2020 Federal Reserve Stress Testing Research Conference: Read-Out[*]

1 Introduction and Conference Overview

The papers presented at this year's Stress Testing Conference focused on three main themes: (1) design of stress tests, (2) impact of stress tests on bank lending, and (3) some preliminary insights from the COVID-19 crisis. Lisa Ryu, Senior Associate Director in the Supervision and Regulation division of the Federal Reserve Board, gave the opening remarks. She highlighted that, while 2020 has been a challenging year, banks and regulators entered this period of uncertainty better prepared than they did during the global financial crisis more than a decade ago. Dr. Ryu also noted that this year's conference papers focused on a more diverse set of topics than in the past. She concluded her remarks by emphasizing the importance of research and critical assessment of stress testing to allow the continued refinement of the methodology and better understanding of exposures to economic and other types of stress. We summarize the main themes from the 2020 conference below.

2 Stress Test Design

Several papers and the conference keynote provided empirical and theoretical insights on potential implications for the design of stress tests and regulators' incentives when designing and implementing stress tests. For example, Cont, Kotlicki, and Valderrama (2020) discuss the importance of a joint stress test for solvency and liquidity. The authors argue that banks have been subject to two separate sets of tests thus far, but the two are ultimately intertwined. They designed an online tool for banks and regulators to estimate what the authors call "liquidity at risk." The authors show that liquidity and solvency interaction may lead to a non-linear amplification of equity losses due to increases in funding needs. In particular, solvency shocks affect liquidity through margin requirements, firms' ability to raise short-term funding, and credit risk sensitive outflows.

This year's conference keynote speaker, Tobias Adrian from the IMF, and Chavleishvili et al. (2020) presented analyses that suggest benefits to incorporating additional measures of financial stability risks into supervisory stress tests. Dr. Adrian presented the concept of the "Growth-at-Risk (GaR) Gap," which measures one potential source of vulnerabilities by incorporating the macrofinancial feedback (banks' amplification of shocks) across the business cycle using quantile regressions (Adrian, Berrospide, and Lafarguette 2020). He argued that this measure is better than the currently used Credit-to-GDP Gap because the latter moves more slowly than the business cycle. Dr. Adrian also proposed that GaR Gap may be useful for regulators when evaluating the supervisory stress tests. This is because it incorporates the feedback effect of banks' capital on GDP growth and the financial conditions index (FCI), identifying additional counter-cyclical, state-dependent, and risk-based capital surcharge needed to offset banks' macrofinancial feedback.

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Chavleishvili et al. (2020) propose a new structural quantile vector autoregressive model (QVAR) relating downside risk to financial stress measures. The authors suggest that macroprudential policies, rather than monetary policy, should be first in line to address future financial stability risks, and that model-based stress tests can give additional information on when to build up macro-prudential capital buffers and when to release them. The paper also provides a complementary measure to GaR, the average future growth shortfall (AGS), which quantifies the expected average GDP contraction implied by current financial stress and vulnerabilities.

Parlatore and Philippon (2020) and Shapiro and Zeng (2020) presented theoretical models of optimal stress test scenarios and bank regulators' incentives. Parlatore and Philippon (2020) show that a risk-averse regulator asks bank managers to report information on their exposures and intervenes based on what exposures appear excessive. Shapiro and Zeng (2020) provide a stylized framework in which regulators design stress tests while keeping in mind the trade-off between bank under-capitalization and the need for banks to continue lending during stressful economic conditions. In both papers, regulators face a trade-off based on the information they uncover, the cost of interventions, and the impact on banks. When the social cost of a potential bank failure is high, the authors show that the stress tests become more informative. Inostroza (2020) presented a related paper with a theoretical framework for identifying the optimal degree of transparency when a regulator conducts both an asset quality review and a stress test. His model allows for differences in how long-term investors and short-term creditors respond to the release of stress test results. He finds that the optimal disclosure policy is opaque (assigning one passing grade) when the quality of banks' assets is high and more transparent when the quality is low (assigning one of multiple failing grades to the bank as a function of the quality of its assets).

Schneider, Strahan, and Yang (2020) take a different perspective and focus on the integrity of the stress tests by studying their implementation by the Fed and whether there is a potential risk of regulatory capture. The authors compare stress test results across banks, exploiting the heterogeneity in banks' ability to influence regulatory decisions. They find that larger banks are more likely to face tougher stress tests, and neither political nor regulatory connections affect the outcome, which is inconsistent with regulatory capture.

