How Does Investor Demand Affect CLO Creation, Firm Borrowing, and Investment?

Abhishek Bhardwaj, Shan Ge, Saptarshi Mukherjee*

1 Introduction

The collateralized loan obligation (CLO) market has experienced dramatic growth, with new deal issuance rising from $6 billion in 2002 to $200 billion in 2018. This project intends to shed light on three important questions about this market that received little attention in the literature. First, what drives the growth of this market? Academics and industry participants have highlighted the role of tighter bank regulations and borrower demand for securitizable loans due to their covenant-light nature.[1] At the same time, many attribute the growth to investor demand for CLO securities.[2] A second important question about the CLO market is whether it has any real effects on firms. Does it merely allow banks to partially offload loans from their balance sheet? Or, does the CLO market supply additional capital to firms and lead to more investments? Third, many papers document that banks' financial conditions affect loan origination and firms' borrowing and investment in the traditional bank lending market. With the dramatic rise of the collateralized loan obligation (CLO), 65% of syndicated term loans are now securitized and ultimately funded by a large group of CLO investors, including banks, insurance companies, pension funds, hedge funds, and private debt funds. One may suspect that firms that borrow through the CLO market would be insulated from adverse shocks to the loan-originating banks. An important question is whether these firms are now subject to adverse shocks to nonbank investors through the CLO market.

The main challenge in answering these questions posed above is identification. Researchers need exogenous shocks to investor demand for CLOs that are not otherwise correlated with firms' financing and investment decisions. To address the identification challenge, we use tranche-level holding and transaction data of life and Property & Casualty insurance companies, which are the largest investor class for U.S.-based CLOs (DeMarco et al. (2020)). In our data, insurers purchase 23% of new CLO issuance and around 40% of the mezzanine tranches in 2020 in new CLOs launched by their relationship CLO managers, i.e., those that insurers invested with in the past. We find that when insurers experience high operating cash flows, they increase their investment in CLOs, especially in deals by their relationship CLO managers. We use insurers' operating cash flows as shocks to their CLO demand and argue that they are plausibly exogenous to CLO managers and firms borrowing through the CLO market.

Our identification strategy relies on the idea that life insurers' operating cash flows are not related to the borrowing firms' financing and investment decisions through any channel other

*Abhishek Bhardwaj is at Tulane University. Email: abhardwaj@tulane.edu. Shan Ge is at New York University. Email: sg3634@stern.nyu.edu. Saptarshi Mukherjee is at Northeastern University. Email: sa.mukherjee@northeastern.edu. We are grateful for the comments by seminar participants at Tulane University and Dartmouth College.

[1] See Acharya et al. (2013), Neuhann and Saidi (2016), Kim et al. (2018), and Irani et al. (2021) for the importance of bank regulations in fostering the shadow banking sector. Several others emphasize the role of borrower demand for cov-lite loans. See Prilmeier and Stulz (2020), FT article dated May 10th, 2012 (link) and Forbes article dated September 26, 2014 (link).

[2] See IMF Report (2020) and WSJ article dated August 31st, 2021 (link).

than the CLO market. Life insurers' operating cash flows are a function of demand, pricing, realized mortality of the insured, and so on. By controlling for time fixed effects in all of our regressions, we can remove the average time trend in insurers' operating performance, conditions in the CLO market, and firms' demand for loans. We can also control for CLO manager and firm fixed effects in our regressions, which removes the effects of manager- or firm-level fixed characteristics. With these fixed effects, it is unlikely that life insurers' operating cash flows are otherwise related to CLO managers' activities and firms' financing decisions.

2 Preliminary Findings

Using idiosyncratic and plausibly exogenous variation in insurers' demand for CLOs, we aim at identifying the causal effect of these investors' demand on new CLO formation, as well as on firms' financing, capital structure, and investment decisions. Our preliminary results suggest that when insurers' demand for CLO securities increases, their relationship CLO managers are more likely to launch new deals. Borrowing firms, whose previous loans are bought by these CLO managers, are more likely to issue new loans, as well as increase leverage and investment. We discuss the steps of our preliminary analyses below.

First, we find that when life insurers experience favorable idiosyncratic shocks to their operating cash flows, they increase their investment in CLOs. The first possible reason is that when insurers have more funds to invest, they increase investment in all asset classes, including CLOs. Another possible reason has to do with insurers' reaching-for-yield incentives (see, Becker and Ivashina (2014)). Cordell et al. (2021) argue that CLOs offer higher yields relative to comparable corporate bonds. Ge and Weisbach (2021) find that when insurers are in better financial health (e.g., due to exogenous shocks to their underwriting performance), they shift towards riskier investment assets that offer higher yields. Thus, our finding that insurers increase their investment in CLOs following favorable operating performance is consistent with the idea that insurers are more risk tolerant and seek higher yields in their portfolios when their financial conditions improve.

