NORTH CAROLINA BANKING INSTITUTE

Volume 26 | Issue 1 Article 12

3-1-2022

Green Haircuts: Federal Risk Collateral Framework Policies That Incorporate Climate Risk

Benjamin J. Marsico

Green Haircuts: Federal Reserve Collateral Policies That Incorporate Climate Risk

I. INTRODUCTION

Climate change has long-term economic impacts, such as disruption of industry by way of extreme weather events and shortages in natural resources.[1] These threats have led to the integration of various ways to quantify the impacts of climate change on the financial sector.[2] Global banks, investors, and companies are currently finding ways to evaluate climate risk through actions surrounding environmental, social, and governance ratings,[3] Securities and Exchange Commission disclosure regimes,[4] intervention by various United States federal regulators,[5] and mandates by regulatory authorities in other countries.[6]

---

1. *See* Vladimir Stenek, et al., *Climate Risk and Financial Institutions: Challenges and Opportunities*, INT'L FIN. CORP. OF THE WORLD BANK GRP., 1, 101 (2010), https://www.ifc.org/wps/wcm/connect/fe18be47-a0cc-4b5d-a134-078a995ce8bd/ClimateRisk_FinancialInstitutions.pdf?MOD=AJPERES&CVID=n48iBMz [https://perma.cc/X4TA-GWXM] (discussing the risks posed by climate change to various financial sector participants).

2. *See id*. at 22 (discussing increasing loss contingencies increasing as risks of climate change continue to be quantified).

3. "Environmental, Social, and Governance Ratings" refers to long-term material risks with regards to a company's operations as it relates to environmental, social, and governance issues. There is not a uniform industry metric or investment type at time of writing, and various ratings agencies and other companies have set forth their own standards. *See ESG* Ratings, MSCI https://www.msci.com/our-solutions/esg-investing/esg-ratings [https://perma.cc/NF3A-R3MW] (last accessed Oct. 17, 2021) (explaining the use of ESG ratings to determine material environmental, social, and governance related factors for companies).

4. *See* Gary Gensler, Chair, Sec. and Exch. Comm'n, *Prepared Remarks Before the Principles for Responsible Investment "Climate and Global Financial Markets" Webinar*, U.S. SEC. & EXCH. COMM'N *(*July 28, 2021), https://www.sec.gov/news/speech/gensler-pri-2021-07-28 [https://perma.cc/7GP9-4S6B] (public statement) (discussing upcoming proposed rule on mandatory climate disclosure).

5. *See, e.g.,* U.S. DEPT. OF TREASURY, Press Release, *Financial Stability Oversight Council Identifies Climate Change as an Emerging and Increasing Threat to Financial Stability*, (Oct. 21, 2021), https://home.treasury.gov/news/press-releases/jy0426 [https://perma.cc/LJU3-2WNU] (discussing the Federal Stability Oversight Council's assessment of various financial risks posed by climate change).

6. *See The Three European Supervisory Authorities Publish Final Report and Draft RTS on Disclosures Under SFDR*, EUR. SEC. AND MKTS. AUTH. (Feb. 4, 2021), https://www.esma.europa.eu/press-news/esma-news/three-european-supervisory-authorities-publish-final-report-and-draft-rts [https://perma.cc/7N5A-UD5K] (discussing the Joint Committee of the three European Supervisory Authorities draft Regulatory Technical standards for sustainability-related disclosures in the financial services sector).

Climate change poses unique challenges to banks and the financial system as a whole, since direct and indirect environmental changes impact various sectors such as public health, agricultural yields, public infrastructure, and real property—all of which are reliant upon credit or have assets utilized by banks.[7] Consequently, banks must account for environmental impacts across many industries and evaluate risks to asset prices, credit availability, and cash flows.[8]

The Federal Reserve is responsible for the promotion of financial system stability and the supervision and regulation of financial institutions, in addition to its other functions.[9] Pursuant to these stability and regulation responsibilities, the Federal Reserve engages in "Discount Window" lending and "Section 13(3)" lending.[10] Discount Window lending is the Federal Reserve's lending to depository institutions such as banks.[11] Section 13(3) lending is the Federal Reserve's specially-tailored lending programs in "unusual and exigent circumstances."[12] The 2008 Financial Crisis and the COVID-19 pandemic highlighted the Federal Reserve's Section 13(3) lending abilities, as numerous facilities were opened to provide liquidity directly to borrowers and investors.[13]

Many of the Federal Reserve loans under Section 13(3) and the Discount Window must be secured.[14] However, the Federal Reserve's

---

7. *See* Celso Brunetti et al., *Climate Change and Financial Stability*, FED. RES. BD. (Mar. 19, 2021) https://www.federalreserve.gov/econres/notes/feds-notes/climate-change-and-financial-stability-20210319.htm [https://perma.cc/G25X-FL97] (discussing the intercorrelated risks of climate change on the financial system).

8. *Id.*

9. *See* FED. RES. SYS. PUB., *The Fed Explained: What the Central Bank Does,* 55 (Aug. 2021), https://www.federalreserve.gov/aboutthefed/files/the-fed-explained.pdf [https://perma.cc/BTL2-VFUU] (explaining the Federal Reserve's stability functions).

10. *Id.*

11. *See Discount Window Lending,* FED. RES. BD (Dec. 30, 2021) https://www.federalreserve.gov/regreform/discount-window.htm [https://perma.cc/K8UT-DZFV] (providing background on the Federal Reserve's Discount Window lending).

12. *See* 12 U.S.C.A. § 343(3)(A) (2018).

13. *See* FED. RES. BD., *Crisis Response: Credit and Liquidity Programs and the Balance Sheet*, https://www.federalreserve.gov/monetarypolicy/bst_crisisresponse.htm [https://perma.cc/ZG7Q-ZXNY] (last accessed Oct. 17, 2021) (discussing the monetary policy actions taken by the Federal Reserve in response to the 2008 financial crisis in order to "foster maximum employment and price stability"); *see also* Richard H. Clarida et al., *The COVID-19 Crisis and the Federal Reserve's Policy Response* (2021), at 8, https://www.federalreserve.gov/econres/feds/files/2021035pap.pdf [https://perma.cc/F2QH-QY4E] (discussing actions taken by the Federal Reserve with regards to liquidity and funding operations).

14. *Financial Accounting Manual for Federal Reserve Banks,* FED. RES. BD. 72 (July 2021), https://www.federalreserve.gov/aboutthefed/files/BSTfinaccountingmanual.pdf [https://perma.cc/G484-52PN].

collateral requirements do not properly account for the hazards posed by climate risk.[15] This improper valuation of risk poses problems for the economy as well as the Federal Reserve's secured interests in loans it provides by not accounting for the potential of rapid devaluation of assets,[16] sudden supply shocks,[17] and climate disasters.[18]

The Federal Reserve should reduce the value of the assets it receives as collateral via a "haircut"[19] for its Section 13(3) and Discount Window lending programs, in order to account for the risks posed to these assets.[20] However, the Federal Reserve should not stray into "screening" assets into or out of out of eligibility for its lending programs based solely upon the potential effects of climate change upon the asset,[21] as this would lead to greenwashing,[22] which is the act of giving the appearance of environmentally-friendly business practices while failing to change any underlying business practices.[23] Such greenwashing could contribute to an asset bubble.[24] This Note discusses the development of the Federal Reserve's lending programs in response to financial crises as well as its "standard" Discount Window operations, then analyzes opportunities for climate risk analysis to be integrated into its secured lending operations to mitigate some of the deleterious effects of climate change on the financial system, and insulate the financial system against preventable climate-related shocks.[25] This Note proceeds in five parts. Part II

15. *See infra* Part III (discussing the various hazards posed to Federal Reserve collateral by climate risk).

16. *See infra* Part III.B.1 & 2 (discussing the physical risks to collateral, such as fire and flood, as well as the lack of risk adjustment in pricing—all of which could cause rapid devaluation of Federal Reserve collateral); see also *infra* Part IV.A (discussing recent rapid-devaluation events).

17. *Id.*

18. *Id.*

19. *See infra* Part II.C (discussing Federal Reserve collateral margin and haircuts).

20. *See infra* Part IV.A (discussing the NGFS recommendation of negative collateral haircuts to properly value collateral that the Federal Reserve accepts for its lending programs).

21. *See infra* Part IV.B. (discussing how improper pricing of assets could incentivize greenwashing).

22. *See infra* Part IV.B (discussing the green assets and greenwashing).

23. Leyla Acaroglu, *What is Greenwashing? How to Spot It and Stop It*, MEDIUM (July 8, 2019), https://medium.com/disruptive-design/what-is-greenwashing-how-to-spot-it-and-stop-it-c44f3d130d5 [https://perma.cc/X7R3-MWED].

24. An economic "bubble" consists of the rapid inflation of an asset, or assets, due to market exuberance rather than the fundamental value of the asset or assets. Typically, bubbles result in "crash" when the asset or assets drop in value rapidly. *See* Will Kenton, *What Is A Bubble?,* INVESTOPEDIA (Oct. 10, 2020), https://www.investopedia.com/terms/b/bubble.asp [https://perma.cc/MV3G-P3E9] (explaining what an economic bubble is); *see also infra* Part IV (discussing how greenwashing could contribute to an asset bubble).

