THREE ESSAYS ON BANKING AND SOCIAL OUTCOMES

THREE ESSAYS ON BANKING AND SOCIAL OUTCOMES

BY

CHENWEI SUN, B.Mgt., M.Sc.

A Thesis Submitted to the School of Graduate Studies in Partial Fulfillment of the

Requirements for the Degree of

DOCTOR OF PHILOSOPHY

DOCTOR OF PHILOSOPHY (2025)   McMaster University

(Business Administration – Accounting)   Hamilton, Ontario

Title: Three Essays on Banking and Social Outcomes

Author: Chenwei Sun (McMaster University)

Supervisor: Dr. Justin Jin

                    Dr. S.M. Khalid Nainar

Committee Member: Dr. Ken Li

Abstract

This thesis investigates three important issues related to corporate activities, banking financial variables, and social outcomes: 1) the impact of firms' corporate social responsibility (CSR) on crime rates, 2) the relationship between banks' non-performing loans (NPL) and loan charge-offs (LCO) and state crime incidence, and 3) the influence of banks' equity capital structure on income inequality.

In the first essay, we examine the societal impact of firms' CSR activities on crime rates. Our research bolsters the expanding work under the Law and Political Economy Project out of Yale University and Economics of Crime Working Group of National Bureau of Economic Research (NBER). Our empirical results show that states with domiciled firms having better CSR performance exhibit significantly lower crime rates. This lower crime incidence is driven by the environmental, social, and governance dimensions of CSR. Our study is the first to document the societal impact of CSR by analyzing state crime rates, and we conclude that CSR activities have positive externalities on society.

In the second essay, we investigate whether banks' NPL and LCO are associated with state crime rates in the US. Our empirical results show that both NPLs and LCOs are significantly and positively associated with crimes incidence. After disaggregating the crime rates, we find a significant and positive association between the two financial reporting variables (NPL and LCO) and property crimes such as larceny, burglary, robbery, and motor vehicle theft. We conclude that bank financial reporting variables, such as non-performing loans and loan charge-offs, can serve as leading indicators of crime rates.

In the third essay, we examine the relationship between bank equity capital and income inequality. Bank equity capital plays a critical role in mitigating financial instability and fostering economic resilience, as highlighted by the Basel III regulation, which increased the required level of regulatory capital to strengthen the quality of banks' capital bases. Although the social outcome of bank equity capital is important, the literature thus far has not examined the connection between bank capital structure and social outcomes. This essay fills this research gap by investigating how bank capital structures can influence income disparity. Empirical results show that states where banks hold more equity capital experience significantly lower income inequality than do states whose banks hold less equity capital. Further analysis indicates that this beneficial effect of higher bank equity capital on reducing income inequality is more pronounced in states with higher bank interest rates, regions with higher inflation, and during financial crises. Our study identifies several important social implications of bank capitalization structure including social externality of Basel III's stringent capital requirements.

Acknowledgements

First, I express my deepest gratitude to my supervisor, Dr. Justin Jin, for his constant guidance, support, and encouragement throughout my doctoral journey. Dr. Jin provides instruction and guidance at every stage of my research, enabling me to deepen my research in bank accounting. I fully acknowledge that any and all accomplishments I achieve in my academic career would not have been possible without him. I am truly fortunate to have such a knowledgeable and forward-thinking supervisor.

I am also deeply grateful to my co-supervisor, Dr. S.M. Khalid Nainar, for his invaluable guidance and steadfast support throughout my doctoral journey. I benefit greatly from his two seminar courses. His mentorship in research and career development has significantly shaped who I am today. I feel fortunate to have such a knowledgeable and supportive co-supervisor.

I sincerely thank my supervisory committee member, Dr. Ken Li, for his thoughtful guidance and constructive comments on my thesis, as well as his generous support and help throughout my doctoral studies. I am especially grateful for his valuable mentorship in teaching, which helps shape my teaching philosophy.

My appreciation also extends to the faculty members in the Accounting area and my fellow Ph.D. students at the DeGroote School of Business. I am especially thankful to Dr. Susan McCracken and Dr. Emad Mohammad.

Last, I am deeply grateful to my parents for their boundless love. They have always been there, ready to offer comfort, encouragement, and strength whenever and wherever I need it.

Table of Contents

List of Tables

List of Figures

x

List of Appendices

Chapter 1   Introduction

This thesis comprises three essays examining the relationship between corporate and bank and social outcomes. Specifically, the essays explore: (1) the societal impact of CSR on crime rates; (2) the relationship between banks' NPL and LCO and state crime rates; and (3) the effect of banks' equity capital structure on income inequality. The three essays are presented in Chapters 2, 3, and 4. In this chapter, we outline the research background and motivation for each essay, along with their main findings and contributions.

In the first essay, we examine the implications of firms' CSR engagement for societal outcomes, focusing on crime incidence. This topic is important because companies are increasingly expected to contribute positively to society, and crime is a critical social issue (Davidson, 2019). Prior research on CSR has largely focused on firm-level benefits or specific stakeholders (e.g.Friede et al., 2015; Harjoto & Jo, 2015; Marin et al., 2009), leaving its broader social impact underexplored. We posit that CSR initiatives may help reduce crime by improving community well-being and social cohesion. Firms engaging in CSR activities influence the crime rate because CSR activities support employees, who are then less likely to commit crimes. CSR initiatives can foster a more equitable and inclusive work environment, and firms can positively influence the broader social environment and community through these activities. However, it is not obvious that voluntary corporate actions will affect public crime rates. Some skeptics argue that CSR activities might be superficial to the root causes of crime. Considering these conflicting arguments, whether higher CSR engagement is associated with lower crime incidence is an open empirical question.

Using a panel dataset of U.S. public firms from 2004 to 2020, we measure CSR performance using environmental, social, and governance (ESG) dimensions and link these measures to crime rates. Our empirical analysis finds that states with firms exhibiting higher CSR scores experience significantly lower crime rates. And this effect is driven by improvements in each of the environmental, social, and governance dimensions of CSR. The evidence from the first essay is the first to document a direct societal benefit of CSR performance by examining the relationship between CSR activities and crime rates. These results indicate that CSR initiatives generate positive externalities for society. This finding further suggests that encouraging CSR activities can be beneficial not only for ethical or reputational reasons, but also as a complement to public policy in addressing social issues. Furthermore, our findings reinforce the value of responsible business practices by providing practical insights that can guide stakeholders, such as regulators, suppliers, and customers, to promote CSR to foster safer, more equitable, and sustainable communities.

In the second essay, we investigate whether indicators of bank financial ratios are associated with crime rates. Specifically, we focus on banks' NPL and LCO as potential predictors of state-level crime incidence. This inquiry is motivated by the notion that deteriorating loan performance often coincides with economic crisis (Ari et al., 2021). NPL and LCO reflect financial distress among businesses and consumers. When banks accumulate more NPL and incur higher LCO, it usually reflects financial hardship in the economy. For instance, more borrowers default on loans due to unemployment or income shocks. Becker (1968) argues that individuals commit crimes if the expected utility outweighs that of lawful behavior, suggesting economic adversity can increase crime.

Despite this intuitive linkage between economic conditions and crime, little prior research has directly examined the connection between banks' financial reporting variables and crime incidence. We aim to fill this gap by empirically testing whether NPL and LCO are associated with increases in crime at the state level.

Drawing on U.S. banking data merged with crime data, we find that when the amount of NPL in a state is high, residents of that state are more likely to engage in crime. In addition, when the amount of LCO in a state is high, the residents of that state are more likely to engage in crime. This relationship is pronounced for property crimes, including offenses such as larceny, burglary, robbery, and motor vehicle theft. The second essay thus provides novel evidence that the financial health of a bank has broader implications beyond the financial realm. While prior research primarily focuses on banks' economic roles, our study contributes to the literature by identifying banks' financial reporting metrics, such as NPL and LCO, as leading indicators of future crime rates. This implies that banking industry distress appears to spill over into social instability. We provide empirical evidence linking banks' financial ratios directly to social outcomes. Our insights also offer significant policy implications to policymakers and regulators.

In the third essay, we examine the effect of banks' equity capital structure on income inequality. Bank equity capital plays a critical role in mitigating financial instability and fostering economic resilience, as highlighted by the Basel III regulation, which increased the required level of regulatory capital to strengthen the quality of banks' capital bases. Although the social outcome of bank equity capital is important, the literature thus far has not examined the connection between bank capital structure and social outcomes. This

essay fills this research gap by investigating how bank capital structures can influence income disparity. Well-capitalized banks are better able to absorb losses while less capitalized banks are more fragile and may constrict credit or even fail under stress. We hypothesize that bank equity capital structure influences the distribution of income. While prior studies more focus on how banking operations affect income inequality (e.g. Delis et al., 2014; Hsieh et al., 2019; D'Onofrio et al., 2019; Colciago et al., 2019), the role of bank capital in shaping income distribution has not been explored.

Using US commercial bank equity capital and income inequality measures, we find that states with higher capitalized banks tend to exhibit lower income inequality. banks with higher equity capital have stronger incentives and enhanced capacity to monitor borrowers effectively. Improved monitoring results in higher loan quality and fewer defaults among vulnerable borrowers, creating a positive cycle that ultimately reduces income inequality. Then, banks holding greater equity capital can more readily expand lending activities and improve credit availability. Increased lending capacity promotes broader financial inclusion, further contributing to decrease income disparity. Furthermore, we find that this effect pronounced in certain economic environments. This negative effect of bank equity capital on income inequality is more pronounced in states with higher bank interest rates, regions experiencing higher inflation, and during financial crisis periods.

The third essay makes several important contributions. Our study contributes to the literature by highlighting the social impacts of bank equity capital. While extensive literature recognizes the economic benefits of higher bank capital, our findings illustrate that bank equity capital also generates social outcomes. We further contribute by examining

how banks' financial metrics, rather than broader banking operations, affect income inequality. To our knowledge, we are the first to provide empirical evidence that banks' equity capital affects income distribution. Our study bridges banking with socioeconomic policy discussions, revealing that regulatory policies on capital adequacy not only ensure financial stability but also have significant implications for addressing inequality.

The rest of the thesis is structured as follows. Chapter 2 investigates the societal impact of corporate social responsibility on crime rates. Chapter 3 examines the influence of NPL and LCO on crime incidence. Chapter 4 studies the effect of banks' equity capital structure on income inequality. Finally, Chapter 5 concludes the thesis, summarizing the key insights and discussing broader implications and avenues for future research.

Reference

Ari, A., Chen, S., & Ratnovski, L. (2021). The dynamics of non-performing loans during banking crises: A new database with post-COVID-19 implications. *Journal of Banking & Finance*, *133*, 106140.

Becker, G. S. (1968). Crime and Punishment: An Economic Approach. *Journal of Political Economy*, 76(2), 169-217.

Colciago, A., Samarina, A., & de Haan, J. (2019). Central bank policies and income and wealth inequality: A survey. *Journal of Economic Surveys*, 33(4), 1199-1231.

Davidson, R. N. (2019). *Crime and environment*. Routledge.

Delis, M. D., Hasan, I., & Kazakis, P. (2014). Bank regulations and income inequality: Empirical evidence. *Review of Finance*, 18(5), 1811-1846.

D'Onofrio, A., Minetti, R., & Murro, P. (2019). Banking development, socioeconomic structure and income inequality. *Journal of Economic Behavior & Organization*, 157, 428-451.

Friede, G., Busch, T., & Bassen, A. (2015). ESG and financial performance: aggregated evidence from more than 2000 empirical studies. *Journal of Sustainable Finance & Investment*, 5(4), 210-233.

Harjoto, M. A., & Jo, H. (2015). Legal vs. normative CSR: Differential impact on analyst dispersion, stock return volatility, cost of capital, and firm value. *Journal of Business Ethics*, 128(1), 1-20.

Hsieh, J., Chen, T. C., & Lin, S. C. (2019). Financial structure, bank competition and income inequality. *The North American Journal of Economics and Finance*, 48, 450-466.

Marin, L., Ruiz, S., & Rubio, A. (2009). The role of identity salience in the effects of corporate social responsibility on consumer behavior. *Journal of Business Ethics*, 84(1), 65-78.

Appendix 1

Supplement to Chenwei Sun's Ph.D. Thesis

The second chapter is published in the International Review of Economics & Finance (2024).

Please cite as:

Sun, C., Jin, J., Nainar, K., & Lobo, G. (2024). Does Firms' Corporate Social Responsibility

Reduce Crime?. International Review of Economics & Finance, 103719

The third chapter is published in the Finance Research Letters (2022).

Please cite as:

Jin, J., Nainar, K., & Sun, C. (2022). Bank non-performing loans, loan charge-offs, and

crime incidence. Finance Research Letters, 49, 103129.

Chapter 2   Firms' Corporate Social Responsibility and Crime

2.1 Introduction

The past decade has witnessed companies crafting corporate social responsibility (CSR) initiatives and implementing them in practice. CSR comprises a wide variety of environmental, social, and governance (ESG) topics, activities, and policies (Christensen et al., 2021). CSR and ESG have a large amount of overlap, with some scholars even arguing that the two are interchangeable (Cho, 2020; Gillan et al., 2021).[1] Our research, by focusing on crime incidence, expands the work of the Law and Political Economy Project (https://lpeproject.org) and Economics of Crime Working Group of National Bureau of Economic Research (NBER). CSR refers to a business taking into account its overall social, economic, and environmental impacts and launching initiatives to ensure that these impacts are positive. CSR initiatives are often broken down into four categories of responsibility: environmental, philanthropic, ethical, and economic (Barnett et al., 2020).[2] Our research studies the societal impact of CSR by analyzing state crime rates and examines whether CSR activities generate positive externalities for U.S. society.

The research on CSR measures activities and benefits to specific stakeholders (e.g., shareholders, employees, suppliers, customers, and policymakers).[3] Using a sample of U.S.

---

[1] A nuanced distinction between CSR and ESG is that CSR represents firms doing good things in society in addition to profit seeking whereas ESG is a risk-based perspective while maintaining the focus on profits.

[2] Environmental initiatives focus on the preservation of natural resources, while philanthropic initiatives focus on donating to worthy causes that may not be (directly) associated with the firm's business purpose. Ethical responsibility ensures fair and honest business operations, while economic responsibility promotes the fiscal support of the firm's goals.

[3] CSR refers to the responsibility of companies to consumers, communities and the environment while generating profits and being legally accountable to shareholders and employees. When presenting the mechanism of the impact of CSR on crime, this paper is centered throughout on the stakeholder theory, where the stakeholders involved in corporate society responsibility include shareholders, employees, suppliers, communities, etc. ESG is not entirely consistent with the mechanisms of influence described in the text. We thank an anonymous reviewer for providing this insightful comment.

public firms, Harjoto and Jo (2015) find that CSR intensity lessens analysts' earnings forecast dispersion, stock return volatility, implicit cost of capital, and that it enhances firm value. Friede et al. (2015) combine the findings from about 2,200 studies conducted since the 1970s and find that a large majority of those studies report a positive relationship between corporate financial performance and ESG. Marin et al. (2009) demonstrate that CSR initiatives affect consumer loyalty through customers' positive impression of and identification with the company. However, the literature has stopped short of assessing the social impact of CSR activities (Barnett et al., 2020).

To address this research gap, our research analyzes the social impact of CSR activities by investigating the relationship between CSR activities and crime rates. Crime is a serious social problem (Davidson 2019) and a significant governmental concern. Gallup poll data show that crime emerged as a central issue among registered voters in the 2022 U.S. midterm elections.

CSR can be characterized as "delegated philanthropy" (Benabou & Tirole, 2010). CSR has a positive effect on stakeholders, including employees and suppliers, and influences the environment and society. Our research hypothesizes that states with lower crime rates have domiciled firms with high CSR scores. Figure 2.1 depicts our hypothesis development. Firms engaging in CSR activities influence the crime rate because CSR activities support employees, who are then less likely to commit crimes. On one hand, CSR initiatives can foster a more equitable and inclusive work environment, thereby mitigating factors like discrimination and prejudice that often contribute to criminal behavior. On the other hand, a firm affects the social environment and community through its CSR activities.

[Figure 2.1]

Companies engaging in a variety of CSR activities instill a culture of social responsibility among their employees and probably elevate the ethical standards of employees, reducing their propensity to engage in criminal activities. In addition, this positive effect extends beyond the workplace through social interaction. The employees' families and communities are likely influenced by the employees themselves, thereby lowering their likelihood of criminal behavior. CSR performance also propagates social rules and norms to the local residents and community, reducing the incidence of crime.

To investigate how firms engaging in CSR activities affect crime rates, we use a panel dataset from Refinitiv for publicly listed U.S. firms for 2004–2020. We run panel regressions with time and firm fixed effects, along with control variables documented to influence crime rates. Our results show that firms' stronger CSR performance reduces crime rates. We document that the crime rate is significantly lower in states whose firms have higher CSR scores. Our results are economically significant and robust to the use of different controls. An increase in CSR of one standard deviation (0.171) is associated with a 0.63 percentage point decrease in the crime rate. Our results hold for overall CSR performance as well as for the three pillars of CSR: social, environmental, and corporate governance.

Moreover, we disaggregate the overall crime incidence and test the relationship between CSR engagement and two kinds of crimes: violent and property. For sensitivity tests, we rerun our primary specification by applying alternative measures for overall CSR performance. Notably, our main finding remains unchanged with the alternative CSR

metric from Refinitiv and the CSR measure constructed using MSCI.

We also confirm the robustness of the relationship between CSR and local crime rates by adding other control variables and excluding subsamples. We deploy a two-stage least squares (2SLS) approach to estimate the relationship between CSR and crime rates to solve the endogeneity problem and corroborate their negative relationship.[4] Our research is consistent with the finding that CSR engagement engenders positive externalities in society.

Our study makes a twofold contribution. It contributes to the theoretical stream of CSR literature. We extend the research on the impact of CSR activities on society as CSR activities of firms might have externalities on society and the environment. Studies on CSR concentrate on assessing CSR practices (e.g., Berrone et al., 2017; Berg et al., 2022; Chin et al., 2013) and their benefit to various stakeholders (e.g., Friede et al., 2015; Harjoto & Jo, 2015; Marin et al., 2009). The overall social impact of CSR activities remains understudied in CSR research (Barnett et al., 2020). This study fills an important research gap in the knowledge of the social consequences of CSR. It also offers valuable insights into the broader societal implications of business practices, including their impact on mitigating social problems and ultimately helping the long-term well-being of communities while creating more sustainable and equitable societies. It undergirds the idea that CSR activities benefit not only businesses by improving corporate financial performance and reputation, but also society by enhancing the mutual relationship with stakeholders and creating shared value.

