Banks and Bank Offices, and MDIs and MDI Offices in Census Tracts Nationwide

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total Number of Census Tracts	66,688	66,688	66,688	66,688	66,688	66,688	66,688	66,688	66,688
Number of Census Tracts with Bank Offices	33,551	33,625	33,947	34,174	34,544	34,869	35,132	35,136	34,119
Percentage of Census Tracts with Bank Offices	50%	50%	51%	51%	52%	52%	53%	53%	51%
Total Number of Bank Offices	86,069	86,577	87,785	89,785	92,043	94,752	97,274	99,164	99,550
Number of Bank Offices, Fail to Find a Census Tract	47	61	68	210	40	31	32	38	51
Rate of Failure Match (%)	0.055	0.070	0.077	0.234	0.043	0.033	0.033	0.038	0.051
Total Number of Banks	9,757	9,474	9,256	9,066	8,856	8,767	8,605	8,440	8,185
Number of Census Tracts with MDI Offices	885	898	894	1,018	1,126	1,152	1,241	1,236	1,272
Percentage of Census Tracts with MDI Offices	1%	1%	1%	2%	2%	2%	2%	2%	2%
Number of Census Tracts with MDI HQs	151	153	150	154	163	167	180	180	177
Number of MDI HQs	164	166	166	172	189	194	211	215	207
Number of MDI Offices	1,191	1,231	1,248	1,502	1,633	1,690	1,821	1,942	1,919
Number of Census Tracts with Both MDIs & Non-MDIs HQs	40	38	37	36	35	34	38	28	29
--Number of Non-MDIs HQs within These Census Tracts	105	94	86	85	80	84	89	85	83
--Number of MDIs HQs within These Census Tracts	49	46	44	41	40	38	45	32	37
Average Number of Bank Offices for Non-MDIs	8.85	9.17	9.52	9.93	10.43	10.86	11.37	11.82	12.24
Average Number of Bank Offices for MDIs	7.26	7.42	7.52	8.73	8.64	8.71	8.63	9.03	9.27

Year					2014	2015	2016	2017
	2010	2011	2012	2013	73,880	73,881	73,873	73,873
Total Number of Census Tracts	73,803	73,803	73,803	73,749				
Number of Census Tracts with Bank Offices	36,851	36,724	36,395	35,936	35,862	35,404	35,062	34,752
Percentage of Census Tracts with Bank Offices	50%	50%	49%	49%	49%	48%	47%	47%
Total Number of Bank Offices	98,519	98,193	97,340	96,339	94,725	93,272	91,834	89,857

Number of Bank Offices, Fail to Find a Census Tract	98	12	92	7	18	23	42	42
Rate of Failure Match (%)	0.099	0.012	0.095	0.007	0.019	0.025	0.046	0.047
Total Number of Banks	7,821	7,523	7,255	6,950	6,669	6,358	6,068	5,797
Number of Census Tracts with MDI Offices	1,345	1,180	1,139	1,136	1,175	1,131	1,122	1,056
Percentage of Census Tracts with MDI Offices	2%	2%	2%	2%	2%	2%	2%	1%
Number of Census Tracts with MDI HQs	169	163	159	153	155	141	141	140
Number of MDI HQs	197	187	181	174	175	164	157	155
Number of MDI Offices	1,957	1,873	1,780	1,793	1,784	1,738	1,646	1,602
Number of Census Tracts with Both MDIs & Non-MDIs HQs	27	26	25	25	22	22	19	19
--Number of Non-MDIs HQs within These Census Tracts	76	64	63	46	44	51	49	44
--Number of MDIs HQs within These Census Tracts	38	35	33	32	31	34	25	24
Average Number of Bank Offices for Non-MDIs	12.67	13.13	13.51	13.95	14.31	14.78	15.26	15.64
Average Number of Bank Offices for MDIs	9.93	10.02	9.83	10.30	10.19	10.60	10.48	10.34

Table 2. Changing Number of MDIs Over Time Based on FDIC Information

Year	001/164	2002	2003	2004	2005	2006	2007	2008	2009
MDIs		166	166	172	189	194	211	215	207
Entering		6	9	11	24	17	20	12	5
Exiting		4	9	5	7	12	3	8	13
Acquired when Exiting		1	0	0	0	0	1	2	7

Year	2011	2012	2013	2014	2015	2016	2017

MDIs	010 197	187	181	174	175	164	157	155
Entering	8	6	1	6	6	0	0	1
Exiting	18	16	7	13	5	11	7	3
Acquired when Exiting	11	7	2	1	2	3	1	1

Table 3. Sample of Banks and Bank Offices and MDIs and MDI Offices

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total Number of Census Tracts	29,816	29,937	30,315	30,531	30,828	31,102	31,339	31,329	30,344
Number of Census Tracts with MDI Offices	757	765	769	884	964	981	1,050	1,044	1,060
Number of Census Tracts with MDI HQs	128	128	126	129	135	137	147	155	149
Low Income MDI HQ Census Tracts	32	31	32	32	32	32	32	28	28
Moderate Income MDI HQ Census Tracts	33	35	43	45	45	45	48	49	43
Low Income MDI Office Census Tracts	78	79	90	91	94	96	97	106	92
Moderate Income MDI Office Census Tracts	170	172	240	271	286	285	308	325	291
Percentage of Low Income MDI HQ Census Tracts	25%	24%	25%	25%	24%	23%	22%	18%	19%
Percentage of Moderate Income MDI HQ Census Tracts	26%	27%	34%	35%	33%	33%	33%	32%	29%
Percentage of Low Income MDI Office Census Tracts	10%	10%	12%	10%	10%	10%	9%	10%	9%
Percentage of Moderate Income MDI Office Census Tracts	22%	22%	31%	31%	30%	29%	29%	31%	27%
Number of MDI HQs	139	140	139	144	152	155	169	183	173
Number of MDI Offices	1,008	1,040	1,062	1,291	1,397	1,445	1,549	1,666	1,572
Number of MDI HQs in Low Income Census Tracts	38	37	41	40	38	37	39	38	39
Number of MDI HQs in Moderate Income Census Tracts	34	36	45	48	48	48	51	52	46
Number of MDI Offices in Low Income Census Tracts	116	120	126	132	130	132	137	155	164

Number of MDI Offices in Moderate Income Census Tracts	207	220	314	375	392	396	434	512	408
Percentage of Low Income MDI HQs	27%	26%	29%	28%	25%	24%	23%	21%	23%
Percentage of Moderate Income MDI HQs	24%	26%	32%	33%	32%	31%	30%	28%	27%
Percentage of Low Income MDI Offices	12%	12%	12%	10%	9%	9%	9%	9%	10%
Percentage of Moderate Income MDI Offices	21%	21%	30%	29%	28%	27%	28%	31%	26%
Number of Census Tracts with Both MDIs & Non-MDIs HQ	40	38	37	36	35	34	38	28	29
--Number of Non-MDIs within These Census Tracts	105	94	86	85	80	84	89	85	83
--Number of MDIs within These Census Tracts	49	46	44	41	40	38	45	32	37

Year	2010	2011	2012	2013	2014	2015	2016	2017
Total Number of Census Tracts	36,374	36,352	36,051	35,597	35,506	35,065	34,787	34,493
Number of Census Tracts with MDI Offices	1,302	1,156	1,117	1,111	1,130	1,088	1,084	1,017
Number of Census Tracts with MDI HQs	165	162	158	151	153	139	137	137
Low Income MDI HQ Census Tracts	21	18	31	29	24	26	26	22
Moderate Income MDI HQ Census Tracts	30	28	37	40	46	38	35	36
Low Income MDI Office Census Tracts	95	93	144	138	140	127	118	113
Moderate Income MDI Office Census Tracts	267	246	290	307	315	279	278	265
Percentage of Low Income MDI HQ Census Tracts	13%	11%	20%	19%	16%	19%	19%	16%
Percentage of Moderate Income MDI HQ Census Tracts	18%	17%	23%	26%	30%	27%	26%	26%
Percentage of Low Income MDI Office Census Tracts	7%	8%	13%	12%	12%	12%	11%	11%
Percentage of Moderate Income MDI Office Census Tracts	21%	21%	26%	28%	28%	26%	26%	26%
Number of MDI HQs	190	184	178	170	171	160	153	152
Number of MDI Offices	1,833	1,778	1,679	1,676	1,701	1,660	1,573	1,527
Number of MDI HQs in Low Income Census Tracts	26	24	38	37	26	29	32	26

Number of MDI HQs in Moderate Income Census Tracts	33	32	41	43	50	44	38	41
Number of MDI Offices in Low Income Census Tracts	137	136	232	230	220	214	196	185
Number of MDI Offices in Moderate Income Census Tracts	353	357	406	421	447	401	391	386
Percentage of Low Income MDI HQs	14%	13%	21%	22%	15%	18%	21%	17%
Percentage of Moderate Income MDI HQs	17%	17%	23%	25%	29%	28%	25%	27%
Percentage of Low Income MDI Offices	7%	8%	14%	14%	13%	13%	12%	12%
Percentage of Moderate Income MDI Offices	19%	20%	24%	25%	26%	24%	25%	25%
Number of Census Tracts with Both MDIs & Non-MDIs HQ	27	26	25	25	22	22	19	19
--Number of Non-MDIs within These Census Tracts	76	64	63	46	44	51	49	44
--Number of MDIs within These Census Tracts	38	35	33	32	31	34	25	24

Table 4. Correlation Matrix (Census Tracts: Coded 1 with an MDI Office, 0 otherwise)

This table presents a correlation matrix for all the demographic variables and the dummy variables for census tract that equal 1 indicating if there is at least one specific MDI office in a census tract, 0 otherwise. Similar coding applies to whether a census tract is an LMI tract. The sample uses annual data from 2001 to 2017. *, **, and *** indicates statistically significant at the 10%, 5%, and 1% levels, respectively.

	MDI Census	Black MDI	Asian MDI	Hispanic MDI	Native American MDI	Minority Population	Black Population	Asian Population	Hispanic Population	Native American	Poverty Rate	Ln Median Household

	Tract	Census Tract	Census Tract	Census Tract	Census Tract	Rate	Rate	Rate	Rate	Population Rate		Income
Black MDI Census Tract	0.36***											
Asian MDI Census Tract	0.43***	-0.00										
Hispanic MDI Census Tract	0.78***	-0.00***	-0.01***									
Native American MDI Census Tract	0.25***	-0.00	-0.00	-0.00**								
Minority Population Rate	0.23***	0.09***	0.08***	0.21***	0.01***							
Black Population Rate	0.02***	0.15***	-0.01***	-0.04***	-0.01***	0.59***						
Asian Population Rate	0.05***	-0.01***	0.17***	-0.03***	-0.01***	0.29***	-0.08***					
Hispanic Population Rate	0.23***	-0.01***	0.03***	0.28***	-0.01***	0.56***	-0.05***	-0.00**				
Native American Population Rate	0.06***	-0.00***	0.00***	0.05***	0.06***	0.16***	-0.03***	-0.08***	0.24***			
Poverty Rate	0.20***	0.06***	0.01***	0.21***	0.02***	0.51***	0.40***	-0.09***	0.32***	0.11***		
Ln Median Household Income	-0.14***	-0.05***	0.01***	-0.16***	-0.02***	-0.31***	-0.34***	0.22***	-0.17***	-0.05***	-0.78***	
LMI census tracts	0.05***	0.05***	0.02***	0.02***	0.01***	0.46***	0.35***	0.00***	0.24***	0.08***	0.56***	-0.49***

Table 5. Logit Regression Results (2001-2017)

This table presents logit regression results of relationships between the existence of MDIs and local demographic variables. The dependent variables are dummy variables that equal 1 if there is at least one specific MDI office in a census tract, 0 otherwise. There are five panels, one for all MDIs and one for each type of MDI. Similar coding applies to whether a census tract is an LMI tract. The analyses are performed using annual data that cover the period 2001 to 2017. Demographic variables, except the LMI tract, for 2001 to 2008 are generated by interpolation. Time and state fixed effects are included, and robust standard errors clustered at the state level. *, **, and *** denote coefficients that are statistically different from zero at the 10%, 5%, and 1% levels, respectively.