Second, we document a sticky relationship between insurers and CLO managers: if an insurer invested in a manager's deals in the past, the insurer is more likely to invest in the manager's new deals.

Third, we find that if a CLO manager is more exposed to insurers' favorable operating cash flows, the CLO manager is more likely to launch a new CLO deal. We calculate each CLO manager's exposure to insurers' operating cash flows as a weighted average of insurers' cash flows, where the weights are each insurer's purchasing share of the manager's deals in the previous year.

Fourth, we document another sticky relationship, i.e., the one between CLO managers and borrowing firms. Specifically, if a CLO manager purchased loans from a certain firm in the past, the manager is more likely to purchase loans from this firm when she launches a new CLO deal. This result can be explained by CLO managers' information advantage of the firms whose loans they previously acquired.

Finally, we examine how investors' demand for CLOs affects borrowing firms' financing and other outcomes. To get around the endogeneity challenge, we instrument for new CLO deal formation with insurers' operating cash flows, relying on our findings summarized above. We calculate each firm's exposure to insurers' operating cash flows as a weighted average of the CLO managers' exposure described in the third step above. We use the share of the firm's loans each CLO manager held in the previous year as weights. We use this firm-level exposure to insurers' operating performance to instrument for whether at least one of the firm's relationship CLO managers launches a new CLO deal.

The first-stage result suggests that firms' exposure to insurers' cash flows predicts CLO

launches by its relationship managers. The second-stage result suggests that firms are more likely to issue new loans, their loan spreads decline, and their leverage increases when their relationship managers launch new CLOs due to investors' demand shocks. Firms also increase their capital investments and R&D in response to the increase in investors' CLO demand. These results suggest that investors' demand for CLO securities, manifested in more CLO issuance, affects firms' financing, capital structure, and investment decisions.

Finally, we find that insurers' aggregate cash flows have increased since 2018. CLO managers connected to insurers through past lending relationships experience more pronounced increases in their balance and new deal activities. This result is consistent with the idea that insurers' aggregate demand can affect the growth of a large segment of the CLO market.

3 Next Steps

The results described above are preliminary. Our next steps are as follows. First, we aim at ensuring the robustness of the preliminary results discussed above, by, for example, altering the regression specifications and including control variables that we need to extract from different data sets.

Second, we will examine some important issues not yet explored in our preliminary analysis. For example, we want to explore how monetary policy and crises such as the Covid-19 pandemic play a role in insurers' demand for CLOs and the subsequent effect on the CLO market and the borrowing firms. We also want to examine whether investors' demand for CLOs affects the following outcomes: the average credit quality of the borrowing firms connected to exposed CLO managers, firms' choice between public bonds and loans and the tightness of firms' loan covenants.

4 Contribution

This project contributes to several strands of literature. First, we add new insights to the literature on CLOs. Our project is particularly related to three papers that are consistent with the idea that investor demand affects CLO loans. Ivashina and Sun (2011) find that higher institutional demand pressure, proxied by a shorter time loans remain in syndication before being sold, is related to lower interest rates on loans. Nadauld and Weisbach (2012) argue that securitization lowers loan spreads. Fleckenstein et al. (2020) find that non-bank loans, bought by CLOs, are more cyclical than bank loans, potentially driven by CLO investors' funding stability. We extend these papers in two ways. First, we use microdata on the largest group of investors to identify *idiosyncratic* shocks to CLO demand and provide *causal* evidence for the notion that non-bank investors' funding supply affects the financing of CLO loans. While the studies cited above focus on the aggregate changes in funding supplies, we highlight that even idiosyncratic funding shocks matter for CLO formation and firm financing. Second, we expand the analysis to the effect on firms' capital structure and investment and find that investors' demand for CLOs affects firms' capital structure and investment.

Our project is also related to a concurrent paper by Fringuellotti and Santos (2021). They focus on why insurers purchase CLOs and argue that insurers do so in search of high yields. We use insurers' demand for CLOs driven by their operating performance as our source of identification and focus on the effect of insurers' demand on CLO issuance, as well as borrowing firms' financing and investment.

Beyond our main conclusion that investor demand leads to more CLO activities and financing for firms, we contribute to the CLO literature with the following new findings. One is that the relationship between investors and CLO managers is sticky, especially when information about the CLO managers is more opaque, i.e., when their past deals are small or their track record is short. We also find that the relationship between CLO managers and loan-issuing firms is sticky,

suggesting that CLO managers produce private information about firms in their portfolios.