25. *Infra* Parts II, III, & IV.

provides background information on the Federal Reserve's stability and regulation responsibilities, lending powers, collateral policies, and climate financial risk.[26] Part III discusses critiques of the Federal Reserve's collateral framework with regards to its current valuation of climate-risks.[27] Part IV explains why the Federal Reserve should integrate haircuts based upon climate risk into its collateral policies to properly fulfill its stability and regulation mandates.[28] Part V summarizes the arguments of this note and draws a conclusion.[29]

II. BACKGROUND

The Federal Reserve is the central bank of the United States, and is responsible for five functions: conducting the nation's monetary policy in order to promote maximum employment and stable prices; promoting the stability of the financial system; promoting the safety and soundness of individual financial institutions; fostering payment and settlement system safety and efficiency; and promoting consumer protection and community development.[30] Relevant to this Note is the Federal Reserve's functions as a promoter of financial system stability, as it is pursuant to its stability authority that the Federal Reserve monitors systemic risk, attempts to head off shocks to the financial system, and actively intervenes to provide liquidity to financial institutions and individual borrowers during times of great financial strain.[31] In order to provide liquidity, two significant programs utilized by the Federal Reserve are the Discount Window and Section 13(3) lending during times of crisis.[32]

A. The Federal Reserve's Discount Window Lending

A significant amount of the Federal Reserve's lending operations consist of secured loans to depository institutions via the Discount

26. *Infra* Part II.
27. *Infra* Part III.
28. *Infra* Part IV.
29. *Infra* Part V.
30. *See* FED. RES. BD., *The Fed Explained: What the Central Bank Does,* 1 (Aug. 2021), https://www.federalreserve.gov/aboutthefed/files/the-fed-explained.pdf#page=8 [https://perma.cc/QC29-4VVZ] (explaining the Federal reserve's five functions).
31. *See id.* at 52-60 (explaining the Federal Reserve's authority pursuant to its stability mandate).
32. *Id.*

Window.[33] Such Discount Window loans are available to depository institutions at all times.[34] Discount Window lending is designed to promote liquidity and stability in the financial system and to ensure that depository institutions can continue to provide credit during times of market stress.[35] This liquidity is essential to providing the continued function of the credit markets during times of stress and prevents negative consequences such as the withdrawal of credit to borrowers.[36]

There are several different programs that the Federal Reserve uses for its Discount Window lending, set forth in Section 10B of the Federal Reserve Act and the Federal Reserve's "Regulation A."[37] These programs consist of primary credit, secondary credit, and seasonal credit.[38] Primary credit is referred to by the Federal Reserve as the "principal safety valve for ensuring adequate liquidity in the banking system."[39] Loans through primary credit are available for up to ninety days and have no limits on the use of funds borrowed by the depository institution.[40] Secondary credit is designed for institutions who do not qualify for primary credit, is typically on an overnight basis, and may not be used to fund the expansion of the borrower's assets.[41] Finally, seasonal credit is designed to assist "small depository institutions" with seasonal liquidity pressures such as fluctuations on loans and deposits caused by college tuition payments, farming, and other seasonal activities.[42]

B. The Federal Reserve's Section 13(3) Lending Powers

Section 13(3) of the Federal Reserve Act allows the Federal Reserve to provide liquidity to nonbank entities in pursuit of financial system stability for "unusual and exigent circumstances."[43] The Federal Reserve utilized its Section 13(3) powers during the COVID-19

33. *See* FED. RES. BD., *The Discount Window and Discount Rate* (last updated Jan. 11, 2022), https://www.federalreserve.gov/monetarypolicy/discountrate.htm [https://perma.cc/K8DT-ZS3T] (discussing the Federal Reserve Discount Window).
34. *Id.*
35. *Id.*
36. *Discount Window Lending, supra* note 11.
37. *Id.*
38. *Id.*
39. *Id.*
40. *Id.*
41. *Id.*
42. *Id.*
43. 12 U.S.C.A. § 343(3)(B)(i) (2018).

pandemic,[44] as well as during the 2008 Financial Crisis.[45] To qualify for Section 13(3) lending, firms must still have sufficient collateral similar to the Discount Window.[46] However, collateral eligibility is generally more expansive than through the Discount Window,[47] because depository institutions are highly regulated and restricted with the types of assets they are allowed to hold in the first place.[48] For Section 13(3) lending, the Federal Reserve must ensure that the value of any collateral is consistent with "sound risk management practices" in order to "ensure protection for the taxpayer."[49] Furthermore, "the security for emergency loans [must be] sufficient to protect taxpayers from losses . . ." and the Federal Reserve Board of Governors "shall require that a Federal reserve bank assign, consistent with sound risk management practices and to ensure protection for the taxpayer, a lendable value to all collateral for a loan executed by a Federal reserve bank."[50]

In response to the individualized bailouts of the 2008 crisis—which led to vastly different outcomes for different firms[51]—the Federal Reserve's emergency lending powers were modified in the 2010 Dodd-Frank Act to disallow individually-tailored bailouts.[52] As such, all

---

44. *See* N.Y. FED. RES., *Federal Reserve 13(3) Facilities Announced During COVID-19 Pandemic* (Apr. 9, 2020) https://www.newyorkfed.org/medialibrary/media/research/blog/2020/LSE_2020_COVID-fed-response_fleming [https://perma.cc/65WH-AN2Y] (listing the Federal Reserve 13(3) facilities enacted during COVID-19).

45. *See* FED. RES. BD., *The Federal Reserve's Section 13(3) Lending Facilities to Support Overall Market Liquidity: Function, Status, and Risk Management* (Nov. 2010), https://oig.federalreserve.gov/reports/FRS_Lending_Facilities_Report_final-11-23-10_web.pdf [https://perma.cc/F8SU-7F2Q] (discussing the Federal Reserve 13(3) lending facilities utilized during the 2008 financial crisis).

46. *See id.* at 4 tbl.A (providing a brief overview of each of the 2008 Section 13(3) lending programs).

47. *See* BENEDICT WELLER, ET AL., *The Collateral Frameworks of the Eurosystem, the Federal Reserve System and the Bank of England and the Financial Market Turmoil*, ECB OCCASIONAL PAPER NO. 107, 27 (Dec. 29, 2009), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1325248 [https://perma.cc/6JBA-SE2A] (explaining the Federal Reserve's expanded collateral eligibility in response to the 2008 Financial Crisis).

48. *See* MARC LABONTE & DAVID W. PERKINS, CONG. RSCH. SERV., R46779, OVER THE LINE: ASSET THRESHOLDS IN BANK REGULATION, 1 (May 3, 2021), https://sgp.fas.org/crs/misc/R46779.pdf [https://perma.cc/8ZQX-TQYA] ("Banking is one of the most heavily regulated industries in the United States due to its key role in the economy, its inherent risks, and the potential taxpayer exposures it creates.").

49. 12 U.S.C.A. § 343(3)(B)(i) (2018).

50. 12 U.S.C.A. § 343(3) (2018).

51. *See infra* Part II.A (discussing the outcomes of Lehman Brothers, AIG, and Bear Stearns in the context of the Federal Reserve's evaluation of their respective collateral).

52. *See* FED. RES. BD., *Federal Reserve Board Approves Final Rule Specifying its Procedures for Emergency Lending under Section 13(3) of the Federal Reserve Act* (Nov. 30,

lending programs are required to have "broad eligibility" with regards to borrowers.[53] Additionally, under Section 13(3), the Federal Reserve cannot aid failing financial companies or insolvent borrowers.[54] While individual bailouts no longer exist, firms wishing to use any of the Federal Reserve's emergency lending programs or facilities with broad-based eligibility must still provide sufficient collateral for any loans they get from the Federal Reserve.[55]

C. Assets Eligible for Federal Reserve Secured Lending

Discount Window loans provided by the Federal Reserve must be fully collateralized "to the satisfaction of the lending Reserve Bank."[56] Similarly, Section 13(3) collateral must be "sufficient to protect taxpayers from losses[.]"[57] The Federal Reserve accepts a variety of collateral pursuant to its Section 13(3) and Discount Window lending.[58] While Section 13(3) provides the Federal Reserve with much more discretion in determining what it may accept as collateral, much of the collateral is the

---

2021), https://www.federalreserve.gov/newsevents/pressreleases/bcreg20151130a.htm [https://perma.cc/Z2LC-Z6BD] (discussing the Federal Reserve Board's final rule and the requirement of broad eligibility).

53. *Id.*

54. 12 U.S.C.A. § 343(3)(A) (2018).

55. *See* 12 U.S.C.A. § 343(3)(B)(i) (stating that "The policies and procedures established by the Board shall require that a Federal reserve bank assign, consistent with sound risk management practices and to ensure protection for the taxpayer, a lendable value to all collateral for a loan executed by a Federal reserve bank under this paragraph in determining whether the loan is secured satisfactorily for purposes of this paragraph.").

56. FED. RES. BD., *Credit and Liquidity Programs and the Balance Sheet* (last updated May 13, 2021), https://www.federalreserve.gov/monetarypolicy/bst_ratesetting.htm [https://perma.cc/Z5AV-YFWH] [hereinafter *Credit and Liquidity Programs and the Balance Sheet*].