Panel A. Results for All MDIs

	Model 1	Model 2	Model 3	Model 4	Model 5
Minority Population Rate	3.80***				4.35***
Poverty Rate		3.64***			0.79
Ln Median Household Income			-0.71***		0.49**
LMI Tract				0.75***	-0.33***
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Yes	Yes	Yes	Yes	Yes
Observations	427,176	427,176	427,152	403,641	403,619

Panel B. Results for Black MDIs

	Model 1	Model 2	Model 3	Model 4	Model 5
Black Population Rate	5.91***				5.60***
Poverty Rate		6.56***			-0.82
Ln Median Household Income			-1.84***		-0.35
LMI Tract				1.94***	0.27
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Yes	Yes	Yes	Yes	Yes
Observations	383,698	383,698	383,674	362,982	362,960

Panel C. Results for Asian MDIs

	Model 1	Model 2	Model 3	Model 4	Model 5
Asian Population Rate	7.12***				7.19***
Poverty Rate		1.53***			2.30***
Ln Median Household Income			-0.14		0.19
LMI Tract				0.40***	0.23
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Yes	Yes	Yes	Yes	Yes
Observations	324,738	324,738	324,714	306,592	306,570

Panel D. Results for Hispanic MDIs

	Model 1	Model 2	Model 3	Model 4	Model 5
Asian Population Rate	3.88***				4.16***
Poverty Rate		3.38***			1.99**
Ln Median Household Income			-0.63***		0.72***
LMI Tract				0.60**	-0.24
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Yes	Yes	Yes	Yes	Yes
Observations	272,523	272,523	272,503	257,172	257,154

Panel E. Results for Native American MDIs

	Model 1	Model 2	Model 3	Model 4	Model 5
Native American Population Rate	7.17***				6.82***
Poverty Rate		3.83**			2.09*
Ln Median Household Income			-1.04**		-0.44
LMI Tract				0.40	-0.40**
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Yes	Yes	Yes	Yes	Yes

Observations	109,090	109,090	109,090	102,397	102,397

Table 6. Logit Regression Results (2009-2017)

This table presents logit regression results of relationships between the existence of MDIs and local demographic variables. The dependent variables are dummy variables that equal 1 if there is at least one specific MDI office in a census tract, 0 otherwise. There are five panels, one for all MDIs and one for each type of MDI. Similar coding applies to whether a census tract is an LMI tract. The analyses are performed using annual data that cover the period 2009 to 2017. Time and state fixed effects are included, and robust standard errors clustered at the state level. *, **, and *** denote coefficients that are statistically different from zero at the 10%, 5%, and 1% levels, respectively.

Panel A. Results for All MDIs

	Model 1	Model 2	Model 3	Model 4	Model 5
Minority Population Rate	3.73***				4.40***
Poverty Rate		3.03***			0.50
Ln Median Household Income			-0.60***		0.46**
LMI Tract				0.61***	-0.42***
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Yes	Yes	Yes	Yes	Yes
Observations	229,861	229,861	229,847	214,726	214,712

Panel B. Results for Black MDIs

	Model 1	Model 2	Model 3	Model 4	Model 5
Black Population Rate	5.81***				5.58***
Poverty Rate		6.03***			-0.66
Ln Median Household Income			-1.84***		-0.32
LMI Tract				1.80***	0.14
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes

Clustered S.E.	Yes	Yes	Yes	Yes	Yes
Observations	208,923	208,923	208,909	195,435	195,421

Panel C. Results for Asian MDIs

	Model 1	Model 2	Model 3	Model 4	Model 5
Asian Population Rate	6.87***				7.03***
Poverty Rate		1.01***			1.08
Ln Median Household Income			-0.10		-0.08
LMI Tract				0.34***	0.21
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Yes	Yes	Yes	Yes	Yes
Observations	180,021	180,021	180,007	168,629	168,615

Panel D. Results f or Hispani c MDIs

	Model 1	Model 2	Model 3	Model 4	Model 5
Asian Population Rate	3.69***				3.95***
Poverty Rate		3.01***			2.32***
Ln Median Household Income			-0.55***		0.75***
LMI Tract				0.46**	-0.33
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Yes	Yes	Yes	Yes	Yes
Observations	138,453	138,453	138,444	129,392	129,383

Panel E. Results for Native American MDIs

	Model 1	Model 2	Model 3	Model 4	Model 5

Native American Population Rate	6.90***				6.63***
Poverty Rate		3.58**			2.06*
Ln Median Household Income			-1.06**		-0.54
LMI Tract				0.31	-0.52***
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Yes	Yes	Yes	Yes	Yes
Observations	57,454	57,454	57,454	53,132	53,132

Table 7. Share of Total Deposit Accounted for By MDI Offices

This table Presents the share of total deposits of all bank offices in a census tract with at least one MDI office, and at least one type of MDI office accounted for by MDIs or types of MDIs. Panel A shows the average share of total deposit accounted for by MDI offices, or type of MDI offices, while Panel B shows the percentage of census tracts in which MDI offices, or type of MDI offices, accounted for 100 percent of all deposits.

Panel A. Average Share of Total Deposit Accounted for By MDI Offices

	2001	2002	2003	2004	2005	2006	2007	2008	2009
All	0.55	0.55	0.55	0.56	0.55	0.54	0.53	0.49	0.54
Black	0.53	0.52	0.51	0.51	0.50	0.53	0.51	0.56	0.56
Asian	0.38	0.39	0.39	0.38	0.39	0.39	0.39	0.41	0.43
Hispanic	0.64	0.65	0.64	0.66	0.62	0.61	0.59	0.51	0.58
Native	0.59	0.59	0.58	0.56	0.58	0.56	0.54	0.53	0.59

	2010	2011	2012	2013	2014	2015	2016	2017
All	0.55	0.50	0.50	0.50	0.51	0.43	0.42	0.46
Black	0.56	0.52	0.51	0.52	0.50	0.49	0.47	0.51
Asian	0.47	0.45	0.45	0.45	0.46	0.45	0.42	0.47
Hispanic	0.59	0.52	0.53	0.53	0.54	0.38	0.38	0.42
Native	0.55	0.53	0.53	0.50	0.51	0.48	0.54	0.49

Panel B. Percentage of Census Tracts in Which MDI Offices Accounted for 100 Percent of All Deposits

	2001	2002	2003	2004	2005	2006	2007	2008	2009
All	36	36	36	40	38	36	35	29	37
Black	40	38	38	36	36	39	37	42	43
Asian	20	20	20	18	18	17	16	16	20
Hispanic	42	43	42	51	46	44	42	33	44
Native	43	38	34	33	35	33	31	23	38

	2010	2011	2012	2013	2014	2015	2016	2017
All	37	30	28	30	31	22	21	24
Black	41	35	34	33	32	35	34	35
Asian	22	21	21	20	22	20	18	21
Hispanic	45	35	33	36	38	20	19	23
Native	33	25	23	20	22	21	29	20

Table 8. Fractional Logit Regression Results

This table presents fractional logit regression results of relationships between the share of total deposits of all bank offices accounted for by MDIs and local demographic variables. The dependent variable is the share of total deposits in a census tract of MDIs. There are five panels, one for all MDIs and one for each type of MDI. The analyses are performed using annual data that cover the period 2001 to 2017. Time and state fixed effects are included, and robust standard errors clustered at the state level. *, **, and *** denote coefficients that are statistically different from zero at the 10%, 5%, and 1% levels, respectively.

Panel A. Results for All MDIs

	Model 1	Model 2	Model 3	Model 4	Model 5
Minority Population Rate	4.60***				4.97***
Poverty Rate		4.37***			0.84
Ln Median Household Income			-1.00***		0.31
LMI Tract				0.97***	-0.33***
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Yes	Yes	Yes	Yes	Yes

Observations	422,138	422,138	422,116	398,898	398,878

Panel B. Results for Black MDIs

	Model 1	Model 2	Model 3	Model 4	Model 5
Black Population Rate	6.81***				6.46***
Poverty Rate		6.93***			-0.19
Ln Median Household Income			-1.92***		-0.11
LMI Tract				2.20****	0.39
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Yes	Yes	Yes	Yes	Yes
Observations	422,138	422,138	422,116	398,898	398,878

Panel C. Results for Asian MDIs

	Model 1	Model 2	Model 3	Model 4	Model 5
Asian Population Rate	6.24***				6.26***
Poverty Rate		2.18***			2.22***
Ln Median Household Income			-0.38***		0.03
LMI Tract				0.51***	0.19
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Yes	Yes	Yes	Yes	Yes
Observations	422,138	422,138	422,116	398,898	398,878

Panel D. Results for Hispanic MDIs

	Model 1	Model 2	Model 3	Model 4	Model 5

Asian Population Rate	4.63***				4.53***
Poverty Rate		4.44***			2.38*
Ln Median Household Income			-1.04***		0.44
LMI Tract				0.93***	-0.17
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Yes	Yes	Yes	Yes	Yes
Observations	422,138	422,138	422,116	398,898	398,878

Panel E. Results for Native American MDIs

	Model 1	Model 2	Model 3	Model 4	Model 5
Native American Population Rate	6.93***				6.76***
Poverty Rate		3.02			1.33
Ln Median Household Income			-0.76		-0.04
LMI Tract				0.40	-0.17
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Yes	Yes	Yes	Yes	Yes
Observations	422,138	422,138	422,116	398,898	398,878

Table 9. Panel Regression Results for ROA: MDI vs. Non-MDI Performance Based on

Bank Financial Variables, with Demographic Variables

This table presents results for panel regressions with a dummy variable included indicating whether a bank is an MDI (coded 1) or not (coded 0). The regressions use quarterly data from 2001 to 2017. The dependent variable is the return on total assets (ROA). All regressions include size (Log_TA), loans (Loan/TA), liquidity (Liquidity/TA), non-performing loans (NPLs), and equity (Equity/TA) as control variables. Year, quarter, and bank fixed effects are included, and robust standard errors clustered at the bank level. *, **, and *** indicates statistically significant at the 10%, 5%, and 1% levels, respectively.

	MDI	Black MDI	Asian MDI	Hispanic MDI	Native American MDI
Log_TA	0.57***	0.57***	0.57***	0.57***	0.57***

Loan/TA	2.18***	2.18***	2.18***	2.19***	2.19***
Liquidity/TA	1.16***	1.16***	1.16***	1.17***	1.17***
NPLs	-7.72***	-7.72***	-7.73***	-7.72***	-7.73***
Equity/TA	-0.06***	-0.06***	-0.06***	-0.06***	-0.06***
MDI_dummy	0.32*	1.95	0.40*	-0.18	-0.53***
Demographic Controls	Yes	Yes	Yes	Yes	Yes
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Yes	Yes	Yes	Yes	Yes
R-Squared	0.01	0.01	0.01	0.01	0.01
Observations	492,130	492,130	492,130	492,130	492,130

Table 10. Panel Regression Results for Risk: MDI vs. Non-MDI Performance Based on

Bank Financial Variables, with Demographic Variables

This table presents results for panel regressions with a dummy variable included indicating whether a bank is an MDI (coded 1) or not (coded 0). The regressions use quarterly data from 2001 to 2017. The dependent variable is Ln Z-score. All regressions include size (Log_TA), loans (Loan/TA), liquidity (Liquidity/TA), non-performing loans (NPLs), and equity (Equity/TA) as control variables. Year, quarter, and bank fixed effects are included, and robust standard errors clustered at the bank level. *, **, and *** indicates statistically significant at the 10%, 5%, and 1% levels, respectively.