This study's other contribution is the empirical evaluation of the CSR performance

---

[4] Other reasons may give rise to a correlation between CSR and crime rate, the overall correlation cannot be interpreted as a causal effect, thus creating an endogeneity problem.

of local firms and local crime rates. Our study is the first to provide evidence on social impact of CSR activities by examining the relationship between CSR activities and crime rates.[5] Moreover, this study contributes practical insights into CSR's influence in engaging stakeholders for societal improvement. This study reinforces the value of CSR engagement and encourages other stakeholders, such as regulators, suppliers, and customers, to pay closer attention to a company's CSR initiatives. By supporting and promoting responsible business conduct, stakeholders contribute to the improvement of the community and society, thereby creating a safer and more sustainable society in which to live and work.

The remainder of this paper is organized as follows: Section 2 details the literature review. Section 3 develops the hypotheses. Section 4 presents the sample construction, which includes the data, variables, and descriptive statistics. Section 5 reports the empirical results. Section 6 presents additional analyses. Section 7 concludes.

2.2 Literature review

Patten (2013) identified three waves in CSR accounting research that gained mainstream attention in the 1960s: The first wave defined corporate social responsibility accounting and expanded the traditional role of accounting. The second wave investigated how markets respond to CSR, the use and perception of CSR information, and the connection between environmental performance and financial outcomes. The third wave concentrated on disclosure of environmental information. Barnett et al. (2020) summarized several categories of research that examined the CSR impact after 1968. One category is CSR activities, including considerations affecting CSR activities (Chin et al., 2013), green

---

[5] In other words, we measured the impact of micro-CSR on the macro-environment.

washing (Berrone et al., 2017; Du, 2015; Parguel et al., 2011), and CSR ratings (Bear et al., 2010; Berg et al., 2022; Gibson Brandon et al., 2021). The other categories are output and outcome of a CSR activity; many papers have explored the consequences of the financial performance of CSR activity (Barnett, 2007; Choi & Jung, 2008; Flammer, 2015; Martin, 2009, pp. 44–55). Barnett (2007) introduced a conceptual framework showing how firms generate financial returns by engaging in CSR activities.

Despite this extensive array of scholarship, few studies have examined the social impacts of CSR activities (Barnett et al., 2020). Social impacts are beneficial outcomes originating from pro-social activities that are entitled to the expected targets for the broader community, organizations, or environments (Rawhouser et al., 2019; Stephan et al., 2016). Determining the social impacts of CSR is challenging, as this multifaceted notion exerts complex effects on stakeholders and data collection can be difficult.

Some researchers have studied the social impact of specific CSR initiatives. Sinha and Chaudhari (2018) investigated the impact of CSR initiatives through an education program introduced by a company to improve the academic performance of primary school students. Using a sample of 411 B2B firms, Pfajfar et al. (2022) found that diversity and inclusion, which are part of employee-focused CSR, show a positive link to the perceived benefits of CSR actions for society, customers, and employees and are positively associated with the quality of B2B relationships.

Individuals commit crimes as the consequence of multiple social, economic, psychological, and biological factors. The most prominent and enduring sociological framework of crime and its causes were developed in the 20th century; it comprised social

disorganization theory (Kornhauser, 1978; Shaw & McKay, 1942), Durkheim's anomie theory, and social control theory (Hirschi, 1969).

Legal sanctions and punishment are effective deterrents of criminal activities (Ehrlich, 1973; Levitt, 1998; Nagin, 1998; Sampson & Cohen, 1988). The fear of sanctions or punishment can deter individuals from committing crimes. Since the work of Jeremy Bentham and Cesare Beccaria and more recently Stigler (1995), scholars have been theorizing about the deterrent effects of legal sanctions and punishment on criminal behavior, and today many researchers empirically investigate and verify the deterrent effects.[6] Sampson and Cohen (1988) used a cross-sectional dataset of 171 American cities to provide evidence that proactive policing strongly discourages robbery, replicating and extending Wilson and Boland's (1978) framework. However, other forms of sanctions and factors can also play a role in deterring criminal activities. Administering a survey study with participants from five countries with distinct cultures, Mann et al. (2016) showed that a person's internal sense of guilt can reduce the tendency to engage in dishonest and illegal actions. Buonanno (2003) listed several socioeconomic determinants of crime, including poverty, social exclusion, wage and income inequality, cultural and family background, level of education, and the unemployment rate. Violent crime and property crime have similar determinants (Han et al., 2013; Kposowa et al., 1995).

CSR and crime have a complex relationship as noted by Hong et al. (2019). Hong et al. (2019) found that socially responsible firms receive lighter sanctions from prosecutors.

---

[6] Jeremy Bentham and Cesare Beccaria both thought about deterrence by using their understanding of how all people make decisions. They thought that the decision to commit a crime is often largely rational; hence, criminals' decision-making works in much the same way as non-criminals' decision-making in line with Stigler (1995).

This phenomenon could be a consequence of the halo effect (Thorndike, 1920), in which ratings of one quality bled over to assessments of other characteristics. Firms with high CSR scores may receive the benefit of the doubt, which facilitates case settlements and results in reduced sanctions for infractions. Using data on violent crime in China, Yin et al. (2024) find that companies that participate in CSR activities are more resilient to the negative regional public sentiment and have relatively high stock returns. Del Bosco and Misani (2011) proposed that CSR initiatives that enhance a firm's legitimacy, stakeholder satisfaction, and perception of fairness can discourage white-collar crimes such as fraud, hacking, industrial espionage, counterfeiting, and corruption. They proposed that these CSR initiatives lessen the motivation for potential offenders to commit a crime against a company and make it more difficult for them to rationalize their illegal behavior. In addition, these CSR initiatives promote rule compliance and social supervision by stakeholders who can prevent or deter crime by limiting the opportunity for potential offenders to participate in criminal actions.

CSR-based public-private partnerships can address social problems. These partnerships between companies and law enforcement can be effective in preventing crime (Gill, 2013; Hardouin, 2009; Prenzler & Sarre, 2012; Van den Berg, 1995). Prenzler and Sarre (2012) identified several traits of effective public–private partnerships, such as shared interest, authoritative leadership on each side promoting participation, mutual respect among the parties, and formal high-level information sharing. Maphosa and Maunganidze (2021) used a qualitative study that adopted semi-structured interviews and secondary data analyses to determine the nature of the involvement of the business sector in crime

prevention.

Avina (2011) listed several examples of the enhanced effectiveness and efficiency of crime prevention, with the most fertile ground being the IT arena. Microsoft responded to the plea of Toronto Police with a Child Exploitation Tracking System, which supports criminal investigators in organizing and sharing media. The Microsoft Government Security Program is a security assurance program through which government clients can access Microsoft's security-related information, documentation, and technology. The Microsoft Government Security Program has garnered the support of more than 45 countries in its efforts to reduce the risk of cybercrime and protect against security threats. CSR-based public–private partnerships prove that corporations can participate in crime prevention. Our research takes this public–private partnership view a step further to study whether corporations can have a broad impact on crime deterrence through CSR engagements.

2.3 Hypothesis development

CSR has had several positive and direct effects on employees (Rupp & Mallory, 2015). Gond et al. (2010) designed an integrative model that explains how CSR influences employees' trust, organizational commitment, and job satisfaction. CSR activities can increase workplace equity and equality and decrease discrimination and prejudice, both of which are important factors in crime reduction (Stigler, 1995).

A firm serves a crucial role in the social environment, which also affects crime. The Industrial Revolution in Europe and North America created a wave of company towns. As defined by Allen (1966), a classic company town is a community in which a company owns

all the real estate and offers most of the amenities. A company builds a company town to "support the operations of a single company" and "for the benefit of its employees." In a company town, [7] the company dominates the local economy and the community. Littlewood (2014) examines how mine companies in three company times engage through CSR with development, sustainability and viability.

A firm affects its social environment and community through its CSR activities. The significance of the social environment lies in the way in which the values, attitudes, and perceptions of the groups with whom a person most regularly interacts affect his or her behavior (Davidson, 2019). One key tenet of CSR activities is "being good by doing good." Companies commit to doing good to instill in their employees a sense of responsibility to doing good themselves. According to social learning theory, employees who often constitute a significant part of the local population observe this CSR engagement and are more likely to emulate it. In addition, situational action theory posits that a person's propensity to commit crime is affected by his or her moral values and a law-relevant moral context (Wikstrom, 2006). In an ethical environment and responsible culture, CSR activities are likely to enhance the morality of employees, deterring them from engaging in crime.

CSR performance also communicates social rules and norms to the local residents and community, also leading to a decrease in the crime rate. Social capital is a measure of the value of resources; more specifically, it can be regarded as trust, shared norms and values, and associational relationships. In this way, CSR activities can be viewed as generating

---

[7] Another similar context is college towns (Qian & Yao, 2017). Illinois's Pullman, Pennsylvania's Hershey and California's San Jose are examples of company towns.

social capital (Fitzgerald, 2003), which has a significant impact on crime reduction (Buonanno et al., 2009; Lederman, 2002). Social interaction also plays a role in criminal activities (Glaeser, 1996). The relationship between social interaction and criminal activities suggests not only independent decision-making, but also collective influence leading to the incidence of crimes. The surrounding environment, such as neighbors and community dynamics, influences individuals' decisions to commit crimes. The positive effects of firms' CSR activities extend beyond the workplace and into employees' social networks. Employees interacting with families, neighbors, and other community members will transmit shared ethical values to the community and influence social norms, reducing the propensity of local residents to commit crimes. Taken together, this reasoning leads to the following hypothesis:

H1: Firms' CSR engagement reduces local crime rates.

CSR engagement might reduce local crime rates through its components' effects when CSR is decomposed into three pillars: environmental, social, and governance (ESG). The environmental pillar measures how a firm affects the environment and manages environmental risks and opportunities. It takes into account issues such as emissions reduction and the depletion of natural resources; at the same time it evaluates a company's capacity to innovate by adopting eco-friendly technologies and processes.

The social pillar measures how a firm contributes to the community and creates a positive work environment. It considers product safety and a company's commitment to being a good and supportive entity that provides assistance and resources to the workforce.

The governance pillar measures a company's governance principles and supervision

procedures. It is concerned with the management structure and compensation and assesses ESG reporting and transparency as well as the capacity to harmonize its interests with those of its stakeholders. On one hand, strengthening corporate governance and environmental governance can strengthen the social responsibility and ethical norms of firm employees and local residents in the community, leading to a reduction in criminal activities. On the other hand, exposure to bad environment can foster aggressive behavior. Visible signs of disorder such as broken windows are indicative of impending crime. Burkhardt et al. (2019) show that a 10% increase in same-day exposure to PM2.5, a marker of air pollution, is associated with a 0.14% increase in violent crimes. Companies engaging in environmentally friendly CSR activities, which focus on eco-efficiency and emission reductions, can create a healthier community environment. This may result in lower crime rates. To acquire a comprehensive understanding of the factors that contribute to criminal activity and the social and environmental consequences of CSR performance, it is necessary to evaluate each dimension in relation to the occurrence of crime. Hypotheses 2 through 4 are stated in a disaggregated CSR dimensional basis as follows, also in an alternative form:

H2: Corporate environmental performance reduces local crime rates.

H3: Corporate social performance reduces local crime rates.

H4: Corporate governance performance reduces local crime rates.

2.4 Sample construction

Our sample consists of U.S. listed companies from 2004 to 2020. Crime data are retrieved from the Uniform Crime Reporting (UCR) releases, which started generating U.S.

crime statistics in 1930. Given that CSR and ESG have significant interactions and are interchangeable (Cho, 2020), we measure CSR using the comprehensive ESG data from Refinitiv. This measurement for CSR has been used in many papers (e.g., Bofinger et al., 2022; Habermann & Fischer, 2023; Havlinova & Kukacka, 2023). Refinitiv offers comprehensive ESG data covering 70% of the global market capitalization, across more than 400 metrics, with a history of data collection dating back to the 2002.

Control variables were collectively derived from the Bureau of Labor Statistics, the UCR, and the Bureau of Economic Analysis. After combining firms' state information from Compustat databases, firms from the Refinitiv ESG database, and state-level annual crime data, our final sample consisted of 24,641 firm-year observations from 3,967 unique companies. Please see sample construction in Table 2.1.

[Table 2.1]

We use the overall ESG combined score (ESGC) as a proxy for a firm's CSR.[8] Corporate environmental performance, corporate social performance, and corporate governance performance are calculated based on scores in 10 categories in Refinitiv. There are 186 metrics in Refinitiv that are essential when assessing the ESG performance of companies. These 186 metrics are the foundation for calculating the 10 main themes of ESG: resource use, emissions, innovation, workforce, human rights, community, product responsibility, management, shareholders, and CSR strategy. These subcategories together comprise the overall ESG score.

---

[8] Compared to ESG scores on account of company-reported data provided by Refinitiv, the ESGC score provides a more holistic and comprehensive picture of companies' CSR performance. The ESGC score is computed based on the ESG and ESG controversies scores, which include 23 controversial ESG topics (e.g., negative media stories) that materially and significantly affect a firm's overall ESG score. The scoring uses percentile rank methodology, and the range of all scores is from 0% to 100%.

CRIME is state-level annual crime rates. CRIME refers to violent and property crimes committed by local residents. People who commit crimes against other people and property do so not only commit their crimes in their hometowns but also elsewhere. CONTROLS is a vector of deterrence and socioeconomic characteristics identified as relevant in the context of crime incidence. These characteristics are included in the analyses as follows: GDP, as Andresen (2015) shows that it affects crime rates; officer rate (OFFICER), with findings police added to the force reduce the number of crimes committed by residents (Levitt, 2004; Evans & Owens, 2007); unemployment rate (UNEMPLOY), which has a mixed and inconsistent relationship with crime (Buonanno, 2003; Smith et al., 1992) ; and personal income (INCOME) because there is a relationship between crime and income (Buonanno, 2003; Hipp, 2007). The definition of variables is introduced in the Appendix 2.

Table 2.2 provides the descriptive statistics for all variables used in the analysis of our final sample. The mean of CSR score (proxied as ESGC) is 0.359. With respect to the three ESG rating pillars, on average, the governance pillar tops the ranking with an average score of 0.453, while the environmental pillar is the worst performer with an average score of 0.208. The logarithm of the crime rate per 100,000 residents has an average of 7.904. The average natural logarithm of GDP per state is 13.4; the average rate of police officers per resident is 0.24%; the average unemployment rate is 5.8%; and the average natural logarithm of personal income per capita is 10.8.

[Table 2.2]

2.5 Empirical results

We employ a multivariate analysis to examine our hypotheses. As our baseline test, we examine the prediction that a state with firms having high CSR ratings will have residents who are less likely to engage in criminal activities. The estimation equation used to investigate how firm-level CSR engagement impacts society-level crime rates is:

$$CRIME_{s,t} = \alpha + \beta_1 * CSR_{i,s,t} + \beta_2 * Controls_{s,t} + Firm \ \& \ Year \ Fixed \ Effects + \varepsilon_{i,t} \qquad (1)$$

$CRIME_{s,t}$ is measured as the natural logarithm of annual state-level crime rates in state s and year t. The crime rate is computed as the number of reported crimes per 100,000 residents. $CSR_{i,s,t}$ is proxied by the ESGC score from Refinitiv for firm i in state s and year t. Equation (1) includes firm and year fixed effects to control for unobserved heterogeneity at the firm level and remove potential bias stemming from unobserved factors that vary over time. It contains the following control variables: *GDP*, the natural logarithm of gross domestic product measured at the state-year level; *OFFICER*, the number of police officers per 1,000 residents measured at the state-year level; *UNEMPLOY*, the proportion of the civilian labor force that is unemployed measured at the state-year level; *INCOME*, the natural logarithm of per capita personal income measured at the state-year level; and ε, the error term. All standard errors in the regressions are clustered at the firm level.

Table 2.3 shows the ESG measures in Refinitiv.

[Table 2.3]

Table 2.4 reports our findings from estimating Equation (1). Column (1) in Table 2.4 presents the results from the baseline regression of crime rates on CSR. The coefficient of *CSR* is negative and statistically significant at the 1% level (*t*-statistic = -5.10), which is in

line with Hypothesis 1 that CSR engagement has a significantly negative association with the crime rate.[9] Regarding social significance magnitude, an increase in *CSR* of one standard deviation (0.171) is associated with a 0.63 percentage point reduction in crime rates. Regarding the control variables, we find that GDP, officer rate, and unemployment rate are negatively and significantly associated with CSR, and personal income is positively and significantly associated with CSR.

Several studies have examined the three pillars (environmental, social, and governance) separately and concluded that one or more of them drive a specific association (Dimson et al., 2015; Habermann & Fischer, 2023; Sassen et al., 2016). To better understand the distinct influence of the three pillars on local crime rates, we estimate Equation (1) but change the dependent variable from *CSR* to *ENV, SOC,* or *GOV*. The calculation of *ENV, SOC*, and *GOV* follows Hassan et al. (2021). The pillar score is the relative sum of the corresponding category weights from Refinitiv: *ENV* contains the subcategories of resource use, emissions, and innovation; *SOC* contains the subcategories of the workforce, human rights, community, and product responsibility; and *GOV* contains the subcategories of management, shareholders, and CSR strategy.

Columns (2)–(4) in Table 2.4 present the results from the regression of crime rates on the three pillars. The coefficient of *ENV* is negative and statistically significant at the 1% level (*t*-statistic = -2.79), which is in line with Hypothesis 2, arguing that firms' environmental engagement has a significantly negative association with the crime rate. The

---

[9] In untabulated analyses, we examined how the number of employees in a firm affects its CSR performance in relation to the crime rate. Our finding suggests that states with firms that have a higher average number of employees are more sensitive to the intensity of CSR influence in lowering crime rates, which supports the view that CSR can affect the crime rate by instilling a sense of responsibility in employees.

coefficient of *SOC* is negative and statistically significant at the 1% level (*t*-statistic = -5.38), which is consistent with Hypothesis 3 that firms' social engagement has a significantly negative association with the crime rate.[10] The coefficient of *GOV* is negative and statistically significant at the 10% level (*t*-statistic = -1.69), which is in line with Hypothesis 4 arguing that corporate governance has a significantly negative association with the crime rate. Regarding economic magnitude, an increase of one standard deviation in *ENV* (0.256) is associated with a 0.49 percentage point reduction in crime rate while an increase of one standard deviation in *SOC* (0.203) is associated with a 0.75 percentage point reduction in crime rate. The economic impact of CSR performance is somewhat attenuated in terms of the corporate governance dimension, in which an increase of one standard deviation in *GOV* (0.219) is associated with a 0.18 percentage point lower crime rate.