Second, our project is also related to the literature on how banks' credit supply affects firms' financing and real outcomes including Khwaja and Mian (2008), Duchin et al. (2010), Ivashina and Scharfstein (2010), and Almeida et al. (2012). One may expect that, as a result of banks distributing loans to the CLO market with a wide range of investors, firms would be insulated from banks' balance-sheet shocks. We demonstrate that idiosyncratic shocks to large non-bank investors in the CLO market can also affect borrowing firms. The shocks are propagated through CLO managers' sticky relationships with both investors and borrowing firms. Our project is also broadly related to others that find shocks to non-bank investors affect firms' financing activities and capital structure, e.g., Zhu (2021), Gopal and Schnabl (2020), Buchak et al. (2018b), Buchak et al. (2018a), and Jiang et al. (2020). While they study bond mutual funds, finance companies and FinTech lenders, we examine the fast-growing CLO market using detailed data on investors, including data on their financial conditions.

Third, our project also contributes new insights to our understanding of the investment behavior of insurers, as well as their effect on financial markets and firms. Insurers are an important group of institutional investors, with $9.4 trillion of assets. It is important to understand their investment behavior and how they affect the rest of the economy. Specifically, we highlight insurers' role as large investors in the CLO market. Their demand for CLOs, affected by their operating performance, can affect CLO new deal issuance as well as firms' borrowing through the CLO market. Our project is also related to Chodorow-Reich et al. (2021) and Coppola (2021), who argue that insurers insulate the corporate bonds they *hold* in their portfolios from market downturns. We find that insurers' capital supply through their *purchase* of financial assets can be still subject to their own idiosyncratic shocks, despite infrequent sales.

5 Data

Our analyses rely on combining three sets of data. We use the CLO-i Creditflux data for details on CLOs' assets and liabilities. We use LPC Dealscan data for loan issuance and contract details. The third dataset, based on insurers' statutory filings, covers the universe of insurers' investment in CLOs at the tranche level, as well as insurers' financial information. Our sample, spanning between 2002 and 2020, includes 695 insurers, 3,153 CLO deals, 226 CLO managers, and 9,480 firms. Below, we summarize the main steps of our analyses.

6 Composition of the Research Team

Shan Ge is at New York University. Her research interest lies in the intersection of insurance and corporate finance. She has published three papers in the top three finance journals, all using the insurance setting to study broader corporate finance questions. One of these papers studies how insurers' financial conditions affect their investments in securities, through which she gained expertise in the data relevant to this project. Abhishek Bhardwaj is at Tulane University. Saptarshi Mukherjee is at Northeastern University. They are experts of the CLO industry, the relevant literature and data, with two working papers in this area.

References

Acharya, V. V., Schnabl, P., and Suarez, G. (2013). Securitization without risk transfer. *Journal of Financial economics*, 107(3):515–536.

Almeida, H., Campello, M., Laranjeira, B., and Weisbenner, S. (2012). Corporate debt maturity and the real effects of the 2007 credit crisis. *Critical Finance Review*, 1(1):3–58.

Becker, B. and Ivashina, V. (2014). Cyclicality of credit supply: Firm level evidence. *Journal of Monetary Economics*, 62:76–93.

Buchak, G., Matvos, G., Piskorski, T., and Seru, A. (2018a). Beyond the balance sheet model

of banking: Implications for bank regulation and monetary policy. Technical report, National Bureau of Economic Research.

Buchak, G., Matvos, G., Piskorski, T., and Seru, A. (2018b). Fintech, regulatory arbitrage, and the rise of shadow banks. *Journal of financial economics*, 130(3):453–483.

Chodorow-Reich, G., Ghent, A., and Haddad, V. (2021). Asset insulators. *The Review of Financial Studies*, 34(3):1509–1539.

Coppola, A. (2021). In safe hands: The financial and real impact of investor composition over the credit cycle. Technical report, Working Paper.

Cordell, L., Roberts, M. R., and Schwert, M. (2021). Clo performance. Technical report, National Bureau of Economic Research.

DeMarco, L., Liu, E., and Schmidt-Eisenlohr, T. (2020). Who owns us clo securities? an update by tranche. *FEDS Notes*, (2020-06):25.

Duchin, R., Ozbas, O., and Sensoy, B. A. (2010). Costly external finance, corporate investment, and the subprime mortgage credit crisis. *Journal of financial economics*, 97(3):418–435.

Fleckenstein, Q., Gopal, M., Gutierrez Gallardo, G., and Hillenbrand, S. (2020). Nonbank lending and credit cyclicality. *NYU Stern School of Business*.

Fringuellotti, F. and Santos, J. A. (2021). Insurance companies and the growth of corporate loans' securitization. *FRB of New York Staff Report*, (975).