	MDI	Black MDI	Asian MDI	Hispanic MDI	Native American MDI
Log_TA	0.01***	0.01***	0.01***	0.01***	0.01***
Loan/TA	0.16***	0.16***	0.16***	0.16***	0.16***
Liquidity/TA	0.05*	0.05*	0.05*	0.05*	0.05*
NPLs	-0.58***	-0.58***	-0.58***	-0.58***	-0.58***
Equity/TA	0.05***	0.05***	0.05***	0.05***	0.05***
MDI_dummy	0.01	0.04	0.02	-0.01	-0.08***
Demographic Controls	Yes	Yes	Yes	Yes	Yes
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Yes	Yes	Yes	Yes	Yes

R-Squared	0.01	0.01	0.01	0.01	0.01
Observations	490,890	490,890	490,890	490,890	490,890

Table 11. Results for ROA: MDI vs. Non-MDI Performance Based on Bank Financial

Variables, with Demographic Variables (same census tract)

This table presents results for panel regressions with a dummy variable included indicating whether a bank is an MDI (coded 1) or not (coded 0). The regressions use quarterly data from 2001 to 2017. The dependent variable is the return on total assets (ROA). All regressions include size (Log_TA), loans (Loan/TA), liquidity (Liquidity/TA), non-performing loans (NPLs), and equity (Equity/TA) as control variables. Year, quarter, and bank fixed effects are included, and robust standard errors clustered at the bank level. *, **, and *** indicates statistically significant at the 10%, 5%, and 1% levels, respectively.

	MDI	Black MDI	Asian MDI	Hispanic MDI	Native American MDI
Log_TA	0.77*	0.90***	0.62*	0.90	2.05***
Loan/TA	1.92*	2.05**	1.28	-1.60	4.29***
Liquidity/TA	-0.39	1.68**	-0.66	-2.44	1.11
NPLs	-4.78***	-8.90***	-18.28***	-12.04***	-4.74*
Equity/TA	-0.03	0.03	-0.06**	-0.08**	0.01
MDI_dummy	0.09	-1.49	-0.21	1.64	1.49
Demographic Controls	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Yes	Yes	Yes	Yes	Yes
R-Squared	0.38	0.72	0.62	0.31	0.65
Observations	6,851	1,918	2,816	2,114	543

Table 12. Results for Risk: MDI vs. Non-MDI Performance Based on Bank Financial

Variables, with Demographic Variables (same census tract)

This table presents results for panel regressions with a dummy variable included indicating whether a bank is an MDI (coded 1) or not (coded 0). The regressions use quarterly data from 2001 to 2017. The dependent variable is Ln Z-score. All regressions include size (Log_TA), loans (Loan/TA), liquidity (Liquidity/TA), non-performing loans (NPLs), and equity (Equity/TA) as control variables. Year, quarter, and bank fixed effects are included, and robust standard errors clustered at the bank level. *, **, and *** indicates statistically significant at the 10%, 5%, and 1% levels, respectively.

	MDI	Black MDI	Asian MDI	Hispanic MDI	Native American MDI
Log_TA	0.78***	0.65**	0.72***	1.07***	1.21***
Loan/TA	1.34***	0.88	0090	2.24**	2.12***
Liquidity/TA	-0.03	-0.21	0.10	0.50	1.74*
NPLs	-0.70***	-2.52***	-2.31	-2.79**	-0.19
Equity/TA	0.06***	0.05***	0.06***	0.06***	0.10***
MDI_dummy	-0.04	-1.07	-0.07	0.38**	1.38*
Demographic Controls	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Yes	Yes	Yes	Yes	Yes
R-Squared	0.72	0.75	0.69	0.75	0.79
Observations	6,792	1,902	2,799	2,081	543

Table 13. Results for Robustness Checks

This table presents results for panel regressions with a dummy variable included indicating whether a bank is an MDI (coded 1) or not (coded 0). The regressions are based on quarterly data from 2001 to 2017. The dependent variables are return on total assets (ROA) and Ln Z-score. All regressions include size (Log_TA), loans (Loan/TA), liquidity (Liquidity/TA), non-performing loans (NPLs), and equity (Equity/TA) as control variables. Year, quarter, and bank fixed effects are included, and robust standard errors clustered at the bank level. *, **, and *** indicates statistically significant at the 10%, 5%, and 1% levels, respectively.

	Entire	FRB	Same Zip	Same City	Entire	FRB		
Log_TA	1.23**	1.08**	1.12***	0.88***	0.84***	0.95***		
	ROA	ROA	ROA	ROA	Ln Z-score	Ln Z-score	Ln Z-score	Ln Z-score
							Same Zip	Same City
							0.56***	0.63***
Loan/TA	0.52	2.71*	4.00***	3.55***	0.93	0.91**	1.78***	1.42***
Liquidity/TA	-0.35	0.79	1.34	1.50***	-0.29	-0.38	0.68*	0.81***
NPLs	-8.81***	-4.38***	-6.83**	-7.96***	-3.36***	-0.62***	-2.62**	-1.59*
Equity/TA	-0.02	-0.02	-0.04*	-0.05***	0.04***	0.06***	0.05***	0.05***
MDI_dummy	5.65**	0.31	-0.02	0.35	4.11***	0.24	0.24	0.28*
Demographic Controls	Yes	Yes	No	No	Yes	Yes	No	No
Clustered S.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.32	0.34	0.52	0.58	0.63	0.67	0.65	0.62
Observations	4,163	5,578	10,411	66,865	4,143	5,541	10,342	66,551

Figure 3. Number of Minority Depository Institutions using both FDIC and FRB Lists

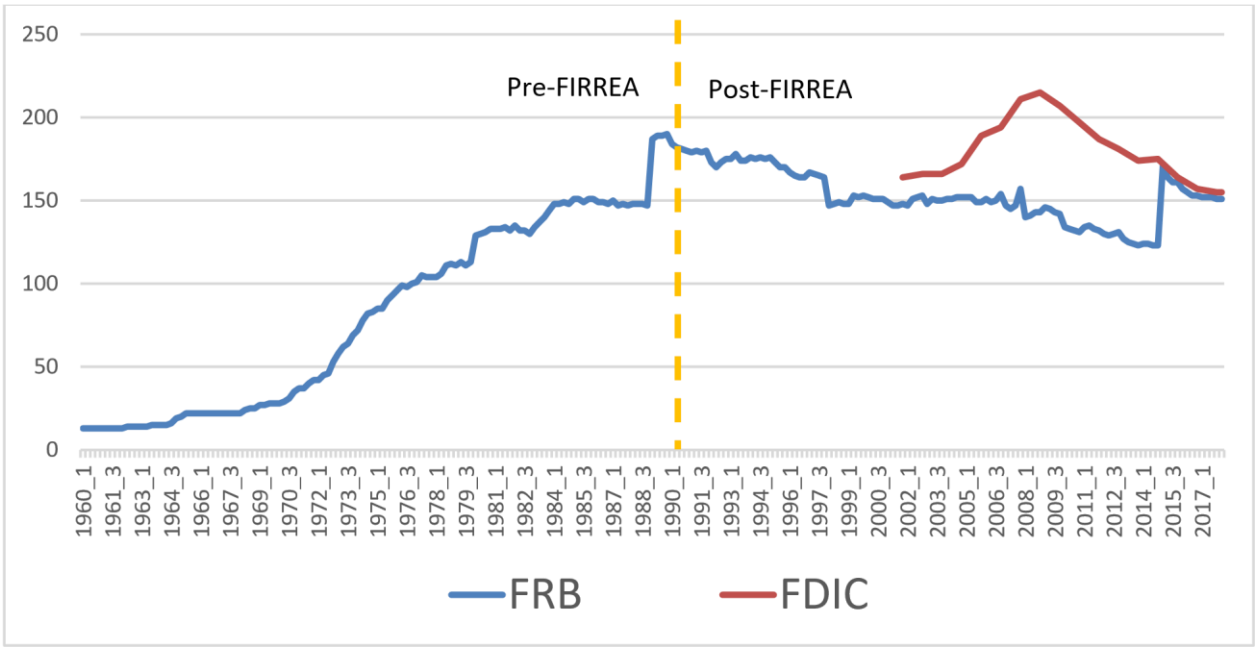

Table 14. Mean in Imbalance Measure Based on Demographic Variables With and

Without Matching (PSM)

Period: 2001Q1 – 2017Q4

	MDI	Black MDI	Asian MDI	Hispanic MDI	Native American MDI
Without Matching	0.99	1.00	1.00	1.00	1.00
With Matching - PSM	0.80	0.69	0.80	0.72	0.69

Table 15. Results for ROA using Propensity Score One-to-One No-Replacement Matching Sample

This table presents results for panel regressions with a dummy variable included indicating whether a bank is an MDI (coded 1) or not (coded 0) based on the sample generated by propensity score matching methodology. The analyses use annual data from 2001 to 2017. The dependent variable is the return on total assets (ROA). One to one without replacement propensity score matching method generates control groups for MDIs and different types of MDIs. All regressions include controls as indicated in Table 9. Year, quarter, and bank fixed effects are included, and robust standard errors clustered at the bank level. *, **, and *** denote an estimate that is statistically different from zero at the 10%, 5%, and 1% levels, respectively.

	MDI	Black MDI	Asian MDI	Hispanic MDI	Native American MDI
Log_TA	1.14***	1.27***	0.88***	0.35	0.96***

Loan/TA	2.80***	1.24	4.23***	0.26	3.62***
Liquidity/TA	1.26**	1.02	1.59**	-0.30	3.50***
NPLs	-8.26***	-5.77***	-8.36***	-10.00***	-5.51*
Equity/TA	-0.03**	0.05	-0.04**	-0.04*	0.02
MDI_dummy	-0.00	1.24	0.10	-0.46	3.37**
Demographic Controls	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Yes	Yes	Yes	Yes	Yes
R-Squared	0.78	0.70	0.90	0.81	0.56
Observations	21,564	4,219	9,165	4,651	2,352

Table 16. Results for Risk using Propensity Score One-to-One No-Replacement Matching Sample

This table presents results for panel regressions with a dummy variable included indicating whether a bank is an MDI (coded 1) or not (coded 0) based on the sample generated by propensity score matching methodology. The analyses use annual data from 2001 to 2017. The dependent variable is Ln Z-score. One to one without replacement propensity score matching method generates control groups for MDIs and different types of MDIs. All regressions include controls as indicated in Table 9. Year, quarter, and bank fixed effects are included, and robust standard errors clustered at the bank level. *, **, and *** denote an estimate that is statistically different from zero at the 10%, 5%, and 1% levels, respectively.

	MDI	Black MDI	Asian MDI	Hispanic MDI	Native American MDI
Log_TA	0.06*	0.18**	-0.01	-0.02	0.06
Loan/TA	0.24***	-0.10	0.15	0.16	0.21**
Liquidity/TA	0.01	-0.09	0.04	-0.11	0.11
NPLs	-0.81***	-0.21	-0.84***	-0.83***	-0.02
Equity/TA	0.05***	0.13***	0.05***	0.05***	0.07***
MDI_dummy	-0.02	0.43	-0.02	-0.05	-2.57***
Demographic Controls	Yes	Yes	Yes	Yes	Yes
Clustered S.E.	Yes	Yes	Yes	Yes	Yes
R-Squared	0.98	0.98	0.98	0.98	1.00
Observations	21,445	4,179	9,103	4,640	2,349

Can Inflation Targeting Mitigate the Resource Curse? Evidence from Emerging Market Economies

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Abstract: Extractive commodities such as fuels and minerals are the driving factors of economic growth in many developing countries. Yet, paradoxically, countries rich in these resources often experience worse economic outcomes compared to countries lacking them- often a result of policy failure. Understanding how to effectively manage such commodities is thus essential for the prospects of resource-rich developing countries. This paper highlights the role of time-consistent and credible monetary policy. Using panel data on 58 emerging market countries over the 1996 - 2018 period, this paper finds a negative link between natural resource rents and economic growth, supporting prior scholarship. Employing a difference-in-difference estimation strategy with country and time fixed effects, I find that Inflation targeting countries experience higher levels of economic growth compared to non-targeting countries during a natural resource boom. The policy effectiveness results are robust to the inclusion of several determinants of economic success in developing countries- cross checked with alternative data sources. These findings underscore an alternative way in which prudent monetary policy can help developing countries succeed.