57. BENEDICT WELLER, ET AL, *supra* note 47.

58. *See* FED. RES. DISC. WINDOW, PAYMENT SYS. RISK, *Discount Window Margins and Collateral Guidelines*, FED. RES. (June 1, 2021), https://www.frbdiscountwindow.org/Home/Pages/Collateral/Discount%20Window%20Margins%20and%20Collateral%20Guidelines#none [https://perma.cc/KP2F-SNQG] [hereinafter *Discount Window Margins and Collateral Guidelines*] (explaining that Federal Reserve member banks accept as collateral: U.S. Treasury and Agency Securities; Government Sponsored Enterprise Securities; Foreign Government Guaranteed Securities and Brady Bonds; Foreign Government Agency Bonds; Supranational Bills, Notes, Bonds, and Zero Coupons; Investment Grade and AAA-rated Corporate Bonds; German Jumbo AAA-rated Bonds; Municipal Bonds; Asset Backed Securities; Collateralized Debt Obligations; Collateralized Loan Obligations; Agency-Backed Mortgage Securities; Non-Agency Residential Mortgage Backed Securities; Commercial Mortgage-Backed Securities; Trust Preferred Securities; and Certificates of Deposit, Bankers' Acceptances, Commercial Paper, and Asset-Backed Commercial Paper).

same as that accepted under the Discount Window.[59] This collateral is valued at the fair market value of the asset, accounting for volatility over the period the loan to the bank is outstanding.[60]

The Federal Reserve accepts mortgage-backed securities as collateral for a variety of different programs. Under its Discount Window lending, the Federal Reserve accepts residential mortgage securities backed by federal agencies, investment grade-rated non-agency residential mortgage-backed securities, and AAA-rated commercial mortgage-backed securities.[61] Additionally, the Federal Reserve accepts individual loans for commercial real estate, farm real estate, first and second lien mortgages for one to four family residences, and mortgages for five-plus family residences.[62]

The Federal Reserve also accepts mortgages as collateral for a variety of its past and present Section 13(3) liquidity facilities. Programs which accepted mortgages as collateral during the pandemic include the Primary Dealer Credit Facility[63] and the Money Market Mutual Fund Liquidity Facility.[64] During the 2008 Financial Crisis, the Federal Reserve accepted mortgages as collateral under the Primary, Secondary, Seasonal, and Term Asset Facility Credit facilities; the Primary Dealer Credit Facility; the Term Securities Lending Facility and Term Securities Lending Facility Options Program.; and the Term Asset-Backed Securities Loan Facility ("TALF").[65]

Under its Discount Window lending, the Federal Reserve generally accepts investment grade-rated corporate bonds in U.S. currency as well as AAA-rated foreign bonds in various foreign

---

59. *Id.*

60. *Id*.

61. *Id.*

62. *Id.*

63. The Primary Dealer Credit Facility accepted obligations from the following mortgage-centered federally related entities: Federal Agricultural Mortgage Corporation, Federal Home Loan Bank System, Federal Home Loan Mortgage Corporation (Freddie Mac), and Federal National Mortgage Association (Fannie Mae) with margin percentages from 105% to 159%. FED. RES. BANK OF NY, *Primary Dealer Credit Facility: Collateral Schedule* (Apr. 9, 2020) https://www.newyorkfed.org/markets/primary-dealer-credit-facility/primary-dealer-credit-facility-collateral-schedule [https://perma.cc/HZA3-VL8H] [hereinafter *Primary Dealer Credit Facility: Collateral Schedule*].

64. *See* FED. RES. BD., *Money Market Mutual Fund Liquidity Facility* (Nov. 30, 2020), https://www.federalreserve.gov/newsevents/pressreleases/files/monetary20201130a2.pdf [https://perma.cc/7DHP-PW9N] [hereinafter *Money Market Mutual Fund Liquidity Facility*] (stating that securities issued by U.S. Government Sponsored Entities qualifies as collateral for the facility).

65. *Credit and Liquidity Programs and the Balance Sheet*, *supra* note 56.

currencies, AAA-rated collateralized debt obligations, AAA-rated collateralized loan obligations, and individual corporate loans.[66] During the 2008 Financial Crisis, the Federal Reserve accepted corporate bonds and loans for its Primary, Secondary, Seasonal, and TALF; Primary Dealer Credit Facility; Term Securities Lending Facility and Term Securities Lending Facility Options Program; and ABCP.[67] During the COVID-19 pandemic, the Federal Reserve accepted corporate bonds and loans as collateral for its Commercial Paper Funding Facility;[68] Money Market Mutual Fund Liquidity Facility;[69] and Term Asset-Backed Securities Loans.[70]

The Federal Reserve applies both "haircuts" and "margins" to collateral it receives under the Discount Window and Section 13(3).[71] Many consider the difference between a haircut and margin to be a matter of expression, with haircut being "a percentage deduction from the market value of collateral," such as a 5% reduction, and margin being "the initial market value of collateral expressed as a percentage of the purchase price," such as 120% margin.[72] With regards to Discount Window lending, the Federal Reserve applies a haircut based upon perceived risk of the loan, and a "margin" based upon the general liquidity of the asset class.[73] In other words, a margin is applied on top

66. *Discount Window Margins and Collateral Guidelines*, *supra* note 58.

67. *Credit and Liquidity Programs and the Balance Sheet*, *supra* note 56.

68. *Primary Dealer Credit Facility: Collateral Schedule*, *supra* note 63.

69. *Money Market Mutual Fund Liquidity Facility*, *supra* note 64.

70. *See* FED. RES. BD., *Term Asset-Backed Securities Loan Facility* (July 28, 2020), https://www.federalreserve.gov/newsevents/pressreleases/files/monetary20200728a6.pdf [https://perma.cc/HMZ6-U7UL] [hereinafter *Term Asset-Backed Securities Loan Facility*].

71. *See* FED. RES. DISC. WINDOW, PAYMENT SYS. RISK, *Federal Reserve Collateral Guidelines*, 18 (Sept. 2020), https://www.frbdiscountwindow.org/~/media/documents/frcollguidelines.pdf [https://perma.cc/4KPA-5LNE] [hereinafter *Federal Reserve Collateral Guidelines*] (noting that "An additional haircut will generally be applied to collateral that is pledged by depository institutions in financial condition that is consistent with eligibility for the secondary credit program."); *see also* MARC LABONTE, CONG. RSCH. SERV., R44185, *Federal Reserve: Emergency Lending*, 13 (Mar. 27, 2020), https://sgp.fas.org/crs/misc/R44185.pdf [https://perma.cc/DUU7-S434] (discussing which Section 13(3) lending facilities created in 2008 received haircuts as part of the terms and conditions of the loans).

72. INT'L CAP. MKT. ASS'N, *What is a haircut?* (last accessed Dec. 20, 2021), https://www.icmagroup.org/Regulatory-Policy-and-Market-Practice/repo-and-collateral-markets/icma-ercc-publications/frequently-asked-questions-on-repo/21-what-is-a-haircut/ [https://perma.cc/2ET3-RFL5].

73. *Compare Federal Reserve Collateral Guidelines*, *supra* note 71 at 18 (noting that "An additional haircut will generally be applied to collateral that is pledged by depository institutions in financial condition that is consistent with eligibility for the secondary credit program."), *with Discount Window Margins and Collateral Guidelines*, *supra* note 58

of the fair market value estimate of collateral, and haircuts change the fair market value estimate of the collateral.[74] Securities pledged as collateral for loans must be at least investment grade,[75] but in some cases they may be required to be as high as AAA-rated.[76] Securities are valued using prices supplied by external vendors.[77] With regards to the acceptance of individual loans as collateral, the general requirements are that they not be past due by thirty or sixty days, not be subject to external constraints, and that the pledging institution has rights that sufficiently grant a perfected security interest to the Federal Reserve bank making the loan.[78] In sum, the Federal Reserve wants the actual, realistic value of the collateral. This is consistent with the intention of the Federal Reserve's liquidity programs, which are designed to address *liquidity crises*, and not prevent insolvent borrowers from going out of business.[79]

D. Climate Financial Risks

Climate change decreases the stability of the financial system.[80] Direct financial effects of climate change include decreases in labor productivity and public health, weather related damage, and decreasing agricultural yields, among other problems.[81] These financial effects can then spread to the entire financial system by way of shocks causing rapid repricing of assets, decreases in credit, and cascading effects across

(discussing margins to be applied to whole asset classes, e.g. agency-backed mortgage securities).

74. *Id.*

75. *See What Does Investment Grade Mean?,* INVESTOPEDIA (Jan. 21, 2021), https://www.investopedia.com/ask/answers/what-does-investment-grade-mean/ [https://perma.cc/69BB-WYM2] ("Investment grade refers to the quality of a company's credit. To be considered an investment grade issue, the company must be rated at 'BBB' or higher by Standard and Poor's or Moody's. Anything below this 'BBB' rating is considered non-investment grade.").

76. *See* FED. RES. DISC. WINDOW, PAYMENT SYS. RISK, *Discount Window Collateral Eligibility*, https://www.frbdiscountwindow.org/pages/collateral/collateral_eligibility [https://perma.cc/6AER-XBVT] (last accessed Dec. 20, 2021) [hereinafter *Discount Window Collateral Eligibility*] (outlining the assets accepted by the Federal Reserve for its Discount Window lending, and the general eligibility standard for those assets).

77. *See Discount Window Margins and Collateral Guidelines*, *supra* note 58 (explaining the valuation process for Federal Reserve collateral).

