Matteo Crosignani

The Federal Reserve Bank of New York Research and Statistics Group Financial Intermediation Division 33 Liberty Street, New York, NY 10045 matteocrosignani.com matteo.crosignani@ny.frb.org Google Scholar SSRN

EMPLOYMENT

Federal Reserve Bank of New York, New York, NY

AND AFFILIATIONS

Research Advisor, Dec 2022–present Senior Economist, July 2021–Dec 2022

Economist, June 2020-July 2021

Center for Economic Policy and Research (CEPR)

Research Affiliate, Banking and Corporate Finance, January 2024-present

New York University, Stern School of Business

Adjunct Assistant Professor of Finance, Spring 2024

University of Michigan, Ross School of Business, Ann Arbor, MI

Assistant Professor of Finance, July 2018-May 2020

Board of Governors of the Federal Reserve System, Washington, DC

Economist, Division of Monetary Affairs, Sep 2016–June 2018

EDUCATION

New York University Stern School of Business, New York, NY

Ph.D., Finance, Sep 2011–May 2016

Dissertation: "Essays in Financial Institutions and Central Banking"

Committee: Viral Acharya (chair), Philipp Schnabl (chair), Alexi Savov, Andres Liberman

London School of Economics and Political Science, London

M.Sc., Finance and Economics, Research Track, Sep 2010–June 2011

Columbia University, New York, NY

Exchange Student, Economics, Jan 2010-May 2010

Università Bocconi, Milan

B.Sc., Economics, Sep 2007-July 2010

Interests

Financial Intermediation: central banks, credit markets, financial stability.

Macroeconomics: sovereign bond markets, capital allocation, supply chains, geonomics.

CITATIONS

Google Scholar: 1,277 citations; h-index 12; i10-index 12.

Papers with more than 100 citations:

(224) — Carpinelli and Crosignani, Journal of Financial Economics, 2021.

(211) — Acharya, Bergant, Crosignani, Eisert, McCann, Journal of Finance, 2022.

(192) — Crosignani, Faria-e-Castro, Fonseca, Journal of Monetary Economics, 2020.

(190) — Acharya, Crosignani, Eisert, Eufinger, Journal of Finance, 2024.

(131) — Crosignani, Macchiavelli, Silva, Journal of Financial Economics, 2023.

(120) — Crosignani, Journal of Financial Economics, 2021.

Publications

Exorbitant Privilege? Quantitative Easing and the Bond Market Subsidy of Prospective Fallen Angels

Co-authors: Viral Acharya, Ryan Banerjee, Tim Eisert, Renée Spigt.

Journal of Financial Economics, forthcoming.

Zombie Credit and (Dis-)Inflation: Evidence from Europe

Co-authors: Viral Acharya, Tim Eisert, Christian Eufinger.

Journal of Finance, 79(3), 1883–1929, June 2024.

Pirates without Borders: the Propagation of Cyberattacks through Firms' Supply

Chains Co-authors: Marco Macchiavelli and André Silva.

Journal of Financial Economics, 147(2), 432–448, February 2023. Editor's Choice.

The Anatomy of the Transmission of Macroprudential Policies

Co-authors: Viral Acharya, Katharina Bergant, Tim Eisert, Fergal McCann.

Journal of Finance, 77(5), 2533–2575, October 2022. Lead Article.

Bank Capital, Government Bond Holdings, and Sovereign Debt Capacity

Journal of Financial Economics, 141(2), 693–704, August 2021.

Klaus Liebscher Award.

The Design and Transmission of Central Bank Liquidity Provisions

Co-author: Luisa Carpinelli.

Journal of Financial Economics, 141(1), 27–47, July 2021.

ECB Young Economist Award.

The (Unintended?) Consequence of the Largest Liquidity Injection Ever

Co-authors: Miguel Faria-e-Castro, and Luis Fonseca.

Journal of Monetary Economics, 112, 97–112, June 2020.

SUERF/UniCredit Foundation Research Prize.

INVITED PAPERS

Zombie Lending: Theoretical, International, and Historical Perspectives

Co-authors: Viral V. Acharya, Tim Eisert, Sascha Steffen.

Annual Review of Financial Economics, 14, November 2022.