Keywords: INFLATION TARGETING, MONETARY POLICY, RESOURCE CURSE,

EMERGING MARKETS, NATURAL RESOURCE POLICY

INTRODUCTION

Since the discovery of offshore oil in Norway during the 1970s, it became apparent that natural resource wealth does not necessarily lead to sustainable economic growth; rather, it can lead to slower growth in the long run. Several mechanisms are highlighted in the literature to illustrate this so-called 'resource curse'. Influxes of natural resource revenues can crowd out important sectors of the economy (Corden and Neary 1982, Sachs and Warner 1995, Egert 2009) either through increasing the real exchange rate and prices, or through drawing labor and capital away from other sectors. Natural resource abundance can also curtail growth through its pervasive impact on political institutions, education, and public health expenditures.

This paper finds that the adoption of inflation targeting (IT) as a monetary policy strategy can reduce the negative growth effects of natural resources. Since the 1990s, many emerging market and industrial countries have implemented a strategy of inflation targeting- whereby the central bank establishes a quantitative price target and commits to maintaining it. The widespread adoption of inflation targeting has sparked much empirical debate in the economics literature. Several studies find that the implementation of IT leads to more stable macroeconomic outcomes

in the long run. I hypothesize two channels by which inflation targeting may prevent natural resources from leading to slower growth. The first is that through promoting lower and more stable prices, inflation targeting may prevent natural resource booms from transmitting into higher and more volatile prices. Second, a legal mandate to pursue inflation stability insulates central banks from political pressures, preventing them from being leveraged by elected officials for political gain. Through strengthening central bank independence, inflation targeting may prevent the anti-institutional impact of natural resources from corrupting monetary policy.

I use panel data on 58 developing countries over the 1996-2018 time period to estimate the impact of natural resource rents on growth, as well as whether adopting a policy of inflation targeting can improve the anti-growth effect of natural resources. Using a difference-indifference estimation strategy with time and country fixed effects, I find that natural resource abundance indeed leads to slower economic growth, and that adopting a monetary policy of inflation targeting mitigates the anti-growth effects of natural resources. The results remain significant even after controlling for potentially confounding factors, such as financial development, foreign direct investment, savings, population growth, and other determinants of successful economic performance. Moreover, they remain significant after controlling for a range of political institutions.

The paper is structured as follows. Section 2 presents the relevant literature on the relationship between natural resources on growth. Section 3 considers the literature on inflation targeting and outlines the conceptual framework. Section 4 presents the data and introduces the estimation strategy. Section 5 presents the results, and section 6 concludes. A list of references and tables follows.

LITERATURE REVIEW

According to the 'Resource Curse' hypothesis, resource-rich countries experience slower levels of economic growth in the long run compared to their resource-poor counterparts. There are several reasons for this. The most commonly cited channel through which natural resource wealth curtails growth is through crowding out the manufacturing sector (Corden and Neary 1982, Sachs and Warner 1995, Egert 2009). A strong manufacturing sector is critical for economic growth: it supports job creation, leads to technological advances, and exerts positive productivity spillovers on the rest of the economy (Krugman 1987, van Wijnbergen 1984). Natural resource wealth also has the capacity to hinder long-run growth through causing adverse political effects. Energy booms- particularly those involving petroleum- exert negative effects on democracy (Skocpol 1982, Ross 2001), on corruption (Robinson et al, 2006), and on the incidence of civil wars and ethnic conflicts (Fearon, 2004). They can even negatively impact education (Cockx and Francken, 2016) and public health expenditures (Cockx and Francken, 2014).

While there are several mechanisms by which natural resource endowments hinder economic growth, effective institutions and policies can transform the so-called resource curse into a blessing. The literature predominantly focuses on the importance of political institutions (Amiri et al. 2019, Horváth and Zeynalov 2014) and fiscal policies (Narantungalag, 2012) in curbing the negative effects of natural resource windfalls. However, there is a gap in the literature on the role

of other policies, particularly inflation targeting, in natural resource management. Studies that address this question focus on only a small handful of resource-rich countries, making it difficult to generalize the appropriate policy response. Can adopting a policy of inflation targeting channel natural resource booms into higher long-run economic growth? This study attempts to address these questions using panel data on developing countries over the post-Cold War period (1996-2018).

The following subsections illustrate the potential channels through which natural resource abundance can lead to economic stagnation, and how strong institutions and policies can mitigate the negative economic effects. I maintain a focus on the negative link between natural resources and both manufacturing and political institutions, and then proceed to review the role of institutions and policies.

Manufacturing/Productivity

One channel through which natural resource abundance may lead to lower economic growth is through causing a contraction in manufacturing output. Manufacturing contributes to rising living standards more than any other sector of the economy. A strong manufacturing base provides research and development, technological innovations, and middle-class jobs. It also sustains other sources of economic activity, such as services and exports.

The term 'Dutch Disease' was first coined after the Netherlands discovered large pockets of offshore oil in the North Sea in the early 1960s, as this discovery led to high unemployment and lower manufacturing output. Since then, a large body of literature has pointed to the detrimental impact of natural resource wealth on economic growth. Corden and Neary (1982) pioneered the theoretical contribution toward this topic. The authors propose a theoretical model explaining how a resource boom leads to de-industrialization. They point to two causal mechanisms. The first is the 'resource movement effect'. According to this channel, a natural resource boom leads to higher profits in the non-tradable energy sector, which causes a heightened demand for labor and capital. This draws labor and capital from tradable sectors of the economy- mainly from services and manufacturing- toward the booming sector, which leads to a process of 'direct de-industrialization'. The second is the 'spending effect'. In this channel, an influx of resource export revenues places upward pressure on a country's exchange rate, making goods in other sectors more expensive for international buyers, rendering them less competitive. This leads to an 'indirect de-industrialization' as tradable sectors are forced to make reductions in plant and factory output, and thus employment.

The empirical analysis of Sachs and Warner (1995) lends evidence in support of these claims. The authors find that resource-rich countries experienced lower levels of growth compared to their resource-poor counterparts over the long-run. Using a sample of 97 developing countries over the 1970-89 period, they find that the negative relationship between natural resource exports and economic growth holds even after controlling for other relevant determinants of economic performance, such as initial income and trade policies. The authors confirm that the primary mechanism through which natural resource booms hamper economic growth is through crowding

out the **tradable** manufacturing sector. As demand for non-traded energy exports increases, wages and prices in those sectors increase. This reduces profits in **tradable** manufacturing sectors that use those non-tradable goods as inputs, leading to reductions in employment.

Sachs and Warner (1999) test the robustness of these findings by controlling for geographic and climate variables, such as distance to the closest major port, percentage of land located in geographic tropics, and the prevalence of malaria. The results confirm those found by prior studies. Moreover, the authors find that resource-rich countries tend to have overall higher price levels in the long run, making non-mineral sectors of their economy less competitive in international markets. As a result, many resource-rich developing countries may miss out on export-led development.

Egert (2009) provides empirical evidence toward the proposed 'spending effect', whereby a natural resource boom (specifically oil) raises a country's real exchange rate, causing other sectors of the economy- particularly manufacturing- to contract. The study uses a sample of 15 former Soviet Union countries from 1991 to 2006. The results indicate that an increase in oil and mineral exports were associated with a decline in manufacturing output during that time period. Moreover, increases in oil prices resulted in an appreciation of the nominal and real exchange rates against the euro and the dollar. However, the results indicate that transmission of increased oil prices into currency appreciation takes one to two years to materialize.

Declines in manufacturing due to a natural resource boom are particularly harmful for a country's long-run growth because of certain negative productivity spillovers. Greenstone et al. (2010) examine the productivity spillover effects of manufacturing plants in the U.S from 1973 to 1998. The authors find that five years after opening a manufacturing plant in a given county, the Total Factor Productivity of neighboring plants is 12% higher. The results of this study lend support to the hypothesis that manufacturing growth can lead to positive productivity spillovers, which contribute to long-run economic development.

Negative productivity shocks resulting from a contraction of a country's manufacturing sector are explained by LBD (Learning-by-doing) models of economic development. Learning-bydoing refers to the process in economic development where productivity is achieved through incremental improvements such as practice and self-improvement. Factories and plants can increase output by using better equipment or adopting more effective management practices, without increasing labor and capital (Ishikawa, 1992). The empirical studies of Krugman (1987) and van Wijnbergen (1984a) suggest that when there is a boom in the non-tradable (energy) sector and subsequent contraction of tradable goods (manufacturing), labor and capital are reallocated from strong Learning-by-doing sectors to weaker ones. This in turn leads to lower levels of productivity and weaker economic performance in the long run.

Role of Institutions and Policies

While there is relative consensus on the negative economic effects of natural resource dependence, more recent literature identifies how institutions and policies can alter the relationship between energy sector booms and economic growth. The success of resource-rich

developing countries such as Chile, Argentina and Botswana points to how effective institutions can turn natural resource wealth into a blessing.
Taguchi and Khinsamone (2018) examine the prevalence of Dutch Disease in a sample of resource-rich ASEAN (Association of Southeast Asian Nations) countries over the 1970 - 2015 time period using a vector auto-regression model. They find that Myanmar and Lao People's Democratic Republic suffered from Dutch Disease over the 1970-2015 period due to crowding out of manufacturing by booming energy sectors; and that Malaysia and Indonesia did not suffer such effects during a more recent 1997-2015 time horizon. They suggest that allocating resource revenues toward investment projects, diversifying domestic industries, and improving institutions that reinforce natural resource governance can help mitigate the adverse impact of natural resource booms.

Other studies examine how political institutions shape the effects of natural resource wealth on economic growth. Evidence from former Soviet Union countries indicates that when the quality of political institutions such as control of corruption, rule of law, government effectiveness, regulatory quality, and political stability is sufficiently high, resource booms do not lead to a crowding-out of manufacturing (Horváth and Zeynalov 2014). Amiri et al (2019) elaborate on this hypothesis by examining a larger sample of resource-rich economies. They find that enhancements in institutional quality lead to more effective utilization of a country's natural resources, specifically in strengthening the manufacturing sector. Boschini et al. (2007) suggest that whether natural resource endowments are beneficial or hurtful depends on the interactions between institutional settings and the types of resources in the domestic economy. The authors show that minerals pose negative development threats only if the quality of institutions is low, and that they exert positive effects when the quality of institutions is high. Moreover, for countries rich in diamonds, these effects- both positive and negative- are larger.

The recent experience of Chile as a resource-rich economy that has avoided the economic resource curse maladies highlights how effective macroeconomic policies can redirect energy wealth in a positive direction. Low levels of inflation, sound fiscal policy, openness to trade, and strong regulatory institutions prevent natural resource revenues from being exploited by political elites and from crowding out other valuable sectors of the economy (Narantungalag, 2012). In Chile, debt controls, spending limits, and export diversification have helped insulate the economy from commodity price cyclicality. Additionally, the establishment of a sovereign wealth fund allows fiscal authorities to invest abroad in the case of a positive shock to the exchange rate (Narantungalag, 2012). It is evident that effective policies and institutions can prevent natural resource abundance from undermining economic performance. Less understood, however, is the role of credible and time-consistent monetary policy. This is the gap in the literature that I seek to address.