78. *See Federal Reserve Collateral Guidelines*, *supra* note 71 at 11-12 (explaining the acceptance criteria for individual loans).

79. 12 U.S.C.A. § 343(3)(B)(i) (2018).

80. *See* Celso Brunetti et al., *supra* note 7 (explaining the various risks posed to the financial system by climate change).

81. *Id.*

various financial markets which depend upon the assets affected by climate change.[82]

Risks posed to the financial system by climate change are generally separated into the categories of physical risk and transition risk.[83] Physical risks are those caused by the effect of climate change on the physical environment, such as rising sea levels, increased extreme weather events, and warmer temperatures.[84] Transition risks are those caused by moving away from carbon-based industries in order to curb global emissions, such as rapid depreciation in the value of oil assets due to increased regulatory oversight.[85] Real property and the financial activities surrounding it face some of the greatest risks of shock due to the potential for large swaths of collateral to be entirely eliminated from physical risks,[86] but collateral derived from corporate activities can also face significant transition risks.[87]

III. EFFECTS OF FEDERAL RESERVE COLLATERAL POLICIES AND CLIMATE RISK

In addition to increasing the liquidity of certain assets, and thus their value, the Federal Reserve's acceptance of certain forms of collateral is often the line between a firm's bankruptcy and coming out of a crisis with renewed vigor.[88] The Federal Reserve's collateral policies act as a backstop when companies are having liquidity problems from economic crises, which can have significant effects on markets.[89] For instance, if the Federal Reserve accepts igloos as collateral but not

82. *Id.*

83. *See* GOV. LAEL BRAINARD, FED. RES. BD., *Financial Stability Implications of Climate Change* (Mar. 23, 2021), https://www.federalreserve.gov/newsevents/speech/brainard20210323a.htm [https://perma.cc/FDJ2-FZ9F] ("Financial market participants that do not put in place frameworks to assess and address climate-related risks could face significant losses on climate-sensitive assets caused by environmental shifts, by a disorderly transition, or both.").

84. *Id.*

85. *Id.*

86. *See infra* III.B.1 (detailing physical risks to real property and the ways that risk is currently underpriced).

87. *See infra* III.B.2 (discussing risks posed to corporate bonds).

88. *See infra* III.A (explaining the significant backstop that Federal Reserve loan eligibility provides).

89. *See* Colleen M. Baker, *The Federal Reserve as Collateral's Last Resort*, 96 NOTRE DAME L. REV. 1381, 1382 (2021) ("The institutional features of these frameworks, which are a result of legislation and central bank policy, can influence the production, liquidity, and pricing of assets that markets use as collateral.").

widgets, it is likely that—all other things being equal—there will be more igloos brought into existence.[90] The Federal Reserve may incentivize financially unsound activities, pose risks to taxpayer funds, and generally raise the risk of systemic shock to the financial system if it does not properly incorporate climate risk into its collateral policies.[91] These risks are posed by both the Federal Reserve's Section 13(3) operations as well as its Discount Window lending.[92]

A. Section 13(3) Specific Risks

With regards to its Section 13(3) lending, the Federal Reserve's acceptance of an asset as collateral can amount to a declaration that it believes an asset is of value despite lenders—and potentially the market as a whole—not viewing it as such.[93] The collateral requirements of Section 13(3) loans can result in situations where the Federal Reserve's designation of "sufficient collateral" is determinative of whether a firm survives an economic crisis.[94] In this capacity, the Federal Reserve ends up acting as an incredibly significant backstop for companies facing economic strain in times of crisis.[95] As such, collateral accepted for Federal Reserve lending programs is significantly more valuable to firms than that which is not.[96]

The market effect of the Federal Reserve backstopping "sufficiently collateralized" companies in economic distress was exemplified in the 2008 Financial Crisis by the collapse of Lehman Brothers. While Lehman Brothers lacked sufficient collateral, the assets of its competitors (AIG and Bear Stearns) qualified for Federal Reserve

90. *See* Kjell G. Nybrog, *Central Bank Collateral Frameworks*, J. OF BANKING & FIN. (Mar. 2017), 83 at 232-248, https://www.sciencedirect.com/science/article/abs/pii/S037842661630259X [https://perma.cc/7VNL-RMBK] (stating "collateral frameworks may have distortive effects on financial markets and the wider economy. They can, for example, bias the private provision of *real* liquidity and thereby also the allocation of resources in the economy as well as contribute to financial instability.").

91. *See infra* III.A & B.

92. *Id.*

93. *See* 12 U.S.C.A. § 343(3)(A) (2018) (stating that participants in Section 13(3) lending facilities must be "unable to secure adequate credit accommodations from other banking institutions").

94. *See* Baker, *supra* note 89 (explaining that during financial crises, sufficient collateral to meet the requirements set for by central bank liquidity lines is the defining line between a firm being illiquid—and thus able to secure central bank funding—and insolvent).

95. *Id.*

96. *Id.*

credit.[97] Because of the lack of a financial backstop, potential purchasers of Lehman Brothers walked away, resulting in Lehman Brothers filing for bankruptcy.[98] In contrast, Bear Stearns was bought by J.P. Morgan, who secured a Federal Reserve loan with the assets of Bear Sterns.[99] AIG utilized a Federal Reserve loan and still exists today.[100]

B. Discount Window and Collateral Risks

Discount Window lending occurs during non-crisis times, so the Federal Reserve is not providing value for something that has no general market valuation.[101] Because the Federal Reserve is not acting as a backstop to institutions who have no other options for credit, the risks posed by the Federal Reserve's Discount Window lending is largely derived from market mispricing the collateral the Federal Reserve is accepting.[102] However, the risks posed to mortgage-backed securities and corporate bonds are significant.[103]

1. Mortgage-Backed Securities

Significant stability and climate change risks arise from the Federal Reserve's acceptance of commercial and residential real property as collateral. The Federal Reserve accepts mortgage-backed securities as

97. *See* BEN BERNANKE, FMR, CHAIRMAN, FED. RES. BD., *Current Economic and Financial Conditions* (Oct. 7, 2008) https://www.federalreserve.gov/newsevents/speech/bernanke20081007a.htm [https://perma.cc/M9BL-QHKL] (explaining how Lehman Brothers did not have sufficient collateral to secure a loan from the Federal Reserve).

98. *See* Carrick Mollenkamp et. al., *Lehman Files for Bankruptcy, Merrill Sold, AIG Seeks Cash*, WALL ST. J. (Sept. 16, 2008), https://www.wsj.com/articles/SB122145492097035549 [https://perma.cc/UV2S-Q4NN].

99. Maria Godoy, *Fed's Moves Highlight Fragile State of Markets*, NPR (Mar. 17, 2008, 5:20 PM), https://www.npr.org/templates/story/story.php?storyId=88425128 [https://perma.cc/3YF9-N3QN].

100. Mollenkamp et al., *supra* note 98.

101. *See* Baker, *supra* note 89 (explaining how Section 13(3) lending occurs for assets which have no general market valuation).

102. *See infra* III.B.1 & 2 (explaining how mortgage-backed securities and corporate bonds are mispriced).

103. *Id.*

collateral for its lending programs[104] through the Discount Window [105] in addition to many Section 13(3) lending programs past and present.[106] There is a severe risk to the U.S. mortgage market by physical risks resulting from climate change,[107] which has been acknowledged by Federal Reserve officials.[108]

Physical risks posed to mortgages include wildfires, hurricanes, and flooding.[109] Climate risk is not priced into a significant number of mortgages,[110] many of which the Federal Reserve holds as collateral for lending programs.[111] There are multiple places where climate risk is not

104. Additionally, and outside of the scope of this paper, the Federal Reserve purchases mortgage-backed securities as part of its open market operations and quantitative easing programs to achieve the goal of reducing the target interest rate. *See* FED. RES. BD., *Open Market Operations* https://www.federalreserve.gov/monetarypolicy/bst_openmarketops.htm [https://perma.cc/FDG4-4CYV] (last accessed Oct. 31, 2021) (discussing the Federal Reserve's purchases of mortgage backed securities pursuant to its open market operations).

105. *See Discount Window Margins and Collateral Guidelines*, *supra* note 58 (explaining that Federal Reserve member banks accept agency-backed mortgage securities; non-agency residential mortgage backed securities; and commercial mortgage-backed securities in addition to other collateral).

106. *See supra* Part II.C (discussing assets accepted for various Federal Reserve lending programs).

107. *See* Charlie Wowk, *Inadequate Climate Risk Disclosures and Information Asymmetries Threaten to Disrupt the U.S. Mortgage Market*, DUKE CLIMATE RISK DISCLOSURE LAB (Feb. 2021), https://climatedisclosurelab.duke.edu/2021/02/burning-down-the-house-how-inadequate-climate-risk-disclosures-and-information-asymmetries-threaten-to-disrupt-the-u-s-mortgage-market/ [https://perma.cc/L2VE-6ZE3] (explaining how natural disasters are currently mispriced in the U.S. mortgage market due to lack of information and disclosure, how this risk is misunderstood by investors, and how this risk is widespread throughout mortgage-backed securities thus posing a risk to the greater financial system).