3   Impact of Stress Tests

Several papers at this year's conference examined the impact on bank lending from stress test outcomes, banks' pessimistic beliefs about future economic performance, and banks' over-optimism regarding their stress test performance (Agarwal et al. 2020; Kok, Müller, and Pancaro 2020; Ma, Peydro, and Paligorogva 2020; Qui and Wang 2020).

Kok, Müller, and Pancaro (2020) study whether stress tests contribute to financial stability by reducing risk in the banking sector. Using the results of the 2016 EU-wide stress test they show that banks participating in the exercise reduce their average risk-weighted credit exposure. The paper finds evidence that this reduction in exposure is explained by supervisory scrutiny: additional reporting requirements for the stress test lead banks to reduce their credit risk. In contrast, the paper does not find any evidence that either the implementation of additional capital measures such as additional capital requirements or

capital distribution limits (the capital structure channel) or the public release of information (the market discipline channel) have any significant effect.

Ma, Peydro, and Paligorogva (2020) take a different approach and utilize data from banks' adverse and baseline stress test scenarios and their underlying C&I portfolios to study the impact of banks' beliefs about future economic conditions on their local lending. The authors find that banks with more pessimistic beliefs curtail their lending more. Their corporate borrowers in turn reduce credit demand and investment.

While most of the literature on stress tests has focused on the impact on banks, Agarwal et al. (2020) is one of the first papers to investigate the impact of the U.S. stress tests on the consumer credit market, focusing on credit cards. The authors identify 'exogenous shocks' to the stressed banks based on the difference in capital projections made by the Fed and the banks (i.e., the capital gap). Since the Fed's model ultimately determines banks' passage of the stress tests, banks with a higher (more optimistic) capital gap face a higher risk of failing the stress test the following year and thus limit their ability to make dividend distributions or common stock share repurchases. The authors exploit cross-sectional variation in the capital gap across banks and show that banks with a larger capital gap reduce credit supply, especially to subprime and lower-income customers. To remain competitive, these banks change their pricing strategy by reducing the interest rate for higher credit score and higher income borrowers and by offering more cash rewards to lower credit score and lower income borrowers.

Qui and Wang (2020) study another relatively under-explored question: the impact of failing a stress test. Failing a stress test has important reputational costs and forces failing banks to restructure their loan portfolio and adjust their risk management and screening practices. The authors show that failing a stress test can have potential positive spillovers for corporate borrowers by reducing the moral hazard problem in M&A activities. Failing banks are less likely to engage in large M&A deals that are often value-destroying and instead focus on a smaller number of higher quality deals. In line with the idea that failing banks improve their screening procedures, this effect is stronger for borrowers with weak corporate governance.

Combined, these papers provide evidence of the real effects of banks' stress test results and the impact failing a stress test could have on banks' risk management and future lending.

4   Impact of COVID-19

While many papers made references to the ongoing impact of the COVID-19 pandemic on the economy and the potential impact on banks and their stress tests, only two papers on the program tested these implications directly (Acharya, Engle, and Steffen 2020; Kapan and Minoiu 2020).

Acharya, Engle, and Steffen (2020) study why financial sector stock prices did not recover with the rest of the stock market following the stock market crash in March 2020. They provide two main explanations: (1) the degree of liquidity on banks' balance sheets and (2) banks' exposure to the energy sector. The authors show that the equity market prices banks' liquidity only during an aggregate economic downturn, such as the experience in March 2020 or during the Great Recession. The energy sector has also been exposed to

increased volatility and under-performance especially during the pandemic. Taking these two factors into account may be critical when performing stress tests.

Kapan and Minoiu (2020) shed more light on the pressures that firms experienced at the pandemic's onset: credit lines were drawn down, directly affecting banks' risk-weighted assets and capital. The authors find that the liquidity pressure for banks was greater than after Lehman Brother's failure in September 2008 by a factor of four. However, banks were able to meet these demands, providing liquidity insurance for firms. Due to the uncertain economic environment, banks also potentially faced the deteriorating quality of their borrowers and credit portfolios. The authors find that banks respond to credit line drawdowns by becoming more risk-averse, curtailing lending and tightening credit standards. The paper's main insight is that regulators need to pay more attention to banks' large credit line exposures as a potential liquidity shock in times of stress. Overall, these two papers provide further insights into the exposures and shocks that might be relevant to regulators when designing stress test models and reviewing individual banks' stress test results, echoing other papers' findings and the keynote speech.

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