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Title of Project: Regulation and Environmental Risks in Mortgage Lending: Exploring the interaction of unconventional monetary policy and natural disasters

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Project Summary:

Freddie Mac and Fannie Mae are Government Supported Enterprises (GSEs) that deal in the Secondary Mortgage Market for both multifamily and single-family homes. All mortgage loans that meet the underwriting standards of Freddie and Fannie may be purchased, packaged and insured against loss of principal and interest in the resulting mortgage backed securities in return for a guarantee fee charged by these GSEs. However, the pricing strategy of GSEs does not vary spatially with the differential ex-ante risk faced by a property by virtue of its geographical location and position. This project aims to explore the intersection of unconventional monetary policy and natural disasters by considering and analyzing QE3 and Hurricane Sandy as a natural experiment for our study. A major objective of this project is assessing the impact of unconventional monetary policy tools in fostering economic growth and stability in areas directly impacted by natural disasters in the U.S. through the bank lending channel.

Our literature review explored the growing body of research on the direct impact of different rounds of quantitative easing on the mortgage lending channels in the US as well as the indirect impact of different rounds of quantitative easing on securitization volumes for MBS as well as effects of income and employment. We also explored research estimating the impact of large (often billion-dollar) natural disaster events on securitization and mortgage credit volumes. Current research suggests that MBS purchases in different rounds of QE caused unintended real effects, in terms of large positive stimulus to the economy and increased employment, through the bank lending channel. In fact, Luck and Zimmermann (2020) find evidence that banks with higher mortgage-backed securities holdings refinanced relatively more mortgages after the first round of QE, which increased local consumption in the nontradable goods sector. In contrast, banks increased lending to firms and home purchase mortgage origination after the third round of QE, which led to a sizable increase in overall employment. In addition, Kahn and Ouazad (2019) suggest that there is a statistically and economically significant increase in securitization volumes at the conforming limit in years following a billion dollar natural disaster event.

We use data from the Home Mortgage Disclosure Act (HMDA) and HUD USPS Zip code Crosswalk files to compile the amount of mortgage lending in each postal zip code annually. In addition, FFIEC call report data reports the total assets and total mortgage securities in a balance sheet format at the bank level on a quarterly basis. Using these publicly available datasets, we constructed an ex-ante exposure measure of each postal zip code to a round of quantitative easing for all Atlantic states in the US: we treat postal zip codes that have historical activities from banks with more MBS holdings as exposed areas and those with less holdings as non-exposed areas. Using Single Family, Fixed rate mortgage level dataset for Freddie Mac that contains the amount of lending at the three-digit postal zip code level, we find that exposed areas had a persistent higher level of lending compared to non-exposed areas following QE3 (Figure 1).

Next, we use data on hurricane wind speed radii, digital elevation and proximity to wetland or coastal areas to identify and visualize all three-digit postal zip codes affected by Hurricane Sandy. Figure 2 visualizes all postal zip code areas (shaded) affected by Hurricane Sandy, assessed on the basis of data on wind speed radii publicly available on NOAA's Atlantic Hurricane database. As a next step, we aim to understand whether there exists a difference between mortgage lending behavior and patterns in areas affected by Hurricane Sandy and those not affected, further differentiated by their level of exposure to a round of QE, before and after the announcement of QE3 on 13 September 2012.

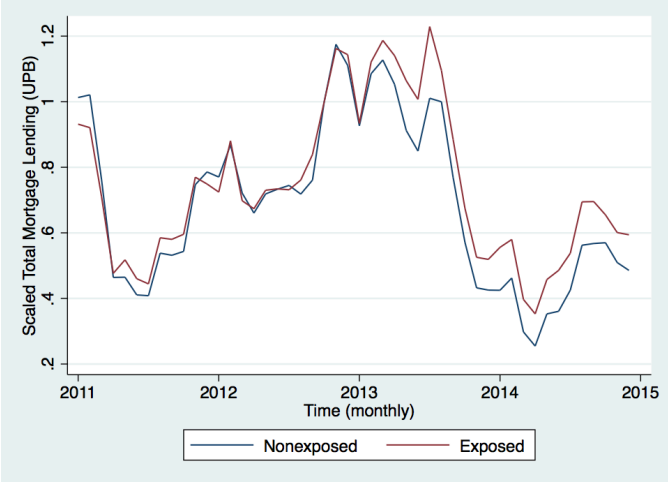

Figure 1: Mortgage lending in exposed vs nonexposed areas (2011-2015) securitized by Freddie Mac

Figure 2: Postal zip code areas affected by Hurricane Sandy