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Discussion

Robert Hall began the discussion by addressing data collection issues. He thought that it was wrong to limit the discussion of gathering data to only the data that will later be made public. He categorized data into four levels. First, there is all data: every position of every financial institution. Only a limited number of people have access to all the data and there is a huge security issue associated with storing this data. Second, there is data for regulators and the Office of Financial Research economists. This is similar to the data that people working in the Bureau of Labor Statistics or the Census utilize. Third, there is data that can be used by outside researchers under confidentiality agreements. Finally, there is public data that has to be aggregated carefully. He added that it is also useful to age the data and make it public. He doubted that an investment bank, for example, cares a lot about disclosing its data with a three-year lag. Markus Brunnermeier agreed that the data dissemination problem is quite important and has to be addressed. He also remarked that it is very important for economists to use the data to differentiate among different macro models with financial sectors. Once economists have better macro models with a financial sector, it will help to gather better data.

Hall made a comment on the great variety of risk factors. He asserted that historically there was only one risk factor: real estate. He claimed there is only one asset class upon which the whole leverage apparatus of the US financial system is built. He mentioned that there has never been a crisis in the financial system based on any other source of asset price decline except for real estate, concluding that the focus should be entirely on real estate. Daron Acemoglu responded by saying that there was no Swiss real estate bubble, but Swiss banks were in trouble. So,

real estate of different countries presents an example of more than just one risk factor. Brunnermeier agreed that real estate is a critical source of risk. However, he believed that there are other sources of risk that should be considered.

Acemoglu commented on the systematic aspect of risk raised by both Darrell Duffie and Hyun Song Shin. He posited that there are two sources of systematic risk. First, there can be extreme events when all or the majority of firms experience a shock. Second, there are situations when some firms are hit by a shock and it spreads and creates cascade effects. There are two issues associated with studying the latter source of systematic risk. First, one needs to understand the network structure. Second, it is important to describe the behavior of agents. Acemoglu remarked that, to the first-order approximation, almost all of the local interactions structures that are observed in the data will be stable. He thought that the reason for nonlinear behavior of the system is that during certain times, agents will take precipitous actions leading the system to a state where some firms start failing. He asserted that to capture the nonlinearities one cannot just use data but must also model behavior. Specifically, one has to understand what shocks and risk factors make agents withdraw liquidity that initiates an avalanche of failures. Brunnermeier agreed with Acemoglu that the systematic risk is about the feedbacks and behavior. He thought that it was important to distinguish between domino effects and general equilibrium price movements. He pointed out that they were trying to capture the latter effect in this paper. He repeated that the deltas that they defined in the paper are the measure of the choice of a risk exposure by a firm. He noted that it is important to compute these deltas not only with respect to a firm's value but also with respect to the liquidity mismatch index that describes the firm's sensitivity to changes in market and funding liquidity. He stressed that one can use leverage instead of the liquidity mismatch index; however, as the paper shows through a series of examples, leverage is an outdated concept. After one understands firms' behavior, one can feed this into a general equilibrium model to see the equilibrium outcome. Brunnermeier highlighted that there are two types of information related to the effects just described. First, the information about the build up of a crisis—information about liquidity mismatch. Second, the information about network structure. He noted that the latter type of information can help understand which agents will be impaired once the crisis hits, while the former type of information, which the authors

are focusing on, could potentially help to detect the build up of a crisis. He acknowledged that both types of information are equally important.

Eichenbaum said that if one wants to take Acemoglu's proposal seriously, then the number of details that one has to understand to create an effective regulation is daunting. He noted that if one considers real estate as the main source of risk then one has to increase mortgage requirements. An alternative approach would be to acknowledge that the financial system is too complex and try to make it simpler. He gave the example of Canada, which has a less complicated financial system and has suffered smaller losses than the United States in the current crisis. He concluded by noting that the more sophisticated data has to be, the harder it is to collect.

Jeremy Stein agreed with Acemoglu's discussion points and provided an example: all of the quantitative equity funds experienced 30 to 40 standard deviations events over a couple of days in August 2007. He claimed that these funds are the best case for measurement. It was possible to find out what equities they held and one could elicit from them any stress test scenario. However, he pointed out that one would never have gotten from them that under a 30 to 40 standard deviations event, they would liquidate everything. He stressed that it is important to determine tipping points when investors start pulling out in such a way that the funds liquidate everything, exposing other firms. He added that understanding agents' behavior may be desirable from an academic point of view but would not necessarily prevent a future financial crisis.

Brunnermeier thought that the liquidation of assets by the equity funds was a good example of a micro-crisis that can be analyzed. He noted that it was not itself a systematic event, though it triggered a systemic event. He thought that mechanisms exist that could be gleaned from smaller crises and extrapolated for a bigger crisis.

Xavier Gabaix reiterated that the authors want to not just elicit how much a firm would lose in terms of money in a particular event but also how much a firm would sell. He insisted that it is important to elicit information about that behavior under very low probability events and not only what is considered extreme now.

Laibson stated that if this project had been in place in 2005, the same financial crisis would have occurred. He noted that Alan Greenspan in 2005 argued repeatedly that there could not be a national decline in housing prices. His extreme event might have been a 5% to 10% decline in the national housing index. Banks were considering a 5% to

10% decline in the national prices as extreme scenarios as well. Laibson warned that it is not enough to ask banks about extreme scenarios of 2, 3, or 4 standard deviations, but it is important to go deeper into the tails. He concluded that the knowledge of the behavior under the belief about the extreme events that agents held in 2005 would not help avoid the current crisis. However, the current knowledge about tail risks can help avoid the next crises.

Gorton closed by emphasizing the opportunity to shape the work of the Office of Financial Research.