108. *See* FEDERAL RESERVE, *Financial Stability Report: November 2020*, at 58-59, https://www.federalreserve.gov/publications/files/financial-stability-report-20201109.pdf [https://perma.cc/F6MH-ELG8] [hereinafter *Financial Stability Report: November 2020*] (discussing the significant risk to real estate by climate change-induced wildfires); *see also* GOV. LAEL BRAINARD, *supra* note 83 ("Sudden realizations of climate-related risks could cause rapid shifts in investor sentiment and shocks to asset prices, including to real estate prices in specific geographic locations.")

109. *See* Wowk, *supra* note 107 (stating that "[t]he mispricing of [sea level rise] and wildfires poses a substantial danger to the U.S. mortgage market[,]" exploring the significant decreases in housing prices from hurricanes, and discussing the inadequacy of FEMA flood maps—which mandate which houses must have flood insurance, a type disaster not covered by home insurance).

110. *See* Erik Hurst et al., *Regional Redistribution through the U.S. Mortgage Market*, 106 AM. ECON. REV. 1, 1-2 (2014), https://www.nber.org/system/files/working_papers/w21007/w21007.pdf [https://perma.cc/9TBF-G57E] (explaining how Government Sponsored Mortgage Enterprises, who securitize most of the loans in the U.S. mortgage market, do not tailor mortgage rates based upon likelihood of default derived from climate-related catastrophe).

111. *See Discount Window Margins and Collateral Guidelines*, *supra* note 58 (explaining how agency-backed mortgages receive between ninety-four and ninety-eight

properly integrated into real estate.[112] First, there is no requirement to disclose wildfire risk when selling most homes,[113] and wildfires increase the rate of mortgage defaults.[114] Second, nearly 40% of the U.S. population lives in a county on the coastal shoreline,[115] leading to a total of $1 trillion in U.S. real estate located along coastal communities.[116] This real estate is subject to hurricanes, coastal storms, tsunamis, landslides, coastal erosion, and sea level rise.[117] As climate-related catastrophes continue to increase, insurers are having trouble properly predicting future trends based upon past data, leading to record losses, increases in insurance premiums, and no available insurance for homeowners at times.[118] Finally, perceptions of climate risk, such as

---

percent of market value as margin for Discount Window loans, depending upon the length of the loan).

112. *See* Wowk, *supra* note 107 ("[First] extreme weather events can cause rapid increases in delinquency and forbearance rates, as well as prepayment rates, [second] these weather events can also increase the number of risky mortgages being securitized and transferred to the secondary market, and [third] the increased threat of extreme weather disasters can and should undermine property values.").

113. Lauren Sommer, *Millions of Homes are at Risk of Wildfires, but it's Rarely Disclosed*, NPR (Oct. 21, 2020, 4:50 AM), https://www.npr.org/2020/10/21/924507691/millions-of-homes-are-at-risk-of-wildfires-but-its-rarely-disclosed?gsBNFDNDN=undefined&utm_campaign=wp_the_energy_202&utm_medium=email&utm_source=newsletter&wpisrc=nl_energy202 [https://perma.cc/YJQ2-E9LF].

114. *See* Paulo Issler et al., *Mortgage Markets with Climate-Change Risk: Evidence from Wildfires in California*, at 34 (July 1, 2020), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3511843 [https://perma.cc/2WG4-LTUL] ("Using a comprehensive data set of houses and mortgages in California between 2000 and 2018, we find, unsurprisingly, that mortgage default and foreclosure increase in the event of a wildfire.").

115. NAT'L OCEAN SERV., *What percentage of the American Population Lives Near the Coast?* (Feb. 26, 2021), https://oceanservice.noaa.gov/facts/population.html [https://perma.cc/ES4B-U9XY].

116. *See* UNION OF CONCERNED SCIENTISTS, *Underwater: Rising Seas, Chronic Floods, and the Implications for US Coastal Real Estate*, 2 (June 2018), https://www.ucsusa.org/sites/default/files/attach/2018/06/underwater-analysis-full-report.pdf [https://perma.cc/T8BJ-33D2] ("[B]y the end of the 21st century nearly 2.5 million residential and commercial properties, collectively valued at $1.07 trillion today, will be at risk of chronic flooding.").

117. *See* NAT'L OCEAN SERV., *What Threats do Coastal Communities Face?* (Feb. 26, 2021), https://oceanservice.noaa.gov/facts/coastalthreat.html [https://perma.cc/N8T5-GWK7] ("The threats to coastal communities include extreme natural events such as hurricanes, coastal storms, tsunamis, and landslides, as well as longer-term risks of coastal erosion and sea level rise.").

118. *See* Noor Zainab Hussain & Carolyn Cohn, *Risky Business: Climate Change Turns up the Heat on Insurers, Policyholders* (Nov. 11, 2021, 3:59 PM), https://www.reuters.com/business/cop/risky-business-climate-change-turns-up-heat-insurers-policyholders-2021-11-11/ [https://perma.cc/2UCX-8EDD] (discussing how "the insurance industry . . . has trouble factoring in climate change[,]" leading to insurers pulling

expected increases in flooding-related damage or wildfire risk, depress real estate prices and are expected to continue to do so as physical risks from climate change become more pronounced and more frequent.[119]

Despite these risks, credit rating agencies—which the Federal Reserve relies upon[120]—do not account for risk of wildfires, sea level rise, or other climate disasters when providing credit ratings for mortgage-backed securities.[121] Relative to private market mortgage rates, government-sponsored enterprises do not risk-adjust mortgage prices based upon geographic distribution.[122] Furthermore, insurers have been withdrawing from renewing policies in areas hit significantly with natural disasters such as wildfires.[123] Homeowners insurance does not cover flooding,[124] and FEMA's "flood maps"—that determine land use

---

out of areas, "coverage getting costlier or harder to come by[,]" and explaining how one couple "could not get insurance to buy another [home]" after a wildfire burnt their previous home to the ground).

119. *See* COMMISSIONER ROSTING BENHAM & BOB LITTERMAN, *Managing Climate Risk in the U.S. Financial System: Report of the Climate-Related Market Risk Subcommittee, Market Risk Advisory Committee of the U.S. Commodity Futures Trading Commissions*, 16-17 (2020), https://www.cftc.gov/sites/default/files/2020-09/9-9-20%20Report%20of%20the%20Subcommittee%20on%20Climate-Related%20Market%20Risk%20-%20Managing%20Climate%20Risk%20in%20the%20U.S.%20Financial%20System%20for%20posting.pdf [https://perma.cc/L8WS-ZMBK] (discussing emerging research showing that perceptions of physical risk from climate change can depress real estate prices, and is expected to do so, and that "[w]hile climate risk already appears to affect real estate values, these effects likely will increase as physical risks become more frequent and severe.").

120. *See Discount Window Collateral Eligibility*, *supra* note 76.

121. *See* Nhu Tran & Cihan Uzmanoglu, *Climate Risk and Credit Ratings*, 20-21 (Nov. 29, 2021), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3708431 [https://perma.cc/6GET-CLJ3] (finding that credit ratings agencies do not factor into credit ratings in a statistically significant way).

122. *See* Hurst et al., *supra* note 110 ("First, risk-adjusted rates are not equalized across locations within the U.S. monetary union: despite large regional variation in ex-ante predictable default risk, there is no regional variation in mortgage contract rates for loans securitized by government-sponsored enterprises (GSEs). Since GSEs securitize most of the loans in the U.S. mortgage market, this constant contract rate in the face of variation in predictable default risk implies that the majority of borrowers face risk-adjusted rates which do vary with their locations. Second, this lack of risk-based pricing does not occur because this risk cannot be observed ex ante: we show that otherwise similar non-GSE loans that are securitized in the private market increase (decrease) mortgage rates when ex-ante local default risk rises (falls).").

123. Khristopher J. Brooks, *California Insurers are Dropping Homeowners Threatened by* Wildfires, CBS NEWS (Oct. 21, 2020, 1:43 PM), https://www.cbsnews.com/news/california-wildfires-home-insurers-dropping-homeowners/ [https://perma.cc/79BC-NB8K].

124. U.S. DEPT. OF HOMELAND SEC., *Homeowners Insurance Does not Cover Flooding* (Apr. 2018), https://www.fema.gov/sites/default/files/2020-05/F061_Homeowners_Does_not_cover_flooding.pdf [https://perma.cc/3RDT-B4KF].

designation and what houses are legally required to purchase flood insurance to secure a federally-backed mortgage—are extremely inaccurate.[125] However, the Federal Reserve does not appear to integrate any such risk into the haircut it takes on mortgages and mortgage-backed securities provided as collateral for its lending programs, due to its universal haircut guidelines based upon either government-sponsored enterprise status or the rating given to it by ratings agencies.[126]

As noted by the Federal Reserve, the lack of climate risk integration into real-estate-linked assets may lead to sharp repricing, incentivizing fire sales,[127] the effects of which would be amplified throughout the economy.[128] Research suggests that the lack of geographic climate risk adjustment by government-sponsored enterprises disincentivizes lenders and borrowers from factoring in risk of natural

125. *See* Melissa Denchak, *Flooding and Climate Change: Everything You Need to Know*, NAT'L RES. DEF. COUNCIL (Apr. 10, 2019), https://www.nrdc.org/stories/flooding-and-climate-change-everything-you-need-know#prevention [https://perma.cc/CP9X-EW9A] (discussing how three times as many Americans live within a 100-year floodplain than estimated by FEMA); *see also* OFF. OF THE INSPECTOR GEN. OF HOMELAND SEC., OIG – 7 – 110, *FEMA Needs to Improve Management of its Flood Mapping Programs* (Sept. 27, 2017), https://s3.documentcloud.org/documents/4066233/OIG-17-110-Sep17.pdf [https://perma.cc/SKE8-T355] (assessment that FEMA is vastly underestimating via its flood maps).