Ge, S. and Weisbach, M. S. (2021). The role of financial conditions in portfolio choices: The case of insurers. *Journal of Financial Economics*, 142(2):803–830.

Gopal, M. and Schnabl, P. (2020). The rise of finance companies and fintech lenders in small business lending. *NYU Stern School of Business*.

IMF Report (2020). Chapter 2: Risky credit markets: Interconnecting the dots. Technical report, International Monetary Fund, Washington, DC, April.

Irani, R. M., Iyer, R., Meisenzahl, R. R., and Peydro, J.-L. (2021). The rise of shadow banking: Evidence from capital regulation. *The Review of Financial Studies*, 34(5):2181–2235.

Ivashina, V. and Scharfstein, D. (2010). Bank lending during the financial crisis of 2008. *Journal of Financial Economics*, 97(3):319–338. The 2007-8 financial crisis: Lessons from corporate finance.

Ivashina, V. and Sun, Z. (2011). Institutional demand pressure and the cost of corporate loans. *Journal of Financial Economics*, 99(3):500–522.

Jiang, E., Matvos, G., Piskorski, T., and Seru, A. (2020). Banking without deposits: Evidence from shadow bank call reports. Technical report, National Bureau of Economic Research.

Khwaja, A. I. and Mian, A. (2008). Tracing the impact of bank liquidity shocks: Evidence from an emerging market. *American Economic Review*, 98(4):1413–42.

Kim, S., Plosser, M. C., and Santos, J. A. (2018). Macroprudential policy and the revolving door of risk: Lessons from leveraged lending guidance. *Journal of Financial Intermediation*, 34:17–31.

Nadauld, T. D. and Weisbach, M. S. (2012). Did securitization affect the cost of corporate debt? *Journal of Financial Economics*, 105(2):332–352.

Neuhann, D. and Saidi, F. (2016). Bank deregulation and the rise of institutional lending. *University of Texas at Austin Working Paper*.

Prilmeier, R. and Stulz, R. M. (2020). Securities laws, bank monitoring, and the choice between cov-lite loans and bonds for highly levered firms. *Fisher College of Business Working Paper*, (2019-03):01.

Zhu, Q. (2021). Capital supply and corporate bond issuances: Evidence from mutual fund flows. *Journal of Financial Economics*, 141(2):551–572.

Statement Regarding Public Policy

How banks affect firms' financing and investment has received a lot of attention both among academics and policymakers. The collateralized loan obligation (CLO) market has experienced dramatic growth, with new deal issuance rising from $6 billion in 2002 to $200 billion in 2018. With the dramatic rise of this market, 65% of syndicated term loans are now securitized and ultimately funded by a large group of banks and non-bank investors, including insurance companies, pension funds, hedge funds, and private debt funds. It is crucial to understand the forces that drive the supply of credit to this market, as well as the effects of credit supply shocks in this market. These questions have been largely overlooked in the literature, mainly due to the lack of data on the investors of CLOs and the difficulties in identifying a causal relationship between credit supply and the outcomes of interest. We study the effect of demand shocks of one of the most important and largest investors in the CLO market, namely insurance companies. Our preliminary results suggest that insurers' *idiosyncratic* credit supply shocks can affect the CLO managers and firms that are exposed to them. Our results also suggest that insurers' *aggregate* credit supply shocks can affect the aggregate growth of the CLO sector that is exposed to insurers through their past relationship. Insurers are sensitive to aggregate shocks, such as the Great Financial Crisis, the Covid-19 pandemic, and the recent banking crisis in March 2023. Between March 7th and 16th, S&P 500 had a cumulative return of -0.7%, but 11 of 26 public life insurers had negative returns that are worse than -10%, with Lincoln National's being -26% and Equitable Holdings' being -20%. It is a natural question how aggregate shocks such as these affect the credit supply of insurers as important financial intermediaries, as well as the resulting real effects on firms. Our proposed project can help us understand how these large investors affect this increasingly important lending market in normal and crisis times. Our paper can also help us understand how monetary policy plays a role in the credit supply of these investors, as well as the effects on firms.