An explanation for the strongest impact of the social pillar is that firms that adopt ethical business practices and support community development programs can contribute to a safer, more stable, and equitable society, which directly reduces crime rates. An explanation for the weaker impact of corporate governance is that this pillar measures CSR activities related more to management and shareholder treatment. These corporate internal practices have less of a spillover effect on the community and society.[11]

[Table 2.4]

---

[10] It is interesting that the SOC pillar has the strongest effect among the three pillars of CSR.

[11] This is not unlike the well-known result in the macroeconomics literature that when the marginal propensity to consume is lower, the income is higher, thereby negatively affecting the multiplier effect of government stimulus (Fisher et al., 2020).

2.6 Additional analyses

In an additional analysis, we distinguish violent crimes from property crimes. Violent crimes are composed of four offenses. Violent crimes are homicide, rape, robbery, and aggravated assault. Property crimes are burglary, larceny, and motor vehicle theft. Both kinds of crimes have an adverse effect on the well-being and quality of life of the victims and wider communities. To protect public safety and order, law enforcement agencies and the criminal justice system take both types of crimes seriously and endeavor to prevent crimes and prosecute the people who commit them. The relationship between CSR and crime depends on the type of crime; therefore, it is essential to understand these relationships.

Considering that the determinants of violent and property crimes have both similarities and differences (Han et al., 2013; Kposowa et al., 1995), we test the relationship between CSR engagement and violent crime as well as property crime. The estimation equation used to investigate the impact of firm-level CSR engagement on different types of society-level crime rates is:

$$CRIMETYPE_{s,t} = \alpha + \beta_1 * CSR_{i,s,t} + \beta_2 * Controls_{s,t} + Firm \ \& \ Year \ Fixed \ Effects + \varepsilon_{i,t} \quad (2)$$

CRIMETYPE is one of the following crime categories: *Propertycrime, Larceny, Burglary, Vehicletheft, Violentcrime, Robbery, Homicide, Assault,* or *Rape*. CSR is proxied by the ESGC score from Refinitiv. Equation (2) uses fixed-effects models to account for time-invariant unobservable heterogeneity and control for socioeconomic factors: *GDP, OFFICER, UNEMPLOY,* and *INCOME*. ε is the error term. Variable measurements for aggregate crime categories used in the analysis are shown in Appendix 2. All standard

errors in the regressions are clustered at the firm level.

Table 2.5 presents our findings on disaggregated crime analysis. In Panel A, we examine the relationship between CSR and property crimes. Columns (1)–(5) in Panel A show that, as CSR engagement increases, each type of property crime significantly decreases. Panel B repeats the analysis of Panel A, with violent crimes as dependent variables. The results are similar to those of Panel A, in which the coefficients of CSR are negative and significant. Our findings indicate that raising CSR performance can lower the rate of various violent and property crimes.

Regarding economic significance, an increase in *CSR* of one standard deviation (0.171) is associated with a 0.63 percentage point reduction in *Propertycrime* and a 0.75 percentage point reduction in *Violentcrime*. GDP shows a negative association with property crime as well as all types of property crimes. In contrast, the results in Panel B indicate a less consistent effect of GDP on violent crime, with the relationship being sometimes positive and sometimes negative, suggesting a less clear relationship between GDP and violent crime. These findings are in line with those of Andresen (2015).

[Table 2.5]

To check the robustness of our results, we use *CSR1,* which is the ESG score from Refinitiv, as an alternative proxy for CSR. This measure integrates ESG factors without discounting significant ESG controversies that influence a firm. The results are presented in Column (1) of Table 2.6. The results show that the significant negative relationship between CSR performance and crime rates still holds. Furthermore, we include additional control variables that influence both *CSR* and *CRIME* in Equation (1): *EDU,* the proportion

of the population over age 25 with at least a high school diploma or equivalent certificate, and (2) *CRIMEAGE*, the proportion of the population between ages 25 and 29. Column (2) in Table 2.6 reports the results. Our findings remain qualitatively unchanged after adding two more control variables. We also control for firm-level time-varying characteristics that influence both *CSR* and *CRIME* in Equation (1): *ROA*, net income to total assets; (2) *LEVERAGE*, long-term debt over total assets; and (3) *SALEGROW*, the difference between the current gross sales and the previous gross sales, divided by the previous gross sales. We exclude firms in the financial industry because the regulatory practices in this industry influence financial reporting. Column (3) in Table 2.6 presents the results. Our findings remain qualitatively unchanged after adding three more control firm-level time-varying characteristic variables.

These results confirm that, when firms in a state are more engaged in CSR activities, the incidence of crime in that state will be less than in other states where firms are less engaged. With the same level of integrity, large public firms not only engage in CSR initiatives within their communities, but also extend CSR activities to other states given their extensive business coverage. Recognizing that large public companies' CSR activities are probably not limited to their local areas, we conduct a sensitivity analysis to mitigate any potential bias arising from the widespread operation of these large listed firms. When we exclude firms listed in the S&P 500, it is interesting to note that we obtain a qualitatively similar result, as shown in Column (4) of Table 2.6.

[Table 2.6]

Although our analyses indicate a significant correlation between firms' CSR

engagement and local incidence of crime, this relationship might be subject to endogeneity problems, such as measurement errors, omitted variable bias, and reverse causality. To address these potential endogeneity problems, we complement our empirical analysis with an instrumental variable approach. A firm's CSR performance is affected by unobservable and non-time-invariant factors. We deploy a 2SLS instrumental variable approach to check the robustness of our results. Following previous studies (Cheng et al., 2014; Habermann & Fischer, 2023), we choose the state-level average industry CSR performance as an instrument for CSR. The mean of industry CSR data is an appropriate exogenous proxy considering that prior studies have adopted the method (Lev & Sougiannis, 1996). We anticipate that the state-industry means will be linked with the company's CSR ratings but will be uncorrelated with the error terms. Other firms also influence the CSR performance of a firm within the industry. For example, in the banking industry, the Net-Zero Banking Alliance, launched by 43 founding banks, has now grown to more than 100 member banks that have issued a statement that they will devote themselves to aligning their lending and investment portfolios with net-zero emissions by 2050. We structure the following instrumental variable specifications:

$$CSR_{i,s,t} = \gamma_0 + \gamma_1 * CSR\_IV_{i,s,t} + \gamma_2 * Controls_{s,t} + Firm \ \& \ Year \ Fixed \ Effects + \mu_{i,t} \qquad (3a)$$

and

$$CRIME_{s,t} = \alpha + \beta_1 * CSR_{i,s,t} + \beta_2 * Controls_{s,t} + Firm \ \& \ Year \ Fixed \ Effects + \varepsilon_{i,t} \qquad (3b)$$

The instrument variable *CSR_IV* for each firm *i* is calculated as the average score across firms within the same industry and the same state, excluding the contribution of the firm being instrumented. We also use the control variables *GDP, OFFICER*, *UNEMPLOY,*

and *INCOME.* Equations (3a) and (3b) include firm and year fixed effects to control for unobserved heterogeneity at the firm level and remove potential bias stemming from unobserved factors that vary over time. ε and μ are the error terms. All standard errors in the regressions are clustered at the firm level. Columns (1) and (2) in Table 2.7 show the results from the first and second stages of the 2SLS tests for Equations (3a) and (3b), respectively. Consistent with our predictions, *CSR_IV* is significantly and positively associated with CSR scores in the first-stage regression. For the second stage, we take the predicted values of *CSR* and fit them into our original model in Equation (1). In the second-stage regression, the coefficient of *CSR_Predicted* is still negative and significant at the 5% level. The outcome demonstrates that local firms' higher level of CSR performance leads to a lower level of local crime rates.

[Table 2.7]

As we have previously shown, states with businesses that participate in CSR have lower local crime rates. Our evaluation of CSR performance was based on the Refinitiv ESGC score. Given the presence of discrepancies in CSR ratings among prominent CSR rating agencies (Berg et al., 2022; Chatterji et al., 2016), relying on a single CSR rating agency's evaluation may result in biased or incomplete conclusions about the relationship between CSR performance and local crime rates. To mitigate potential bias and assess the robustness of the findings, we re-evaluate our main specifications using an alternative CSR metric derived from the MSCI ESG KLD STATS database (formerly KLD Research and Analytics). MSCI gathers data from company reports, government databases, regulatory filings, news articles, and other publicly accessible sources. In the MSCI database,

companies are assessed based on various strengths and concerns across seven categories: community, diversity, employee relations, environment, product, human rights, and corporate governance.

Previous research conducted in the U.S. has extensively employed the MSCI ESG KLD STATS database for CSR studies (Albuquerque et al., 2019; Hasan et al., 2018; Krüger, 2015). We follow Jo and Harjoto (2012) and McCarthy et al. (2017) to construct CSR scores using the MSCI database. We subtract the total number of concerns from the total number of strengths for each category, and then we aggregate these net category scores to form a *CSR2* measure that incorporates strengths while deducting concerns. We re-estimate Equation (1) using CSR performance variable (*CSR2*) from an alternative database.

Column (1) in Table 2.8 reports the robustness test results. The coefficient of *CSR2* is negative and statistically significant at the 1% level, suggesting that our findings remain consistent when utilizing this alternative metric from MSCI. Each category consists of a range of strengths and concerns across various CSR areas. We also re-estimate Equation (1), focusing on the strengths and concerns of CSR performance. Columns (2) and (3) in Table 2.8 summarize these results. The negative relationship is significant for strengths in CSR performance (*CSR_S*). The positive relationship is significant for concerns in CSR performance (*CSR_C*). These results are consistent with the baseline regression results reported using Refinitiv's ESG rating.

[Table 2.8]

2.7 Conclusions

The extensive and growing body of CSR research literature overwhelmingly focuses

on firm financial performance, but offers little insight into how CSR practices address their social mission. This paper provides the first evidence that firms' engagement in CSR activities has social impacts, especially in lowering crime incidence. Our empirical strategy used a sample of 24,641 firm-year observations of U.S. listed companies to test the relationship between CSR performance and crime rates cross-sectionally and over time. We find that a state with companies with high CSR ratings outperforms a state with companies with low CSR ratings in terms of fewer crimes, after controlling for a variety of socioeconomic factors.

To ensure the robustness of our results, we conducted sensitivity analyses using alternative measures for overall CSR performance, incorporating additional control variables into the analysis while excluding subsamples. These tests yielded consistent results, supporting our primary conclusions. To address a potential endogeneity problem, we adopted a 2SLS approach to corroborate the negative relationship between CSR engagement and crime rates. Furthermore, we checked the three pillars of CSR and found that corporate environmental performance, corporate social performance, and corporate governance performance can reduce crime rates. However, compared to corporate governance, this phenomenon is driven more by corporate environmental and social performance. We then disaggregated crime into two components, violent crime and property crime, and find negative relationships between CSR performance and each of these subcomponents, thereby providing a better understanding of the way to prevent different forms of criminal behavior. Overall, our research is consistent with the finding that CSR engagement engenders positive externalities in society.

Our research findings have implications for regulators, government officials, police officers, corporate management, and shareholders. Law enforcement officers can be better informed when establishing a crime prevention strategy, particularly through public–private partnerships. The results of this study give corporations more incentives to engage in CSR activities. Companies' involvement in CSR activities represents not only moral and philanthropic behavior, but also sustainable business practices. Employers' participation in CSR activities can create a better community, characterized by a safer environment for their corporate assets and the generation of long-term shareholder value. By taking a proactive approach to CSR initiatives, companies indirectly lower the possibility of property damage, inventory loss, and reputational damage in their local communities.

Moreover, we highlight the need for further research in the externality of CSR literature. We provide novel insights into the social impacts of CSR engagement, and future research can extend our research designs. Social impacts are a multifaceted concept encompassing various stakeholders, issues, and results. Our research findings bolster the expanding work of the Law and Political Economy Project (https://lpeproject.org) out of Yale University and Economics of Crime Working Group of National Bureau of Economic Research.

Future researchers can use other research methodologies, such as experiments or surveys, or use small data for specific CSR initiatives to examine how CSR engagement leads to achieving social and environmental objectives. They can consider exploring the social impacts of CSR initiatives on various social issues (e.g., employment discrimination, alcoholism, vehicle accident, divorce, dropping out of school) to shed light on potential

synergies that could expand the function and influence of CSR activities. Thus, future studies can provide further evidence that society benefits from companies' CSR activities.

Reference

Albuquerque, R., Koskinen, Y., & Zhang, C. (2019). Corporate social responsibility and firm risk: Theory and empirical evidence. *Management Science*, *65*(10), 4451-4469.

Allen, J. B. (1966). *The company town in the American West*. University of Oklahoma Press.

Andresen, M. A. (2015). Unemployment, GDP, and crime: The importance of multiple measurements of the economy. *Canadian Journal of Criminology and Criminal Justice*, *57*(1), 35-58.

Avina, J. (2011). Public-private partnerships in the fight against crime: an emerging frontier in corporate social responsibility. *Journal of Financial Crime*, 18(3), 282-291.

Barnett, M. L. (2007). Stakeholder influence capacity and the variability of financial returns to corporate social responsibility. *Academy of Management Review*, 32(3), 794-816.

Barnett, M. L., Henriques, I., & Husted, B. W. (2020). Beyond good intentions: Designing CSR initiatives for greater social impact. *Journal of Management*, 46(6), 937-964.

Bear, S., Rahman, N., & Post, C. (2010). The impact of board diversity and gender composition on corporate social responsibility and firm reputation. *Journal of Business Ethics*, 97(2), 207-221.

Bénabou, R., & Tirole, J. (2010). Individual and corporate social responsibility. *Economica*, 77(305), 1-19.

Berg, F., Koelbel, J. F., & Rigobon, R. (2022). Aggregate confusion: The divergence of ESG ratings. *Review of Finance*, *26*(6), 1315-1344.

Berrone, P., Fosfuri, A., & Gelabert, L. (2017). Does greenwashing pay off? Understanding the relationship between environmental actions and environmental legitimacy. *Journal of Business Ethics*, *144*, 363-379.

Bofinger, Y., Heyden, K. J., & Rock, B. (2022). Corporate social responsibility and market efficiency: Evidence from ESG and misvaluation measures. *Journal of Banking & Finance*, 134, 106322.

Buonanno, P. (2003). The Socioeconomic Determinants of Crime. A Review of the Literature. University of Milano-Bicocca, Department of Economics Working Papers, (63).

Buonanno, P., Montolio, D., & Vanin, P. (2009). Does social capital reduce crime? *The Journal of Law and Economics*, 52(1), 145-170.

Burkhardt, J., Bayham, J., Wilson, A., Carter, E., Berman, J. D., O'Dell, K., Ford, B., Fischer, E. V., & Pierce, J. R. (2019). The effect of pollution on crime: Evidence from data on particulate matter and ozone. Journal of Environmental Economics and Management, 98, 102267.

Chatterji, A., Durand, R., Levine, D.I., and Touboul, S. (2016). Do ratings of firms converge? Implications for managers, investors and strategy researchers. *Strategic Management Journal*, 37(8): 1597-1614.

Cheng, B., Ioannou, I., & Serafeim, G. (2014). Corporate social responsibility and access to finance. *Strategic Management Journal*, 35(1), 1-23.

Chin, M. K., Hambrick, D. C., & Treviño, L. K. (2013). Political ideologies of CEOs: The influence of executives' values on corporate social responsibility. *Administrative Science Quarterly*, 58(2), 197-232.

Cho, C. H. (2020). CSR accounting 'new wave' researchers: 'step up to the plate'… or 'stay out of the game'. *Journal of Accounting and Management Information Systems*, 19(4), 626-650.

Choi, T. H., & Jung, J. (2008). Ethical commitment, financial performance, and valuation: An empirical investigation of Korean companies. *Journal of Business Ethics*, 81(2), 447-463.

Christensen, H. B., Hail, L., & Leuz, C. (2021). Mandatory CSR and sustainability reporting: economic analysis and literature review. *Review of Accounting Studies*, 26(3), 1176-1248.

Davidson, R. N. (2019). *Crime and environment*. Routledge.

Del Bosco, B., & Misani, N. (2011). Keeping the enemies close: The contribution of corporate social responsibility to reducing crime against the firm. *Scandinavian Journal of Management*, *27*(1), 87-98.

Dimson, E., Karakaş, O., & Li, X. (2015). Active ownership. *The Review of Financial Studies*, 28(12), 3225-3268.

Du, X. (2015). How the market values greenwashing? Evidence from China. *Journal of Business Ethics*, 128(3), 547-574.

Ehrlich, I. (1973). Participation in illegitimate activities: A theoretical and empirical investigation. *Journal of Political Economy*, *81*(3), 521-565.

Evans, W. N., & Owens, E. G. (2007). COPS and Crime. Journal of public Economics, 91(1-2), 181-201.

Fisher, J., Johnson, J., Smeeding, T., and Thompson, J. (2020). Estimating the marginal propensity to consume using the distributions of income, consumption, and wealth. *Journal of Macroeconomics*, 65 (September), 103218.

Fitzgerald, N. (2003). Rebuilding trust in business. A perspective on corporate social responsibility in the 21st century. London: Unilever and London Business School.

Flammer, C. (2015). Does corporate social responsibility lead to superior financial performance? A regression discontinuity approach. *Management Science*, 61(11), 2549-2568.

Friede, G., Busch, T., & Bassen, A. (2015). ESG and financial performance: aggregated evidence from more than 2000 empirical studies. *Journal of Sustainable Finance & Investment*, 5(4), 210-233.

Gibson Brandon, R., Krueger, P., & Schmidt, P. S. (2021). ESG rating disagreement and stock returns. *Financial Analysts Journal*, *77*(4), 104-127.

Gill, M. (2013). Engaging the corporate sector in policing: Realities and opportunities. *Policing: A journal of policy and practice*, *7*(3), 273-279.

Gillan, S. L., Koch, A., & Starks, L. T. (2021). Firms and social responsibility: A review of ESG and CSR research in corporate finance. *Journal of Corporate Finance*, 66, 101889.

Glaeser, E. L., Sacerdote, B., & Scheinkman, J. A. (1996). Crime and social interactions. The Quarterly journal of economics, 111(2), 507-548.

Gond, J. P., El-Akremi, A., Igalens, J., & Swaen, V. (2010). Corporate social responsibility influence on employees. *International Center for Corporate Social Responsibility*, 54, 1-47.

Habermann, F., & Fischer, F. B. (2023). Corporate social performance and the likelihood of bankruptcy: evidence from a period of economic upswing. *Journal of Business Ethics*, 182(1), 243-259.

Han, L., Bandyopadhyay, S., & Bhattacharya, S. (2013). Determinants of violent and property crimes in England and Wales: a panel data analysis. *Applied Economics*, 45(34), 4820-4830.

Hardouin, P. (2009). Banks governance and public-private partnership in preventing and confronting organized crime, corruption and terrorism financing. *Journal of Financial Crime*.