126. *See Discount Window Margins and Collateral Guidelines*, *supra* note 58 (showing universal margins for agency-backed mortgages and non-agency-backed mortgages).

127. A "fire sale" refers to selling of a security or other product at a price that is well below market value in order to raise money quickly, because the seller is in financial distress. *See* Will Kenton, *Fire Sale*, INVESTOPEDIA (Oct. 23, 2021), https://www.investopedia.com/terms/f/firesale.asp [https://perma.cc/5M3L-5EW3] (explaining what a fire sale is).

128. *See Financial Stability Report: November 2020*, *supra* note 108, at 59 ("A sharp repricing, in turn, could create incentives to fire sale such assets by leveraged financial and nonfinancial firms.").

disaster when purchasing a home,[129] despite the fact that mortgage delinquency rates rise in the aftermath of natural disasters.[130]

This has led to a scenario where there is current market distortion,[131] potentially leading to an abrupt repricing of mortgages[132] held by the Federal Reserve as collateral.[133] Repricing would primarily be due to an increase in mortgage defaults from homes being destroyed by natural disasters, insurers declining to continue to insure an area or homeowner's being underinsured against risks such as flooding, or rapid shifts in market sentiment.[134] As discussed by the Federal Reserve, these abrupt repricing events can pose significant risks to the financial stability due to the intercorrelated nature of the financial system.[135] However, the Federal Reserve does not integrate any of these potential risks into its collateral framework,[136] creating potential systemic risk, loss of Federal Reserve money at the expense of the taxpayer, and general market distortion.

2. Corporate Bonds

The Federal Reserve also faces climate-related financial risks from its acceptance of corporate debt as collateral. Corporations face both physical and transitory risks from climate change.[137] However,

---

129. *See* Amine Ouazad & Matthew E. Kahn, *Mortgage Finance and Climate Change: Securitization Dynamics in the Aftermath of Natural Disasters*, NAT'L BUREAU OF ECON. RSCH. at 4-6 (Feb. 2021), http://www.nber.org/papers/w26322 [https://perma.cc/7WAS-RMF3] (showing that "GSEs do not provide significant incentives to either lenders or households to choose different locations and mortgage amounts when facing increasing climate risk[,]" but rather that lenders—instead of decreasing mortgage supply or holding the same amount of mortgages on their books as prior—originate more loans to GSEs in the aftermath of natural disasters, leading "GSEs [to] partially act as a *de facto* substitute for the National Flood Insurance Program outside of mandated flood insurance zones") .

130. *Id.*

131. Wowk, *supra* note 107.

132. *Id.*

133. *See Supra* Part II.C. (discussing assets accepted for various Federal Reserve lending programs).

134. Wowk, *supra* note 107.

135. *See Financial Stability Report: November 2020*, *supra* note 108, at 58 (discussing how climate-related repricing events "and direct losses associated with climate hazards can result in an increased frequency and severity of financial shocks")

136. *See supra* Part II.C. (explaining the standardized nature of Federal Reserve collateral margins and haircuts, depending upon asset type).

137. *See* GOV. LAEL BRAINARD, *supra* note 83 (explaining that risks from climate change include both physical risks and risks from the transition to a more sustainable economy).

research has demonstrated that corporate credit ratings do not reflect a significant amount of this risk.[138]

In 2019, PG&E filed for what many consider to be the first bankruptcy caused by climate change, due to being overwhelmed by California's wildfires.[139] Extreme temperatures, such as those caused by climate change, significantly impacted earnings in over 40% of industries from 1990-2015.[140] Notably, financiers appear to price in some of the impact of climate change in premiums charged to bond issuers, but the impact is not considered by credit ratings agencies.[141] Because the impact of climate change is not incorporated by credit ratings agencies, which the Federal Reserve relies upon to properly assess risk to the corporate loans which it accepts as collateral, there is likely risk posed to the assets the Federal Reserve is holding in return for liquidity loans under its Section 13(3) and Discount Window lending.

IV. EVALUATING THE COLLATERAL POLICIES FROM THE NETWORK FOR THE GREENING OF THE FINANCIAL SYSTEM

The Central Banks and Supervisors Network for Greening the Financial System ("NGFS") is a collection of central banks and supervisory authorities working to develop best practices for management of climate risk in the financial sector.[142] The Federal Reserve joined the NGFS in December 2020 after engaging with the group for over a year.[143] The NGFS has stated that central banks should

138. *See* Edith Ginglinger & Quentin Moreau, *Climate Risk and Capital Structure*, EUR. CORP. GOVERNANCE INST at 27-28. (Mar. 9, 2021), https://ssrn.com/abstract=3327185 [https://perma.cc/F824-M327] (explaining that "credit ratings do not reflect physical climate risk specific to the firm" the climate risk faced by the country the firm is headquartered in).

139. *See* Russell Gold, *PG&E: The First Climate-Change Bankruptcy, Probably Not the Last*, WALL ST. J. (Jan. 18, 2019), https://www.wsj.com/articles/pg-e-wildfires-and-the-first-climate-change-bankruptcy-11547820006 [https://perma.cc/CT8J-55CA] ("PG&E Corp.'s bankruptcy could mark a business milestone: the first major corporate casualty of climate change. Few people expect it will be the last.")

140. Elsa Allman, *Pricing Climate Change Risk into Corporate Bonds*, CITY UNIV. OF N.Y. at 6 (July 2020), https://academicworks.cuny.edu/cgi/viewcontent.cgi?article=2207&context=bb_pubs [https://perma.cc/HD9T-YJ3V].

141. *Id.*

142. *Charter of the Central Banks and Supervisors Network for Greening the Financial System,* NETWORK FOR GREENING THE FIN. SYS. 1, 2 (2020), https://www.ngfs.net/sites/default/files/media/2020/09/03/ngfs_charter_final.pdf [https://perma.cc/U5ZN-3SQG].

143. Press Release, FED. RES. BD., *Federal Reserve Board Announces it has Formally Joined the Network of Central Banks and Supervisors for Greening the Financial System, or*

"seriously consider" how to use the tools available to them to match the effectiveness of supervisory methods of assessing climate risk, which might threaten their balance sheets.[144]

The NGFS released its recommendations in a report ("NGFS Report"), providing various methods by which central banks may implement climate-focused monetary policy operations.[145] In addition to various other recommendations, the NGFS Report provides detailed recommendations for central bank collateral operations, outlined below.[146] Note that while the following explores various collateral framework policies which the Federal Reserve could implement, it does not discuss changes that would need to be made with regards to credit ratings and other methods used to evaluate collateral—such discussion is deserving of its own, separate analysis.

A. Within the Federal Reserve's Authority: Collateral Haircuts

The NGFS Report recommends negative collateral haircuts in order to properly price collateral that is at risk of devaluation from climate change. A collateral haircut is the amount by which a given collateral asset's value is decreased, compared to its market value, in order to better account for risk posed by the assets utilized to secure the loan.[147] NGFS recommends two potential haircut adjustments: those to account for risk posed by climate change to assets, and those to support "green" assets.[148] Generally, haircuts with an eye towards climate risk are expected to better

NGFS, as a Member (Dec. 15, 2020), https://www.federalreserve.gov/newsevents/pressreleases/bcreg20201215a.htm [https://perma.cc/TQE5-YUWD].

144. *Adapting Central Bank Operations to a Hotter World: Reviewing Some Options*, NETWORK FOR GREENING THE FIN. SYS. 1, 2 (2021), https://www.ngfs.net/sites/default/files/media/2021/06/17/ngfs_monetary_policy_operations_final.pdf [https://perma.cc/M42Q-JG29] [hereinafter *Adapting Central Bank Operations to a Hotter World: Reviewing Some Options*].

145. *Id.* at 5.

146. *Id.*

147. *See* CORY MITCHELL, *Haircut Definition and Example*, INVESTOPEDIA (July 14, 2020) https://www.investopedia.com/terms/h/haircut.asp [https://perma.cc/Z5MN-732T] ("A haircut refers to the lower-than-market value placed on an asset being used as collateral for a loan. The haircut is expressed as a percentage of the markdown between the two values.").

148. *Adapting Central Bank Operations to a Hotter World: Reviewing Some Options*, *supra* note 144, at 35.

protect central bank balance sheets, assuming that the central bank controls for other financial threats.[149]

Climate risk is especially relevant to assets held as collateral by the Federal Reserve for long periods of time, however, the NGFS Report incorrectly states that climate-related risk to collateral may not be relevant in cases where a central bank will only be holding the asset for a short period of time.[150] This is particularly relevant to the Federal Reserve's lending, as a great deal of it is on a short-term basis such as overnight, for ninety days, or for "seasonal" liquidity problems.[151] However, economic experts are not good at predicting recessions.[152] Black swan events have caused rapid decreases in asset prices, and even so-called "predictable" events such as hurricanes cause unpredictable and significant losses.[153]

Rapid decreases in asset prices may occur within an extremely short period of time, as recently demonstrated during the COVID-19 pandemic.[154] For instance, during March 2020 the cumulative total index for real estate investment trusts focused on the retail sector declined by 49%.[155] Risks to retail real estate have been known for years, and "brick and mortar" stores were consistently closing.[156] Yet in the span of a month, retail real estate dropped drastically, and some expect it to never

149. *Seeid.*, at 36 (explaining that "Many of the options reviewed would probably better shield central bank balance sheets against increasing financial risks" so long as the options do not result in higher financial risk concentrations or greater unrelated credit risk).