Working Papers Extend-and-Pretend in the U.S. CRE Market, with Saketh Prazad

 $2025\ SFS\ Cavalcade$

Stakeholders' Inequality Aversion and Bank Lending to Minorities, with Hanh Le

2025 AFA Meetings, 2024 Santiago Finance Workshop, 2024 UNC Solutions for Reducing

Wealth Inequality, MOFIR 2023

How do Supply Shocks to Inflation Generalize? Evidence from the Pandemic Era

in Europe, with Viral Acharya, Tim Eisert, and Christian Eufinger

EFA 2024, WFA 2024, CEPR Paris Symposium 2023, 2024 Yale Supply Chain Workshop

Securing Technological Leadership? The Cost of Export Controls on Firms, with

Lina Han, Marco Macchiavelli, and André Silva

CEPR & Kiel Institute Geoeconomics Conference 2023, 2024 Bocconi Geonomics Workshop,

2nd Annual GCAP Conference (Columbia)

Understanding the Pricing of Carbon Emissions: New Evidence from the Stock

Market, with Matthew Pritsker and Emilio Osambela

2024 NBER Summer Institute (Capital Markets and the Economy)

Navigating Geopolitical Risk: Evidence from U.S. Mutual Funds, with Lina Han and

Marco Macchiavelli

2025 Kroner Center for Financial Research Award

Other Papers

Financial Inclusion in the U.S.: Measurement, Determinants, and Recent Developments Co-authors: Jonathan Kivell, Daniel Mangrum, Don Morgan, Ambika Nair, Joelle Scally, Wilbert Van Der Klaauw.

Federal Reserve Bank of New York Economic Policy Review, forthcoming.

Climate-related Financial Stability Risks for the United States: Methods and Applications Co-authors: Celso Brunetti, John Caramichael, Benjamin Dennis, Gurubala Kotta, Donald P Morgan, Chaehee Shin, Ilknur Zer.

Federal Reserve Bank of New York Economic Policy Review, forthcoming.

The Portuguese Banking System During the Sovereign Debt Crisis

Co-authors: Miguel Faria-e-Castro, and Luìs Fonseca.

Banco de Portugal Economic Studies, 1(2), pp. 43–80, July 2015

Paper Awards

Kroner Center for Financial Research Award, $2025\,$

Journal of Financial Economics Editor's Choice, 2023

Journal of Finance Lead Article, 2022

Young Economist Award, ECB Forum on Central Banking, 2016 Edwin Elton Prize for the Best Finance Job Market Paper, 2015 3rd SUERF/UniCredit & Universities Foundation Research Prize, 2015

Klaus Liebscher Award, 2015

D. Graifman Memorial Award for the Best 2^{nd} Year Paper at NYU Stern, 2013

FELLOWSHIPS AND GRANTS

NTT Mitsui Fellowship, 2020–21 Jules Bogen Fellowship, 2015–16

Macro Financial Modeling Group (Becker Friedman Institute) Dissertation Fellowship, 2014

Unicredit & Universities Crivelli Europe, Runner-up, 2012 NYU Stern School-wide Doctoral Fellowship, 2011–15

Ph.D. Director's Fellowship, 2011–15

PRESENTATIONS

2025

Conferences:

^p presentation

<u>Conferences:</u> AFA Annual Meeting*, AEA Annual Meeting†, MFA Annual Meeting*, SFS Cavalcade North America p

* by co-author

Seminars: International Monetary Fund, Federal Reserve Board.

† discussion/chair

2024

Conferences: University of Connecticut Finance Conference*, Nova and WU Workshop*, Western Finance Association Annual Meeting*, Identification and Measurement of US Climate-Related Financial Stability Risk (Fed Board)*, UNC Market Based Solutions for Reducing Wealth Inequality Conference*, Equitable Growth System Conference*, Luiss Finance Workshop*, European Finance Association Annual Meeting*, Junior Workshop in Geonomics (Bocconi)*, International Risk Management Conference*, Supply Chain Workshop (Yale)*, CEPR Conference on Financial Intermediation (Bank of Portugal)*, NBER Summer Institute (Capital Markets and the Economy)*, Global Research Forum on International Macroeconomics and Finance†, FMA Annual Meeting*, 2nd Annual GCAP Conference*, Santiago Finance Workshop*, Christmas Meetings of the German Economists Abroad*, IFEA Annual Conference (Milan)*, Boca Real Estate 2024 Conference*

Seminars: Norges Bank.