CONCEPTUAL FRAMEWORK

Over the past two decades, many emerging market countries have adopted a monetary policy strategy of inflation targeting (IT), where the central bank establishes a medium-run price level target and commits to achieving it. The first country to formally adopt inflation targeting was New

Zealand in 1990. Since then, countries such as Brazil and Chile have followed suit, and are examples of successfully implemented IT regimes. However, the effectiveness of inflation targeting as a monetary policy for emerging market economies remains subject to heavy debate. There are several advantages of inflation targeting. As opposed to targeting the money supply or exchange rate, inflation targeting allows central banks to focus on shocks to the real economy. Moreover, it can promote central bank credibility: the mandate to pursue price stability insulates the bank from political pressures, and in doing so avoids the threats posed by time-inconsistent policy (Mishkin, 2000).

A large body of empirical evidence suggests that adopting a monetary policy strategy of inflation targeting can help emerging market countries produce superior macroeconomic outcomes in the long run. Using panel data on industrial and emerging market countries over the 1986 - 2004 period, Mollick et al. (2011) find positive effects of inflation targeting on real output growth. They suggest, however, that the inflation targeting policy must be strictly enforced for the disinflation process to outweigh the output costs. Using a variety of propensity score matching methods, Yin and Ye (2008) find that inflation targeting has positive effects on both inflation and inflation volatility in emerging market countries. They argue, however, that the effectiveness of inflation targeting is determined by country-specific factors, such as the institutional framework and the degree to which the central bank has a desire to limit exchange rate movements. Mishkin and Klaus (2007) find that inflation targeting indeed "works", as the policy helps countries achieve lower inflation in the long-run and improves the overall efficiency of monetary policy. They also find that industrial-economy inflation targeters have benefitted from the policy more than emerging market economy inflation targeters.

Inflation targeting has been a focus of many empirical studies in economic literature since its proliferation in the 1990s. However, little is known about its effectiveness in preventing the 'resource curse'. I hypothesize that the use of inflation targeting may prevent natural resource revenues from dampening economic growth for at least two reasons. The first, and perhaps most intuitive, is that a well-implemented inflation targeting program reduces both overall inflation and inflation volatility. As a result, it may mitigate the high and volatile inflation rates experienced by resource-exporting countries. Second, and perhaps less intuitive, inflation targeting insulates the central bank from political pressures- especially if it is legally mandated. This prevents politicians from using the central bank as a re-election tool- in which case monetary policy would be time-inconsistent and inefficient. As previously mentioned, undermining fiscal regimes and political institutions is one channel through which natural resources lead to stagnation (Sala-i-Martin and Subramanian, 2013). An independent central bank with a legal mandate to pursue price stability may shield the institution from the corruptive impacts of natural resource abundance.

DATA AND ESTIMATION STRATEGY

Data

My sample consists of 58 developing countries over the 1996 - 2018 period. These countries vary substantially in their economic growth rates, natural resource exports, and central bank mandates, which makes them particularly useful for statistical analyses.

As a measure of economic growth, I use GDP per capita growth measured in 2010 U.S dollars. Total natural resource rents are calculated as the difference between the total value of natural resource production at world prices and their total costs of production, and are measured as a percentage of GDP. Total natural resources rents are the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents. This data is obtained from the World Bank's WDI (World Development Indicators) database.

Considering factors that impact economic growth in developing countries, I include the following variables. Total trade is the sum of imports and exports of goods and services as a share of GDP. Domestic credit to the private sector consists of financial resources provided to the private sector by financial corporations and is measured as a share of GDP. Foreign direct investment (net inflows) are the net inflows of investment to acquire ownership in businesses in economies outside of those of the investors and are measured as a share of GDP. As a proxy for the average tax rate, I use tax revenues measured as a percentage of GDP. Gross domestic savings are measured as GDP less final consumption expenditure (total consumption) and are measured as a share of GDP. These variables are from the World Bank's WDI (World Development Indicators) database.

As is consistent with the inflation targeting literature, I include several indicators of political institutions. These include control of control of corruption, rule of law, government effectiveness, regulatory quality, political stability and the absence of violence/terrorism, and voice and accountability. They are defined as the following:

- Control of Corruption: refers to perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption.
- Rule of Law: refers to perceptions of the extent to which agents have confidence in, and abide by, the rules that govern society. In particular, it looks at the quality of contract enforcement, property rights, confidence in the police and the courts, as well as the likelihood of being affected by either crime and/or violence.
- Government Effectiveness: refers to perceptions of the quality of public services, and the quality of the civil service and how independent it is perceived to be from political pressures. It also captures perceptions of the quality of policy formulation and implementation, as well as the credibility of the government's commitment to carrying such policies through.
- Regulatory Quality: refers to perceptions of the government's ability to formulate and implement sound policies and to develop regulations that permit and promote private sector development.
- Political Stability and Absence of Violence/Terrorism: this dimension refers to perceptions of the likelihood that a government will be destabilized or overthrown by unconstitutional or violent means and includes both politicallymotivated violence and terrorism.
- Voice and Accountability: refers to perceptions of the extent to which a country's citizens are able to participate in selecting the government, how free they are to express their feelings and attitudes in public, to what extent freedom of association

is permitted and finally how free and open the media is. All variables are measured on a scale from -2.5 to 2.5, with -2.5 being the weakest institutional quality and 2.5 being the highest. This data is obtained from the World Bank's WGI (World Governance Indicators) database.

Estimation Strategy

The empirical analysis begins by re-evaluating the claim that higher levels of natural resources lead to lower growth. I start with a simple two-way fixed effects model along the following specification:

$$Growth_{i,t} = \alpha_i + \tau_t + \beta_1 NR_{i,t} + \epsilon_{i,t} \quad (1)$$

Where $Growth_{i,t}$ is the log of GDP per capita growth (measured in 2010 US dollars), α_i represents country fixed effects, $\tau_t$is a variable controlling for time fixed effects, and $NR_{i,t}$is total natural resource rents (as a share of GDP). In order to reduce the chance of omitted variable bias and thus more accurately estimate the baseline effect of natural resource rents on economic growth, I incorporate a subset of covariates. These include total trade, domestic credit to the private sector, average tax rate (tax revenues as a percentage of GDP), net foreign domestic investment inflows, gross domestic savings, and population growth. They also consist of several indicators of institutional strength: control of corruption, rule of law, regulatory quality, government effectiveness, political stability and the absence of violence/terrorism, and voice and accountability. All institutional variables are converted to log form. The expanded model is estimated along the following equation:

$$Growth_{i,t} = \alpha_i + \tau_t + \beta_1 NR_{i,t} + \theta X_{i,t} + \epsilon_{i,t} \quad (2)$$

Where $Growth_{i,t}$ is the log of GDP per capita growth, α_i and τ_t are country and time fixedeffects, respectively, and $NR_{i,t}$is total natural resource rents. Now, $X_{i,t}$ represents the vector of control variables. The removal of confounding factors associated with both economic growth and natural resource rents allows for more accurate empirical estimations.

Since the primary aim of this paper is to evaluate the policy of inflation targeting as a means of improving the growth effects of natural resources, I generate an interaction term between inflation targeting and natural resource rents. This allows for comparison between targeting and non-targeting groups. This is done along the following equation:

$$Growth_{i,t} = \alpha_i + \tau_t + \beta_1 NR_{i,t} + \beta_2 IT_{i,t} + \beta_3 (NR_{i,t} \cdot IT_{i,t}) + \theta X_{i,t} + \epsilon_{i,t} \quad (3)$$

Where $Growth_{i,t}$ is the log of GDP per capita growth (measured in 2010 US dollars), α_i represents country fixed effects, $\tau_t$is a variable controlling for time fixed effects, and $NR_{i,t}$ is total natural resource rents. $IT_{i,t}$ is a dummy variable set equal to 1 if and when a country's central bank decides to adopt a strategy of pursuing price stability, and 0 if otherwise. The main coefficient of interest is now β_3, which measures the difference in the effect of natural resources on growth between targeting and non-targeting countries. In other words, it is the marginal effect of inflation targeting, which can be illustrated as:

$$\frac{\delta Growth_{i,t}}{\delta IT_{i,t}} = \beta 1 + \beta 3 NRi,t \quad (4)$$

To reduce the chance of omitted variable bias, I include $X_{i,t}$, a vector of covariates. These include total trade, domestic credit to the private sector, average tax rate (tax revenues as a percentage of GDP), net foreign domestic investment inflows, gross domestic savings, and population growth. It also includes several indicators of institutional strength: control of corruption, rule of law, regulatory quality, government effectiveness, political stability, the absence of violence/terrorism, and voice and accountability. As a robustness check, I include data on political institutions from the ICRG (International Country Risk Guide) dataset. All institutional variables are converted to log form. Both economic growth and the decision to adopt a legal mandate of price stability can be influenced by political institutions, and thus including them into the regression eliminates a potentially large source of endogeneity.

Results

My analysis begins by examining the effect of natural resource rents on economic growth in developing countries over the 1996-2018 period. Following the structure of equations 1 and 2, the results indicate that natural resource rents are negatively associated with economic growth, confirming the evidence of prior studies. When political institutions are controlled for, the effect of natural resource rents becomes weaker but remains significant. The effect of a 1 percentage point increase in natural resource rents (as a percentage of GDP) is associated with a 0.1 percentage point decrease in GDP per capita growth. These results are presented in columns 1 through 4 of table 1.

The primary aim of this study is to compare the effect of natural resource rents on growth between inflation-targeting and non-targeting countries. To do this, I generate an interaction term between natural resource rents ($NR_{i,t}$) and an inflation targeting dummy variable ($IT_{i,t}$). I find that on average, Inflation targeting countries experience a 0.2 percentage point higher per-capita GDP growth compared to non-targeting countries when natural resource rents increase by 1 percentage point. The coefficient on natural resource rents remains negative and significant across specifications. Columns 1, 2 and 3 in table 2 present these results.

As a robustness check, I evaluate the interaction term using ICRG data on a range of political institutions. Similarly, the coefficient on natural resource rents remains negative and significant,

and that on the interaction remains positive and significant. The results are similar to the specification containing World Governance Indicators (WGI) data: on average, inflation targeting countries experience a 0.2 percentage point higher per-capita GDP growth when natural resource rents increase by 1 percentage point compared to non-targeting countries. These results are shown in columns 1 through 3 in table 3.

Conclusion

The 'resource curse' hypothesis has gained prominence in the economics and political science literature since the 1970s and continues to be a topic of scholarly debate. The evidence suggests that natural resources- particularly fuels and minerals- can be a detriment to economic growth. The classic argument is that natural resource abundance curtails economic development by either putting upward pressure on the exchange rate and prices, or by drawing labor and capital away from valuable LBD (learning-by-doing) sectors of the economy such as manufacturing and services. Political-economy models show that natural resource wealth undermines a country's institutional framework, and in doing so incentivizes natural resource revenues to be allocated inefficiently. By promoting corruption and weakening rule of law, natural resources create rent-seeking opportunities for public officials.

Understanding how to mitigate the anti-growth effects of natural resource wealth has been the focus of contemporary resource curse scholarship. The existing literature finds that strong political institutions- such as control of corruption, government effectiveness, and rule of law- and responsible fiscal policies can turn the resource 'curse' into a blessing. Less understood is the role of monetary policy for resource-exporting developing countries. This paper finds that a policy of inflation targeting (where the central bank identifies and maintains a quantitative price target) is a potential cure. Using panel data on 58 developing countries over the 19962018 period, I find a negative link between natural resource rents and economic growth. However, I find that inflation-targeting resource-rich countries fare significantly better than non-targeting countries.

There are at least two reasons why IT might mitigate the anti-growth effects of natural resource abundance. First, when successfully implemented, inflation targeting reduces both inflation and inflation instability. If properly communicated to financial markets and consumers, inflation targeting can anchor expectations- such that economic shocks are less detrimental to the real economy. Thus, in the case of a resource boom, resource-rich inflation targeters may experience less volatility in their exchange rate and price level. Second, inflation targeting insulates the central bank from political pressures, preventing it from being leveraged by public officials. Natural resource exporting economies that lack insulated central banks, such as Venezuela and Zimbabwe, are not likely to implement the most efficient monetary policy during a resource boom.