150. *Seeid.*, at 37 (stating that "[i]f collateral is expected to be liquidated within a short time horizon, the exposure to climate-related risks may not materialise").

151. *See Discount Window Lending, supra* note 11 (explaining that primary credit has terms of up to ninety days; secondary credit typically has overnight terms; and seasonal credit terms are adjusted seasonally).

152. Simon Kennedy & Peter Coy, *Why are Economists so Bad at Forecasting Recessions?*, BLOOMBERG BUSINESSWEEK (Mar. 28, 2019), https://www.bloomberg.com/news/articles/2019-03-28/economists-are-actually-terrible-at-forecasting-recessions [https://perma.cc/CZB8-LBMY].

153. *See supra* III.B (discussion of risks to Federal Reserve collateral).

154. Pippa Stevens et al., *Stock Market Live Thursday: Dow Tanks 2,300 in Worst Day Since Black Monday, S&P 500 Bear Market*, CNBC (Mar. 12, 2020, 7:15 AM), https://www.cnbc.com/2020/03/12/stock-market-today-live.html [https://perma.cc/3W38-SWE3].

155. David C. Ling et al., , *A First Look at the Impact of COVID-19 on Commercial Real Estate Prices: Asset-Level Evidence*, 10 THE REV. OF ASSET PRICING STUD. 669-704 (Dec. 2020) https://academic.oup.com/raps/article/10/4/669/5902841 [https://perma.cc/V8SB-CBYA] at figure 2.

156. *See* Suzanne Kapner, *Brick-and-Mortar Stores are Shuttering at a Record Pace*, WALL ST. J. (Apr. 21, 2017, 7:53 PM) https://www.wsj.com/articles/brick-and-mortar-stores-are-shuttering-at-a-record-pace-1492818818 [https://perma.cc/4U6B-W747] (discussing record retail store closures in 2017).

return fully with the rise of e-commerce.[157] Oil became so severely oversupplied that, at one point, the futures contract for a barrel of oil was worth *negative* $37.63 a barrel.[158] Of particular note is the fact that the price of oil futures dropped to negative $37.63 from $18.27 in a single day.[159] This quick and unexpected decline in oil value occurred despite the fact that there has been years-long knowledge and discussion of an oversupply of oil risking price drops in the asset.[160] Each of the time periods in which asset prices plummeted are within the Federal Reserve's holding windows for collateral.[161] Despite these specific assets not necessarily being utilized as collateral for Federal Reserve lending, they share parallels with the assets which the Federal Reserve does accept. In light of these facts and because of the clear risk of climate-sensitive assets, current exposure to such assets poses risk which should be incorporated into the collateral haircuts of even short-term collateral arrangements.

---

157. *See* Melissa Repko & Lauren Thomas, *6 Ways the Coronavirus Pandemic has Forever Altered the Retail Landscape*, CNBC (Sept. 29, 2020, 10:00 AM), https://www.cnbc.com/2020/09/29/how-coronavirus-pandemic-forever-altered-retail.html [https://perma.cc/8328-HCRY] (discussing the change in retail stores because of the coronavirus, including a large shift to ecommerce).

158. William Watts & Mark DeCambre, *U.S. Oil Benchmark Crashes Below $0 a Barrel to Mark Historic Plunge*, MKT.WATCH (Apr. 20, 2020, 4:43 PM), https://www.marketwatch.com/story/us-oils-may-contract-skids-about-20-at-nadir-as-crudes-woes-continue-2020-04-19 [https://perma.cc/82LT-AT48].

159. *Id.*

160. *See* Tom DiChristopher, *U.S. Crude Drops 2.6% to 14-month Low, Settling at $49.88, on Oversupply Concerns*, CNBC (Dec. 16, 2018, 10:08 PM), https://www.cnbc.com/2018/12/17/oil-markets-global-economy-in-focus.html [https://perma.cc/2DWF-QYLJ] (discussing falling oil prices in 2018 due to signs of oversupply); *see also* Cathy Bussewitz, *OPEC Nations Grapple with Oversupply of Oil*, ABC NEWS (Dec. 4, 2019) https://abcnews.go.com/Business/wireStory/opec-nations-grapple-oversupply-oil-67485052 [https://perma.cc/3SCY-JFEA] (discussing OPEC negotiations surrounding cutting production of oil in response to oversupply in 2019); *see also Oversupply of Oil and Demand for Gas Expected in 2020, says DWF*, OIL & GAS (Dec. 16, 2019, 3:04 PM), https://www.oilandgasmiddleeast.com/exploration-production/drilling-production/35718-oversupply-of-oil-and-demand-for-gas-expected-in-2020-says-dwf [https://perma.cc/L4RL-BHS7] (discussing an expected oversupply of oil in 2020).

161. *See* MARC LABONTE, *supra* note 71 at 7-8 (explaining basics of Federal Reserve COVID-19 lending programs opened in March, 2020, including how the PDCF provided loans with up to ninety-day terms); *see also Term Asset-Backed Securities Loan Facility*, *supra* note 70 (explaining how TALF loans have a term of up to three years); *see also* discussion *supra* Part II.A ("Loans through primary credit are available for up to ninety days and have no limits on the use of funds borrowed by the depository institution.").

B. Outside the Federal Reserve's Authority: "Screening" and Positive Collateral Haircuts

The NGFS report recommends "screening collateral" that central banks have traditionally accepted.[162] The first option is "negative screening" in which certain assets are excluded as collateral based upon climate risk.[163] The second option consists of "positive screening" intended to encourage climate positive activities by expanding the pool of accepted collateral and adjusting collateral requirements for "green" assets.[164]

Negative screening serves as a sort of "amplified" collateral haircut policy by effectively being a 100% haircut on screened assets.[165] Due to being excluded from collateral eligibility in times of crisis as well as for regular Federal Reserve lending operations, negative screening would significantly affect the market value of screened assets.[166] Negative screening would therefore lead to a significant decrease in the sort of funding available to those utilizing screened assets;[167] this negative screening could support the transition away from assets subject to significant climate risk due to their decreased value.[168] However, negative screening is a blunt instrument for climate change,[169] and poses the risk of over-exclusion of assets, which has economy-distorting effects.[170]

Positive screening for climate friendly assets would lead to increased financing options for climate friendly projects due to the increased market value and ability to use these assets as collateral for

---

162. *Adapting Central Bank Operations to a Hotter World: Reviewing Some Options*, *supra* note 144, at 37.

163. *Id.*

164. *Id.* at 38.

165. *See id.* ("In fact, an exclusion-based policy is equivalent to applying a 100% haircut to the targeted assets.").

166. *See id*. (stating that ". . . the eligibility of an asset as collateral typically influences its liquidity and market price").

167. *See* discussion *supra* Part II (explaining how acceptance as collateral for Federal Reserve lending increases the liquidity of assets in crises and thus their value).

168. *Adapting Central Bank Operations to a Hotter World: Reviewing Some Options supra* note 144, at 38.

169. *See id.* ("[negative screening] is a crude approach").

170. *See id.* at 37-38 ("If negative screening is broad, applied to a very large range of asset classes or based on excessively stringent metrics or criteria, it could restrict the participation of banks in lending operations.").

Federal Reserve borrowing.[171] This would expand climate-friendly financing, as it would expand the universe of eligible collateral rather than excluding or providing a haircut to already-eligible collateral.[172]

Generally, the screening of assets based upon climate risk may serve to incentivize the creation of a green assets bubble,[173] which due to lack of proper measurement[174] and greenwashing, could create an economic bubble.[175] "Greenwashing" consists of portraying assets as more environmentally sound than they actually are.[176] Greenwashing is currently an area of concern for regulators, and is widespread in the sustainable finance industry.[177] Banks often are responsible for greenwashing, such as promoting their green products while also

---

171. *See id.* at 39 ("Positive screening would signal the central bank's willingness to improve financing conditions for low carbon projects through the 'eligibility premium' incorporated in the price of loans issued to finance these project. The measure may improve the liquidity and attractiveness of green and low-carbon assets,"); *see also supra* Part II (explaining how acceptance as collateral for Federal Reserve lending increases the liquidity of assets in crises and thus their value).

172. *See Adapting Central Bank Operations to a Hotter World: Reviewing Some Options supra* note 144 *at 39* ("If anything, the policy would expand the universe of eligible collateral").

173 *Id.*

174 *See* INFLUENCEMAP, *Climate Funds: Are They Paris Aligned?* (Aug. 2021), https://influencemap.org/report/Climate-Funds-Are-They-Paris-Aligned-3eb8334726794984708 4306dae01c7b0 [https://perma.cc/HL6C-LWGA] (explaining how ESG equity funds—which allegedly take into account climate risk as a core investing principle, are significantly misaligned with the Paris Climate Agreement).