2023

<u>Conferences:</u> American Finance Association Meetings[†], European Winter Finance Summit[†], FMA Applied Finance Conference*, Annual FIRS Finance Conference (Vancouver)[†], 12th MoFiR Workshop on Banking*, Joint CEPR & Kiel Institute for the World Economy Conference on Geoeconomics^p, Challenges for Financial Intermediaries and their Supervisors in the New (or Old?) Monetary Policy Normal[†], CEPR Paris Symposium*.

Seminars: European Central Bank.

2022

<u>Conferences:</u> American Finance Association Meetings^p, 8^{th} International Conference on Sovereign Bond Markets*, Esade Spring Workshop in Corporate Finance and Banking^p, International Research Forum on Monetary Policy Conference (ECB) p , 8^{th} Lubrafin Finance Network Conference*, Barcelona GSE Summer Forum Financial Intermediation and Risk † , NBER Summer Institute Corporate Finance/Risks of Financial Institutions*, Western Finance Association Meeting † , FSB Conference on "Systemic Risk in Non-Bank Financial Intermediation" p , European Finance Association Meetings*, Endless Summer Conference on Financial Intermediation and Corporate Finance*, Regulating Financial Markets Conference*, CEBRA Annual Meeting*.

Seminars: University of Melbourne, Asian Joint-School Macro Seminar.

^c COVID-canceled

2021

<u>Conferences:</u> American Finance Association Meetings^p, Annual Meeting of the Swiss Society for Financial Market Research^p, Oxford Said–Risk Center at ETH Zurich Macro-finance Conference*, NBER Corporate Finance Spring Meeting^p, IBEFA Summer Meeting*, 10th MoFiR Workshop on Banking^p, NBER Summer Institute Capital Markets and the Economy*, IBEFA Virtual Summer Meeting*, 3rd Endless Summer Conference on Financial Intermediation and Corporate Finance*, European Finance Association Meetings[†], Federal Reserve Stress Testing Research Conference (2 papers)^{p*}, Fourth Conference on Financial Stability (Mexico City)*, Christmas Meetings of the German Economists Abroad*, Deutsche Bundesbank/FRIC/CEPR "Credit Risk over the Business Cycle" conference^p

Seminars: Bank of Spain, Columbia SIPA-NY Fed Cyber Risk to Financial Stability Workshop

2020

Conferences: American Finance Association Meetings*, Annual FIRS Finance Conference (Budapest)*†c, Chicago Financial Institutions Conference*pc, 3rd Short-Term Funding Markets (STFM) Conference†, SFS Cavalcade (UNC Chapel Hill)*, Western Finance Association Meeting*p, Bank of Portugal Financial Intermediation Conference*c, Oxford SAID-ETH Zurich Macro-Finance Conference*c, Central Bank of Chile Workshop on Microdata in Finance*, Federal Reserve System Conference on Financial Institutions, Regulations, and Markets*, OFR/Cleveland Fed Financial Stability Conference*p, European Banking Authority "New Technologies in the Banking Sector"*, Bank of Italy/FRB "Nontraditional Data & Statistical Learning with Applications to Macroeconomics."*

<u>Seminars</u>: University of Illinois Urbana-Champaign, Bank of Italy, MoFiR Virtual Seminars on Banking.

2019

Conferences: Midwest Finance Association Meetings[†], Annual FIRS Finance Conference (Savannah)[†], Chicago Financial Institutions Conference[†], 4th Conference on Financial Markets and Macroeconomic Performance*, SFS Cavalcade (Carnegie Mellon)[†], European Finance Association Meetings*, IWH-FIN-FIRE workshop on "Challenges to Financial Stability"*, FRBSF-UCLA Conference on Housing, Financial Markets, and Monetary Policy^p, CEPR-Bank of Finland conference on "Monetary Economics and Reality"^p, Labor and Finance Group Conference (Chicago)*, Financial Intermediation in a Globalized World Conference (Frankfurt)*, DG ECFIN "Addressing Housing Market Imbalances" workshop (Brussels)*, WFA-CFAR Conference (Olin)^p, FRBNY/NYU Stern Conference on Financial Intermediation^p, Nova SBE Conference on Financial Intermediation and Corporate Finance*, "Recent Trends in Firm Organiza-

tion and Firm Dynamics" conference (Rome)*, Christmas Meetings of the German Economists Abroad*

Seminars: New York Fed, Michigan Ross, Philadelphia Fed, Zurich University.