ABHISHEK BHARDWAJ

abhardwaj@tulane.edu ◇ (929) 215-2434 ◇ www.abhishek-bhardwaj.com

(This version: January 2023)

ACADEMIC POSITIONS

Tulane University, A. B. Freeman School of Business 2022-Present
Assistant Professor of Finance

EDUCATION

NYU Stern School of Business 2016-2022
Ph.D., M.Phil. in Finance

Indian Institute of Technology, Kharagpur 2007-2012
Dual Degree (B.Tech, M.Tech) in Metallurgical Engineering

PUBLICATIONS

Relationship Banking and Monetary Policy Transmission: Evidence from India
with Krishnamurthy Subramanian and Prasanna Tantri
Journal of Money, Credit and Banking, 2022

WORKING PAPERS

Do Lending Relationships Matter When Loans Are Securitized?(with Saptarshi Mukherjee)

Incentives of Fund Managers and Precautionary Fire Sales (with Kose John and Saptarshi Mukherjee)

Government Investment Stimulus and Household Balance Sheet Externalities
(with Saptarshi Mukherjee)
Revise and Resubmit at the Journal of Financial and Quantitative Analysis

Million Dollar Plants and Retail Prices (with Devaki Ghose, Saptarshi Mukherjee, and Manpreet Singh)
Reject and Resubmit at the Review of Economics and Statistics

WORK IN PROGRESS

How Does Investor Demand Affect CLO Creation, Firm Borrowing and Investment?
(with Shan Ge and Saptarshi Mukherjee)

CONFERENCE PRESENTATIONS

2023: IBEFA Annual Meeting at ASSA 2023
2022: FMA Annual Meeting 2022, SFS Cavalcade 2022, 2022 EFA Annual Meeting, Midwest Finance Association 2022
2021*: 2021 NFA Conference, 17th FRA Conference (poster), 2021 SFA Meeting, UT Austin Ph.D. Symposium, 61st Southwestern Finance Association Meeting, 6th Vietnam Symposium in Banking and Finance, 15th North American Meeting of the Urban Economics Association, NYU Stern Department Seminar

SERVICE

Committee: MFIN Curriculum Committee

Referee: Financial Innovation

Invited Discussions: 2022 FMA Annual Meeting

*including scheduled and co-author presentations

TEACHING

Instructor, Financial Management (Undergraduate) Fall 2022
(Section 1: 4.3/5.0, Section 2: 4.28/5, Section 3: 4.57/5) Tulane

Instructor, Foundations of Finance (Undergraduate) Summer 2019
Awarded commendation for exceptional teaching score (4.6/5.0) NYU Stern

AWARDS AND HONORS

- Stern CGEB Research Grant 2020
- Jules I Bogen Fellowship 2020
- NYU Stern Teaching Commendation 2019
- Glucksman Institute Award 2019

PROFESSIONAL EXPERIENCE

Researcher, Centre for Analytical Finance (CAF) 2014-16
Indian School of Business Hyderabad, India

Analyst, Fixed Income, Currency and Commodities (FICC) Division 2012-2014
Deutsche Bank Mumbai, India

WORKING PAPERS

How Does Demand for CLOs Affect Firm Financing: Evidence from Insurers (with Shan Ge and Saptarshi Mukherjee)

Abstract: The collateralized loan obligation (CLO) market has grown drastically, with the amount outstanding rising from $100 Billion in 2005 to $650 Billion in 2020. We examine the effect of investors' demand on new CLO deal formation as well as on corporate borrowing and investment. We do so by using detailed data from a group of large investors: insurance companies. We present three main findings. First, when insurers experience favorable operating cash flows, they are more likely to invest in CLO deals, especially deals by CLO managers that they previously invested with. Second, when CLO managers are more exposed to insurers' favorable cash flows through past relationships, they are more likely to launch new CLO deals. Third, among borrowing firms, those more affected (through CLO managers) are more likely to take out new loans and increase leverage and cash holding, while not changing investment. Our results imply that investor demand affects CLO deal formation, as well as corporate borrowing and capital structure decisions.

Status: Draft in-circulation

Do Lending Relationships Matter When Loans Are Securitized?(with Saptarshi Mukherjee)

Abstract: This paper documents a novel "fire-sale insurance" channel through which lending relationships help borrowers when their loans are securitized into CLOs. We document that CLO managers avoid selling the loans of firms related to their underwriter bank when liquidity shocks induce selloffs. Immunity from fire-sales translates into higher borrowing and investment rates for relationship firms even when their CLO investors are under stress. Banks benefit from higher fee revenue and compensate the CLO managers by arranging cheaper debt financing on their new CLOs. These results highlight why relationships continue to remain valuable in the originate-to-distribute model of banking.

Status: Draft in-circulation
Earlier Submissions: Rejected from Journal of Financial Economics

Incentives of Fund Managers and Precautionary Fire Sales (with Kose John and Saptarshi Mukherjee)

Abstract: This paper investigates how precautionary trading behavior of fund managers induced by a higher junior fee component in their compensation structure affects prices of downgraded loans in the leveraged loans market. Using detailed portfolio data from Collateralized Loan Obligation (CLO) funds, we find that fund managers with a higher ratio of subordinate fee to total fees are more likely to sell downgraded loans. Fund managers exhibit such precautionary trading behavior even when currently unconstrained, in anticipation of future binding collateral constraints. Loans subject to a high probability of precautionary selling exhibit large price declines and subsequent reversals. Our results provide new insights into the role of incentives on managerial risk taking and consequent amplification of fire sale externalities in the corporate debt market.