175 An economic "bubble" consists of the rapid inflation of an asset, or assets, due to market exuberance rather than the fundamental value of the asset or assets. Typically, bubbles result in "crash" when the asset or assets drop in value rapidly. *See* Will Kenton, *Bubble,* INVESTOPEDIA (Oct. 10, 2020), *https://www.investopedia.com/terms/b/bubble.asp* [https://perma.cc/MV3G-P3E9] (explaining what an economic bubble is).

176. *See* Will Kenton, *What is Greenwashing?,* INVESTOPEDIA (Jan. 23, 2021), https://www.investopedia.com/terms/g/greenwashing.asp [https://perma.cc/5S8U-VF8J] ("Greenwashing is the process of conveying a false impression or providing misleading information about how a company's products are more environmentally sound.").

177. *See* Michael Tobin & Davide Scigliuzzo, *Wall Street's ESG Loans Charge Corporate America Little for Missed Goals*, BLOOMBERG (Sept. 8, 2021, 12:01 AM), https://www.bloomberg.com/news/articles/2021-09-08/esg-financing-comes-with-few-penalties-for-missing-goals [https://perma.cc/6DKE-ELXW] (explaining how sustainability-linked loans often have few consequences if the borrow fails to meet the sustainability target); *see also* INFLUENCEMAP, *supra* note 174 ("In the broad ESG category, this report identifies 593 equity funds with over $265 billion in total net assets. Of the funds assessed, 421 of them, or 71%, have a negative Portfolio Paris Alignment score, indicating the companies within their portfolios are misaligned from global climate targets."); *see also* Ricardo Boffo & Robert Patalano, *ESG Investing: Practices, Progress and Challenges*, OECD PARIS, 9 (2020), https://www.oecd.org/finance/ESG-Investing-Practices-Progress-Challenges.pdf [https://perma.cc/VX2F-EV8S] ("Agencies and expert groups are prioritizing sustainable finance to promote sustainable investments and reduce the risks associated with a missing framework, such as greenwashing.").

providing significant financing for fossil fuel endeavors.[178] It is often hard to discern whether greenwashing has occurred due to a lack of current industry standards surrounding disclosure of climate risk.[179] Utilizing screening would vastly encourage greenwashing of assets in order to have them qualify for Federal Reserve collateral inclusion.[180] This would not serve the purpose of the Federal Reserve's lending programs,[181] and also runs counter to the risk-tailoring the central bank's collateral policies seek to embody.[182]

Positive collateral haircuts may also serve to distort markets. While regulatory scrutiny is increasing,[183] there is still strong potential for a green bubble to occur without Federal Reserve incentivization,[184] as it is unclear that green assets perform significantly better than other assets.[185] For instance, sustainable investments generally have seen increased valuation solely by way of increased flows of investments,

178. *See* Akshat Rathi & Saijel Kishan, *Banks Get ESG Upgrades Despite Lending Billions for Fossil Fuels*, BLOOMBERG (Feb. 4, 2022, 9:30 AM), https://www.bloomberg.com/news/articles/2022-02-04/banks-get-esg-upgrades-despite-fossil-fuel-financing [https://perma.cc/3TPE-QBJ6] (explaining how MSCI "is rewarding some of Wall Street's biggest banks [with ESG rating upgrades] even though they continue to lend billions of dollars to fossil-fuel companies").

179. *See* Boffo & Patalano, *supra* note 177 ("Moreover, the lack of standardized reporting practices and transparency, and the difficulty of translating qualitative information in numerical information, creates a barrier in the proper integration of sustainability factors into investment decisions.").

180. *Adapting Central Bank Operations to a Hotter World: Reviewing Some Options*, *supra* note 144, at 38-39.

181. *See supra* Part II (explaining how the Federal Reserve is charged with promoting safety and soundness of the financial system generally, and how the Federal Reserve's Discount Window and Section 13(3) lending facilities are designed to promote stability by providing liquidity).

182. *See supra* Part II.C ("Discount Window loans provided by the Federal Reserve must be fully collateralized 'to the satisfaction of the lending Reserve Bank.' Similarly, Section 13(3) collateral must be 'sufficient to protect taxpayers from losses[.]'").

183. Tim Quinson, *Regulatory Intensify ESG Scrutiny as Greenwashing Explodes*, BLOOMBERG (Sept. 1, 2021, 5:45 AM), https://www.bloomberg.com/news/articles/2021-09-01/regulatory-scrutiny-of-esg-greenwashing-is-intensifying [https://perma.cc/C22W-K97Y].

184. Agustín Carstens, General Manager, Bank for Int'l Settlements, Speech at the Green Swan Conference, *Transparency and Market Integrity in Green Finance* (June 2, 2021), https://www.bis.org/speeches/sp210602.htm [https://perma.cc/5A5L-KLV7].

185. *See North American Non-Bank Financials Increasingly Tap Green Bonds*, FITCH RATINGS: FITCH WIRE (May 27, 2021), https://www.fitchratings.com/research/non-bank-financial-institutions/north-american-non-bank-financials-increasingly-tap-green-bonds-27-05-2021 [https://perma.cc/WY33-N9NH] ("The credit performance of green bonds has historically been similar to non-green bonds given that credit risk is typically identical, as it is based on the issuer's credit profile and not the use of proceeds.").

rather than any increase in expected returns.[186] While the market for climate-based investing is in excess of $35 trillion, there is concern that climate finance is currently similar to other assets "related to fundamental economic and social change" such as the dot-com bubble or nineteenth century railroad stocks.[187] This poses a problem for the implementation of a positive collateral haircut because increased valuation of a green asset without an underlying increase in intrinsic value could create, or further support, a green bubble.[188] In contrast, negative collateral haircuts would take a more nuanced approach of decreasing the value of the collateral in proportion to its risk, but not entirely remove its ability to receive funding.[189]

Clearly, a large-scale incentivization of greenwashing or a green bubble would be directly counter to the Federal Reserve's stability mandate.[190] Moreover, any intervention based upon a wish to incentivize green assets, rather than tailoring for the risks posed by climate-risky assets, would fall outside of the scope of the Federal Reserve's stability and liquidity mandates.[191]

V. CONCLUSION

The Federal Reserve has increasingly acknowledged that climate change poses significant threats to the financial system.[192] Additionally, the Federal Reserve takes on risks to its balance sheet through its collateral operations—as acknowledged by the existing collateral framework and the fact that it applies various haircuts to different types

186. Philippe van der Beck, *Flow-Driven ESG Returns*, SWISS FIN. INST. RSCH. PAPER NO. 21-71 (Sept. 23, 2021), https://papers.ssrn.com/sol3/Papers.cfm?abstract_id=3929359 [https://perma.cc/X76Y-X9Q5].

187. Catherine Bosley, *Green Investment Frenzy Runs Risk of Becoming a Bubble, BIS Says*, BLOOMBERG (Sept. 20, 2021, 7:00 AM), https://www.bloomberg.com/news/articles/2021-09-20/green-investment-frenzy-runs-risk-of-becoming-a-bubble-bis-says [https://perma.cc/HWN8-ZQYQ].

188. *See supra* Part IV.B (discussing greenwashing).

189. *See Adapting Central Bank Operations to a Hotter World: Reviewing Some Options*, *supra* note 144, at 35-36.

190. *See supra* Part II (explaining how the Federal Reserve is charged with promoting safety and soundness of the financial system generally, and how the Federal Reserve's Discount Window and Section 13(3) lending facilities are designed to promote stability by providing liquidity).

191. *Id.*

192. *See* GOV. LAEL BRAINARD, FED. RES. BD., *supra* note 83 (discussing risks to the financial system from climate change).

of collateral.[193] There is significant risk to the Federal Reserve by climate change, including physical threats to assets such as houses and transition threats to corporate bonds.[194]

The Federal Reserve should address climate risk in its collateral policies.[195] To avoid doing so flies in the face of its stability mandate, as there is risk of holding assets at risk of rapid depreciation as collateral.[196] The Federal Reserve should carefully value climate-sensitive assets by using the NGFS recommendations surrounding collateral haircuts to ensure that they are risk-adjusted.[197] However, the NGFS recommendations surrounding incentivizing green assets by way of screening or positive haircuts are outside of the Federal Reserve's statutory authority and likely to subject it to significant political scrutiny and legal challenges.[198]

BENJAMIN J. MARSICO*

193. *See supra* Part II.C (discussing Federal Reserve collateral policies).

194. *See supra* Part III.B (exploring risks from mortgage-backed securities and corporate bonds).

195. *See supra* Part III & IV (discussing risks to the Federal Reserve by its current collateral policies and utilizing haircuts to reduce this risk).

196. *Id.*

197. *Id.*

198. *See supra* Part IV (discussing issues with utilizing screening and positive haircuts).

* To Professor Lissa L. Broome, Nickolas Harrelson, Elizabeth Peters, and all the staff members of the North Carolina Banking Institute Journal, thank you for your tireless assistance in bringing this Note to fruition. To Zosha Silverstein-Belden, thank you for your continual confidence, understanding, and love throughout this writing process, law school, and everything else I do. To my mother and siblings, thank you for support, sacrifice, and endless patience, which have been the most essential component of my success. Finally, I want to thank my father, with whom countless conversations sparked a love of law which has led me precisely to where I am today.