2018

Conferences: Federal Reserve System "Day-Ahead" Conference (Philadelphia)*, Midwest Finance Association Meetings (invited session)^p, Midwest Finance Association Meetings[†], RFS Conference on "New Frontiers in Banking Research"^p, SFS Cavalcade (Yale)[†], Fixed Income and Financial Institutions Conference (University of South Carolina)[†], Annual FIRS Finance Conference (Barcelona)*[†], EuroFIT Workshop "Financial Intermediation and Risk"[†], Western Finance Association Meeting[†], Second Maryland Junior Finance Conference[†], LSE Paul Woolley Conference*, NBER Summer Institute (CF)^p, European Finance Association Meetings^{††}. Seminars: Johns Hopkins Carey.

2017

Conferences: American Finance Association Meetings^p, MFM Winter Meeting^p, Chicago Financial Institutions Conference*, RFS Banks and Systemic Risk Measurement and Mitigation Conference (Rome)^p, Irish Economic Association Annual Conference*, NA Summer Meetings of the Econometric Society^p, Banco de Portugal Conference on Financial Intermediation*, Yale Program on Financial Stability Conference^p, Norges Bank Workshop on Housing and Household Finance*, Oxford-NY Fed Monetary Economics Conference*, Basel Committee-CEPR "The Impact of Banking Regulation on Financial Market" Conference*, Western Finance Association Meeting[†], Baffi Carefin Conference (Bocconi)^p, CREDIT "Interest Rates, Growth, and Regulation" Conference*, "Bank Performance, Financial Stability and the Real Economy" (CSEF)*, "Financial Regulation: Fit for the Future?" (Atlanta Fed)^p, Regulating Financial Markets (Frankfurt)[†], Meeting of German Economists Abroad*.

Seminars: New York Fed, Federal Reserve Board, Michigan Ross.

2016

<u>Conferences:</u> American Finance Association Meetings*, International Conference on Sovereign Bond Markets^p, MoFiR Workshop on Banking*, Marco Fanno Alumni Workshop^p, European Finance Association Meetings^{p†}, ECB Forum on Central Banking (Sintra)^p, Society for Economic Dynamics Annual Meeting^p, Oxford Financial Intermediation Theory Conference^p, Yale Program on Financial Stability (YPFS) Conference*, Baffi Carefin Banking Conference (Bocconi)[†], CREDIT "New Credit Solutions for the Real Economy"*, Regulating Financial Markets Conference (Frankfurt)[†], Workshop in Macro Banking and Finance (Rome)*, European Banking Center Network Conference (Tilburg)^p, Monetary Policy Implementation in the Long Run (Minneapolis Fed)[†], Atlanta Fed "The Impact of Extraordinary Monetary Policy on the Financial Sector" Conference^p, Workshop on Empirical Monetary Economics (Sciences Po)*.

<u>Seminars:</u> Rochester Simon, European Central Bank, UCLA Anderson, McGill Desautels, Boston Fed, Fed Board, Fordham Gabelli, NYU Stern.

2014-15

<u>Conferences</u>: MFM Winter Group Meeting^p, Barcelona GSE Summer Forum^p, London Business School TADC^p, First ECB Forum on Central Banking (Sintra)*, Second ECB Forum on Central Banking (Sintra)*, Ninth Annual Meeting of the Portuguese Economic Journal*, 3rd NYU Economics Alumni Conference*, Second Belgrade YEC^p, Finance, Economics Graduate Student Conference (WashU)*, Bocconi-Carefin Conference^p, Capital Reallocation and Growth 1st FGN Conference (St. Gallen)^p

Seminars: NYU Stern, NYU Econ, Universiteit van Amsterdam.

DISCUSSIONS

Monetary Tightening, Commercial Real Estate Distress, and U.S. Bank Fragility by Jiang, Matvos, Piskorski, Seru, AEA Annual Meetings, January 2025.

No News is Bad News: Monitoring, Risk, and Stale Financial Performance in Commercial Real

Estate by Hughes and Nichols, Boca Real Estate and Finance Conference, December 2024.