This paper is a first attempt at addressing the use of inflation targeting as a means of avoiding the resource curse. However, this paper does not address the self-selection bias involved in choosing a policy of inflation targeting: central banks that choose to adopt IT may do so as a result of pre-existing country-specific factors. Thus, future scholarship in this sphere should aim to address this limitation- through the use of either propensity score matching methods, or entropy balancing.

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FIGURES AND TABLES TABLE 1

Natural resources and growth

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4
NR	0.000745	-0.000914*	-0.000892*	-0.00105*
	(0.000656)	(0.000525)	(0.000532)	(0.000557)
Total trade		-0.000141	-0.000176*	-0.000159
		(9.64e-05)	(0.000102)	(9.67e-05)
FDI net inflows		0.000890	0.000750	0.000723
		(0.000603)	(0.000659)	(0.000650)
Tax rate		9.14e-05	5.49e-05	4.30e-05
		(0.000157)	(0.000184)	(0.000181)
Private sector credit		-0.000414***	-0.000445***	-0.000433**
		(0.000151)	(0.000165)	(0.000166)
Population growth		-0.0131***	-0.0123***	-0.0124***
		(0.00147)	(0.00170)	(0.00171)
Savings		0.00101***	0.000882***	0.000961***
		(0.000291)	(0.000288)	(0.000320)
Logcorruption			0.0175	0.0160
			(0.0213)	(0.0209)
Logruleoflaw			-0.0417*	-0.0422*
			(0.0222)	(0.0214)
Logregulatoryquality			0.0102	0.0147
			(0.0259)	(0.0252)
Loggoveffectiveness				-0.0208
				(0.0193)
Logaccountability				0.0197
				(0.0170)
Observations	1,237	783	683	683
R-squared	0.147	0.318	0.341	0.345
Number of CountryID	57	49	49	49

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE 2
Interaction between natural resources and inflation targeting

VARIABLES	(1) Model 4	(2) Model 5	(3) Model 6
NR	0.000661	-0.00138**	-0.00148**
	(0.000673)	(0.000604)	(0.000628)
Targeting	-0.000179	-0.00469	-0.00495
	(0.00879)	(0.00655)	(0.00845)
Targeting*NR	0.00121	0.00203**	0.00207**
	(0.000977)	(0.000935)	(0.000962)
Total trade		-0.000108	-0.000133
		(9.53e-05)	(9.76e-05)
FDI net inflows		0.000820	0.000675
		(0.000583)	(0.000629)
Tax rate		4.12e-05	-1.10e-05
		(0.000154)	(0.000183)
Private sector credit		-0.000446***	-0.000460**
		(0.000159)	(0.000177)
Population growth		-0.0129***	-0.0122***
		(0.00150)	(0.00174)
Savings		0.00110***	0.00106***
		(0.000301)	(0.000335)
Logcorruption			0.0122
			(0.0208)
Logruleoflaw			-0.0409*
			(0.0218)
Logregulatoryquality			0.0111
			(0.0255)
Loggoveffectiveness			-0.0203
			(0.0191)
Logaccountability			0.0156
			(0.0170)
Observations	1,237	783	683
R-squared	0.150	0.325	0.353
Number of CountryID	57	49	49

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

TABLE 3

Interactions with ICRG data

VARIABLES	(1) Model 7	(2) Model 8	(3) Model 9
NR	-0.00134*	-0.00144*	-0.00139*
	(0.000707)	(0.000766)	(0.000718)
Targeting	-0.00989	-0.00824	-0.0104
	(0.00723)	(0.00715)	(0.00722)
Targeting*NR	0.00205*	0.00194*	0.00198*
	(0.00108)	(0.000967)	(0.00107)
Total trade	-1.20e-05	1.35e-05	-1.32e-05
	(9.93e-05)	(9.89e-05)	(9.91e-05)
FDI net inflows	0.00229***	0.00213***	0.00226***
	(0.000596)	(0.000596)	(0.000604)
Tax rate	7.24e-05	6.05e-05	9.56e-05
	(0.000185)	(0.000173)	(0.000185)
Private sector credit	-0.000498***	-0.000503***	-0.000493***
	(0.000141)	(0.000154)	(0.000146)
Savings	0.00123***	0.00125***	0.00126***
	(0.000338)	(0.000372)	(0.000353)
Population growth	-0.0134***	-0.0132***	-0.0133***
	(0.00161)	(0.00152)	(0.00160)
Log corruption	0.0114**		0.00990**
	(0.00503)		(0.00482)
Log bureaucratic quality	-0.00964		-0.0113
	(0.00718)		(0.00750)
Log law and order	-0.0116		-0.0139**
	(0.00694)		(0.00655)
Log democratic accountability		0.00629	0.00690
		(0.00786)	(0.00800)
Log ethnic tensions		-0.000889	0.000731
		(0.00641)	(0.00665)
Log external conflict		0.00768	
		(0.0188)	
Observations	704	701	701
R-squared	0.341	0.335	0.342
Number of CountryID	43	43	43

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Causality between Growth, Inflation and Economic Policy Uncertainty: Evidence from the India

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Abstract

The aim of the paper is to study the relationship between economic growth, inflation and economic policy uncertainty in India for the period of Q4:2002-03 to Q1:2019-20. Unit root tests, Johansen cointegration test, VAR model and IRF (impulse response function) are employed. This study confirms a long-run equilibrium relationship between the economic growth, inflation and economic policy uncertainty in India. The study finds that inflation and economic policy uncertainty jointly influence the growth in the long-term. The empirical result shows unidirectional causality from economic growth to inflation. The results indicate that there is no causality between growth and economic policy uncertainty. IRF shows that inflation has a positive impact on economic growth and EPU has a negative effect on economic growth of India.

Keywords: Economic growth, Inflation, Economic policy uncertainty, Johansen cointegration test, Granger causality test, India

JEL Classification: C32, D80, E31, O47

1. Introduction

Economic growth is a very crucial factor for every country as it measures how well the economy is performing. It is a long-run process that occurs as an economy's potential output increases. Inflation which is the increase in overall level of prices is also one of the primary concerns of economists and policymakers. The relationship between economic growth and inflation is one of the most debatable issues in finance. Economic growth and inflation are the two most important variables for determining the macroeconomic targets and handling price stability. Also, the changes in economic policy uncertainty like international trade disputes, military conflicts, policy related economic uncertainty and global crisis is found to have a significant impact on the macro-economy (Bloom, 2009). The effects of uncertainty shocks on key economic variables have aroused interest among the researchers and policy makers to examine the influence of economic policy uncertainty (EPU) on the economic activity.

Economic Growth

Economic growth is an increase in the capacity of an economy to produce goods and services, compared from one period of time to another. Economic growth is a crucial factor as it stimulates the growth of financial sector like stock market, banking and other macroeconomic variables i.e. inflation, exchange rate, interest rate and money supply (Pradhan et al., 2014; Pradhan et al., 2015). It also strengthens the fiscal conditions of an economy.

It can be measured in nominal or real terms, the latter of which is adjusted for inflation. Aggregate economic growth is measured in terms of gross national product (GNP) or gross domestic product (GDP), although alternative metrics are sometimes used. Higher GDP growth usually signals that an economy is doing well leading to high growth in employment and standard of living whereas weak growth signals that the economy is not doing well. If GDP falls from one quarter to the next then the growth is negative which results in falling incomes, lower consumption and job cuts. If the growth is negative for the two consecutive quarters then the economy is in recession. It is imperative for every economy to have a stable economic and policy structure to have a stable and sustainable economic growth.

Inflation

Inflation is the rate at which the general price level of goods and services increases over some period of time therefore leading to decline in purchasing power of the currency. The most commonly used measure of the level of prices is the consumer price index (CPI) and wholesale price index (WPI). Among the CPIs in India, CPI-IW (Consumer Price Index-Industrial Worker) is one of the most important price indicators and is primarily used to adjust for price rise by way of the dearness allowance of government employees and the workers in the industrial sector. It is also used in fixation and revision of minimum wages in scheduled employments besides measuring the inflation in retail prices. Further, CPI-IW is used as a deflator for estimating GDP at constant prices of various segments like water supply, public administration and defence, education, medical and health services in public sector, etc.

A sound economic structure, and thus, a sustainable economic growth performance largely depend on price stability. Price stability refers to a low and sustainable inflation rate that does not influence individual's investment, consumption, saving decisions and preferences. Price stability is the basic condition for ensuring economic and social stability in the medium and long-term and assuring

sustainable development. Economic, political and social structures of a country may seriously suffer if it fails to establish price stability in its economy.

If inflation becomes too high, the economy can suffer as it leads to unemployment. Higher inflation leads to higher interest rates, which increases the cost of borrowings and lowers exports; whereas, if the inflation is controlled and is at reasonable levels, the economy may prosper. Controlled and lower inflation increases the employment. At a lower inflation rate, consumers have more money to buy goods and services and the economy benefits and grow. However, the impact of inflation on economic recovery cannot be assessed with complete accuracy.

The relationship between growth and inflation remains a controversial one both in theory and empirical findings. Some economists, specifically of Keynesian persuasion, believe that inflation contributes positively to economic growth. There are many existing literature that support the existence of positive impact of growth on inflation (Tobin, 1965; Rapach, 2003). Other economists, mainly of the neoclassical school, believe that inflation affects economic growth negatively. Negative impact of inflation on growth is supported by various empirical literatures (Friedman, 1971; Barro, 2013; Fernández Valdovinos, 2003). There are some studies, which failed to establish any meaningful relationship between inflation and economic growth (Dorrance, 1966; Sidrauski, 1967).

Economic Policy Uncertainty (EPU)

EPU has been an important determinant of economic cycle, investment decision and policy making (Bernanke, 1983). EPU refers to non-zero probability of changes in existing economic policies that determines the rule of game for economic agents. EPU index is constructed on monthly basis by Baker et al. (2013, 2016) based on newspaper coverage frequency. News based Indian EPU index is constructed using 7 Indian newspapers (The Economic Times, the Times of India, the Hindustan Times, the Hindu, the Statesman, the Indian Express, and the Financial Express). The number of news articles, for each paper, containing at least one term from each of the three term sets is utilized. The first set is uncertain, uncertainties, or uncertainty. The second set is economic or economy. The third set consists of policy relevant terms such as 'regulation', 'central bank', 'monetary policy', 'policymakers', 'deficit', 'legislation', and 'fiscal policy'.

Economic growth in an emerging economy is likely to be affected by various domestic factors such as economic, political, financial as well as global factors. During the recent crisis, economic policy uncertainty adversely impacted the growth of both the developed and developing economy. Most of the theoretical and empirical literature advocated that uncertainty has recessionary effects on economic activity. EPU seems not only to contracts the economic activity but it also leads to raise in long-term inflation expectations.

Most of the literature focuses on investigating the effects of uncertainty shocks on US economy (Karnizova & Li, 2014; Baker et al., 2016; Leduc & Liu, 2016; Basu & Bundick, 2017), which provides supports to the negative relationship between increase in the uncertainty shocks and various macro variables. A large number of literature shows that uncertainty has negative impact on key macroeconomic variables (Stock & Watson, 2012; De Wind & Grabska, 2016; Bloom et al., 2018). There are very few literatures that support the positive relationship between uncertainty and growth (Hartmann, 1972; Abel, 1983; Bloom, 2014).

Growth, inflation and Economic policy uncertainty are interrelated variables as discussed above and should, therefore, be endogenously determined simultaneously in the system. However, most of the studies on these variables do not analyze them in a simultaneous equation framework. It is therefore important for a policy maker to understand the dynamics among economic growth, inflation and EPU in the system.