Harjoto, M. A., & Jo, H. (2015). Legal vs. normative CSR: Differential impact on analyst dispersion, stock return volatility, cost of capital, and firm value. *Journal of Business Ethics*, 128(1), 1-20.

Hasan, I., Kobeissi, N., Liu, L., & Wang, H. (2018). Corporate social responsibility and firm financial performance: The mediating role of productivity. *Journal of Business Ethics*, *149*, 671-688.

Hassan, M. K., Chiaramonte, L., Dreassi, A., Paltrinieri, A., & Piserà, S. (2021). The crossroads of ESG and religious screening on firm risk. *Research in International Business and Finance*, 58, 101500.

Havlinova, A., & Kukacka, J. (2023). Corporate social responsibility and stock prices after the financial crisis: The role of strategic CSR activities. *Journal of Business Ethics*, 182, 223-242.

Hipp, J. R. (2007). Block, tract, and levels of aggregation: Neighborhood structure and crime and disorder as a case in point. *American sociological review*, *72*(5), 659-680.

Hong, H. G., Kubik, J. D., Liskovich, I., & Scheinkman, J. (2019). Crime, punishment and the value of corporate social responsibility. Working paper.

Hirschi, T. (1969). Causes of delinquency. *Berkeley, CA: University of California Press.*

Jo, H., & Harjoto, M. A. (2012). The causal effect of corporate governance on corporate social responsibility. *Journal of Business Ethics*, *106*, 53-72.

Kornhauser, R. (1978). *Social sources of delinquency: An appraisal of analytic models*. Chicago: University of Chicago Press.

Kposowa, A. J., Breault, K. D., & Harrison, B. M. (1995). Reassessing the structural covariates of violent and property crimes in the USA: A county level analysis. *British Journal of Sociology*, 46(1), 79-105.

Krüger, P. (2015). Corporate goodness and shareholder wealth. *Journal of Financial Economics*, *115*(2), 304-329.

Lederman, D., Loayza, N., & Menendez, A. M. (2002). Violent crime: does social capital matter?. *Economic Development and Cultural Change*, 50(3), 509-539.

Lev, B., & Sougiannis, T. (1996). The capitalization, amortization, and value-relevance of R&D. *Journal of Accounting and Economics*, 21(1), 107-138.

Levitt, S. D. (1998). Why do increased arrest rates appear to reduce crime: deterrence, incapacitation, or measurement error?. *Economic inquiry*, *36*(3), 353-372.

Levitt, S. D. (2004). Understanding why crime fell in the 1990s: Four factors that explain the decline and six that do not. *Journal of Economic Perspectives*, *18*(1), 163-190.

Littlewood, D. (2014). 'Cursed'communities? Corporate social responsibility (CSR), company towns and the mining industry in Namibia. *Journal of business ethics*, *120*, 39-63.

Mann, H., Garcia-Rada, X., Hornuf, L., & Tafurt, J. (2016). What deters crime? Comparing the effectiveness of legal, social, and internal sanctions across countries. *Frontiers in Psychology*, 7, 85.

Maphosa, F., & Maunganidze, L. (2021). *Corporate Citizenship*. Springer International Publishing.

Marin, L., Ruiz, S., & Rubio, A. (2009). The role of identity salience in the effects of corporate social responsibility on consumer behavior. *Journal of Business Ethics*, 84(1), 65-78.

Martin, Maximilian. (2009). Toward a social agenda for commodity business. Viewpoint. Pp. 44-55.

McCarthy, S., Oliver, B., & Song, S. (2017). Corporate social responsibility and CEO confidence. *Journal of Banking & Finance*, *75*, 280-291.

Nagin, D. S. (1998). Criminal deterrence research at the outset of the twenty-first century. *Crime and Justice*, *23*, 1-42.

Parguel, B., Benoît-Moreau, F., & Larceneux, F. (2011). How sustainability ratings might deter 'greenwashing': A closer look at ethical corporate communication. *Journal of Business Ethics*, *102*, 15-28.

Patten, D. M. (2013). Lessons from the Third Wave: a Reflection on the Rediscovery of Corporate Social Responsibility by the Mainstream Accounting Research community. *Financial Reporting*, (2), 9-26.

Pfajfar, G., Shoham, A., Małecka, A., & Zalaznik, M. (2022). Value of corporate social responsibility for multiple stakeholders and social impact–Relationship marketing perspective. *Journal of Business Research*, *143*, 46-61.

Prenzler, T., & Sarre, R. (2012). Public-private crime prevention partnerships. In T. Prenzler (Ed.), *Private Security in Practice: Challenges and Achievements* (pp. 149-167). Palgrave Macmillan.

Qian, H. and X. Yao. (2017). The role of research universities in U.S. college-twon entrepreneurial eco-systems. University of Iowa Working Paper.

Rawhouser, H., Cummings, M., & Newbert, S. L. (2019). Social impact measurement: Current approaches and future directions for social entrepreneurship research. *Entrepreneurship Theory and Practice*, 43(1), 82-115.

Rupp, D. E., & Mallory, D. B. (2015). Corporate social responsibility: Psychological, person-centric, and progressing. *Annual Review of Organizational Psychology and Organizational Behavior*, 2(1), 211-236.

Sassen, R., Hinze, A. K., & Hardeck, I. (2016). Impact of ESG factors on firm risk in Europe. *Journal of Business Economics*, 86, 867-904.

Shaw, C. R., & McKay, H. D. (1942). Juvenile delinquency and urban areas.

Sinha, S. N., & Chaudhari, T. (2018). Impact of CSR on learning outcomes. *Management of Environmental Quality: An International Journal*, 29(6), 1026-1041.

Sampson, R. J., & Cohen, J. (1988). Deterrent effects of the police on crime: A replication and theoretical extension. *Law & Society Review*, *22*, 163.

Smith, M. D., Devine, J. A., & Sheley, J. F. (1992). Crime and unemployment: Effects across age and race categories. *Sociological perspectives*, *35*(4), 551-572.

Stephan, U., Patterson, M., Kelly, C., & Mair, J. (2016). Organizations driving positive social change: A review and an integrative framework of change processes. *Journal of Management*, 42(5), 1250-1281.

Stigler, G. (1995). "The economics of crime," Cross Sections, Federal Reserve Bank of Richmond. Vol. 12 (Fall), pp. 8-15.

Thorndike, E. (1920). A constant error in psychological ratings. *Journal of Applied Psychology*, 4, 25-29.

Van den Berg, E. M. (1995). Crime prevention on industrial sites: Security through public-private partnerships. *Security Journal*, *6*(1), 27-35.

Wikstrom, P. (2006). Situation Action Theory in Encyclopedia of Criminological Theory. Edited by F. Cullen and P. Wilcox, Beverly Hills, CA: Sage.

Wilkinson, R. G., Kawachi, I., & Kennedy, B. P. (1998). Mortality, the social environment, crime and violence. *Sociology of Health & Illness*, 20(5), 578-597.

Wilson, J. Q., & Boland, B. (1978). The effect of the police on crime. *Law and Society Review*, 367-390.

Yin, Z., Yan, C., & Li, Z. (2024). Can CSR mitigate negative regional public sentiment? Evidence from major violent crimes in China. *International Review of Economics & Finance*, *91*, 332-347.

Appendix 2

Variables	Definitions	Source
Firm-level variables		
CSR	ESGC Score	Refinitiv
CSR1	ESG Score	Refinitiv
CSR2	Net CSR measure that subtracts the total number of concerns from the total number of strengths across all seven CSR categories	MSCI
CSR_IV	Average score across firms within the same industry and the same state, excluding the contribution of the firm being instrumented.	Refinitiv
CSR_S	CSR measure that sums up total number of strengths across all seven CSR categories	MSCI
CSR_C	CSR measure that sums up total number of concerns across all seven CSR categories	MSCI
ENV	Environmental pillar score is relative sum of the emission, innovation, and resource use categories weights	Refinitiv
SOC	Social pillar score is relative sum of the community, human rights, product responsibility, and workforce categories weights	Refinitiv
GOV	Governance pillar score is relative sum of the corporate social responsibility strategy, management, and shareholder categories weights	Refinitiv

ROA	Net income over total assets	Compustat
LEVERAGE	Long-term debt over total assets	Compustat
SALEGROW	Difference between the current gross sales and the previous gross sales, divided by the previous gross sales	Compustat
State-level variables		
CRIME	Natural logarithm of annual crime rates which is the number of reported crimes per 100,000 residents, measured at the state level	UCR
Violentcrime	Natural logarithm of annual violent crime rates which is the number of reported violent crimes per 100,000 residents, measured at the state level	UCR
Propertycrime	Natural logarithm of annual property crime rates which is the number of reported property crimes per 100,000 residents, measured at the state level	UCR
Larceny	Natural logarithm of annual larceny rates which is the number of reported larceny per 100,000 residents, measured at the state level	UCR
Burglary	Natural logarithm of annual burglary rates which is the number of reported burglary per 100,000 residents, measured at the state level	UCR
Vehicletheft	Natural logarithm of annual vehicle theft rates which is the number of reported vehicle theft per 100,000 residents, measured at the state level	UCR
Robbery	Natural logarithm of annual robbery rates which is the number of reported crimes per 100,000 residents, measured at the state level	UCR
Homicide	Natural logarithm of annual homicide rates which is the number of reported homicide per 100,000 residents, measured at the state level	UCR

Assault	Natural logarithm of annual aggravated assault rates which is the number of reported aggravated assault per 100,000 residents, measured at the state level	UCR
Rape	Natural logarithm of annual rape rates which is the number of reported rape per 100,000 residents, measured at the state level	UCR
GDP	Natural logarithm of state-level gross domestic product	Bureau of Economic Analysis
OFFICER	State-level rate of police officers per 1,000 residents	UCR
UNEMPLOY	State-level the proportion of the civilian labor force that is unemployed	Bureau of Labor Statistics
INCOME	Natural logarithm of state-level per capita personal income	Bureau of Economic Analysis
EDU	State-level the percentage of population that is over age 25 with a high school degree or equivalency certificate or higher diploma	U.S. Census Bureau
CRIMEAGE	State-level the percentage of population age 25–29	U.S. Census Bureau

Figure 2.1 The relationship between crime rate and CSR
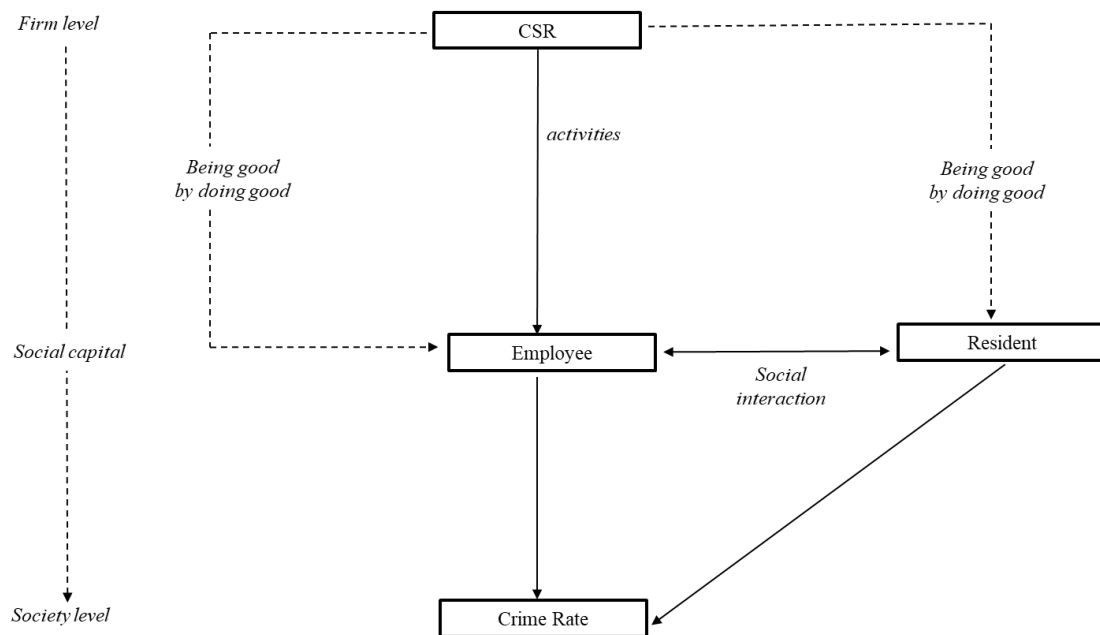
Table 2.1 Sample construction

	Sample
Beginning ESGC sample	129,655
Merge with Compustat and drop duplicates, missing data and non-U.S. firms	(105,014)
Final sample	24,641

Table 2.2 Descriptive statistics

Variable	N	Mean	Median	SD	Min	Max
CRIME	24,641	7.904	7.937	0.283	7.127	8.786
CSR	24,641	0.359	0.331	0.171	0.004	0.925
ENV	24,641	0.208	0.081	0.256	0.000	0.984
SOC	24,641	0.412	0.379	0.203	0.000	0.985
GOV	24,641	0.453	0.451	0.219	0.002	0.995
GDP	24,641	13.444	13.340	0.901	10.267	14.957
OFFICER	24,641	2.438	2.317	0.581	1.426	7.527
UNEMPLOY	24,641	0.058	0.050	0.022	0.022	0.137
INCOME	24,641	10.829	10.836	0.202	10.204	11.401

Variables are defined in the *Appendix* 2.

Table 2.3 ESG measures in Refinitiv

Pillar	Category	Metrics	Category weights
Environmental	Resource Use	20	11%
Environmental	Emissions	28	15%
Environmental	Innovation	20	11%
Social	Workforce	30	16%
Social	Human Rights	8	4%
Social	Community	14	8%
Social	Product Responsibility	10	5%
Governance	Management	35	19%
Governance	Shareholders	12	6%
Governance	CSR Strategy	9	5%
Summary		186	100%

Table 2.4 The relationship between crime rate and CSR

VARIABLES	(1) CRIME	(2) CRIME	(3) CRIME	(4) CRIME
CSR	-0.037***			
	(-5.10)			
ENV		-0.019***		
		(-2.79)		
SOC			-0.037***	
			(-5.38)	
GOV				-0.008*
				(-1.69)
GDP	-0.226***	-0.224***	-0.225***	-0.225***
	(-4.74)	(-4.68)	(-4.75)	(-4.69)
OFFICER	-0.041***	-0.041***	-0.041***	-0.041***
	(-9.98)	(-10.02)	(-10.03)	(-9.97)
UNEMPLOY	-0.755***	-0.746***	-0.757***	-0.748***
	(-6.43)	(-6.34)	(-6.45)	(-6.35)
INCOME	0.764***	0.762***	0.771***	0.764***
	(12.14)	(12.10)	(12.33)	(12.07)
CONSTANT	3.331***	3.312***	3.250***	3.320***
	(6.52)	(6.46)	(6.36)	(6.46)
Observations	24,641	24,641	24,641	24,641
Adj. R-squared	0.847	0.847	0.847	0.846
Firm FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

This table presents the regression results that test the relationship between crime rates and CSR. Variables are defined in *Appendix* 2. Standard errors are clustered at the firm level. t-statistics are in parentheses. *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively.

Table 2.5 The relationship between different types of crime and CSR

Panel A: Property crime rates and CSR

VARIABLES	(1) Propertycrime	(2) Larceny	(3) Burglary	(4) Vehicletheft
CSR	-0.037***	-0.029***	-0.052***	-0.057***
	(-4.73)	(-3.74)	(-4.53)	(-3.43)
GDP	-0.222***	-0.157***	-0.469***	-0.187*
	(-4.36)	(-3.31)	(-6.69)	(-1.66)
OFFICER	-0.044***	-0.044***	-0.079***	-0.037***
	(-10.10)	(-7.71)	(-10.88)	(-3.64)
UNEMPLOY	-0.685***	-0.807***	0.033	-1.690***
	(-5.23)	(-7.21)	(0.18)	(-7.31)
INCOME	0.777***	0.683***	1.018***	0.338**
	(11.19)	(11.21)	(10.41)	(2.24)
CONSTANT	3.018***	2.766***	2.146***	5.061***
	(5.38)	(5.27)	(2.70)	(4.46)
Observations	24,641	24,641	24,641	24,641
Adj. R-squared	0.854	0.819	0.898	0.717
Firm FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Table 2.5 The relationship between different types of crime and CSR (Continued)
Panel B: Violent crime rates and CSR

VARIABLES	(1) *Violentcrime*	(2) *Robbery*	(3) *Homicide*	(4) *Assault*	(5) *Rape*
CSR	-0.044***	-0.059***	-0.031**	-0.044***	-0.028*
	(-4.39)	(-4.66)	(-2.24)	(-3.76)	(-1.95)
GDP	-0.042	0.590***	-0.976***	-0.333***	0.191**
	(-0.74)	(7.43)	(-12.06)	(-5.42)	(2.32)
OFFICER	-0.025***	-0.078***	-0.040***	0.001	0.005
	(-4.01)	(-8.70)	(-4.11)	(0.27)	(0.77)
UNEMPLOY	-1.514***	-0.115	-2.471***	-1.819***	-0.268
	(-12.41)	(-0.69)	(-13.22)	(-12.52)	(-1.53)
INCOME	0.310***	-0.053	0.140	0.613***	0.388***
	(4.02)	(-0.54)	(1.50)	(6.92)	(4.10)
CONSTANT	3.559***	-2.007***	13.121***	3.611***	-3.153***
	(5.43)	(-2.83)	(12.03)	(4.70)	(-3.74)
Observations	24,641	24,641	24,641	24,641	24,641
Adj. R-squared	0.507	0.788	0.492	0.448	0.722
Firm FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

This table presents the regression results that test the relationship between different types of crime and CSR. Variables are defined in *Appendix* 2. Standard errors are clustered at the firm level. t-statistics are in parentheses. *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively.

Table 2.6 Robustness tests

VARIABLES	(1) CRIME	(2) CRIME	(3) CRIME	(4) CRIME
CSR1	-0.042***			
	(-5.03)			
CSR		-0.037***	-0.031***	-0.050***
		(-5.15)	(-3.56)	(-4.82)
GDP	-0.225***	-0.236***	-0.147**	-0.296***
	(-4.75)	(-4.97)	(-2.22)	(-3.47)
OFFICER	-0.041***	-0.040***	-0.041***	-0.036***
	(-9.99)	(-10.11)	(-8.07)	(-8.06)
UNEMPLOY	-0.752***	-0.763***	-0.907***	-0.877***
	(-6.40)	(-6.58)	(-5.84)	(-5.95)
INCOME	0.767***	0.755***	0.735***	0.660***
	(12.22)	(12.02)	(8.37)	(6.48)
EDU		0.032		
		(0.14)		
CRIMEAGE		1.423***		
		(3.12)		
ROA			-0.013*	
			(-1.78)	
LEVERAGE			-0.009	
			(-1.09)	
SALEGROW			-0.005***	
			(-2.76)	
CONSTANT	3.295***	3.438***	2.578***	5.327***
	(6.45)	(6.54)	(3.90)	(7.83)
Observations	24,641	24,641	15,060	17,209
Adj. R-squared	0.847	0.847	0.847	0.793
Firm FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

This table presents the robustness check that test the relationship between crime rates and CSR. Variables are defined in *Appendix* 2. Standard errors are clustered at the firm level. t-statistics are in parentheses. *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively.