Status: Draft in-circulation
Earlier Submissions: Rejected from Journal of Finance

Government Investment Stimulus and Household Balance Sheet Externalities (with Saptarshi Mukherjee)

Abstract: We document spillover effects of government policies promoting capital investment on household financial choices and wealth accumulation. Using individual-level data on employment outcomes and household balance sheets, we find that increase in accelerated depreciation limits increases the layoff probability of routine workers and reduces their stock share of liquid wealth relative to non-routine workers. Background risk due to the

policy is mitigated when workers have access to generous unemployment insurance benefits. Finally, we show that such portfolio rebalancing adversely impacts investment returns and the wealth accumulation of routine workers.

Status: Revise and Resubmit at the Journal of Financial and Quantitative Analysis
Earlier Submissions: Rejected from Journal of Financial Economics

Large Plant Openings and Retail Prices (with Devaki Ghose, Saptarshi Mukherjee, and Manpreet Singh)

Abstract: We show how the opening of a large plant affects local income inequality by focusing on a new mechanism: retail inflation. Using detailed barcode-level prices, we find that local barcode-level prices increase in winning compared to runner-up counties after large plant openings. We develop a model of monopolistic retail firms with variable mark-ups and non-homothetic consumer preferences and show that consumers become less price-sensitive as they substitute shopping time for more working time in response to rising labor demand generated in the local economy after large plant entry. We show that local retail firms respond to less elastic consumer demand by raising their markups. Our reduced-form evidence shows that establishing a large plant entry only increases the wages and labor hours of certain high-skilled workers but it increases overall county-level prices, thus creating larger increases in income inequality in winning counties compared to runner-up counties. Our results highlight how a firm's location decision impact local communities.

Status: Draft in-circulation
Status: Reject and Resubmit at the Review of Economic Statistics

WORK IN PROGRESS

The Recap Revolution: How Dividend Recapitalizations Shape Modern Private Equity (with Abhinav Gupta and Sabrina Howell)

Description: Private Equity sponsors increasingly use dividend recapitalization as a tool to extract value from their portfolio company. In 2021 alone, PEs issued more than $15 Billion worth of loans on behalf of their portfolio companies to pay dividends to their investors. Critics argue that such transactions over-lever the companies and endanger their prospects. On the other hand, sponsors highlight that their healthier portfolio companies can tolerate additional leverage, and dividend recaps provide early returns to their LPs without compromising future gains. In this project, we study how dividend recaps affect limited partner returns, general partner performance, and portfolio companies.

Status: Pre-draft

Heat Shocks and Business Reallocation(with Viral Acharya and Tuomas Tomunen)

Description: There is increasing evidence that extreme heat shocks affect firms by lowering labor productivity and increasing energy expenses. However, the aggregate impact of heat stress on economic growth may be lower if firms have sufficient ability to reallocate production away from impacted regions towards colder places. Using granular data on heat shocks and establishment-level data on firms, we inspect whether firms reallocate employment away from heat-impacted regions to their other locations. We also study what factors (financial constraints, labor mobility, industry characteristics, etc.) enhance firms' ability to deal with heat shocks through the reallocation channel.

Status: Pre-draft

SHAN GE

Assistant Professor, Department of Finance

Stern School of Business, New York University

E-Mail: sg3634@stern.nyu.edu Website: shan-ge.com

EMPLOYMENT

Assistant Professor, Department of Finance, New York University 2018-

(Tenure clock extended by two years for one child and Covid)

EDUCATION

PhD in Finance, The Ohio State University 2013-2018

MA in Economics, The Ohio State University 2011-2013

BA in Business Administration & BA in German, Renmin University of China 2006-2011

FORTHCOMING PAPERS

– "How Do Financial Constraints Affect Product Pricing? Evidence from Weather and Life Insurance Premiums", by Shan Ge, *Journal of Finance*, 2022, 77 (1), 449-503.

– "The Role of Financial Conditions in Portfolio Choices: The Case of Insurers", by Shan Ge and Michael Weisbach, *Journal of Financial Economics*, 2021, 142 (2), 803-830.

– "Conflicting Interests and Fiduciary Duty—Evidence from Variable Annuities", by Mark Egan, Shan Ge, and Johnny Tang, *Review of Financial Studies,* 2022*,* 35 (12), 5334-5386.