Since the prior empirical work generally concentrated on US and developed economy, this study however focuses on emerging economy, India. Emerging economies like India, China and Brazil reported a significant growth during the initial months of 2009 while developed economies struggled to recover from the financial crisis. However in the last few years it is being stated that India is a throes of the worst recession. Therefore, policy makers are very much interested to study the impact of EPU on Indian economy. In this study we make an important contribution to the literature by examining the relationship between economic growth, inflation and economic policy uncertainty in India over the period Q4:2002-03 to Q1:2019-20. Literature contains a limited number of studies on this relationship.

The rest of the paper is organized as follows: Section 2 briefly reviews the related literature on the relationship between economic growth, inflation and economic policy uncertainty. Section 3 describes the data and methodology applied in the study. Section 4 presents empirical results and discussion. Finally the conclusion of the study with some policy implications is provided in Section 5.

2. Literature Review

Some of the referred studies explaining the relationship between growth, inflation and economic policy uncertainty are presented below in chronological order.

Chaturvedi et al. (2009) examined the inter-relationship between economic growth, saving rate and inflation for South East and South Asia in a simultaneous equation framework using two stage least squares with panel data from 1989 to 2003. The result of the study finds that there exists significant negative effect of inflation on the economic growth, which is unidirectional, i.e. economic growth does not affect inflation.

Bachmann et al. (2013) examined the impact of business-level uncertainty from business survey data in both Germany and the US from 1968 to 2011. The result of the study finds that uncertainty leads to significant reductions in production in both Germany and US, but the surprise increases in uncertainty have more persistent negative effects on the economic activity in US than in Germany.

Arslan et al. (2015) analyzed the relationship between uncertainty and economic activity in Turkey from 1987 to 2010 using Cross correlation, VAR model, Granger causality and Probit analysis. The results of the study find strong evidence to a negative relationship between aggregate uncertainty and economic activity.

Pradhan et al. (2015) employed a panel VAR model to examine the linkages between economic growth and inflation rate for G-20 countries for the period 1961 to 2012. The results of the study show a robust long-run economic relationship between economic growth and inflation rate. Also, the study finds that inflation has a significant and positive impact on growth and there exists the bidirectional causality between the variables.

Sethi (2015) examined the relationship between inflation, inflation volatility and economic growth for India for the period 1980 to 2014 using Unit root tests, Linear Regression Model and Granger Causality test. The result of the study reveals that the level of inflation has negative but insignificant effect on economic growth.

Bhagat et al. (2016) studied the impact of EPU on Indian economy over the period 2003 to 2012 using VAR model. The result of the study finds that Indian GDP is negatively related to EPU in India.

Kronen & Belke (2017) examined the impact of political and economic uncertainty on a set of macroeconomic variables such as production, consumption and investment in Europe from 1995 to 2016 using Structural VAR. The result of the study finds that the rise in policy uncertainty leads to mixed effects of uncertainty (positive versus negative sign) on the macroeconomic variables like production, consumption and investment across the European economies depending on the basic economic performance of the country under investigation.

Istiak & Serletis (2018) examined the negative and positive impact of uncertainty shocks on real output from 1985 to 2015 in G7 economies (Canada, France, Germany, Italy, Japan, UK and USA) using the impulse response function. The result of the study finds that positive economic policy uncertainty shocks (both typical and large) leads to decrease in industrial production while negative shocks (both typical and large) lead to an increase in industrial production. Also it is found that the impact of EPU on industrial production is overall symmetric for Canada, Germany, Japan, the UK, USA, and asymmetric for France and Italy.

Christou et al. (2019) analyzed the impact of uncertainty (corporate bond spread) shock on inflation rate of the UK over the monthly period of 1855 to 2016 using time-varying parameter vector autoregressive (TVP-VAR) model. The result of the study finds positive uncertainty shock reflects a negative demand shock.

Nilavongse et al. (2019) employed Structural VAR (SVAR) model to investigate the impact of foreign and domestic economic policy uncertainty shocks on UK economy from 1986 to 2019. The result of the study finds that uncertainty shocks in UK have no significant impact on industrial production but it strongly affects the value of British pound. Also, it is found that the uncertainty shock in US acts as a negative foreign aggregate demand disturbance, leading to a contraction in the economic activity in UK implying that production in the small open economy is mainly driven by the foreign shocks rather than domestic shocks.

3. Data and Methodology

Data

The quarterly data for the period of Q4:2002-03 to Q1:2019-20 for India is used on the following variables: economic growth (GDP per capita at market price (at constant price)), inflation (measured by using CPI (Consumer Price Index)) and EPU (economic policy uncertainty) index.

The data are taken from the website of Reserve Bank of India (RBI), Handbook of statistics on Indian Economy. As for EPU data, we adopt the index developed by Baker et al. (2013, 2016) (website:

http://www.policyuncertainty.com/), which is the news based index and captures a wide range of policy uncertainty terms appeared in the countries newspapers. All variables are used in natural logarithms.

Methodology

To examine the relationship among EPU, economic growth and inflation, the following steps are involved: first, unit root test is performed to identify the nature of stationarity of the time series variables; second, the Johansen cointegration test is conducted in order to determine whether there is a long-run relationship between the variables; and third, a VAR model is constructed to ascertain the direction of causality between the variables. Finally, to complement our analysis, impulse response function (IRF) is employed to trace the effect of a one-off shock to one of the innovations on the current and future values of the endogenous variables. The detail descriptions of these tests are given below.

Unit Root Test

The unit root test is usually used to check the stationarity of variables. Here we apply the ADF (Augmented Dickey-Fuller) and PP (Phillips-Perron) tests to check for stationarity properties of the variables. In both ADF test and PP test the null hypothesis is that data set being tested has unit root. We also performed the KPSS test (Kwiatkowski, Phillips, Schmidt. and Shin) where the null hypothesis is that the data series is stationary against the alternative of a unit root. This provides a robustness check for stationary. The unit root tests also provide the order of integration of the timeseries variables.

Cointegration Test

Cointegration test is conducted to establish if a stable long-run relationship exists between the variables of interest. We make use of the Johansen multivariate maximum likelihood cointegration test (Johansen, 1988), which involves estimation in a vector error correction modelling framework. It is necessary to define appropriate time lag length within this test. Long term relationships between variables in Johansen cointegration test are examined on the basis of two tests, and they are Trace test statistic and Max-Eigenvalue test statistic.

Vector Error Correction Model (VECM)

If the variables are cointegrated, the VECM-based Granger causality analysis is an appropriate technique used to determine the long-run and the short-run relationships (Engle & Granger, 1987). In a VECM, short-run causal effects are indicated by changes in other differenced explanatory variables and the long-run relationship is implied by the level of disequilibrium in the cointegration relationship, i.e., the lagged error-correction term (ECT). The causal nexus between selected timeseries variables is investigated by estimating the following VECM:

$$\Delta GDP_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i} \Delta GDP_{t-i} + \sum_{i=0}^{p} \alpha_{2i} \Delta CPI_{t-i} + \sum_{i=0}^{p} \alpha_{3i} \Delta EPU_{t-i} + \alpha_3 ECT_{t-1} + \varepsilon_{1t} \quad (1)$$

$$\Delta CPI_t = \beta_0 + \sum_{i=1}^{p} \beta_{1i} \Delta CPI_{t-i} + \sum_{i=0}^{p} \beta_{2i} \Delta GDP_{t-i} + \sum_{i=0}^{p} \beta_{3i} \Delta EPU_{t-i} + \beta_3 ECT_{t-1} + \varepsilon_{2t} \quad (2)$$

$$\Delta EPU_t = \gamma_0 + \sum_{i=1}^{p} \gamma_{1i} \Delta EPU_{t-i} + \sum_{i=0}^{p} \gamma_{2i} \Delta CPI_{t-i} + \sum_{i=0}^{p} \gamma_{3i} \Delta GDP_{t-i} + \gamma_3 ECT_{t-1} + \varepsilon_{3t} \quad (3)$$

where, GDP, CPI and EPU represent economic growth, inflation (CPI) and EPU respectively; ECT is error correction term derived from the cointegrating equation; ***t*** is the time dimension and Δ denotes a first difference operator; ***p*** is a lag length, α_0, β_0 and γ_0 are the intercepts and ε_{it} is a white noise error term.

Impulse Response Function (IRF)

As a further tool of analysis, impulse response function (IRF) is also employed in this study. The IRF has an advantage that it is insensitive to the ordering of the variables in the VAR system. The IRF shows the response of a variable to a unit standard innovation or shocks to itself and other variables in the model.

4. Empirical Results

The results of the tests for covering the entire study period are provided in this section.

Descriptive Statistics

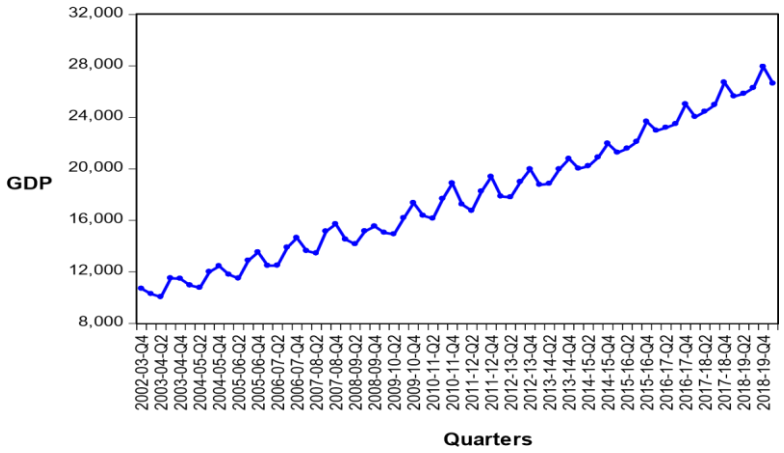
Statistical characteristics of all variables are shown in Table 1.

Table 1: Descriptive Statistics

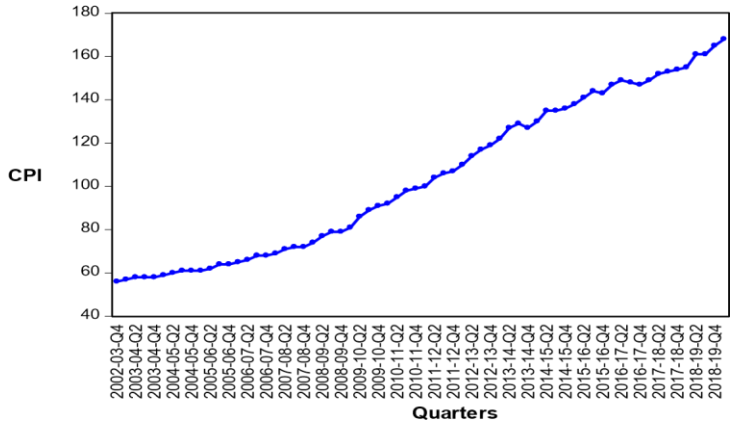
Variables	Mean	Median	Max	Min	Std. Dev.	C.V.	Skew	Kurt	J-B
GDP	9.7496	9.7704	10.2374	9.2153	0.2834	0.0291	-0.1180	1.9317	3.2918
CPI	4.5814	4.6001	5.1240	4.0254	0.3619	0.0790	-0.0861	1.5119	6.1709*
EPU	4.4243	4.3503	5.4574	3.5422	0.4615	0.1043	0.3408	2.3468	2.4510
Note 1: * indicates significance at the 5% level.									

Table 1 compares economic growth, inflation (CPI) and EPU for India. Among all the variables GDP has the highest mean value. Jarque-Bera statistics indicates that the distributions of the variables GDP and EPU are normal. EPU is more volatile as compare to the other variables.