Table 2.7 IV Regression for crime rate and CSR

VARIABLES	(1) CSR	(2) CRIME
	First stage	Second stage
CSR_IV	0.509***	
	(30.48)	
CSR_Predicted		-0.038**
		(-2.49)
GDP	0.078	-0.226***
	(1.55)	(-4.74)
OFFICER	0.000	-0.041***
	(0.01)	(-9.98)
UNEMPLOY	0.111	-0.755***
	(0.94)	(-6.44)
INCOME	0.054	0.764***
	(0.77)	(12.14)
CONSTANT	-1.547***	3.331***
	(-2.66)	(6.52)
Observations	24,641	24,641
Adj. R-squared	0.554	0.847
Firm FE	YES	YES
Year FE	YES	YES

This table presents the IV Regression that test the relationship between crime rates and CSR. Variables are defined in *Appendix* 2. Standard errors are clustered at the firm level. t-statistics are in parentheses. *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively.

Table 2.8 The relationship between crime rate and CSR using MSCI CSR performance

VARIABLES	(1) CRIME	(2) CRIME	(3) CRIME
CSR2	-0.001***		
	(-2.98)		
CSR_S		-0.001**	
		(-2.32)	
CSR_C			0.001*
			(1.65)
GDP	-0.178***	-0.179***	-0.178***
	(-4.92)	(-4.94)	(-4.92)
OFFICER	-0.029***	-0.029***	-0.029***
	(-7.68)	(-7.68)	(-7.66)
UNEMPLOY	-1.013***	-1.014***	-1.011***
	(-7.67)	(-7.67)	(-7.64)
INCOME	0.630***	0.631***	0.631***
	(13.98)	(13.99)	(13.98)
CONSTANT	4.094***	4.098***	4.086***
	(8.64)	(8.65)	(8.63)
Observations	31,830	31,830	31,830
Adj. R-squared	0.865	0.865	0.865
Firm FE	YES	YES	YES
Year FE	YES	YES	YES

This table presents the sensitivity test that test the relationship between crime rates and CSR using MSCI CSR performance. The sample period is 2004-2019 due to the data availability of MSCI. Variables are defined in *Appendix* 2. Standard errors are clustered at the firm level. t-statistics are in parentheses. *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively.

Chapter 3   Bank Non-performing Loans, Loan Charge-offs, and Crime

3.1 Introduction

Crime is a social problem (Haines, 1999). Social interactions are exchanges between individuals of a society. By interacting with one another, people design rules, institutions, systems, and laws within which they seek to live. Laws are used to communicate the rules and regulations of a society to the members. Glaeser et al. (1996) created an index of social interactions given the variance of cross-city crime rates. They find that the number of social interactions is high in larceny and auto theft, moderate in more serious crimes such as assault, burglary, and robbery, and very low in arson, murder, and rape. Buonanno et al. (2009) find that social capital, which is embodied in civic norms and associational networks, reduces property crimes in Italian provinces. Moreover, researchers have acknowledged the impact of social networks on criminal behavior. Gerstner and Oberwittler (2018) treat unstructured socializing as a criminogenic phenomenon, and find a strong interaction between unstructured socializing and adolescents' propensity for crime if their peers have a strong propensity for delinquency. However, Light and Miller (2018) examine the influence of unauthorized immigration on violent crime between 1990 and 2014, and find no evidence that undocumented immigration increases rates of violent crime.

This paper studies the crime problem through the bank information provided by financial institutions, given the increased financialization of the economy (Tomaskovic-Devey and Lin, 2013; Collins, 2015). The study explores the links between crime rate and banks' financial indicators in an attempt to determine whether or not some bank financial reporting variables are good indicators of crime rates in a state. We find that when the

amount of non-performing loans (NPLs) in a state is high, residents of that state are more likely to engage in crime. In addition, when the amount of loan charge-offs (LCOs) in a state is high, the residents of that state are more likely to engage in crime. Consistent with the finding that states with high non-performing loans and loan charge-offs have higher crime rates, we document that a one standard deviation increase in non-performing loans and loan charge-offs is associated with an increase of 1.4 percent and 1.5 percent in crime rate respectively. We further disaggregate the crimes and find a positive association between the two financial variables (NPL and LCO) and larceny, burglary, robbery, and motor vehicle theft, crimes that are economically motivated.

Our study contributes to the accounting and socioeconomic literature in the following ways. Extant research has focused traditionally on the economic role of bank accounting, and discussed the role of banks and accounting information in resolving information asymmetry in the economy (Beatty & Liao, 2014). Batabyal (2011) attempts to identify a crime-delinquency relationship at the national level. He does not find any evidence of a long-term association between the crime rate and delinquency rate of real estate loans in his full sample from 1987 to 2008. We try to determine whether NPL and LCO, two critical financial data of banks, can be leading indicators of crime rates in a state. Second, we provide plausible recommendations, such as the setting up of a crime prevention strategy office, in government institutions.

3.2 Literature Review and Hypotheses Development

Criminal choices can be analyzed by way of economic models. Becker (1968) incorporates the behavioral relations behind crime through cost-benefit analysis.

Perpetrators commit an offense if the expected utility of doing so exceeds the utility of being law-abiding. Many studies examine crime from the vantage point of socioeconomic factors. Poverty, social exclusion, wage and income inequality, cultural and family background, education, and unemployment affect an individual's likelihood of committing crimes (Buonanno, 2003).

Commercial banks will generally assign loans where the repayments are more than 90 days overdue to the range of non-performing loans. Ghosh (2015) studies the determinants of non-performing loans for American banks, and concludes that greater capitalization will elevate NPLs, while better quality credit, a smaller share of illiquid loans in banks' asset portfolios, efficient cost management, and more bank profitability will reduce NPLs. NPLs weaken the health of the balance sheet, shrink the credit of banks, and decrease banks' lending capacity to productive business (Bernanke, 1983; Park & Shin, 2021). Loan charge-offs indicate that the lenders believe the loan is unlikely to be repaid, so they write it off. Ghosh (2018) finds that greater regulatory capital, a bank's more diversified business model, more bank profits and efficient cost management, and a stable economic environment with higher GDP and housing price growth rates and lower inflation rates all diminish the rate of loan charge-offs.

NPLs and LCOs describe the nature of loan defaults at various life-cycle points in the life of a loan. For a bank, NPLs and LCOs are driven by defaults on commercial and consumer loans. A default on a commercial loan represents a failure of the lending arrangement between a bank and a business; a default on a consumer loan represents a failure of the lending arrangement between a bank and a person. A financial default is one

of the worst situations a corporation can face. Commercial loan default indicates that a company is in poor financial condition. This financial stress is attributable to salaries being in arrears, pay cuts, or layoffs of company employees. The company might weather this financial stress and eventually repay the overdue loan or interest. However, according to CreditRiskMonitor, one in four firms that experience default will declare bankruptcy, even in normal economic times.[12] If the firm is restructured or begins bankruptcy proceedings, its employees will lose their jobs after the company is restructured or shut down. Thus, the loan default of the firm will be reflected in financial hardship for residents within the state.

Conversely, individuals' economic conditions help to determine loan default rates. Consumer loan default intuitively captures borrowers' bad financial condition. For instance, Hillman (2014) finds that students from low-income families default on their student loans at disproportionately high rates.

As Becker said in his Nobel lecture (1993), "some individuals become criminals because of the financial and other rewards from crime compared to law-abiding work, taking account of the likelihood of apprehension and conviction, and the severity of punishment." The economic approach implies that crime rates will rise when citizens endure financial setbacks. Taken together, we predict that both non-performing bank loans and loan charge-offs are positively associated with local crime rates.

We expect residents in a state to be more likely to commit crimes when they experience economic adversity. That is, non-performing bank loans and bank loan charge-offs are two plausible leading indicators for the state crime rates. We next disaggregate the

---

[12] CreditRiskMonitor is a financial risk analysis and news service for credit, the supply chain, and financial professionals (https://www.creditriskmonitor.com).

crime rate into larceny, burglary, robbery, and motor vehicle theft, which tend to be economically motivated. Then we investigate the impact of the two bank financial variables on these economic crime rates. We predict that both non-performing bank loans and loan charge-offs are positively associated with local larceny, burglary, robbery, and motor vehicle theft crimes.

3.3 Sample and data

Our sample period is from 1991 to 2019. Banks' financial reporting data, including NPLs and LCOs, were collected from the Quarterly Report of Condition and Income (call reports), available at the Federal Reserve Bank of Chicago, and the Statistics on Depository Institutions (SDI) reports, available at Federal Deposit Insurance Corporation. The annual data on the U.S. crime rates can be retrieved from the Uniform Crime Reporting Releases (UCR) available from the Federal Bureau of Investigation. This UCR database releases information on violent crime and property crime.[13] Control variables were collectively derived from the U.S. Census, the Bureau of Labor Statistics, the UCR, and the Bureau of Economic Analysis.

3.4 Research design

After controlling for deterrence and socioeconomic variables alongside year- and state-fixed effects, we examine whether NPL and LCO are associated with rising crime rates. The estimation equations are used to investigate how NPL and LCO affect crime rates, respectively.

$CRIME_{it} = Constant + \alpha*NPL_{it} + \beta*Controls_{it} + STATE\ AND\ YEAR\ FIXED\ EFFECTS$

---

[13] We expect residents to be more likely to commit crimes when they experience economic adversity. We implicitly assume that crimes in a specific state are committed by residents only.

$+ \varepsilon_{it}$ (1)

$$CRIME_{it} = Constant + \alpha * LCO_{it} + \beta * Controls_{it} + STATE\ AND\ YEAR\ FIXED\ EFFECTS$$

$+ \varepsilon_{it}$ (2)

where t denotes years and i denotes states. The dependent variable $CRIME_{it}$ is represented by the natural logarithm of annual crime rates. The annual crime rate is the number of reported crimes per 100,000 inhabitants, measured at the state level. *NPL* and *LCO* are the variables of interest. NPL_{it} is the ratio of aggregate non-performing loans to total aggregate assets for state i in year t. LCO_{it} is the ratio of aggregate net loan charge-offs to total aggregate assets for state i in year t. Aggregate net loan charge-offs are measured on a net basis – loans charged off as losses minus recoveries on loans previously charged off. Aggregate data of banking variables for each state are considered preferable for two reasons. First, all the data on control variables are state-year based, which corroborates the consistency of the regression models. The second reason is that the context of our study is macro-prudential, so the adoption of state-level data will facilitate studying cross-state differences regarding socioeconomic characteristics on criminal activities. $CONTROLS_{it}$ is a vector of deterrence and socioeconomic characteristics, including *GDP*, *OFFICER*, *UNEMPLOY*, and *INCOME*. *GDP* is denoted as gross domestic product divided by population, measured at the state-year level. *OFFICER* is denoted as the rate of police officers per 1,000 inhabitants, measured at the state-year level. *UNEMPLOY* is denoted as the percentage of the unemployed civilian labor force, measured at the state-year level. *INCOME* is denoted as the natural logarithm of median household income, measured at the state-year level. ε_{it} is the error term. All standard errors in the regressions are clustered at

the state level.

3.5 Empirical results

Table 3.1 displays the descriptive statistics for all the variables used in the regression analyses in the sample period from 1991 to 2019. After we drop the missing data, the final sample has 1,475 state-year observations. The crime rate per 1,000 inhabitants has an average of 8.202. The mean of NPL_{it} and LCO_{it} for the aggregate banks in state i and year t is 2.1% and 0.8%, respectively. The mean of GDP per capita is $0.043 million; the average rate of police officers per 1,000 inhabitants is 2.319; the average unemployment rate is 5.5%; and the average natural logarithm of median household income is 10.706.

We conducted the Augmented Dickey-Fuller (ADF) test to examine the stationarity of the panel series. ADF Test is a common statistical test used to test whether a time series is stationary or not. The more negative the ADF statistic is, the stronger the rejection of the hypothesis that there is a unit root at some level of confidence. When the time series has no unit root, it is stationary and hence exhibits reversion to the mean. The ADF statistics are compared to the relevant critical value for the Augmented Dickey–Fuller test. Using the sample of 1475 observations, we show in Table 3.1 that the ADF test statistics are less (more negative) than the critical value 3.96, so at the 99 percent level the null hypothesis is rejected. Thus, our time series data are stationary.

[Table 3.1]

Table 3.2 reports the results of the baseline regression for for Eqs. (1)-(2). In Panel A, the coefficient for NPL_{it} is positive and statistically significant at the 1% level (t-statistic = 3.61), which is consistent with our hypothesis proposing that NPL_{it} has a significantly

positive association with the crime rate. This result indicates that states with more NPLs can have higher crime rates in the same year. To infer the economic magnitude of this relationship, one can note that one standard deviation of NPL_{it} is 0.100. Multiplying the coefficient (0.138) by the standard deviation of $NPL_{i,t-1}$ (0.100) suggests that a one standard deviation increase in NPL_{it} is associated with an increase of 1.4 percent in crime rate. The coefficient of LCO_{it} is positively and statistically significant at the 1% level (t-statistic = 4.73), which is consistent with our hypothesis proposing that LCO_{it} has a significantly positive association with the crime rate. This result indicates that states with more LCOs can have higher crime rates in the same year. To infer the economic magnitude of this relationship, one can note that one standard deviation of LCO_{it} is 0.031. Multiplying the coefficient (0.483) by the standard deviation of LCO_{it} (0.031) suggests that a one standard deviation increase in LCO_{it} is associated with an increase of 1.5 percent in crime rate. In addition, the results reported in Panel A of Table 3.2 for both Eqs. (1) and (2) exhibit a significantly positive association between *INCOME* and crime rate. We find that higher median household income is positively and significantly associated with the aggregate crime rate. Higher median household income indicates the increasing wealth of the communities, and thus, more people in these communities likely become targets. If the criminals perpetrate crimes (i.e., robberies and thefts) on wealthy households, the gains from these criminal activities will be higher. As a result, the probability of criminals perpetrating crimes is higher in more wealthy communities. This positive relation is consistent with the finding that the crime rate increases as income increases (Hipp, 2007).

The model in Panel B of Table 3.2 was estimated using the first difference model. The

significance of the coefficients on both explanatory variables ΔNPL_{it} and ΔLCO_{it} is at the 1% level (t-statistics = 2.85 and 3.80, respectively). This result indicates that states with higher changes in NPLs and LCOs are associated with higher changes in crime rates. Overall, our results in Table 3.2 show that the two financial variables, NPL and LCO, are leading indicators of state crime rates.

[Table 3.2]

Table 3.3 reports the results of the regressions for disaggregated crime categories. Referring to Uniform Crime Reporting, larceny, burglary, and robbery are similar but not identical crimes. A burglary is an unlawful entry into a structure to commit theft. A robbery is the taking of property from a person by force or the threat of force. Larceny is unlawful taking, carrying, leading, or riding away of property from its owners. Panel A of Table 3.3 shows that the significant and positive relation between NPL_{it} and crime rates holds for property crimes, including motor vehicle theft, larceny, burglary, and robbery. Panel B of Table 3.3 shows that the significant and positive relation between LCO_{it} and crime rates holds for the same four types of property crimes. A decrease in GDP is associated with increased motor vehicle theft and burglary but not other crimes. We assume that motor vehicle theft and burglary are considered to be more time consuming and require more detailed planning by criminals. However, robbery and larceny are relatively incidental and do not require criminals to do detailed planning. The criminals of robbery and larceny randomly target victims. That is why we can plausibly detect a negative association between GDP and motor vehicle theft and burglary. The incidental and random nature of robbery and larceny results in no association between GDP and these two types of crimes.

Previous studies on unemployment rates and crime rates show an inconsistent and insignificant relationship at the aggregate level (Chiricos, 1987). In Panels A and B of Table 3.3, we find that the unemployment rate is only positively and significantly associated with the crimes of larceny, robbery, and burglary. But a higher unemployment rate is not associated with the aggregate crime rate or motor vehicle theft. This is consistent with the argument that the relationship between unemployment rates and crime rates may be more readily observed for lower levels of aggregation (Chiricos, 1987). Motor vehicle theft is different from the crimes of larceny, robbery, and burglary. Motor vehicle thieves employ special techniques and tools to steal motor vehicles. A higher unemployment rate does not necessarily indicate an increase in motor vehicle thieves with special techniques and tools. In fact, those people who have special vehicle techniques and tools are usually employed in the economy.

[Table 3.3]

We conduct two additional tests. First, to check the robustness of our results, we replicate models (1) and (2) using one-period lag for the main explanatory variables. The untabulated results show that the significantly positive relationship between the two financial banking variables and crime rates remains unchanged.

Second, to examine how individual financial hardship drives citizens to conduct criminal activities, we investigate the relationship between NPL and LCO for uncollateralized retail loans and crime rate, respectively, from 1992 to 2019. Table 3.4 shows that a significant and positive relation exists between NPL for uncollateralized retail loans (*NPL_URL*) and crime rates. Table 3.4 also shows a significant and positive relation

between LCO for uncollateralized retail loans (*LCO_URL*) and crime rates. A state with more NPL and LCO for uncollateralized retail loans can have higher crime rates. This result indicates that individual financial hardship is positively associated with crime rates.

[Table 3.4]

3.6 Conclusions

This study examines whether *NPL* and *LCO* are two leading indicators of future crime rates. The empirical results show that when *NPL* is high in a state, its residents are more likely to commit a crime in the next year. When *LCO* is high in a state, its residents are also more likely to commit a crime in the next year. The results remain robust when we use the alternative sample size. After disaggregating the crime rates, we find significant and positive associations between the two bank financial reporting variables (*NPL* and *LCO*) and larceny, burglary, robbery, and motor vehicle theft. We conclude that bank financial variables such as non-performing loans and loan charge-offs can be leading indicators of crime rates.

References

Batabyal, S. (2011). Temporal causality and the dynamics of crime and delinquency. *Atlantic Economic Journal*, 39(4), 421-441.

Beatty, A., & Liao, S. (2014). Financial accounting in the banking industry: A review of the empirical literature. *Journal of Accounting and Economics*, 58(2-3), 339-383.