WORKING PAPERS

– "Health Insurance Costs, Upskilling, and Technology Adoption" by Janet Gao, Shan Ge, Lawrence Schmidt, Cristina Tello-Trillo

– "The Costs of Hedging Disaster Risk and Home Prices" by Shan Ge, Ammon Lam, and Ryan Lewis

WORK IN PROGRESS

– "How Does Investor Demand Affect CLO Creation, Firm Borrowing, and Investment?" by Abhishek

Bhardwaj, Shan Ge, and Saptarshi Mukherjee

– "The Effect of Warming on Home Prices and The Unequal Distribution of Climate Adaptation" by Shan Ge, Ryan Lewis, and Yiwen Lu

– "The Effect of Community Climate Adaptation on Home Prices—Evidence from Levees" by Shan Ge, Ammon Lam, Ryan Lewis, Mila Sherman, and Deborah Sunter

– "Measuring Insurers' Climate Risk" by Richard Berner, Robert Engle, Shan Ge, and Hyeyoon Jung

– "Catastrophe Risk Sharing and Insurance Pricing in the Face of Climate Change" by Shan Ge and Tuomas Tomunen

– "Corporate Risk Management and Moral Hazard—Evidence from Employer Health Insurance" by Shan Ge and Yiwen Lu

– "Broker Competition and Health Insurance Costs" by Yuan Gao and Shan Ge

– "Real Effects of Financial Shocks—Evidence from Opioid Prescriptions" by Isil Erel, Shan Ge, and Pengfei Ma

SELECT SEMINARS & CONFERENCE PRESENTATIONS

– **2024**: Hong Kong University of Science and Technology

– **2023**: University of Iowa | University of Chicago | Rutgers | Federal Reserve Bank of New York | Department of the Treasury, Office of Financial Research | Office of the Comptroller | Florida State University Risk Management Research Symposium

– **2022**: American Finance Association Annual Meeting | Virtual Corporate Finance Seminar | University of Georgia | London Business School | Yale SOM | Dartmouth | Labor and Finance Conference | MIT Finance Junior Faculty Conference | New York University

– **2021**: American Finance Association Annual Meeting | NBER Insurance Meeting | NFA | University of Hong Kong | Harvard Business School | Washington University in St. Louis | Temple University | HEC Paris

– **2020**: University of California, Berkeley | Stanford University | University of North Carolina | New York University | Ohio State University | University of Amsterdam | Queen Mary University

of London | European Finance Association Annual Meeting | Showcasing Women in Finance | WFA Early Career Women in Finance Conference

– **2019**: New York University | University of California, Berkeley | Ohio State University | Case Western Reserve University | Fixed Income and Financial Institutions Conference | Finance Meets Insurance Conference | SFS Cavalcade

– **2018**: University of Southern California | Northwestern University | University of Delaware | University of South Carolina | New York University | Harvard University | Emory University | University of Houston | University of Pittsburgh | University of Oregon | Tulane University | Women Assistant Professors of Finance Conference at NYU Stern (Early Ideas Session) | Five Rising Star Finance Conference at Columbia University | Drexel Corporate Finance Conference (Early Ideas Session) | 5th ECGC Workshop on Governance and Control PhD Symposium

– **2017**: NBER Insurance Meeting | University of Arizona | Fordham University | University of Missouri | Cornerstone Research, Washington DC | China International Conference in Finance | Northern Finance Association Conference PhD Student Session | London Business School Trans-Atlantic Doctoral Conference | Risk Theory Society Annual Seminar | American Finance Association Annual Meeting PhD Student Session

PROFESSIONAL SERVICE

Journal Referee: Journal of Finance | Review of Financial Studies | Review of Finance | Management Science | Journal of Banking and Finance | Journal of Corporate Finance | Review of Corporate Finance Studies | Journal of Empirical Finance | Journal of Risk and Insurance | Journal of the European Economic Association

Book Review: Princeton University Press

Program Committee: European Finance Association Annual Meeting | Financial Intermediation Research Society Conference | SFS Cavalcade

Program Committee Cochair of 2022 China International Risk Forum

Associated Editor of Asia-Pacific Journal of Financial Studies, since 2021

TEACHING EXPERIENCE

– **Instructor**: Corporate Finance (Upper-Class Undergraduate), New York University 2019-

– **Instructor**: Corporate Finance (Upper-Class Undergraduate), The Ohio State University 2015

– **Teaching Assistant**: Private Equity (MBA), The Ohio State University 2014, 2015

GRANTS, AWARDS

NYU Center for Global Economy and Business Research Grant 2018, 2019, 2020, 2021

NYU Center for Sustainable Business Faculty Research Grant 2019, 2021

Best Ph.D. Student Award, Finance Department, The Ohio State University 2020

First Place in Business, 2018 Hayes Research Forum, The Ohio State University 2018