Supply Chain Shortages, Large Firms' Market Power, and Inflation by Franzoni, Giannetti, Tubaldi, Global Research Forum on International Macroeconomics and Finance, Frankfurt, November 2024.

Effects of Usury Limits on Credit Access and Spending of High Risk Individuals by Seltzer, Equitable Growth System Conference, New York Fed, April 2024.

Monetary Transmission through Bank Securities Portfolio by Greenwald, Krainer, and Paul, Challenges for Financial Intermediaries and their Supervisors in the New (or Old?) Monetary Policy Normal, Frankfurt, Germany, November 2023.

Cultural Stereotypes of Multinational Banks by Eichengreen and Saka, European Winter Finance Summit, Zurs, Austria, March 2023.

Firm Quality Dynamics and the Slippery Slope of Credit Intervention by Li and Li, AFA, New Orleans, January 2023.

The Core, the Periphery, and the Disaster: Corporate-Sovereign Nexus in COVID-19 Times by Jappelli, Pelizzon, and Plazzi, WFA, Portland, June 2022.

Tracing Banks' Credit Allocation to their Funding Costs by Duquerroy, Matray, and Saidi, Barcelona Summer Forum, Barcelona, June 2022.

Risk, Monetary Policy and Asset Prices in a Global World by Bekaert, Hoerova, and Xu, EFA, online, August 2021.

Overcoming Borrowing Stigma: The Design of Lending-of-Last-Resort Policies by Hu and Zhang, 3rd Short-Term Funding Markets Conference, online, September 2020.

Unconventional Monetary Policy: Evidence from TLTROs by Benetton and Fantino, SFS Cavalcade, May 2019.

Illiquidity, Closure Policies & the Role of LOLR by Corradin and Sundaresan, FIRS, May 2019.

Macroprudential Policy and Household Leverage: Micro-Evidence by Van Bekkum, Gabarro, Irani, Peydró, CFIC, Chicago, April 2019.

Busy Bankruptcy Courts and the Cost of Credit by Müller, MFA, March 2019.

Credit and Social Unrest: Evidence from 1930s China by Braggion, Manconi, Zhu, EFA, August 2018.

Capital Requirements for Government Bonds: Implications for Bank Behaviour and Financial Stability by Neyer and Sterzel, EFA, August 2018.

Sharing the Pain? Credit Supply and Real Effects of Bank Bail-ins by Beck, Da-Rocha-Lopes, Silva, FIRS, June 2018.

Villains or Scapegoats? The Role of Subprime Borrowers during the Housing Boom by Conklin, Frame, Gerardi, Liu, WFA, June 2018.

The Rise of Shadow Banking: Evidence from Capital Regulation by Irani, Iyer, Meisenzahl, Peydró, EuroFIT "Financial Intermediation and Risk", April 2019.

FinTech Credit and Service Quality: Evidence from Alibaba Online Merchants by Huang, Lin, Sheng, Wei, SFS Cavalcade, May 2018.

Making Room for the Needy: the Credit-Reallocation Effects of the ECB's Corporate QE by Arce, Gimeno, and Mayordomo, FIFI, University of South Carolina, April 2018.

Intermediaries and Asset Prices: Evidence from the U.S., U.K., and Japan, 1870-2016 by Baron and Muir, Maryland Junior Finance Conference, April 2018.

Banking on the Boom, Tripped by the Bust: Banks and the World War I Agricultural Price Shock by Wheelock and Jaremski, MFA, March 2018.

Whatever it Takes: The Real Effects of Uncoventional Monetary Policy, by Acharya, Eisert,

Eufinger, and Hirsch, WFA, June 2017.

Inefficient Banking, by Begenau and Stafford, Regulating Financial Markets Conference (Frankfurt), June 2017.

Does a Larger Menu Increase Appetite? Collateral Eligibility and Bank Risk-Taking, by Van Bekkum, Gabarro, Irani, Baffi Carefin Annual International Banking Conference (Bocconi), October 2016.

Surviving the Perfect Storm: The Role of the Lender of Last Resort, by Alves, Bonfim, Soares, Monetary Policy Implementation in the Long Run (Minneapolis Fed), October 2016.

Lending Standards Over the Credit Cycle, by Rodano, Serrano-Velarde, Tarantino, EFA, August 2016.

