



Contents lists available at ScienceDirect

J. Finan. Intermediation

journal homepage: www.elsevier.com/locate/jfi

Evaluating the information in the federal reserve stress tests[☆]

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ARTICLE INFO

Article history:

Received 18 April 2016

Revised 30 July 2016

Accepted 6 August 2016

Available online xxx

Keywords:

Stress testing

Banking

Financial crises

Disclosure

Information asymmetry

ABSTRACT

We present evidence that the Federal Reserve stress tests produce information about both the stress-tested bank holding companies and the overall state of the banking industry. Our evidence goes beyond a standard event study, which cannot differentiate between small abnormal returns and large, but opposite-signed, abnormal stock returns. We find that stress test disclosures are associated with significantly higher *absolute* abnormal returns, as well as higher abnormal trading volume. More levered and riskier holding companies seem to be more affected by the stress test information. We find no evidence that stress test disclosures have reduced the production of private information. After disclosure begins, stress tested firms attract equity analysts without changing analysts' forecast dispersions or their mean forecast error.

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1. Introduction

When the first supervisory stress tests were administered to large U.S. bank holding companies (BHCs) in the first half of 2009, the Federal Reserve took the unprecedented step of announcing publicly its assessment of the BHCs' capital positions under stress. The Supervisory Capital Assessment Program (SCAP) of 2009 evolved into a series of annual supervisory stress tests beginning in 2011. The process now includes two related reviews of BHC capital: the Dodd-Frank Act stress tests (DFAST) and the Comprehensive Capital Analysis and Review (CCAR). As these processes have evolved, the Federal Reserve has provided increasingly detailed public disclosures about the tests' results and implications. This paper evaluates two questions about the publication of this official sector analysis. First, how do the announced DFAST and CCAR results affect private investors' assessments of the tested BHCs' values? And second, does this disclosure affect the production of private information about stress tested firms?

Other authors have studied market reactions to U.S. or European stress test announcements (Morgan et al., 2014; Petrella and Resti, 2013; Candelon and Sy, 2015; Bird et al., 2015; Fernandes, Igan and Pinheiro, 2015) and found mixed evidence of whether banking firms experience significant abnormal average stock returns when supervisory stress test results are disclosed.³ These studies report statistically significant average abnormal returns on some disclosure event dates but not on others. Some studies report both positive and negative average abnormal returns across different event dates.

To at least some extent, we believe that these variable findings reflect assumptions embedded in standard event study methodology. For example, this approach assumes that all treated firms react in the same direction, so a zero mean abnormal return implies no effect on treated firms. But a mean return for a set of stress-tested banks could be zero for two quite different reasons. Either the abnormal return is very small for all firms, or the returns are large in absolute value, but positive for some BHCs and negative for others. Disparate revaluations are particularly likely when an event's timing is known to investors. Standard event study methodology assumes that the events are unanticipated, making market expectations zero by definition. By contrast, because stress test announcement dates are known well in advance, their information content must be evaluated in relation to the market's prior beliefs about each firm's condition. Large negative

^{*} We thank Angela Deng, Eric McKay and Samantha Zeller for outstanding research assistance, and Deniz Igan for her discussion of an earlier version of this paper at the June 2015 Federal Reserve Stress Test Research Conference.

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² Opinions expressed in this paper are those of the authors, and do not reflect the views of the Federal Reserve Bank of New York or the Federal Reserve System.

³ Other studies have described alternative methods for calculating bank capital adequacy needs under stress. For example, Acharya and Steffen (2014) assess capital shortfalls at European banks using range of book-value and market-based models and Hirtle et al. (2016) presents results from a simplified "top down" stress test model for large U.S. banks.

<http://dx.doi.org/10.1016/j.jfi.2016.08.001>

1042-9573/Published by Elsevier Inc.

or positive announcement effects are both consistent with the stress test results conveying new information to the market. In sum, a standard event study does not necessarily tell us what we need to know about new information produced in the stress tests.

To address this conceptual shortcoming, we examine several additional measures that should better capture whether the market responds to stress testing disclosure. First, we examine the average *absolute* cumulative abnormal return ($|CAR|$) associated with stress test result announcements. This measure should be large if investors react to the announcement, regardless of the distribution of positive and negative effects. Second, the existing literature concludes that trading volume also spikes upwards if new disclosure affects investors' prior beliefs (Bamber et al., 2011; Karpoff, 1986). We estimate a measure of abnormal trading volume ("CAV") that captures deviations in BHC trading volume from what would be expected given market-wide trading volume. We interpret these price and volume changes as empirical measures of information production. Third, we explore the absolute change in credit default swap spreads, which price a firm's probability of default and loss given default. Again, the absolute value of this measure should be larger on event dates, regardless of whether the news is good or bad. Finally, we look at changes in option implied volatility across the disclosure dates, motivated by the evidence that a firm's earnings announcements resolve some uncertainty about its condition and hence lowers its stock's price volatility (Ederington and Lee, 1996).⁴

The history of U.S. stress testing provides nine dates through 2015 on which the Federal Reserve disclosed its stress-related assessments of large BHCs. For each date, we also examine a comparison group of large BHCs not subject to supervisory stress testing to determine whether stress test results contain significant information about the banking industry in general, and not just about the stress tested firms. Stress testing might provide information about non-stress tested BHCs if these firms have businesses, activities or exposures in common with stress tested BHCs.