Research Proposal Grant, the Risk Institute, The Ohio State University 2016

Small Grant Research Award, Fisher College of Business, The Ohio State University 2016

American Finance Association Doctoral Student Travel Grant 2016

Distinguished University Fellowship, The Ohio State University 2011, 2016

SAPTARSHI MUKHERJEE

Address : 413D Hayden Hall, Northeastern University, 360 Huntington Ave., Boston 02115, USA.
Email : sa.mukherjee@northeastern.edu Contact : +1 617 343 5030

EMPLOYMENT

Northeastern University, D'Amore-McKim School of Business 2020-Present
Assistant Professor of Finance

Northeastern University, D'Amore-McKim School of Business 2019-2020
Visiting Assistant Professor of Finance

EDUCATION

New York University, Stern School of Business 2013-2019
Ph.D., M.Phil in Finance

Indian Institute of Management, Bangalore 2008-2010
M.B.A in Finance

Jadavpur University 2002-2006
B.S., Electronics Engineering

PUBLICATIONS

Borrower Distress and Debt Relief: Evidence from a Natural Experiment 2019
with Prasanna Tantri and Krishnamurthy Subramanian
Journal of Law and Economics

When are Investors Rational 2018
with Sankar De
Journal of Behavioral Finance

WORKING PAPERS

Government Investment Stimulus and Household Balance Sheet Externalities
with Abhishek Bhardwaj
Revise and Resubmit, Journal of Financial and Quantitative Analysis

Million Dollar Plants and Retail Prices
with Abhishek Bhardwaj and Devaki Ghose and Manpreet Singh
Reject and Resubmit, Review of Economics and Statistics

Do Lending Relationships Matter when Loans are Securitized?
with Abhishek Bhardwaj

Incentives of Fund Managers and Precautionary Fire Sales
with Abhishek Bhardwaj and Kose John

Bank Regulation and Systemic Risk Propagation
with Viral Acharya and Raghu Sundaram

Foreclosure Laws and Household Risk Taking

WORK IN PROGRESS

How Does Investor Demand Affect CLO Creation, Firm Borrowing and Investment?
with Abhishek Bhardwaj and Shan Ge

Pecuniary Externalities and Systemic Risk Propagation with Weiling Liu

TEACHING

Introduction to Financial Mathematics 2019,2020,2021,2022
Northeastern University
Masters of Finance, Average Rating : 4.3/5

Introduction to Financial Management 2020, 2021
Northeastern University
Undergraduate, Average Rating : 4.7/5

Financial Management 2016
New York University
Undergraduate, Average Rating : 6.7/7

CONFERENCE AND SEMINARS

2023	ASSA
2022	FMA, SFS Cavalcade, EFA, SWFA, MFA, UEA
2021	SWFA, VBFA, FMA
2018	AFA, FIRS

SERVICES

Discussant : MFA(2023), MFA(2022), EFA(2022), SWFA(2022), VSBF(201), FMA(2020)
Ad-Hoc Referee: : Management Science, Journal of Law and Economics, Critical Finance Review, Journal of Behavioral Finance Northeastern Conference Committee : 2021, 2022, 2023
Masters of Quantitative Finance : Core Curriculum Committee

AWARDS AND HONORS

Dean's Fellowship	2019
David Wood Memorial Fellowship	2018
AFA Travel Grant	2017
Teaching Commendation	2017
D. Graifman Memorial Award	2015
Distinction - Macro Field Qualifying Exam	2014
NYU Doctoral Fellowship	2013-2018

PROFESSIONAL EXPERIENCE

Researcher, Indian School of Business	2011 - 2013
Senior Manager, Hinduja Group of Industries	2010 - 2011
Software Engineer, Atrenta India Private Limited	2007-2008

References

Prof. Viral V. Acharya
C.V. Starr Professor of Economics
NYU Stern School of Business
✉ vacharya[at]stern.nyu.edu

Prof. Rangarajan K. Sundaram
Richard R. West Dean
Edward I. Altman Professor
NYU Stern School of Business
✉ rsundara[at]stern.nyu.edu

Prof. Kose John
Charles William Gerstenberg Professor
NYU Stern School of Business
✉ kjohn[at]stern.nyu.edu

Prof. Alexi Savov
Associate Professor of Finance
NYU Stern School of Business
✉ asavov[at]stern.nyu.edu

Conflict of Interest Statement

Abhishek Bhardwaj does not have any conflict of interest.

Shan Ge does not have any conflict of interest.

Saptarshi Mukherjee does not have any conflict of interest.