Becker, G. S. (1968). Crime and Punishment: An Economic Approach. *Journal of Political Economy*, 76(2), 169-217.

Becker, G. S. (1993). Nobel lecture: The economic way of looking at behavior. *Journal of Political Economy*, 101(3), 385-409.

Bernanke, B. S. (1983). Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression. *The American Economic Review*, 73(3), 257-276.

Chiricos, T. G. (1987). Rates of crime and unemployment: An analysis of aggregate research evidence. *Social Problems*, 34(2), 187-212.

Buonanno, P. (2003). The socioeconomic determinants of crime. A review of the literature. No 63, Working Papers, University of Milano-Bicocca, Department of Economics.

Buonanno, P., Montolio, D., & Vanin, P. (2009). Does social capital reduce crime?. *The Journal of Law and Economics*, 52(1), 145-170.

Collins, M. (2015). Wall street and financialization of the economy. Forbes, February 4, 2015.

Gerstner, D., & Oberwittler, D. (2018). Who's hanging out and what's happening? A look at the interplay between unstructured socializing, crime propensity and delinquent peers using social network data. *European Journal of Criminology*, 15(1), 111-129.

Ghosh, A. (2015). Banking-industry specific and regional economic determinants of non-performing loans: Evidence from US states. *Journal of Financial Stability*, 20, 93-104.

Ghosh, A. (2018), "Determinants of bank loan charge-off rates: evidence from the USA", *Journal of Financial Regulation and Compliance*, 26(4), 526-542.

Glaeser, E. L., Sacerdote, B., & Scheinkman, J. A. (1996). Crime and social interactions. *The Quarterly Journal of Economics*, 111(2), 507-548.

Haines, K. (1999). Crime is a social problem. *European Journal on Criminal Policy and Research*, 7(2), 263-275.

Hillman, N. W. (2014). College on credit: A multilevel analysis of student loan default. *The Review of Higher Education*, 37(2), 169-195.

Hipp, J. R. (2007). Block, tract, and levels of aggregation: Neighborhood structure and crime and disorder as a case in point. *American Sociological Review*, 72(5), 659-680.

Light, M. T., & Miller, T. (2018). Does undocumented immigration increase violent crime? *Criminology*, 56(2), 370-401.

Park, C. Y., & Shin, K. (2021). COVID-19, non-performing loans, and cross-border bank lending. *Journal of Banking & Finance*, 106233.

Tobler, W. R. (1970). A computer movie simulating urban growth in the Detroit region. *Economic Geography*, 46(sup1), 234-240.

Tomaskovic-Devey, D., & Lin, K-H. (2013). Financialization: causes, inequality consequences, and policy implications. 18 North Carolina Banking Institute. 167.

Zenou, Y. (2003). The spatial aspects of crime. *Journal of the European Economic Association*, 1(2-3), 459-467.

Appendix 3

Variables	Definitions
CRIME	Natural logarithm of annual crime rates which is the number of reported crimes per 100,000 inhabitants, measured at the state level.
VEHICLETHEFT	Natural logarithm of annual motor vehicle theft rates which is the Number of reported motor vehicle theft per 100,000 inhabitants, measured at the state level.
LARCENY	Natural logarithm of annual larceny rates which is the number of reported larceny per 100,000 inhabitants, measured at the state level.
ROBBERY	Natural logarithm of annual robbery rates which is the number of reported robbery per 100,000 inhabitants, measured at the state level.
BURGLARY	Natural logarithm of annual burglary rates which is the number of reported burglary per 100,000 inhabitants, measured at the state level.
NPL	Ratio of aggregate non-performing loans to total aggregate assets
LCO	Ratio of aggregate total net loan charge-offs to total aggregate assets
GDP	State-level gross domestic product divided by population (in $millions)
OFFICER	State-level rate of police officers per 1,000 inhabitants
UNEMPLOY	State-level the percentage of the civilian labor force that is unemployed, measured at the state level
INCOME	Natural logarithm of state-level median household income
NPL_URL	Ratio of aggregate non-performing uncollateralized retail loans to total aggregate assets. Aggregate non-performing uncollateralized retail loans are the sum of P9CON (loans to individuals, past due 90+ days) and NACON (loans to individuals in nonaccrual status). Data source is Statistics on Depository Institutions (SDI) Reports.
LCO_URL	Ratio of aggregate total net uncollateralized retail loans charge-offs to total aggregate assets. Aggregate total net uncollateralized retail loans charge-offs are NTCON (loans to individuals). Data source is Statistics on Depository Institutions (SDI) Reports.

Table 3.1 Descriptive statistics for variables in the tests

variable	N	Mean	Median	SD	Q1	Q3	ADF Stat
$CRIME_{it}$	1,475	8.202	8.205	0.344	7.953	8.440	-11.15***
$VEHICLETHEFT_{it}$	1,475	9.181	9.339	1.326	8.381	10.082	-8.36***
$LARCENY_{it}$	1,475	11.270	11.451	1.069	10.354	11.983	-11.02***
$ROBBERY_{it}$	1,475	8.009	8.294	1.669	7.015	9.121	-11.49***
$BURGLARY_{it}$	1,475	10.021	10.216	1.192	9.131	10.828	-9.33***
NPL_{it}	1,475	0.021	0.007	0.100	0.005	0.013	-12.24***
LCO_{it}	1,475	0.008	0.002	0.031	0.001	0.005	-11.15***
NPL_URL_{it}	1,425	0.002	0.000	0.008	0.000	0.001	-6.41***
LCO_URL_{it}	1,425	0.004	0.001	0.019	0.000	0.002	-6.08***
GDP_{it}	1,475	0.043	0.040	0.020	0.031	0.051	-6.23***
$OFFICER_{it}$	1,475	2.319	2.130	0.934	1.840	2.510	-6.85***
$UNEMPLOY_{it}$	1,475	0.055	0.052	0.019	0.041	0.065	-13.15***
$INCOME_{it}$	1,475	10.706	10.714	0.272	10.511	10.907	-12.05***

Variables are defined in the *Appendix* 3. The null hypothesis of ADF test is that all panels contain unit roots. The ADF statistics are reported. *, **, *** represent the rejection of null hypothesis at the 10%, 5%, and 1% levels, respectively.

Table 3.2 The relationship between crime rate and two financial variables NPL and LCO

Panel A: The relationship between $Crime_{it}$ and two financial variables NPL_{it} and LCO_{it}

Variable	$Crime_{it}$	$Crime_{it}$
NPL_{it}	0.138***	
	(3.61)	
LCO_{it}		0.483***
		(4.73)
GDP_{it}	-3.042*	-3.041*
	(-1.91)	(-1.90)
$OFFICER_{it}$	0.040	0.040
	(1.10)	(1.11)
$UNEMPLOY_{it}$	0.896	0.874
	(0.95)	(0.93)
$INCOME_{it}$	0.314**	0.312**
	(2.41)	(2.40)
$CONSTANT$	5.383***	5.406***
	(3.91)	(3.94)
Observations	1,475	1,475
Adj R^2	0.922	0.922
State FE	YES	YES
Year FE	YES	YES

73

Table 3.2 The relationship between crime rate and two financial variables NPL and LCO (Continued)

Panel B: The relationship between Change in *Crime* and Changes in *NPL* and *LCO*

Variable	$\Delta Crime_{it}$	$\Delta Crime_{it}$
ΔNPL_{it}	0.037***	
	(2.85)	
ΔLCO_{it}		0.107***
		(3.80)
ΔGDP_{it}	-2.403**	-2.400**
	(-2.60)	(-2.59)
$\Delta OFFICER_{it}$	-0.003	-0.003
	(-0.59)	(-0.59)
$\Delta UNEMPLOY_{it}$	-0.158	-0.162
	(-0.40)	(-0.40)
$\Delta INCOME_{it}$	0.001	0.001
	(0.04)	(0.03)
CONSTANT	0.024***	0.024***
	(3.53)	(3.52)
Observations	1,424	1,424
Adj R^2	0.171	0.172
State FE	YES	YES
Year FE	YES	YES

This table presents the regression results that test the relationship between crime rates and two financial variables NPL and LCO. Variables are defined in *Appendix* 3. Standard errors are clustered at the state level. t-statistics are in parentheses. *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively.

Table 3.3 The relationship between property crime rates and two financial variables NPL and LCO

Panel A: property-related crime rates and NPL_{it}

Variable	$Vehicletheft_{it}$	$Larceny_{it}$	$Robbery_{it}$	$Burglary_{it}$
NPL_{it}	0.366***	0.087***	0.228**	0.128***
	(3.34)	(4.52)	(2.30)	(3.74)
GDP_{it}	-8.438**	-1.797	-3.375	-10.860***
	(-2.12)	(-1.22)	(-0.91)	(-4.41)
$OFFICER_{it}$	0.069	-0.033	0.052	0.031
	(0.84)	(-0.75)	(0.78)	(0.61)
$UNEMPLOY_{it}$	2.154	1.770**	2.696**	2.711***
	(1.65)	(2.38)	(2.22)	(3.12)
$INCOME_{it}$	0.859**	0.333**	0.775***	0.402**
	(2.65)	(2.17)	(2.77)	(2.17)
$CONSTANTS$	-0.978	6.412***	-1.681	4.557**
	(-0.28)	(3.99)	(-0.55)	(2.25)
Observations	1,475	1,475	1,475	1,475
Adj R^2	0.965	0.992	0.986	0.987
State FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Table 3.3 The relationship between property crime rates and two financial variables NPL and LCO (Continued)

Panel B: property-related crime rates and LCO_{it}

Variable	$Vehicletheft_{it}$	$Larceny_{it}$	$Robbery_{it}$	$Burglary_{it}$
LCO_{it}	1.340***	0.301***	0.784***	0.462***
	(5.13)	(3.98)	(2.87)	(4.21)
GDP_{it}	-8.434**	-1.797	-3.375	-10.858***
	(-2.11)	(-1.22)	(-0.91)	(-4.42)
$OFFICER_{it}$	0.069	-0.033	0.052	0.031
	(0.84)	(-0.75)	(0.78)	(0.61)
$UNEMPLOY_{it}$	2.086	1.756**	2.661**	2.688***
	(1.60)	(2.36)	(2.20)	(3.10)
$INCOME_{it}$	0.853**	0.332**	0.772***	0.399**
	(2.63)	(2.17)	(2.77)	(2.17)
$CONSTANTS$	-0.905	6.426***	-1.645	4.581**
	(-0.26)	(4.01)	(-0.54)	(2.26)
Observations	1,475	1,475	1,475	1,475
Adj R^2	0.965	0.992	0.986	0.987
State FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

This table presents the regression results that test the relationship between property crime rates and two financial variables NPL and LCO. Variables are defined in *Appendix* 3. Standard errors are clustered at the state level. t-statistics are in parentheses. *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively.

Table 3.4 The relationship between crime rates and NPL and LCO for uncollateralized retail loan

Variable	$Crime_{it}$	$Crime_{it}$
NPL_URL_{it}	2.300***	
	(4.05)	
LCO_URL_{it}		0.991***
		(3.87)
GDP_{it}	-2.930*	-2.933*
	(-1.82)	(-1.82)
$OFFICER_{it}$	0.037	0.037
	(1.03)	(1.01)
$UNEMPLOY_{it}$	0.849	0.824
	(0.94)	(0.91)
$INCOME_{it}$	0.293**	0.289**
	(2.21)	(2.17)
$CONSTANT$	4.739***	4.792***
	(3.18)	(3.21)
Observations	1,425	1,425
Adj R^2	0.924	0.924
State FE	YES	YES
Year FE	YES	YES

This table presents the regression results that test the relationship between crime rates and NPL and LCO for uncollateralized retail loans. Variables are defined in *Appendix* 3. Standard errors are clustered at the state level. t-statistics are in parentheses. *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively.

Chapter 4   Bank Capital Structure and Income Inequality

4.1 Introduction

Increasing income inequality has grave economic and social consequences. It leads to reduced growth, innovation, and investment, and exacerbates health and social problems (Wilkinson, 2010; Polacko, 2021). Extreme inequality corrodes social cohesion and hinders upward mobility, and it has been linked to adverse outcomes like lower economic growth. Thus, understanding the determinants of income inequality has become increasingly important for both researchers and policymakers (Contreras et al., 2023).

Bank equity capital is the bank's self-insurance that serves both as a cushion against unexpected losses and insolvency (Repullo, 2004; Von Thadden, 2004), and as a mediator for risk management (Acharya et al., 2016; Lindquist, 2004; Zheng et al., 2019). With adequate bank equity capital, banks are more capable of supplying credit to healthy borrowers and more resilient to widespread panic. Bank equity capital plays a critical role in mitigating financial instability and fostering economic resilience, as highlighted by the Basel III regulation, which increased the required level of regulatory capital to strengthen the quality of banks' capital bases. The bank capital research focuses on measuring bank capital structure on bank and macroeconomic impact. Bank equity capital significantly influences broader social outcomes. Although the social outcome of bank equity capital is important, the literature thus far has not examined the connection between bank capital structures and social outcomes. This study fills this research gap by investigating how bank capital structures can influence income disparity.

We use a sample of U.S. banks from 2001 to 2020 to examine the association between

bank equity capital and two measures of income inequality. First, we document that states whose banks hold more equity capital experience significantly lower income disparity than do states whose banks hold less equity capital. This negative relationship arises through two key theoretical mechanisms. One mechanism involves strengthened bank monitoring incentives fostered by higher equity capital (Bhat & Desai, 2020). Better capitalized banks have stronger incentives and greater capacity to monitor borrowers, resulting in improved loan quality, and fewer defaults among vulnerable borrowers. This generates a positive cycle and consequently reduces income inequality.

The other mechanism suggests that higher bank equity capital facilitates greater loan growth and credit availability (Gambacorta & Shin, 2018; Kick et al., 2020). Enhanced lending capacity expands financial inclusion, which finally alleviates income inequality. Moreover, this negative effect of bank equity capital on income inequality is more pronounced in states with higher bank interest rates, regions experiencing higher inflation, and during financial crises. We conduct sensitivity analyses to calibrate our findings.

We make two important contributions. First, our research contributes to the literature by shedding light on the social impact of bank capital. Larger amounts of capital bring many benefits to banks. For example, increasing capital helps maintain a low default risk on deposits (Calomiris & Mason, 2003; Calomiris & Wilson, 2004), reduces market risk (Karels et al., 1989), improves the bank's stability and lowers systemic risk (Santos, 1999; Thakor, 2014), creates more liquidity (Berger & Bouwman, 2009), and has a positive impact on the bank's profitability (Berger, 1995; Lee & Hsieh, 2013; Tarek Al-Kayed et al., 2014). However, there is limited research on the social impact of bank capital. Our study

addresses this shortcoming by demonstrating that bank equity capital can reduce income inequality.

The second contribution of our paper is its exploration of how banks' financial metrics affect income inequality. Specifically, we contribute to a growing body of research that explores the socioeconomic impacts of banking activities (Garmaise & Moskowitz, 2006; Doerr et al., 2022; Contreras et al., 2023). Several studies in this stream have examined the link between banking operations and income inequality (e.g., Delis et al., 2014; Hsieh et al., 2019; D'Onofrio et al., 2019; Colciago et al., 2019). We focus on the impact of banks' financial metrics on income inequality, an area where research remains scant. A paper closely related to ours is by Apergis (2024), who finds that higher loan loss provisions, which indicate lower expected loan losses, are positively correlated with income inequality. The key difference between Apergis (2024) and this study is that while Apergis (2024) focused on loan loss provision, the current study focuses on bank equity capital.

The remainder of this paper is organized as follows. Section 2 presents a literature review and hypothesis development. Section 3 describes the sample construction, detailing data sources, variable definitions, and descriptive statistics. Section 4 provides the main empirical findings. Section 5 discusses additional analyses and robustness checks. Section 6 concludes with suggestions for future research.

4.2 Literature Review and Hypothesis Development

Dabla-Norris et al. (2015) identify several key drivers of income inequality: technological change, globalization, financialization, labor market institutions, tax policies, and education. Among the financial factors, the role of banks is particularly important, as

they are the primary channel through which financial resources are allocated across individuals and regions. Several studies investigate the relationship between bank operation and income inequality. Financial deepening can reduce income inequality through broader access and better resource allocation (Dabla-Norris et al., 2015). Though in early stages of development, financialization measured as the relative share of the banking and stock market sectors in the economy leads the wealthy to benefit more (Roine et al., 2009). Beck et al. (2007) find that financial development disproportionately boosts incomes of the poorest quintile and thereby reduces income inequality. Hsieh et al. (2019) argue that greater banking concentration worsens inequality by limiting credit to small firms, whereas increased bank competition expands credit access and then reduces income inequality. Delis et al. (2014) find a strong correlation between banking regulation and a substantial reduction in income disparities. Among liberalization policies, removing credit and interest rate controls and tightening banking supervision significantly reduce income inequality by improving access to credit and financial intermediation. The effects are not uniform across all types of regulation or countries. Easing entry barriers and promoting bank privatization tend to lower inequality, particularly in developed countries. while securities market liberalization (Delis et al., 2014) and foreign bank ownership (Delis et al., 2020) exacerbate income inequality.

Drawing on evidence from credit markets in Italy, D'Onofrio et al. (2019) show that banking development, as measured by an increase in bank branch density, can alleviate disparities in income through immigration flows and urban population structure. Colciago et al. (2019) study the relationship between central bank policies and income and wealth

inequality, indicating that extant findings on their relationship are mixed. There appears to be a consensus that higher inflation leads to inequality. In summary, previous studies have mixed evidence that banking sector operations and regulations significantly change income inequality. Considering banks' critical intermediary role in allocating financial resources and shaping income distributional outcomes, the capitalization of banks deserves further attention and scrutiny.

Higher bank equity capital strengthens banks' monitoring efforts. Well-capitalized banks have better risk-bearing capacity. Higher bank equity capital improves overall loan quality. Bhat and Desai (2020) argue that higher bank capital strengthens monitoring incentives, as higher equity capital increases the chance of survival and reaps the long-term benefits of its monitoring investment. Higher capital leads to better loan quality as does the effectiveness of monitoring effort. The improvement in loan quality not only strengthens the bank's financial health but also reduces the default risk for corporate and individual borrowers, particularly for small businesses and low-income individuals. A loan default and possible bankruptcy can be devastating for low-income households. They may lose critical assets like their homes. Such asset losses can cause significant reductions in household wealth, pushing lower-income groups even deeper into poverty and exacerbating income inequality. In contrast, when households experience lower probabilities of loan default and personal bankruptcy, this creates a positive cycle, with banks becoming more willing to extend credit to vulnerable and lower-income groups, and narrowing income disparities.