Lending-of-last-resort is as Lending-of-last-resort Does: Central Bank Liquidity Provision and Interbank Market Functioning in the Euro Area, by Garcia-de-Andoain, Heider, Hoerova, Manganelli, Regulating Financial Markets Conference (Frankfurt), May 2016.

Professional Service

Conference Committees

WFA, Associate Program Chair, 2020; Program Committee Member, 2021–25

SFS Cavalcade North America, Program Committee Member, 2022–25

EFA, Program Committee Member, 2021–25

Conference on the International Roles of the U.S. Dollar, Program Committee Member, 2025

Deutsche Bundesbank/IWH/CEPR, Program Committee Member, 2025

ECB "Technological Innovations in Financial Markets", Program Committee Member, 2025

IBEFA Annual Meeting, Program Committee Member, 2025–26

NY Fed/NYU Financial Intermediation, Program Committee Member, 2019–21

FIRS, Program Committee Member, 2020

Deutsche Bundesbank/SAFE/CEPR, Program Committee Member, 2023

IFEA Annual Conference, Program Committee Member, 2024

IBEFA Summer Meeting, Program Committee Member, 2023

 ${\tt CEMLA/Dallas\ Fed/IBEFA\ Financial\ Stability\ Workshop},\ Program\ Committee\ Member,\ 2024$

Mitsui Finance Symposium, Organizing Committee, 2020

FMA Annual Meeting, Program Committee Member, 2019–20

Session Chair

FIRS, Regulation and Incentive, 2023 EFA, Insolvency and Restructuring, 2022

Internal

Organizer, Seminar Series, Michigan Ross, 2019–20 Member, Junior Recruiting Committee, Michigan Ross, 2019–20

Refereeing

American Economic Journal: Macroeconomics; American Economic Review; American Economic Review: Insights; Economic Policy Review; Economica; International Journal of Central Banking; Journal of Applied Econometrics; Journal of Banking and Finance; Journal of Corporate Finance; Journal of the European Economic Association; Journal of Finance; Journal of Financial and Quantitative Analysis; Journal of Financial Econometrics; Journal of Financial Economics; Journal of Financial Intermediation; Journal of Financial Stability; Journal of International Economics; Journal of Monetary Economics; Journal of Money, Credit, and Banking; Journal of Political Economy; Management Science; Review of Corporate Finance Studies; Review of Economic Studies; Review of Financial Studies.

VISITS

New York Fed, Summer 2019

Advising Predoctoral Research Assistants (placement)

Lily Gordon (in progress, 2026); Martin Hiti (in progress, 2025); Niclas Carlson (in progress, 2025); Erica Bucchieri (Stanford GSB, Finance Ph.D., 2023); Jasper Yang (Boston College, Finance Ph.D., 2023).

TEACHING NYU Stern

Fountations of Finance, Langone MBA, Spring 2024. Evaluation: 3.8/5.0 Fountations of Finance, UG, Summer 2014, Awarded Teaching Commendation

Michigan Ross

Financial Management, Core FT MBA, Fall 2020. Evaluation: 4.9/5.0; 4.4/5.0. Financial Management, Core FT MBA, Fall 2019. Evaluation: 4.4/5.0; 4.3/5.0; 4.3/5.0. Financial Management, Undergraduate BBA, Winter 2019, Evaluation: 4.1/5.0; 4.1/5.0.

Guest Speaker

NYU Stern — Credit Risk and Bankruptcy, MBA/UG, Spring 2025 NYU Stern — Credit Risk and Bankruptcy, MBA/UG, Spring 2024 NYU Stern — Credit Risk and Bankruptcy, MBA/UG, Spring 2023

NYU Shangai — Credit Risk, MS, Spring 2023

NYU Stern — The Nexus Between Sovereign and Financial Sectors, Ph.D., Fall 2021

NYU Stern — Credit Risk and Bankruptcy, MBA, Spring 2021

NYU Stern — The Nexus Between Sovereign and Financial Sectors, Ph.D., Spring 2020

NON ACADEMIC JP Morgan, London

Positions Intern, Interest Rates Strategy, Summer 2011

REFERENCES Viral V. Acharya, NYU Stern

Philipp Schnabl, NYU Stern

Personal Authorized to work in EU (Italian citizen) and the U.S. (Permanent Resident)

Tennis player. Highest rankings: 2.8 (Italy), 3.1 (UK), 5.5 NTRP (US)