Our results suggest that disclosure of supervisory stress test results generates significant, new information about stress tested BHCs. As in other studies, we find statistically significant average cumulative abnormal returns (CARs) around many, though not all, of the stress test disclosure dates. These CARs are sometimes positive and sometimes negative, suggesting that simply averaging positive and negative abnormal returns could obscure the impact of stress test disclosures. In fact, average absolute value CARs ($|CAR|$) are significantly larger than pre-disclosure event values around most disclosure dates for stress tested BHCs. Our results contrast with research suggesting that the information value of the U.S. stress disclosures has declined over time (Glasserman and Tangirala, 2015).

We also find evidence that stress test results convey information about non-stress-tested BHCs, although the tested sample's $|CAR|$ almost always exceeds that of the non-stress tested sample. Non-stress tested firms that are more similar to stress tested firms, as measured by stock price covariance with an index of stress tested firms, experience larger abnormal stock price movements on stress testing announcement dates.

We find similar results using other measures of new market information. Average abnormal trading volumes are significantly higher (by more than 1%) on the typical stress test disclosure date. Again, the mean abnormal trading volumes (CAV) are larger and more significant for stress tested BHCs than for other banking companies. Option implied volatility falls significantly around some

event dates, though it rises significantly on others.⁵ Finally, CDS prices of stress tested firms move relative to the index by more than 4% on stress testing dates, although the differences are statistically significant only in 2009. It appears that stress testing announcements are producing information that is meaningful across all types of markets. Stress test disclosures also provide significant information about non-stress tested banks.

We next investigate whether the market reaction to supervisory stress test results affects some types of BHCs – e.g. riskier institutions – more prominently. For each event date, we regress $|CAR|$ or abnormal trading volume on variables measuring the BHCs' leverage and risk to see if these characteristics are associated with greater information on stress test disclosure dates. Our results suggest that the stress tests produce more information about riskier or more highly leveraged BHCs. This result holds even in the sample of firms not subject to stress testing, suggesting information is being produced about industry performance, not just specific firms.

Disclosing supervisory stress test results might affect market values for at least two (non-exclusive) reasons. The disclosures might contain new information about the tested firms' financial conditions, or they might imply something about the Federal Reserve's likely treatment of the tested firms. We attempt to separate these two effects by examining non-stress tested BHC. The disclosures related to financial conditions should affect non-tested BHCs more if their stock returns are more highly correlated with an index of the stress-tested BHCs' returns. The implications of stress test disclosures for future regulatory treatment of non-tested firms should vary with their size, since asset size heretofore has been the sole determinant of which BHC are subject to DFAST and CCAR testing. We find that stock return correlation is positively related to the magnitude of non-stress tested BHCs' $|CAR|$, but a dummy variable for the larger non-tested banks is insignificant. It thus seems that the information contained in stress test disclosures is at least partly related to the banking industry's condition.

The final part of the paper investigates Goldstein and Sapra's (2014) suggestion that the public disclosure of stress testing results may drive out private information producers (such as stock analysts), or may have other negative welfare effects. We begin by examining if the release of stress testing information by the Federal Reserve discourages private information gathering. We find no evidence of reduced equity analyst coverage or deterioration in the accuracy of analysts' earnings forecasts. Next, we look for evidence that supervisory stress test disclosures have affected bank managers' choices about asset or loan growth or about the composition of the loan portfolio. Such shifts could negatively affect social welfare if they distort credit allocation decisions by, for instance, causing banks to disproportionately increase their loans to sectors with relatively low Federal Reserve-estimated loss rates. In fact, we find no evidence that stress tested firms significantly change their loan portfolio composition in response to stress testing results. We also examine the hypothesis that supervisory stress test disclosure negatively impacts private risk sharing. We find no indication that stress-tested firms reduce their interbank borrowing and lending, which is consistent with no change in ex ante risk-sharing through interbank markets. In sum, we see little evidence of negative social welfare consequences of supervisory stress test disclosure.

We acknowledge two key limitations of our analysis. First, these disclosures mostly occurred in the context of a relatively benign environment for banking firms. With the exception of 2009, only a relatively small number of firms have "failed" the CCAR stress tests. Therefore, we cannot rule out the possibility of different

⁴ A uniform price increase across treated firms might occur if the announcements reduce the amount of (systematic) uncertainty associated with the firms' valuations.

⁵ Ellahie (2013) examines option implied volatilities, as well as bond and equity bid-asked spreads, around the release of the 2011 European stress test results and finds the disclosures reduced information asymmetries among investors and allowed sorting of strong and weak banks, but increased uncertainty more broadly.

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