Higher bank equity capital facilitates stronger annual loan growth (Gambacorta &

Shin, 2018; Kick et al., 2020). When banks are well capitalized, they become healthier and more resilient, and capable of offering more loans and taking prudent risks. Increased lending capacities facilitate more credit access for underserved and low-income populations, thereby fostering greater financial inclusion. According to extant economic theory, financial inclusion reduces income inequality by expanding opportunities for education and entrepreneurship among poor borrowers (Banerjee & Newman, 1993; Galor & Zeira, 1993; Aghion & Bolton, 1997; Kling et al., 2022). Such expanded lending activities are conducive to upward social mobility and to the mitigation of income inequality in the broader society. But there is also a competing view. Some argue that higher bank capital limits the ability of the bank to lend. Following this view, higher bank capital increases income inequality. Taken together, this discussion leads to the following hypothesis:

H1: Higher bank equity capital is associated with lower income inequality.

4.3 Sample construction

Our sample consists of U.S. commercial banks over 2001 to 2020 period. We obtain commercial banks data from the Report of Condition and Income (Call Report), which includes information on public and private banks. These reports provide comprehensive details on banks' balance sheets, income statements, and off-balance sheet activities. We exclude bank-year observation for missing data to compute equity capital or other bank variables in our tests. Our final sample consisted of 137,552 bank-year observations for U.S. commercial banks.

Our main independent variable is bank equity capital. We extract bank data for

commercial banks from call reports to measure bank equity capital (*Capital*). *Capital* is

calculated as equity capital divided by total assets. We also construct the following bank-

specific variables: *ROA* is calculated as the ratio of net income to total assets. *Liquidity*

measures banks' liquidity positions using the ratio of bank loans to deposits. *Dividend* is a

binary variable that is assigned a value of 1 if the bank pays dividends in a specific year,

and 0 if it does not. *Interest* represents banks' interest expenses on deposits divided by the

amount of interest-bearing deposits. The bank data are winsorized at the 1st and 99th

percentiles to mitigate the effect of extreme values.

Our main dependent variable measuring income inequality is the Gini coefficient

(*Gini*), which utilizes all available information about the entire income distribution. The

Gini coefficient captures the annual income inequality at the state-level. The Gini

coefficient data are sourced from the U.S. State-Level Income Inequality Data.[14] The Gini

coefficient of income distribution is derived from the Lorenz curve.[15] The Gini coefficient

is a common measure used by many studies to value income inequality, ranging from 0 to

1, with 0 indicating perfect equality and 1 indicating perfect inequality.

Following Contreras et al. (2023), and Beck et al. (2010), to enhance robustness and

better capture different aspects of income inequality, we employ another measure. We use

the ratio of income at the 90th percentile to that at the 20th percentile, which has the

advantage of being less sensitive to extreme income values. We use American Community

Survey (ACS) data from the Integrated Public Use Microdata Series (IPUMS) of the U.S.

---

[14] U.S. State-Level Income Inequality Data is provided by Mark Frank, a professor of economics at Sam Houston State University (https://profiles.shsu.edu/eco_mwf/inequality.html).
[15] The Lorenz curve is a graphical representation of the distribution of income or of wealth (Lorenz (1905).

Census (Ruggles et al., 2025). IPUMS USA provides detailed information at the individual level. Each individual in the ACS dataset is assigned a probability sampling weight corresponding to its representativeness in the overall population. We incorporate these sampling weights throughout our analyses. To construct this annual income inequality measure, we consider only individuals aged between 25 and 65 who report a nonnegative total personal income, excluding those who receive zero income and reside in households with zero income. We calculate income inequality from these data as the ratio of the 90th percentile to the 20th percentile of income distribution (*Income90/20*).

Macroeconomic variables were collectively derived from the Bureau of Labor Statistics, the U.S. Census Bureau, and the Bureau of Economic Analysis. *Population* is computed as the natural logarithm of the annual state-level population. *GDP* is measured as the natural logarithm of gross domestic product at the state level. *Inflation* is the annual percentage change in Consumer Price Index (CPI) at the regional level.

In Table 4.1, we present summary descriptive statistics for all variables included in our analysis based on the final sample. Specifically, our dataset covers a 20-year period from 2001 to 2020 and includes data from the 50 states plus the District of Columbia. The measure of income inequality, Gini coefficient, is 0.6 across states. Another measure of income inequality *Income90/20* across states is 8.8. The equity capital ratio, calculated as equity capital deflated by total assets, has a mean of 11.5%. The natural logarithm of the state-level population yields a mean of 15.7, and the average natural logarithm of state-level gross domestic product (GDP) is 12.6. Liquidity ratio has a mean of 77.1%. On average, approximately 69.1% of banks distribute dividends yearly, as represented by

Dividend. The net income deflated by total assets is 0.8%. Interest rate has an average of 1.7%. The following measurement inflation rate is measured at the regional level with an average value of 2%.

[Table 4.1]

Our starting point is a dataset containing bank-level data on 140,382 U.S. commercial banks from Call Reports, covering the period from 2001 to 2020. We exclude bank-year observations with missing data and observations from U.S. unincorporated territories. We then merge this dataset with annual state-level measures of income inequality, specifically the Gini coefficient and the ratio of the 90th to the 20th income percentile. After these procedures, our final sample consists of 137,552 bank-year observations from U.S. commercial banks. Please see sample construction in Table 4.2.

[Table 4.2]

4.4 Empirical results

To investigate the relationship between bank equity capital and income inequality, we estimate the following empirical model:

Inequality$_{s,t}$ = α + β$_1$*Capital$_{i,s,t}$ + β$_2$ *Controls$_{i,s,t}$ + Bank & Year Fixed Effects + ε$_{i,t}$ (1)

Inequality$_{s,t}$ is *Gini* or *Income90/20* in state s and year t. The variable of interest is *Capital*. The coefficient, *β$_1$*, therefore indicates the impact of bank capital on income distribution. A positive and significant *β$_1$* suggests that higher bank capital is associated with greater income inequality, while a negative and significant *β$_1$* indicates that increased bank capital contributes to reducing income inequality. *Controls* consist of a set of time-varying, bank-level or state-level variables. *ε$_{i,t}$* is the error term. Standard errors in the

regressions are clustered at the bank level. Regressions include bank- and year-fixed effects to capture bank-specific but time-invariant characteristics and yearly variations in income disparities that are unaccounted for by other explanatory variables. Variables are defined in the Appendix.

Figure 4.1 shows binned scatter plots of income inequality versus bank equity capital. Both plots adjust both bank equity capital and the income inequality for bank- and year-fixed effects. Observations are first sorted into 20 equal-sized bins based on the value of bank equity capital. Each dot then represents the average value of bank equity capital and income inequality in a given bin. We find that states with higher bank equity capital tend to have significantly less income inequality.

[Figure 4.1 Here]

In Table 4.3, we present baseline regressions examining the effect of bank equity capital on income inequality using two regression specifications. The analyses incorporate a set of time-varying bank financial and socioeconomic characteristics, including *Population*, *GDP*, *Liquidity*, *Dividend*, and *ROA*, to better control for factors influencing income inequality and bank equity capital. The results presented in Table 4.3 show that higher bank equity capital is significantly associated with lower income inequality, supporting Hypothesis 1. Specifically, column (1) and column (2) each include one of the two measures of income inequality. The coefficient on bank equity capital in column (1) is negative and statistically significant at the 1% level (t-statistic = 8.42), indicating that higher bank equity capital is associated with lower income inequality, as measured by the Gini coefficient. The coefficient on bank equity capital in column (2) is negative and

statistically significant at the 1% level (t-statistic = 8.73), indicating that higher bank equity capital is associated with lower income inequality, as measured by the income ratio between the 90th and 20th percentiles.

[Table 4.3]

There is a potential reverse causality issue worth mentioning. Higher income inequality could indicate the presence of a relatively large number of affluent individuals, leading to a wider income distribution. Such wealthier populations often rely on personal funds rather than bank loans or mortgages when purchasing major assets, such as real estate. Consequently, banks operating in states with high income inequality may experience weaker loan demand from these affluent clients. This lower demand can limit the lending activities of banks, potentially restricting their opportunities to grow loan portfolios, and thus constraining their ability to accumulate capital. Therefore, income inequality might influence bank capital, raising concerns about reverse causality.

4.5 Additional Analyses

Our additional analyses complement the baseline regression results by exploring whether the link between bank capital and inequality varies across financial contexts. We also conduct a series of sensitivity checks to ensure the robustness of our main finding that higher bank equity capital leads to lower income inequality.

4.5.1 Interest rate

Prior literature has established that bank capital and interest rate play a central role in shaping financial stability and credit allocation. Zheng et al. (2019) indicate that higher bank capital strengthens the negative association between liquidity creation and failure risk.

Dell'Ariccia et al. (2017) show that a bank's ex-ante risk-taking, proxied by the risk rating of new loans, is negatively associated with increases in short-term interest rates, and this relationship is more pronounced for banks with higher capital ratios, suggesting that in tightening monetary environments, well-capitalized banks tend to offer less risky loans. Given by this strand of literature, we explore how bank interest rate moderates the impact of bank capital on income inequality by estimating the following empirical model:

$$Inequality_{s,t} = \alpha + \beta_1 Capital_{i,s,t} + \beta_2 Interest_{i,s,t} + \beta_3 Capital_{i,s,t} \times Interest_{i,s,t} + \beta_4 Controls_{i,s,t}$$
$$+ \text{ Bank \& Year Fixed Effects} + \varepsilon_{i,t} \tag{2}$$

The variable of interest is the interaction term, *Capital × Interest*. We introduce the variable *Interest*, measured as the bank's deposit interest rate, calculated by dividing interest expense on deposits by interest-bearing deposits. The results in both columns of Table 4.4 show that the coefficients on the interaction term *Capital × Interest* are negative and statistically significant. This finding suggests that the inequality-reducing effect of bank capital is stronger among banks with higher interest rates. Our result is consistent with the traditional risk-shifting channel. When bank equity capital is low, managers have stronger incentives to engage in excessive risk-taking or asset substitution (Jensen & Meckling, 1976). In a high deposit rate environment, where funding costs are elevated, only banks with strong capital buffers can afford to continue extending credit to borrowers. In the presence of high interest rates with rising deposit costs and compressed profit margins, poorly capitalized banks are more prone to excessive risk-taking and have a stronger incentive to "gamble for resurrection" due to limited liability. In contrast, well-capitalized banks are better positioned to maintain prudent and inclusive lending, thereby mitigating

the exclusion of lower-income borrowers. Furthermore, the positive and statistically significant coefficients of *Interest* imply that, holding bank capital constant, income inequality tends to be higher for banks offering higher deposit rates. The coefficients on *Capital* remain negative and statistically significant at the 1% level, consistent with our earlier findings in Table 4.3.

[Table 4.4]

4.5.2 Inflation

Inflation influences bank performance (Perry, 1992; Tan & Floros, 2012). Boyd et al. (2001) provide empirical evidence indicating a significant and economically meaningful negative relationship between inflation and banking sector development. In line with this research, Ehigiamusoe et al. (2019) confirm that the interaction between financial development and inflation weakens the positive impact of financial development on economic growth. Our empirical results suggest that higher bank capitalization tends to reduce income inequality. However, the moderating role of inflation in shaping this relationship remains unclear. To investigate whether and how inflation influences the effect of bank capital on income inequality, we construct an interaction term between bank capital and inflation and estimate the following empirical model:

Inequality$_{s,t}$ = α + β$_1$Capital$_{i,s,t}$ + β$_2$Inflation$_{r,t}$ + β$_3$ Capital$_{i,s,t}$ × Inflation$_{r,t}$ + β$_4$ Controls$_{i,s,t}$

+ Bank & Year Fixed Effects + ε$_{i,t}$ (3)

The variable of interest is the interaction term, *Capital × Inflation*. We introduce the variable *Inflation*, measured as the percentage change in the CPI from the previous year, calculated at the regional level. State-level inflation rates are not available. Thus, the core

inflation measure is based on price inflation from the U.S. Census regional CPI data. The results in both column (1) and column (2) of Table 4.5 show that the coefficients on the interaction term *Capital × Inflation* are negative and statistically significant. This finding suggests that the inequality-reducing effect of bank capital is more pronounced in regions with higher inflation. Furthermore, the positive and statistically significant coefficients of *Inflation* imply that, holding bank capital constant, income inequality tends to be greater in higher inflation environments. This is consistent with Sintos (2023), who synthesizes findings from 124 peer-reviewed studies using meta-regression analysis and notes that inflation generally has a small-to-moderate inequality-increasing effect on both the level and the change of income inequality. The coefficients on *Capital* remain negative and statistically significant at the 1% level, consistent with our earlier findings in Table 4.3.

[Table 4.5]

4.5.3 Financial Crisis

We define the financial crisis period as one of severe stress in global financial markets and banking systems, covering the years from 2007 to 2009. Our empirical results suggest that bank capital buffers have a negative relationship with *Gini* and *Income90/20*, indicating that higher bank capitalization contributes to the reduction of income inequality. However, the moderating role of financial crises in shaping this relationship remains unclear. To investigate whether and how a financial crisis influences the effect of bank capital on income inequality, we construct an interaction term between bank capital and this crisis indicator and estimate the following empirical model:

$Inequality_{s,t} = \alpha + \beta_1 Capital_{i,s,t} + \beta_2 Crisis_t + \beta_3\ Capital_{i,s,t} \times Crisis_t + \beta_4\ Controls_{i,s,t}\ +$

Bank & Year Fixed Effects + $\varepsilon_{i,t}$ (4)

The variable of interest is interaction term, *Capital × Crisis*. We introduce a dummy variable *Crisis*, assigning a value of 1 to observations within the crisis period from 2007 to 2009 and 0 otherwise. The results in column (1) and column (2) of Table 4.6 show that the coefficients on the interaction term Capital × Crisis are negative and statistically significant at the 1% level. This finding indicates that during periods of financial crisis, bank capital is more strongly associated with reductions in income inequality than it is during non-crisis periods. Furthermore, the positive and statistically significant coefficients of *Crisis* suggest that, in the absence of any changes in bank equity capital, income inequality tends to increase during crises. This is consistent with the results of Baldacci et al. (2012) and De Haan and Sturm (2017). The coefficients on *Capital* are still negative and statistically significant at the 1% level, which supports our earlier results in Table 4.3. The negative interaction term *Capital × Crisis* supports the interpretation that this effect is amplified in times of economic downturns, consistent with the view that capital acts as a buffer, not just against financial instability, but also against rising inequality under economic downturns .

[Table 4.6]

4.6 Sensitivity Analysis

We conduct a series of sensitivity checks to ensure that our main finding that higher bank equity capital leads to lower income inequality is robust. These additional tests assess the robustness of our results to alternative definitions of the key variables, including different measures of bank capital and control variables. The following section presents the details of robustness checks.

Our baseline analysis measures bank capital using the book equity value. However, regulatory capital encompasses a more extensive and detailed set of criteria. Regulatory capital adjusts the book equity value when computing Tier 1 capital and adjusts for off-balance-sheet items when determining risk-weighted assets. To test the robustness of our findings, we replicate the analysis using two alternative measures of regulatory capital: *Tier1CapitalRatio*, defined as Tier 1 capital divided by total risk-weighted assets, and *TotalCapitalRatio*, defined as total capital divided by total risk-weighted assets. The results are reported in column (1) and column (2) of Table 4.7. We find that the coefficients on both Tier 1 capital ratio and total capital ratio are negative and statistically significant at the 1% level. This suggests that our main finding that higher bank capital is associated with lower income inequality is robust. Furthermore, given that annual macroeconomic data are sometimes considered noisy (Roine et al., 2009), we conduct another sensitivity analysis using three-year averages instead of relying solely on annual and cross-sectional data. The results are presented in Column (3) of Table 4.7. The coefficient on capital remains negative and statistically significant at the 1% level, which means our findings are qualitatively unchanged.

[Table 4.7]

4.7 Conclusions

The growing body of literature on bank capital structure highlights its economic and regulatory benefits yet provides limited insight into the social consequences of bank capital. This paper complements that body of literature by presenting novel evidence regarding the impact of bank capital structures on income inequality. Our empirical analysis uses 137,552

bank-year observations of U.S. commercial banks to examine the relationship between bank equity capital and income inequality cross-sectionally and across time. We find that states where banks hold more equity capital experience significantly less of an income disparity than do states where banks hold less equity capital.

We find that the effect depends on the economic context: The negative effect of bank equity capital on income disparity is more pronounced for periods of financial crisis than for non-crisis periods. The negative effect of bank equity capital on income disparity is more pronounced for banks with higher interest rates than for banks with lower interest rates. The negative effect of bank equity capital on income disparity is more pronounced for banks located in regions with higher inflation than for banks located in regions with lower inflation. We conduct sensitivity analyses using alternative measures for independent and control variables. These tests produce stable results, supporting our primary findings.

Our study is pertinent to the ongoing regulatory discussions concerning bank capital structures. We contribute to that understanding of Basel III's more stringent capital requirements by emphasizing a significant benefit of higher bank equity capital. Higher capital levels not only safeguard financial stability but also promote more equitable economic outcomes. Building capital buffers by accumulating extra equity during boom periods helps maintain credit supply in downturns, thereby mitigating credit crunches that exacerbate unemployment and income disparities. This leverages the banking system's role in income redistribution and economic equity, facilitates social mobility, improves resource allocation across social classes, and ultimately ensures equitable social outcomes.

Future studies could explore specifically how bank equity capital influences income

94

inequality across different countries and financial systems. Prior cross-country studies (e.g., Beck et al., 2007) have examined the impact of financial development on income disparity. Further research can ascertain whether higher bank capital ratios consistently reduce income disparity across a variety of institutional settings, regulatory frameworks, and stages of economic development.

Reference

Acharya, V. V., Mehran, H., & Thakor, A. V. (2016). Caught between Scylla and Charybdis? Regulating bank leverage when there is rent seeking and risk shifting. *The Review of Corporate Finance Studies*, *5*(1), 36-75.

Aghion, P., & Bolton, P. (1997). A theory of trickle-down growth and development. *The Review of Economic Studies*, *64*(2), 151-172.

Apergis, N. (2024). The role of loan loss provisions in income inequality: Evidence from a sample of banking institutions. *Journal of Financial Stability*, 73, 101299.

Baldacci, E., De Mello, L., & Inchauste, G. (2004). Financial crises, poverty, and income distribution. In *Macroeconomic Policies and Poverty* (pp. 269-307). Routledge.

Banerjee, A. V., & Newman, A. F. (1993). Occupational choice and the process of development. *Journal of Political Economy*, *101*(2), 274-298.

Beck, T., Demirgüç-Kunt, A., & Levine, R. (2007). Finance, inequality and the poor. *Journal of Economic Growth*, *12*, 27-49.