(a) GDP Growth



(b) CPI Inflation



(c) EPU

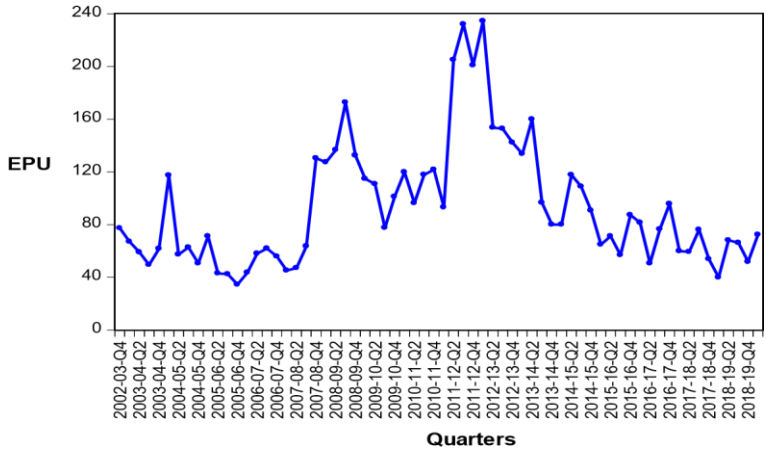


Figure 1: Plots of time series of GDP growth, CPI inflation and EPU for India (Q4:2002-03 – Q1:2019-20)

Figures 1(a), 1(b) and 1(c) show the GDP growth, CPI inflation and EPU in India respectively for the period Q4:2002-03 to Q1:2019-20. These figures highlight the fluctuations in these variables in the period considered.

Unit Root Tests Results

Table 2: Results from Unit Root Tests

Variables	Tests	Level			First Difference			Conclusions
		M1	M2	M3	M1	M2	M3	
GDP	ADF	3.1131	-1.0549	-2.8054	-1.281	-3.4954*	-3.5953*	1(1)
	PP	6.6123	-0.6146	-7.3828	-8.0393*	-15.9008*	-16.4872*	1(1)
	KPSS		1.0460*	0.1388		0.1196	0.1037	1(1)
CPI	ADF	1.9633	-0.8732	-1.9572	-0.4509	-2.1974	-2.2362	1(1)
	PP	9.4414	-0.3401	-1.1057	-3.4782*	-7.1147*	-7.0582*	1(1)
	KPSS		1.0411*	0.1492*		0.2294	0.2212*	1(1)
EPU	ADF	-0.2993	-2.7587	-2.7403	-7.8463*	-7.7801*	-7.7571*	1(1)
	PP	-0.2188	-2.5522	-2.5337	-10.6161*	-10.5121*	-10.4857*	1(1)
	KPSS		0.2246	0.2020*		0.0866	0.0731	1(1)

Note 1: GDP: Gross Domestic Product; CPI: Consumer Price Index; EPU: Economic Policy Uncertainty.
Note 2: ADF: Augmented Dickey-Fuller statistics; PP: Phillips-Perron statistics, KPSS: Kwiatkowski Phillips Schmidt. Shin.
Note 3: ADF, PP: The null hypothesis is that the variable follows a unit root process.
KPSS: The null hypothesis is that the variable is stationary.
Note 4: M1: None, M2**:** Individual Intercept, M3: Individual Intercept and Trend.
Note 5: * indicates significance at the 5% level.

Table 2 shows the results from unit root tests for all the variables. The results reveal that all the variables in this study (i.e. GDP, CPI and EPU) are non-stationary at their levels. However, all the variables become stationary at their first differences. Therefore, it is concluded that the time series for all the variables is integrated of order one for the given period.

Cointegration Test Results

Table 3: Results from Cointegration Test

Variables	H_0: $r = 0$	H_0: $r \leq 1$
GDP, CPI, EPU		
Trace Statistic	31.6950*	12.0338
Max-Eigen Statistic	19.6611	10.0906

Note 1: * indicates significance at 5% level.
Note 2: ***r*** denotes the number of cointegrating vect ırs.

Table 3 reports the results of cointegration test (Trace statistic and Max-Eigen statistic). The cointegration results indicate the presence of long-run relationship among the variables GDP, CPI and EPU.

Results of VECM

Having found cointegrating relationship exists among the variables GDP, CPI and EPU, the next step is to perform causality tests. The causality is examined through the significance of the coefficient of the lagged error-correction term and significance of the F-statistics of the explanatory variables as determined by the Wald Test. The results of the causality test within the errorcorrection mechanism are reported in Table 4.

Table 4: Results of Long-run Granger Causality Test (Based on VECM)

Independent Variables	Dependent Variables		
	ΔGDP	ΔCPI	ΔEPU
ΔGDP(-1)	-0.39959* [-3.42474]	-0.104792 [-1.33863]	1.184898 [0.50571]
ΔGDP(-2)	-0.478346* [-4.14881]	0.020731 [0.26799]	4.020147 [1.73631]
ΔGDP(-3)	-0.489044* [-3.95887]	0.048278 [0.58249]	1.678798 [0.67675]
ΔGDP(-4)	0.395631* [3.02371]	0.065307 [0.74392]	4.370795 [1.66347]
ΔCPI(-1)	0.178654 [0.91428]	-0.070249 [-0.53582]	-1.160656 [-0.29579]
ΔCPI(-2)	0.110888 [0.54384]	-0.180779 [-1.32145]	0.21081 [0.05149]
ΔCPI(-3)	0.111468 [0.56308]	-0.045627 [-0.34352]	0.431305 [0.10849]
ΔCPI(-4)	0.29338 [1.44521]	0.192857 [1.41596]	-0.359514 [-0.08819]
ΔEPU(-1)	0.010281 [0.86657]	-0.021352* [-2.68222]	-0.266635 [-1.11911]
ΔEPU(-2)	-0.000123 [-0.01104]	-0.0143 [-1.90891]	-0.352812 [-1.57352]
ΔEPU(-3)	0.002118 [0.22054]	-0.006295 [-0.97716]	0.043517 [0.22568]

ΔEPU(-4)	-0.00234 [-0.28104]	-0.009241 [-1.65440]	-0.097079 [-0.58066]
ECT	-0.128243* [-2.08338]	0.125699* [3.04356]	0.324462 [0.26248]
C	0.017136 [1.92856]	0.018698* [3.13643]	-0.151172 [-0.84724]
J-B Test of Normality	0.8180	0.1376	0.9050
Breusch-Godfrey Serial Correlation LM Test	1.3046	4.7048	4.9778
Breusch-Pagan Test for Heteroscedasticity	22.5828	18.7094	6.9312

Note 1: GDP: Gross Domestic Product; CPI: Consumer Price Index; EPU: Economic Policy Uncertainty

Note 2: VECM: Vector Error-Correction model; ECT: Error-Correction term.

Note 3: Values in square brackets represent *t*-statistics.

Note 4: Basis for the determination of long-run causality lies in the significance of the lagged ECT coefficient.

Note 5: * indicates significance at the 5% level.

From Table 4, it is clear that the estimate of lagged error-correction term (ECT) of GDP equation has the expected negative sign and it is statistically significant. It confirms that CPI and EPU jointly influence GDP in the long-term with the speed of convergence to equilibrium of 12.82%. The lagged error-correction terms (ECTs) in CPI and EPU equations are not statistically significant at 5% level of significance. This indicates that there are no long-run Granger causal relationships when CPI or EPU serves as the dependent variable.

It is also observed that the residuals are normally distributed. There is no serial correlation and heteroscedasticity present in the model. The result of the stability test, i.e., the cumulative sum (CUSUM) test statistic confirms that the estimated model is stable over time. Hence, the results from these models are robust and reliable.

Results of Short-run Granger Causality

Table 5: Short-run Granger Causality Results

Causal relationships tested in the model	Direction of relationships
GDP vs CPI	GDP⇨CPI
GDP vs EPU	NA
CPI vs EPU	NA

Note 1: GDP: Gross Domestic Product; CPI: Consumer Price Index; EPU: Economic Policy Uncertainty.

Note 2: X ⇨Y means variable X Granger causes variable Y.

Note 3: NA: No causality between the two variables.

From the Table 5, it is observed that there exists unidirectional causality from GDP growth to CPI inflation. In case of GDP-EPU and CPI-EPU, there is no causality in either direction. The test result shows that GDP growth and EPU are independent, since both fail to Granger-cause the other.

IRF Results

The IRFs of the VAR model are presented below. Figure 2 shows the response of GDP growth to one-standard deviation shock of CPI inflation and EPU in the VAR model. The result, Figure 2(a), shows that GDP has positive response to shocks in CPI throughout the period under consideration. Figure 2(b) depicts that the response of GDP to shocks in EPU is negative all through the periods under study. It can be inferred from the above that CPI inflation has a positive impact on economic growth and EPU has a negative effect on economic growth of India.

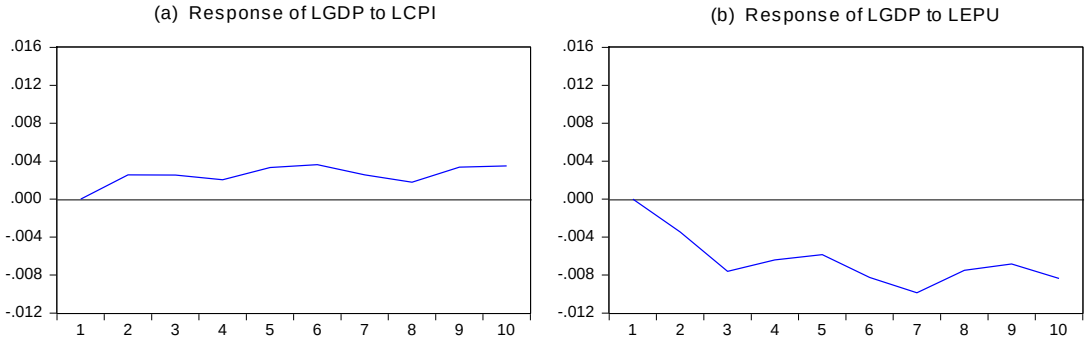


Figure 2: Impulse Response Functions of GDP

5. Conclusions

This study examined the causal relationship between economic growth, inflation and economic policy uncertainty using the quarterly data for India over the period Q4:2002-03 to Q1:2019-20. In order to capture both long-run cointegration and short-run dynamics of relationships, unit root tests, Johansen cointegration test, VAR model and IRF have been employed.

Unit root and stationarity tests indicate that GDP growth, CPI inflation and EPU are non-stationary in the levels but are first-difference stationary. The study reveals that three variables (GDP, CPI and EPU) are cointegrated and confirms the presence of long-run equilibrium relationship among the economic growth, CPI inflation and economic policy uncertainty. The results suggest that there is unidirectional causality from growth to CPI inflation and there is no causality between growth and EPU. The results indicate that there is an insignificant negative relationship between the growth and economic policy uncertainty while the relationship between economic growth and inflation is positive and insignificant.

About the relationship between growth and inflation, we found two interesting results. First, growth and inflation are positively related. Second, there is unidirectional causality from growth to inflation. These findings have important policy implications. Contrary to the policy advice of the international lending agencies, attempts to reduce inflation to a very low level (or zero) are likely to adversely affect economic growth. However, attempts to achieve faster economic growth may overheat the economy to the extent that the inflation rate becomes unstable. Therefore, the challenge for any economy is to find a growth rate which is consistent with a stable inflation rate, rather than beat inflation first to take them to a path of faster economic growth.

In this study we find that GDP growth is negatively related to EPU in India. The policymakers should be careful to reduce economic policy uncertainties to maintain the economic stability. It is very important for the policymakers to understand the possible reasons for a significant increase in uncertainty and facilitate taking the necessary actions. It is suggested that reducing uncertainty is very important for the

smooth functioning of the stock market and for optimal business investment in the economy. This paper suggests that steady and sustainable economic policies by the government also minimize economic uncertainty and encourage the economic agents to increase economic activities to maintain the long term economic growth.

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