Beck, T., Levine, R., & Levkov, A. (2010). Big bad banks? The winners and losers from bank deregulation in the United States. *The Journal of Finance*, 65(5), 1637-1667.

Berger, A. N. (1995). The relationship between capital and earnings in banking. *Journal of Money, Credit and Banking*, 27(2), 432-456.

Berger, A. N., & Bouwman, C. H. (2009). Bank liquidity creation. *The Review of Financial Studies*, 22(9), 3779-3837.

Berger, A. N., & Bouwman, C. H. (2013). How does capital affect bank performance during financial crises? *Journal of Financial Economics*, 109(1), 146-176.

Bhat, G., & Desai, H. A. (2020). Bank capital and loan monitoring. *The Accounting Review*, 95(3), 85-114.

Boyd, J. H., Levine, R., & Smith, B. D. (2001). The impact of inflation on financial sector performance. *Journal of Monetary Economics*, 47(2), 221-248.

Calomiris, C. W., & Mason, J. R. (2003). Consequences of bank distress during the Great Depression. *American Economic Review*, 93(3), 937-947.

Calomiris, C. W., & Wilson, B. (2004). Bank capital and portfolio management: The 1930s "capital crunch" and the scramble to shed risk. *Journal of Business*, 77(3), 421–455.

Colciago, A., Samarina, A., & de Haan, J. (2019). Central bank policies and income and wealth inequality: A survey. *Journal of Economic Surveys*, 33(4), 1199-1231.

Contreras, S., Ghosh, A., & Hasan, I. (2023). The effect of bank failures on small business loans and income inequality. *Journal of Banking & Finance*, 146, 106690.

Dabla-Norris, M. E., Kochhar, M. K., Suphaphiphat, M. N., Ricka, M. F., & Tsounta, M. E. (2015). *Causes and consequences of income inequality: A global perspective*. International Monetary Fund.

De Haan, J., & Sturm, J. E. (2017). Finance and income inequality: A review and new evidence. *European Journal of Political Economy*, 50, 171-195.

Delis, M. D., Hasan, I., & Kazakis, P. (2014). Bank regulations and income inequality: Empirical evidence. *Review of Finance*, 18(5), 1811-1846.

Delis, M. D., Hasan, I., & Mylonidis, N. (2020). Foreign bank ownership and income inequality: empirical evidence. *Applied Economics*, 52(11), 1240-1258.

Dell'Ariccia, G., Laeven, L., & Suarez, G. A. (2017). Bank leverage and monetary policy's risk-taking channel: evidence from the United States. *The Journal of Finance*, 72(2), 613-654.

D'Onofrio, A., Minetti, R., & Murro, P. (2019). Banking development, socioeconomic structure and income inequality. *Journal of Economic Behavior & Organization*, 157, 428-451.

Doerr, S., Gissler, S., Peydró, J. L., & Voth, H. J. (2022). Financial crises and political radicalization: How failing banks paved Hitler's path to power. *The Journal of Finance*, *77*(6), 3339-3372.

Ehigiamusoe, K. U., Lean, H. H., & Lee, C. C. (2019). Moderating effect of inflation on the finance–growth nexus: insights from West African countries. *Empirical Economics*, 57, 399-422.

Galor, O., & Zeira, J. (1993). Income distribution and macroeconomics. *The Review of Economic Studies*, *60*(1), 35-52.

Gambacorta, L., & Shin, H. S. (2018). Why bank capital matters for monetary policy. *Journal of Financial Intermediation*, 35, 17-29.

Garmaise, M. J., & Moskowitz, T. J. (2006). Bank mergers and crime: The real and social effects of credit market competition. *the Journal of Finance*, *61*(2), 495-538.

Gropp, R., & Heider, F. (2010). The determinants of bank capital structure. *Review of Finance*, 14(4), 587-622.

Hsieh, J., Chen, T. C., & Lin, S. C. (2019). Financial structure, bank competition and income inequality. *The North American Journal of Economics and Finance*, 48, 450-466.

Jensen, M. C., & Meckling, W. H. (1976). A theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305–360.

Karels, G. V., Prakash, A. J., & Roussakis, E. (1989). The relationship between bank capital adequacy and market measures of risk. *Journal of Business Finance & Accounting*, 16(5), 663–673.

Kick, T., Malinkovich, S., & Merkl, C. (2020). Loan supply and bank capital: A micro-macro linkage. *Journal of International Money and Finance*, 104, 102166.

Kling, G., Pesqué-Cela, V., Tian, L., & Luo, D. (2022). A theory of financial inclusion and income inequality. *The European Journal of Finance*, 28(1), 137-157.

Lee, C. C., & Hsieh, M. F. (2013). The impact of bank capital on profitability and risk in Asian banking. *Journal of International Money and Finance*, 32, 251-281.

Lindquist, K. G. (2004). Banks' buffer capital: how important is risk. *Journal of International Money and Finance*, *23*(3), 493-513.

Lorenz, M. (1905). Methods of measuring the concentration of wealth. Publications of the American Statistical Association, Vol. 9, No. 70, 209-219.

Perry, P. (1992). Do banks gain or lose from inflation? *Journal of Retail Banking*, 14(2), 25-31.

Polacko, M. (2021). Causes and consequences of income inequality–an overview. *Statistics, Politics and Policy*, 12(2), 341-357.

Repullo, R. (2004). Capital requirements, market power, and risk-taking in banking. *Journal of Financial Intermediation*, 13(2), 156-182.

Roine, J., Vlachos, J., & Waldenström, D. (2009). The long-run determinants of inequality: What can we learn from top income data? *Journal of Public Economics*, 93(7-8), 974-988.

Ruggles, S., Flood, S., Sobek, M., Backman, D., Cooper, G., Rivera Drew, J. A., Richards, S., Rodgers, R., Schroeder, J., & Williams, K. C. W. (2025). IPUMS USA: Version 16.0 [dataset]. Minneapolis, MN: IPUMS. https://doi.org/10.18128/D010.V16.0

Santos, J. A. (1999). Bank capital and equity investment regulations. *Journal of Banking & Finance*, 23(7), 1095-1120.

Sintos, A. (2023). Does inflation worsen income inequality? A meta-analysis. *Economic Systems*, 47(4), 101146.

Tan, Y., & Floros, C. (2012). Bank profitability and inflation: the case of China. *Journal of Economic Studies*, 39(6), 675-696.

Tarek Al-Kayed, L., Raihan Syed Mohd Zain, S., & Duasa, J. (2014). The relationship between capital structure and performance of Islamic banks. *Journal of Islamic Accounting and Business Research*, 5(2), 158-181.

Thakor, A. V. (2014). Bank capital and financial stability: An economic trade-off or a Faustian bargain? *Annual Review of Financial Economics*, 6(1), 185-223.

Von Thadden, E. L. (2004). Bank capital adequacy regulation under the new Basel Accord. *Journal of Financial Intermediation*, 13(2), 90-95.

Wilkinson, R. (2010). *The Spirit Level: Why equality is better for everyone*. Penguin.

Zheng, C., Cheung, A., & Cronje, T. (2019). The moderating role of capital on the relationship between bank liquidity creation and failure risk. *Journal of Banking and Finance*, 108, 105651.

Appendix 4

Variable	Definition	Source
Capital	Equity capital deflated by total assets	Call Report
ROA	Net income deflated by total assets	Call Report
Liquidity	The ratio of bank loan to deposits	Call Report
Dividend	A binary variable that equals 1 if the bank distributes dividends in a given year and 0 otherwise.	Call Report
Interest	Interest expense on deposits divided by interest-bearing deposits	Call Report
GINI	Annual state-level income inequality	U.S. State-Level Income Inequality Data
Income90/20	Ratio of the 90th percentile to the 20th percentile of income distribution, measured at the state level	American Community Survey
Population	Natural logarithm of annual population, measured at the state level	U.S. Census Bureau
GDP	Natural logarithm of state-level gross domestic product	Bureau of Economic Analysis
Inflation	Percentage change in CPI from last year, measured at the regional level	Bureau of Labor Statistics
Crisis	Equal to 1 within the crisis period from 2007 to 2009 and 0 otherwise	

Figure 4.1 Binned scatterplots of Income inequality versus bank equity capital
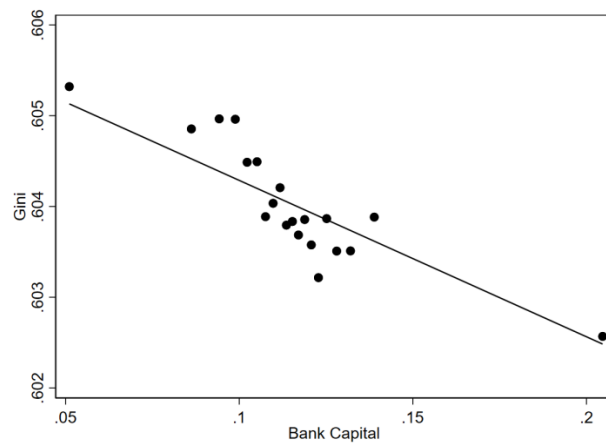
Plot A. Gini versus bank equity capital
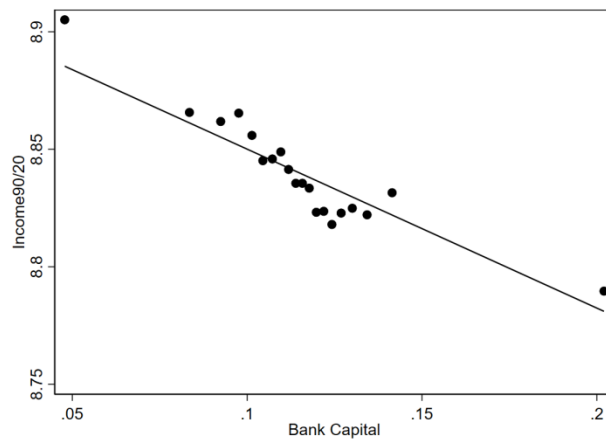
Plot B. Income90/20 versus bank equity capital

Table 4.1 Descriptive statistics

Variable	N	Mean	Median	SD	Min	Max
Gini	137,552	0.604	0.600	0.036	0.522	0.733
Income90/20	137,552	8.840	8.926	1.905	5.000	15.385
Capital	137,552	0.115	0.102	0.065	0.053	0.822
Population	137,552	15.668	15.595	0.898	13.112	17.492
GDP	137,552	12.594	12.562	0.970	9.836	14.957
Liquidity	137,552	0.771	0.788	0.215	0.161	1.321
Dividend	137,552	0.691	1.000	0.462	0.000	1.000
ROA	137,552	0.008	0.009	0.010	-0.043	0.032
Interest	137,552	0.017	0.015	0.012	0.001	0.048
Inflation	127,160	0.020	0.020	0.011	-0.094	0.127
Crisis	137,552	0.162	0	0.369	0	1

Variables are defined in the *Appendix 4*.

Table 4.2 Sample Construction

	Sample
Beginning bank data	140,382
Merge with income inequality measures and drop missing data and U.S. unincorporated territories data	(2,830)
Final sample	137,552

Table 4.3 The relationship between income inequality and bank equity capital

VARIABLES	(1) *Gini*	(2) *Income90/20*
Capital	-0.017***	-0.676***
	(-8.42)	(-8.73)
Population	0.025***	3.959***
	(4.15)	(9.50)
GDP	-0.007**	-3.159***
	(-1.96)	(-14.48)
Liquidity	0.001	0.119***
	(1.58)	(5.33)
Dividend	-0.000	-0.032***
	(-0.79)	(-4.48)
ROA	-0.007	-1.420***
	(-0.73)	(-4.60)
Constant	0.269***	-15.531***
	(4.26)	(-3.79)
Observations	137,552	137,552
Adj. R-squared	0.558	0.704
Bank FE	YES	YES
Year FE	YES	YES

This table presents the regression results that test the relationship between income inequality and bank capital. Variables are defined in *Appendix 4*. Standard errors are clustered at the bank level. t-statistics are in parentheses. *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively.

Table 4.4 Income inequality, bank equity capital and interest rate

VARIABLES	(1) Gini	(2) Income90/20
Capital	-0.008***	-0.211**
	(-3.61)	(-2.42)
Interest	0.140***	9.493***
	(5.37)	(11.89)
Capital × Interest	-0.441***	-16.636***
	(-3.91)	(-5.16)
Population	0.024***	3.924***
	(4.11)	(9.46)
GDP	-0.006*	-3.134***
	(-1.89)	(-14.40)
Liquidity	0.001	0.086***
	(1.12)	(3.87)
Dividend	-0.000	-0.035***
	(-1.03)	(-4.93)
ROA	-0.003	-1.310***
	(-0.34)	(-4.23)
Constant	0.267***	-15.620***
	(4.26)	(-3.84)
Observations	137,552	137,552
Adj. R-squared	0.559	0.705
Bank FE	YES	YES
Year FE	YES	YES

This table presents the regression results that test the moderating effect of interest rates on the relationship between bank capital and income inequality. Variables are defined in *Appendix 4*. Standard errors are clustered at the bank level. t-statistics are in parentheses. *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively.

Table 4.5 Income inequality, bank equity capital and inflation

VARIABLES	(1) *Gini*	(2) *Income90/20*
Capital	-0.009**	-0.349**
	(-2.24)	(-2.20)
Inflation	0.308***	3.356***
	(8.36)	(3.50)
Capital × Inflation	-0.400***	-9.796***
	(-3.40)	(-3.36)
Population	0.026***	3.656***
	(4.16)	(9.30)
GDP	-0.010***	-3.003***
	(-2.86)	(-14.51)
Liquidity	0.002**	0.105***
	(2.53)	(4.44)
Dividend	-0.000	-0.032***
	(-0.70)	(-4.41)
ROA	-0.022**	-2.029***
	(-2.29)	(-6.25)
Constant	0.293***	-12.556***
	(4.46)	(-3.19)
Observations	127,160	127,160
Adj. R-squared	0.507	0.672
Bank FE	YES	YES
Year FE	YES	YES

This table presents the regression results that test the moderating effect of interest rates on the relationship between bank capital and inflation. Variables are defined in *Appendix 4*. Standard errors are clustered at the bank level. t-statistics are in parentheses. *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively.

Table 4.6 The relationship between income inequality and bank equity capital during the financial crisis and non-crisis periods

VARIABLES	(1) Gini	(2) Income90/20
Capital	-0.012***	-0.551***
	(-5.94)	(-6.79)
Crisis	0.040***	2.032***
	(44.83)	(43.73)
Capital × Crisis	-0.020***	-0.509***
	(-6.25)	(-5.91)
Population	0.025***	3.956***
	(4.14)	(9.50)
GDP	-0.007*	-3.154***
	(-1.91)	(-14.46)
Liquidity	0.001	0.120***
	(1.64)	(5.38)
Dividend	-0.000	-0.032***
	(-0.87)	(-4.55)
ROA	-0.008	-1.454***
	(-0.88)	(-4.73)
Constant	0.268***	-15.558***
	(4.25)	(-3.80)
Observations	137,552	137,552
R-squared	0.559	0.704
Bank FE	YES	YES
Year FE	YES	YES

This table presents the regression results that test the relationship between income inequality and bank capital during the financial crisis and non-crisis periods. Variables are defined in *Appendix 4*. Standard errors are clustered at the bank level. t-statistics are in parentheses. *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively.

Table 4.7 Robustness tests

VARIABLES	(1) *Gini*	(2) *Gini*	(3) *Gini*
Tier1CapitalRatio	-0.011***		
	(-7.20)		
TotalCapitalRatio		-0.011***	
		(-7.08)	
Capital			-0.019***
			(-8.58)
Population	0.027***	0.027***	
	(3.95)	(3.96)	
GDP	-0.009**	-0.009**	
	(-2.52)	(-2.53)	
Liquidity	-0.000	-0.000	0.004***
	(-0.34)	(-0.29)	(3.75)
Dividend	-0.000	-0.000	-0.000
	(-0.73)	(-0.73)	(-1.20)
ROA	-0.003	-0.003	-0.009
	(-0.31)	(-0.30)	(-0.88)
AvgPopulation			0.036***
			(5.23)
AvgGDP			-0.022***
			(-5.57)
Constant	0.266***	0.266***	0.283***
	(3.54)	(3.53)	(3.91)
Observations	134,487	134,487	120,665
R-squared	0.552	0.552	0.393
Bank FE	YES	YES	YES
Year FE	YES	YES	YES

This table presents the robustness check that test the relationship between income inequality and bank capital. Variables are defined in *Appendix 4*. Standard errors are clustered at the firm level. t-statistics are in parentheses. *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively.

Chapter 5   Conclusion

The three essays of this thesis investigate 1) the impact of firms' CSR performance on crime rates, 2) the relationship between banks' NPL and LCO and state crime incidence, and 3) the influence of banks' equity capital structure on income inequality. Each essay addresses a distinct facet of the broader question of how corporate and banking sector activities affect societal outcomes.

The first essay examines whether firms' engagement in CSR generate externalities beyond the firm boundary to the society. Our empirical results indicate that states with domiciled firms exhibiting stronger CSR performance experience significantly lower crime rates. This finding is driven by three dimensions of CSR which are environmental, social, and governance dimensions. The results imply that CSR initiatives generate positive externalities for society. This essay is the first to document the association between CSR engagement and crime. The study gives a new dimension to the understanding of the social impact of CSR activities and provides implications for policymakers and business leaders.

The second essay explores the relationship between bank financial ratios and crime rates. States experiencing spikes in NPL and LCO tend to see significantly higher rates of crime crimes. After disaggregating the crime rates, we find significant and positive associations between the two bank financial reporting variables (NPL and LCO) and larceny, burglary, robbery, and motor vehicle theft. Our findings suggest that worsening bank asset quality in the banking industry foreshadows social strain. banks' financial reporting variables can serve as leading indicators or early warning signals of rising crime.

The third essay investigates the influence of banks' capital structures on income

inequality. Our findings indicate that states with higher capitalized banks experience lower income inequality, with the effect most pronounced during economic stress. By maintaining sufficient capital buffers, banks can mitigate the adverse effects of economic shocks on income distribution. The mitigating impact of bank equity capital on income inequality is greater in environments characterized by higher interest rates and elevated inflation. This essay presents evidence linking bank equity capital to income inequality, providing a social dimension to regulatory debates. Policymakers can use these insights to promote robust bank capitalization as a tool for fostering inclusive economic prosperity.

Collectively, these three essays highlight the significant role corporate and banks play in shaping social outcomes, which has important implications for academics, practitioners, and policymakers. Future research could further examine how specific elements of bank accounting influence various societal outcomes. Cross-country comparative studies could also be pursued to assess the generalizability and robustness of these findings under diverse regulatory frameworks and economic contexts.